3歳11カ月　女子

を改善.
則方永久歯の萌出余地を側方拡
より獲得.
こ移る.

後　　2½　　3年後

第2から第3段階

No. 2号

D. P. 3

CEPHALOMETRIC ANALYSIS

ILOGRAM

CEPHALOMETRIC ANALYSIS

ILOGRAM

規格写真より求めた

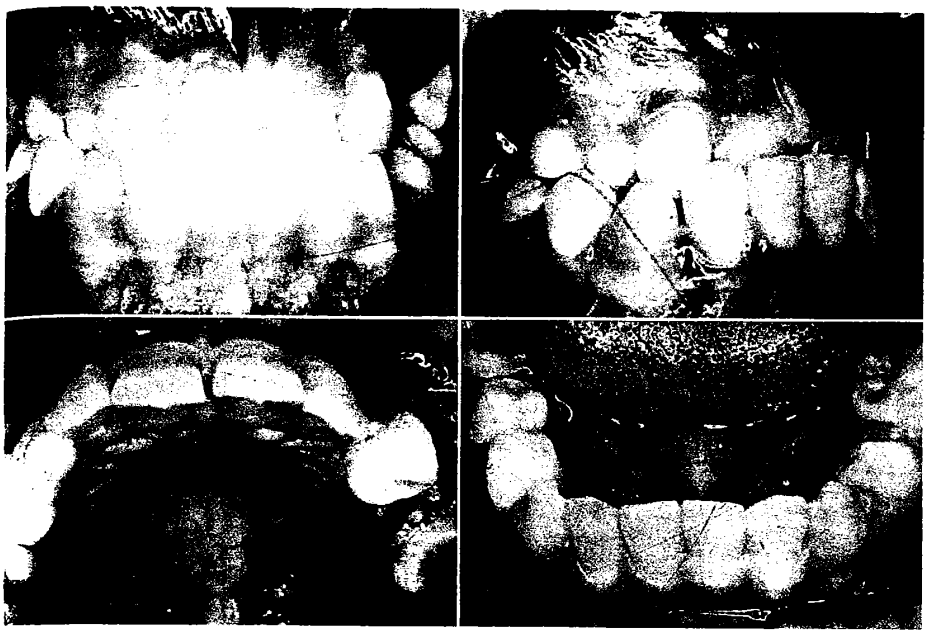


図14　治療開始時の口腔内写真（症例2）.

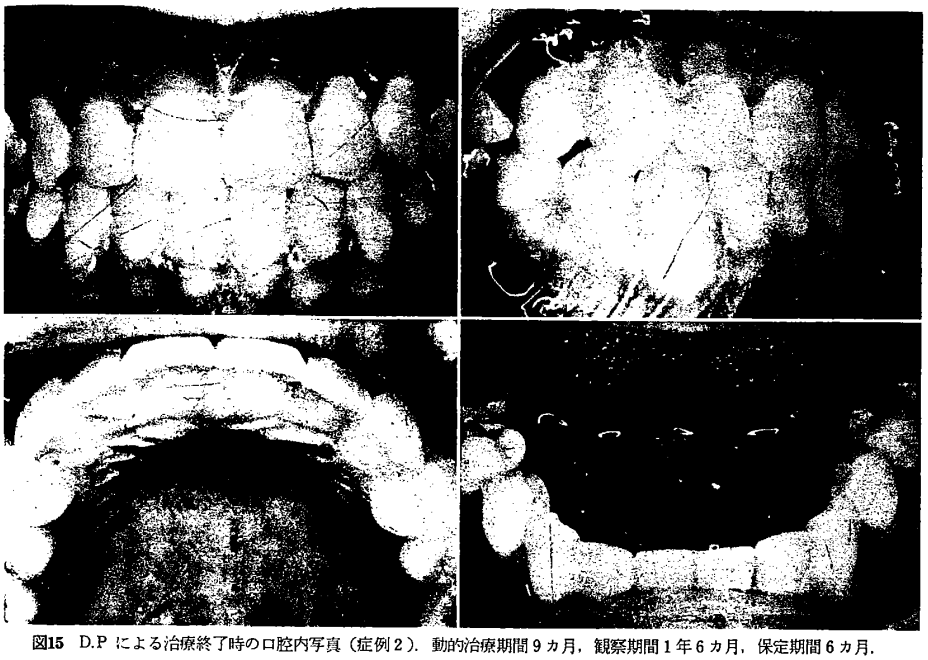


図15　D.P による治療終了時の口腔内写真（症例2）. 動的治療期間9カ月，観察期間1年6カ月，保定期間6カ月.

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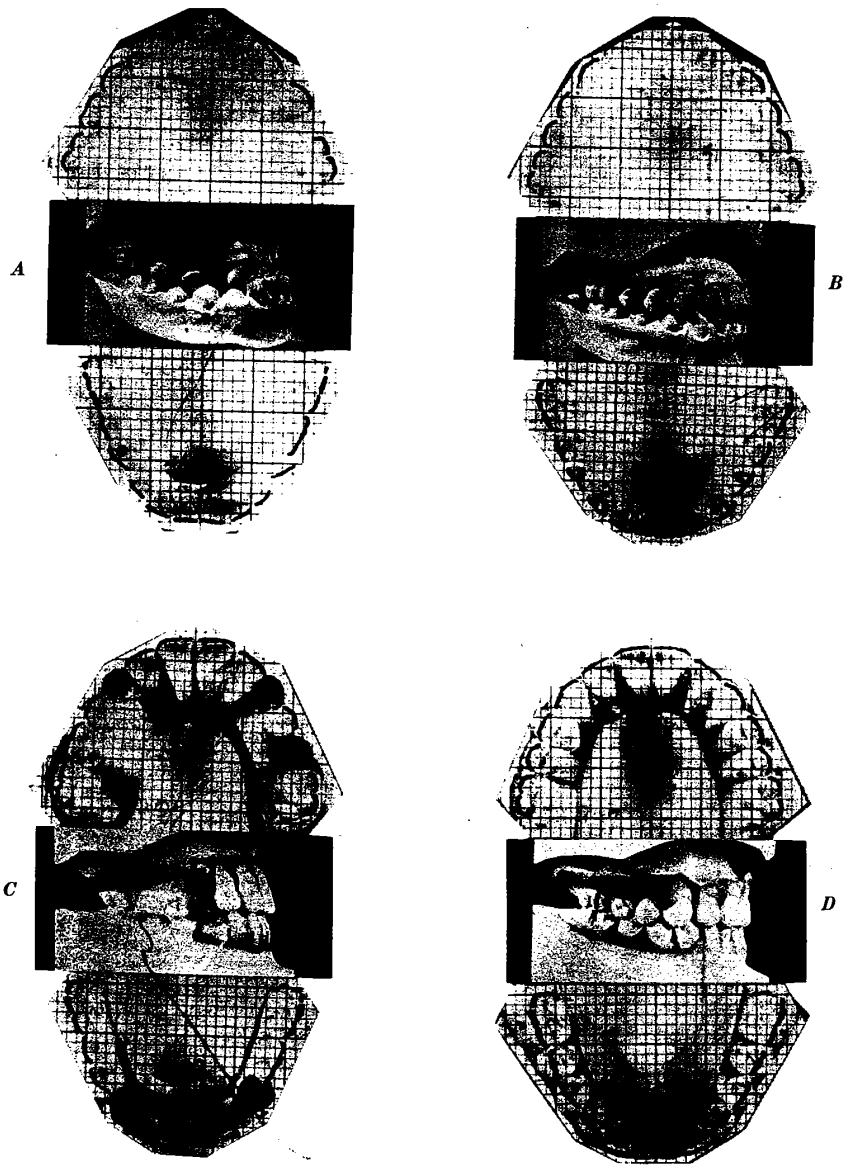


図16 症例2の石膏模型と set-up model の咬合面規格写真（1目盛りが 2 mm）.
A：術前　B：術後　C：No. 1 号の set-up model
D：No. 2 号の set-up model

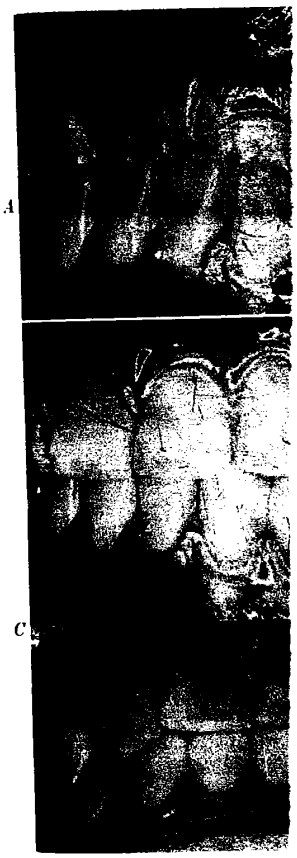
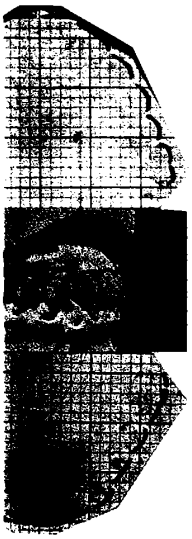


図17 症例2の治療経過.



図18 側貌頭部X線規
トリミングした上

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りが 2 mm).

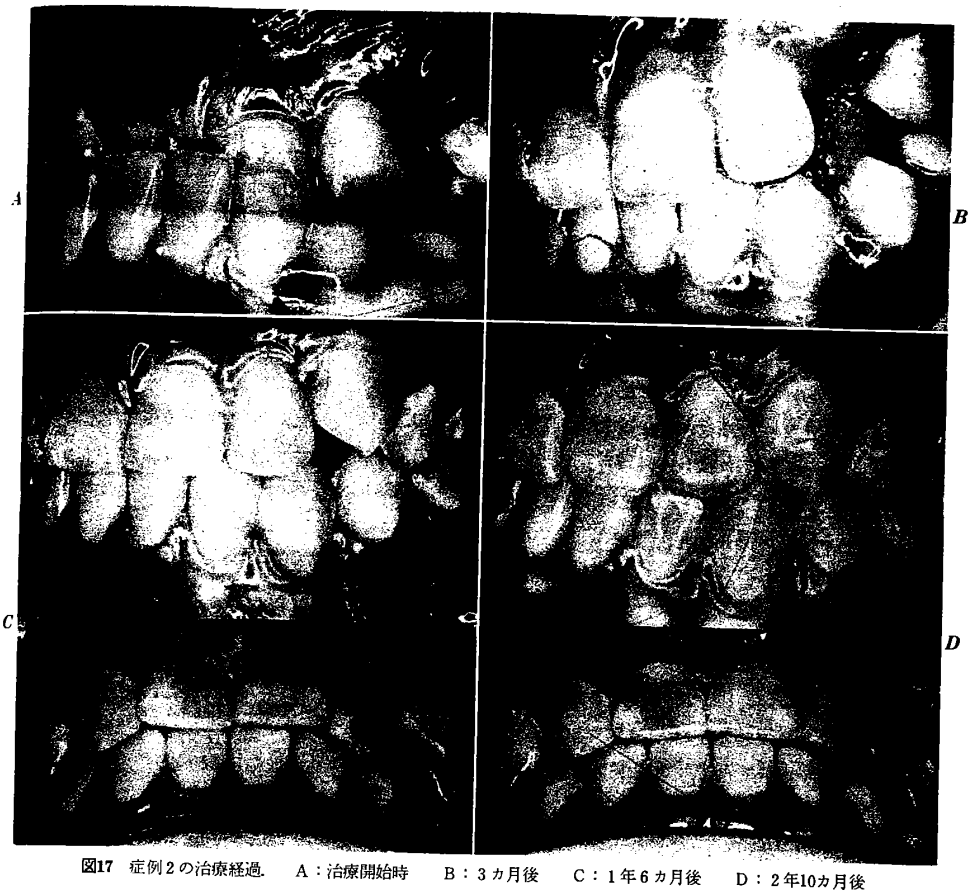


図17 症例2の治療経過. A：治療開始時 B：3カ月後 C：1年6カ月後 D：2年10カ月後

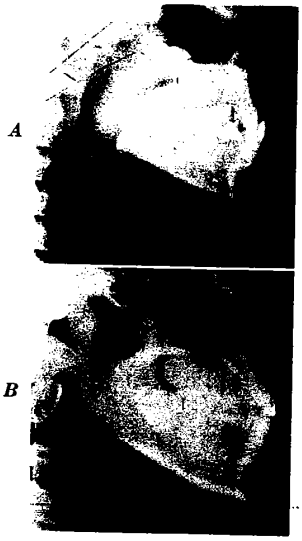
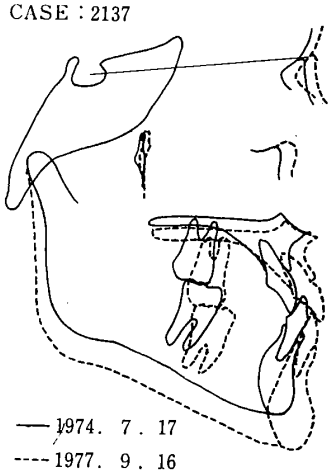


図18 側貌頭部X線規格写真よりトリミングした上下顎関係.
A：術前 B：術後

CASE：2137



—— 1974．7．17
---- 1977．9．16

図19 側貌頭部X線規格写真の重ね合わせ(S-N基準). 実線は術前，点線は術後を示す.

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【症例1】 $\overline{1}$に外傷性咬合をともなう歯性反対咬合（図6～図12）

患者：8歳5カ月　男子

1） 現症

顔貌所見：側貌では特に著しい異常は認められないが，下唇にわずかのほんてんがみられる（図6-A）.

咬合所見：本症例は歯牙年齢ⅢBの症例で前歯部3歯が反対咬合を呈し，左側の上顎中切歯は下顎の中切歯と側切歯の間にくさび状に咬合している（図7）．また，左側の下顎中切歯は外傷性咬合により歯肉の退縮をともなっている．正中線は，上顎に対して下顎がわずかに左側に偏位している.

臼歯の咬合関係はAngle Ⅲ級である．上下顎側方歯群の萌出余地は，図6-Aのパノラマ X線をみても十分にあると思われる．本症例は下顎を後退させると，構成咬合位が採得できる点からも機能的要素が含まれているものと考えられる.

頭部X線規格写真分析所見：本所見では上顎骨はほぼ正常であるが，下顎が前方に偏位し，しかも下顎下縁平面角が小さいことから下顎が前上方に回転していることがわかる（図6-Aのプロフィログラム参照）.

2） 診断および治療方針

下顎の機能的な前方位による歯性反対咬合でAngle Ⅲ級と診断した．治療方針は，D.P法による非抜歯症例として治療を進めることにした.

3） D.Pの治療目的

D.Pの治療目的を3段階に分けて行うことにした.

第1段階：前歯部の早期接触による障害を除去すると同時に前歯部の反対咬合と乱排歯を改善する.

第2段階：側方歯群の萌出誘導を行う.

第3段階：保定に移る.

なお，set-up modelの排列法はこの治療目標に準じ，3段階に分けて製作することにした.

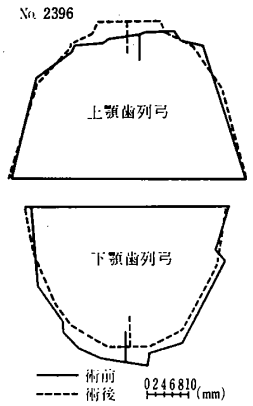


図20 症例1の咬合面規格写真の重ね合わせ（第1大臼歯遠心面を基準面とした）.

表1 側貌頭部X線規格写真の分析値（症例1）

	術前	術後
SNA	79.83	79.98
SNB	80.08	78.53
ANB	−0.25	1.45
MP-SN	31.29	32.75
Go.A	113.19	114.66
$\underline{1}$ to SN	97.38	105.22
$\overline{1}$ to MP	93.66	86.59

4） 治療経過

治療経過は図10で示した通り，第1段階でD.Pを2個使用（オーソコン-LとM）し，約5カ月で初期の目的を達成した．Set-up modelは，図9-Cで示してある通り上顎前歯は約2.5mm唇側方向に拡大すると同時に下顎前歯は舌側方向に約1.5mm移動させ製作した．その後，側方永久歯の萌出誘導を行う目的で，第2段階に使用するset-up modelを製作し，動的治療期間に9カ月，側方歯群萌出誘導に11カ月，保定期間に1年を要し治療を終了した．またset-up modelは3段階に分けて製作し，D.Pは計5個を使用して矯正治療を終了した症例である.

5） 治療成績と評価

図7と図8は，実際の口腔内の術前と術後を示

し，図9は患者の術前，術後の
で製作された set-up model の
また図12は側貌頭部X線規格写
重ね合わせで，その変化を示し
の移動効果を調べる目的で，術
規格写真の重ね合わせ（左右第
を基準面とした）を行った（図
は頭部X線規格写真の角度的分
値を示した.

これらの治療結果から最も
られた点について列記してみ

1） 上下顎前歯部の移動が
て現われている.

2） Set-up model の効果が
現われ，再排列した通り

3） $\overline{1}$の外傷性咬合が改善
的が満足できる結果とし

4） 顎顔面頭蓋の成長発育
ることができた.

以上の点から，歯性を示す
にとって，D.P法はその機能
により高い治療効果を発揮
ことが認められた．また，
た後，引き続いて側方永久
ながら個性正常咬合が得
来の矯正治療法には認めら
で高く評価できることを知

**【症例2】 機能的因子に
た反対咬合**（

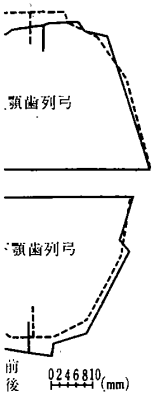
患者：8歳11カ月　女子

1） 現症

顔貌所見：側貌では，著
（図13-A）.

咬合所見：本症例は歯牙
が全て反対咬合を呈し
前突の状態を示している
bite（5mm）が深く over
中線は上顎に対して下顎
ている．臼歯部の咬合

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合面規格写真の重ね合わせ
心面を基準面とした).

規格写真の分析値（症例1）

	術 前	術 後
	79.83	79.98
	80.08	78.53
	−0.25	1.45
	31.29	32.75
	113.19	114.66
	97.38	105.22
	93.66	86.59

した通り，第1段階で D.P
ン-LとM）し，約5カ月
した．Set-up model は，図
り上顎前歯は約2.5mm 唇側
に下顎前歯は舌側方向に約
した．その後，側方永久歯
的で，第2段階に使用する
し，動的治療期間に9カ月，
1カ月，保定期間に1年を要
た set-up model は3段階
は計5個を使用して矯正治
る．

の口腔内の術前と術後を示

し，図9は患者の術前，術後の咬合面観と各段階で製作された set-up model の同側面観であり，また図12は側貌頭部X線規格写真の術前と術後の重ね合わせで，その変化を示したものである．歯の移動効果を調べる目的で，術前と術後の咬合面規格写真の重ね合わせ（左右第1大臼歯の遠心面を基準面とした）を行った（図20）．また，表1は頭部X線規格写真の角度的分析結果の代表的な値を示した．

これらの治療結果から最も明確にその変化が現われた点について列記してみると

1) 上下顎前歯部の移動が最も大きな変化として現われている．
2) Set-up model の効果が正確に治療結果に現われ，再排列した通りの咬合関係を得た．
3) $\underline{1}$の外傷性咬合が改善され，矯正治療の目的が満足できる結果として得られた．
4) 顎顔面頭蓋の成長発育を正常な軌道にのせることができた．

以上の点から，歯性を示す反対咬合の矯正治療にとって，D.P 法はその機能をフルに活用することにより高い治療効果を発揮できる治療法であることが認められた．また，初期の不正咬合を改善した後，引き続いて側方永久歯群の萌出誘導を行いながら個性正常咬合が得られる治療効果は，従来の矯正治療法には認められない新しい方法として高く評価できることを知った．

【症例2】 機能的因子により下顎が前方偏位した反対咬合（図13～図19）

患者：8歳11カ月　女子

1) 現症

顔貌所見：側貌では，著しい異常は認められない（図13-A）．

咬合所見：本症例は歯牙年齢IIIBの症例で前歯部がすべて反対咬合を呈し，いわゆる典型的な下顎前突の状態を示している（図14）．特に，over bite（5mm）が深く over closure の観を呈し，正中線は上顎に対して下顎が約2mm 右側に偏位している．臼歯部の咬合関係は Angle III級である（図18-A）．

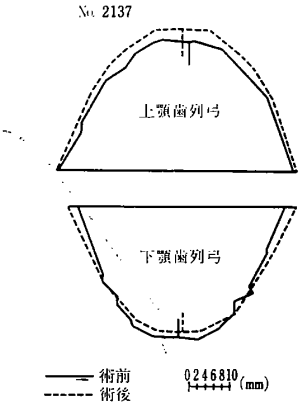


図21 症例2の咬合面規格写真の重ね合わせ．

表2 側貌頭部X線規格写真の分析値（症例2）

	術 前	術 後
SNA	81.17	82.27
SNB	83.71	82.08
ANB	−2.53	0.19
MP-SN	28.42	29.49
Go.A	123.41	123.33
$\underline{1}$ to SN	104.79	111.99
$\underline{1}$ to MP	84.45	77.16

上下顎側方歯群の萌出余地は，図13-Aのパノラマ X線が示しているように，上顎歯列に不足（特に$\underline{3}$の萌出余地は½程度）を認める．

また，本症例は下顎を人為的に後方に移動させると上下顎中切歯切端部で接触する，いわゆる構成咬合位が採得できる．このことから機能的因子が含まれているものと考えられた．

頭部X線規格写真所見：本所見では，特に下顎骨が前方位に位置し，また下顎下縁平面角が小さく下顎が前上方に回転していることが認められる（図13-Aのプロフィログラム参照）．

2) 診断および治療方針

機能的因子によって発生した典型的な機能性反対咬合で，Angle III級と診断した．治療方針は

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D.P 法による非抜歯症例として治療を行うことにした.

3) D.P の治療目的

症例1と同様に治療目的を3段階に分けて治療計画を作った.

第1段階：前歯部の咬頭干渉を排除し，まず被蓋改善を行う.

第2段階：上顎側方歯群の萌出余地をつくるために側方拡大を行う．これにより⌊3を歯列内に誘導する.

第3段階：保定に移る.

Set-up model の製作法もこの治療目的に沿って進めることにした.

4) 治療経過

治療経過は図17で示した通り，第1段階で D.P を2個使用し，約3カ月で初期の目的である被蓋改善を行った．その後安定した咬合状態を示したので，何の矯正装置も使わずに自然の推移に任せて観察を行った．1年6カ月の観察期間中に側方永久歯がすべて萌出し，上顎左側犬歯が予測していたように少し歯列弓から頬側寄りに萌出してきた．そこで，⌊3を歯列内に誘導する目的で第2段階に移り，側方永久歯の側方拡大と⌊3の歯列内への誘導を行った．D.P のゴム硬度はオーソコン-H を使用し，6カ月後に⌊3を歯列内に誘導した．第1段階と第2段階の動的治療期間は通算9カ月を要し，また観察期間に1年6カ月，保定期間に6カ月を要し治療を完了した.

5) 治療成績と評価

図14と図15をみても治療結果は大変優れていることが分かる．このように機能的因子により反対咬合を発現した症例では，まず被蓋の改善を行うことが治療効果を決定づけるものである．被蓋の改善を行った後に何の処置も加えなくても，このような症例では咬合関係は正常に維持される．種種な治療結果から，次のことが明らかとなった.

(1) 機能的因子をともなう反対咬合には短期間の被蓋改善が必要であり，この意味からも D.P の効果は優れているといえる.

(2) 側方拡大にも有効に作用する.

図21は咬合面規格写真の重ね合わせ，表2は頭部X線規格写真の角度的分析結果（術前と術後）である.

おわりに

今回は，矯正臨床の場で使用する際の要点として，D.P法の矯正治療上の位置づけと意義，治療開始時期，適応症，治療の進め方と目的などについてその概要を簡単に紹介した．また，D.P 法による治験例として，いわゆる軽度な反対咬合の2症例（歯性ならびに機能的因子によって発現したと思われる混合歯列期の非抜歯症例）を示し，その治療経過や治療効果について報告した.

これらのことから，D.P法は従来の矯正治療法の域を脱したまったく新しい概念とテクニックから成り，歯科矯正分野に一つの可能性を見出したものといえるだろう．特に，矯正臨床面で特徴づけられる点は，成長発育の最も旺盛な時期（乳歯と永久歯の交代期）にその効果を最も発揮できる点にあるということである．このことは，矯正治療本来の姿である生物学的な基盤にたった歯の移動が D.P 法を用いることにより可能になった点を示唆するものと受けとめることができる.

さて，次回は顎性を示す反対咬合の治験例を示しながら，抜歯ならびに非抜歯症例の治療効果とその進め方などを報告する予定である.

（つづく 文献は最終回に一括掲載）

* * *

再び帰って来る人に

有床技工、鋳

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Nippon Dental Review
Vol. 458, P. 112-129 (December 1980)

RESEARCH ON A NEW ORTHODONTIC APPLIANCE: THE DYNAMIC POSITIONER (D.P.)

III. The General Concept of the D.P. Method and Its Therapeutic Effect. Part 2. Skeletal Reversed Occlusion Case Reports

By Osamu Yoshii, Head of the Kanto Teishin Hospital's Dental Department

Introduction

Last time (No. 457, November 1980), in the course of introducing orthodontic clinical aspects of the so-called dynamic positioner, I introduced the name the I applied to the new orthodontic treatment method, namely the D.P. method (Dynamic Positioner System) and briefly described the general concept. I also introduced cases of dental and functional reversed occlusion as clinical examples utilizing this method, and reported on their treatment progress and clinical effects.

Incidentally, the D.P.'s special features can be fully utilized clinically when employing the D.P. method in cases such as those described above, so it goes without saying that its therapeutic effects and advantages in use and treatment aspects are more highly regarded than conventional treatment methods, which use primarily metal wire.

However, in reversed occlusion cases which involve a so-called skeletal pattern, discrepancies in the maxillary and mandibular growth and development patterns, which are thought to be directly influenced by individual latent factors (genetic factors too), are the factors which mainly determine the degree of difficulty or ease of orthodontic treatment, and both the treatment period and the treatment result are strongly influenced by these. Therefore, when applying the D.P. method to a reversed occlusion accompanying a skeletal pattern, it is absolutely necessary to start only after thoroughly conducting an orthodontic study.

Therefore I now want to briefly describe important points about the D.P. method with regard to skeletal reversed occlusions, and introduce case reports in which treatment began in the mixed dentition stage, and to continue to provide clinical reports on their therapeutic effects.

I. Important Points about the D.P. Method with Regard to Skeletal Reversed Occlusions

1. When To Begin Treatment

In reversed occlusions accompanying a skeletal pattern, in general it is not enough to simply correct the reverse overbite relationship of the upper and lower anterior teeth by providing them with a proper positional relationship. One must correct the anteroposterior relationship of the maxilla and mandible, and often some sort of fatal element lies herein.

However, if treatment is begun in the period when the individual's growth and development is most vigorous, it is possible to control the growth and development of the maxilla and mandible to some extent through artificial force. An example of this method is the extraoral retainer, a commonly used orthodontic appliance. The orthopedic force

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obtained from this appliance is well known from considerable clinical experience to work effectively for this objective.

Therefore, to describe when to begin treatment for skeletal reversed occlusions, treatment should be started as early as possible in order to fully utilize the effect of orthopedic force, and the necessity of this is an important parameter in determining the success or failure of treatment.

2. Combination of D.P. and Chin Cap

The chin cap, which is a type of extraoral retainer, is used in cases in which the mandible grows too far forward and down. It is used in order to restrain this overgrowth.

Incidentally, the D.P. and chin cap are often combined (the usage period varies according to the treatment regimen) in order to fully realize the therapeutic effect of orthopedic force when initiating treatment by the D.P. method. That is, this means integrating the D.P., whose objective is to move teeth into the alveolar bone, and the chin cap, whose objective is suppressing overgrowth of the mandible, so this can be considered the basic treatment concept for skeletal reversed occlusions.

3. Important Points in Realigning the Set-up Model

First, the nature and pattern of the reversed occlusion is studied in detail, and a set-up model is made for each stage based on the treatment system derived therefrom. In cases with a skeletal pattern, very little movement of the jaw position (movement due to functional factors) arising from premature contact and the like can be expected, so movement of teeth presenting malpositioning must be completely resolved within the alveolar bone. That is, once the D.P. is installed in the oral cavity a more active and strong corrective force needs to be applied to the teeth, so realignment of teeth on the set-up model must be carried out aggressively.

For example, in a reversed occlusion where the maxilla exhibits undergrowth, all of the maxillary dentition is moved in the labial direction (the first molar acquires a class I relationship), and if necessary the maxillary anterior area is greatly expanded in the same direction. Also, in some instances a set-up model is made with a step formed at the palatal mucosa in order to stimulate forward growth of the maxilla by applying some type of artificial rubber force (meaning in this case an orthopedic force) to the palatal mucosa in the maxillary anterior area. In the actual work operation this procedure is carried out at each stage and a number of set-up models are made (usually three or four by the end of treatment). First, in the first stage, in order to correct the overbite relationship, movement and realignment are large, until the ideal position relation is reached. Then, in the course of going from the second to the third stage, the teeth are moved past the ideal position. The point about doing realignment in this manner is an important point in regard to set-up models for cases with a skeletal pattern.

4. Introduction of the Serial Extraction Method

In the mixed dentition stage, in order to prevent malocclusion in advance, serial extraction is often carried out in this stage (usually the four first premolars after the first primary molar). In particular, this is employed when the crown's width diameter is large and there is an obvious mismatch between the total thereof and the size of the alveolar base (cases presenting so-called discrepancy).

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Incidentally, in cases of skeletal reversed occlusion one often encounters instances in which extraction is convenient because of a discrepancy. In this sort of case serial extraction is carried out in the course of proceeding with D.P. treatment. However, when the D.P. method is used in extraction cases, inclination of the tooth axis occurs, particularly in the lateral permanent teeth group, so when completing the permanent dentition it is necessary to finish with an all-band appliance (generally using the edgewise method). Therefore, when handling an extraction case, the basic treatment system is a combination of the D.P. method and the edgewise method.

In the foregoing I briefly described important points about the D.P. method in regard to reversed occlusions accompanying skeletal patterns. Now I wish to introduce case reports in which treatment began in the mixed dentition stage, and to report on their therapeutic effects.

II. Case Reports of Skeletal Pattern Reversed Occlusions Treated with the D.P. Method

The first case is a case involving mandible overgrowth, and the second case is a case presenting maxilla undergrowth. Both are reversed occlusions with skeletal pattern treated as nonextraction. A third case is skeletal reversed occlusion accompanying severe crowding (discrepancy case). It is a case in which treatment used a combination of serial extraction and the D.P. method and the edgewise method.

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Case No. 1: Skeletal Reversed Occlusion Accompanying Mandibular Overgrowth; Age 10 years 1 month; Male

Diagnosis: Skeletal Reversed Occlusion with Mandibular Overgrowth.
Angle Class III

Treatment system: Nonextraction using D.P. method. (Chin cap not used because D.P. treatment effect was decided upon.)

D.P. Treatment Objectives:
First stage: Labial expansion of maxillary anterior area and correction of reverse overbite relationship.
Second stage: Guide eruption of lateral permanent teeth.
Third stage: Shift to retention.

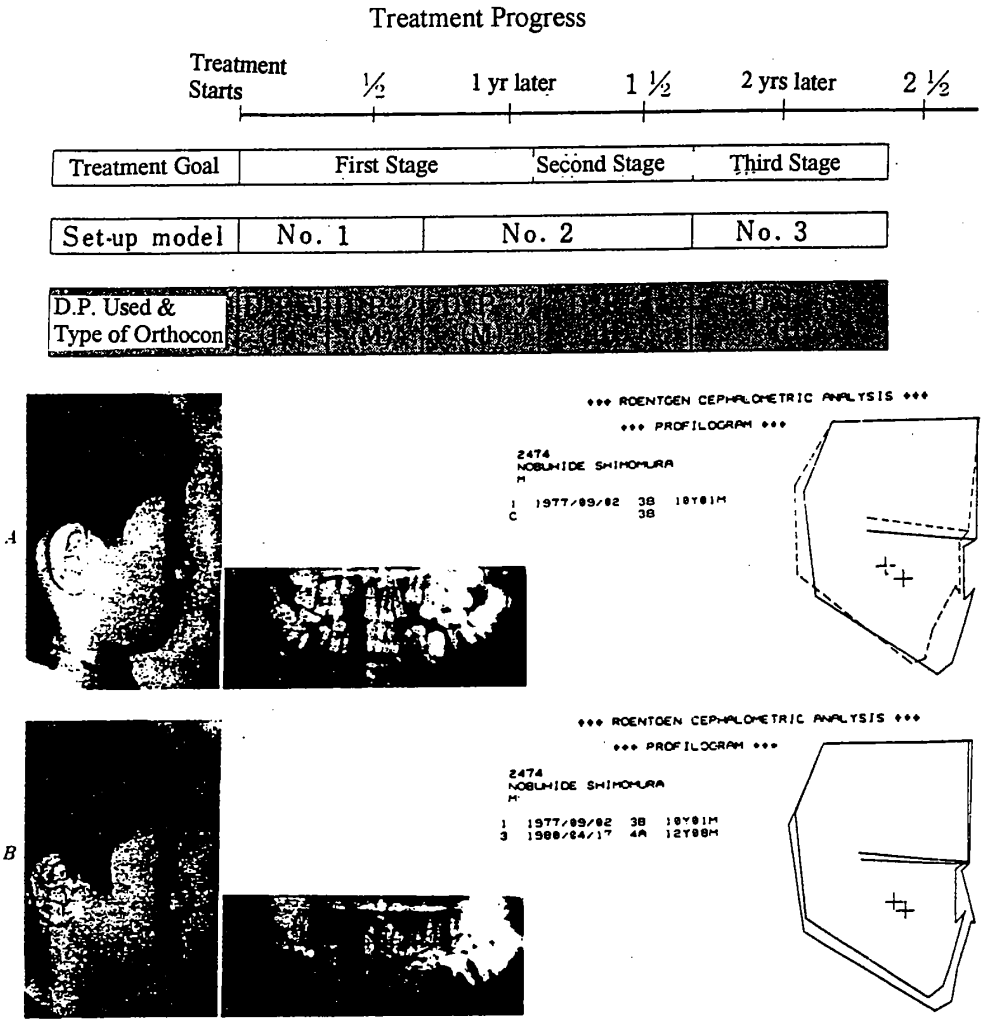


Figure 1. Case 1's profile view (left), panoramic X-ray view (center), and profilogram obtained from cephalometric radiograms (right) (S-N superimposed using NEAC 3200 computer image analysis system).
A: Before treatment B: After treatment

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Figure 2. Photograph of oral cavity before beginning treatment. (Case 1)

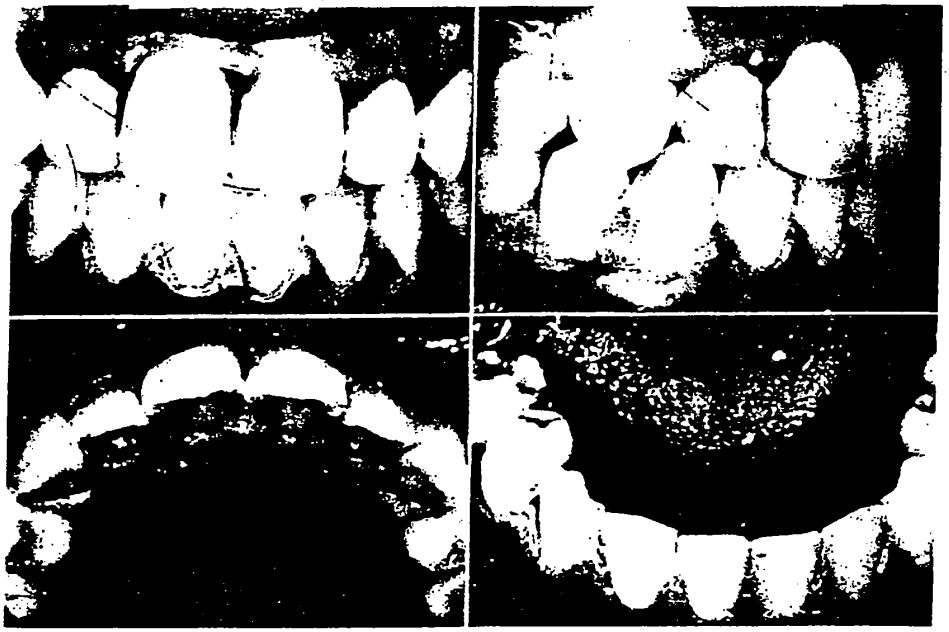


Figure 3. Photograph of oral cavity after treatment using D.P. ended (Case 1). Dynamic treatment for 1 year 1 month, lateral tooth eruption guidance for 7 months, retention for 9 months.

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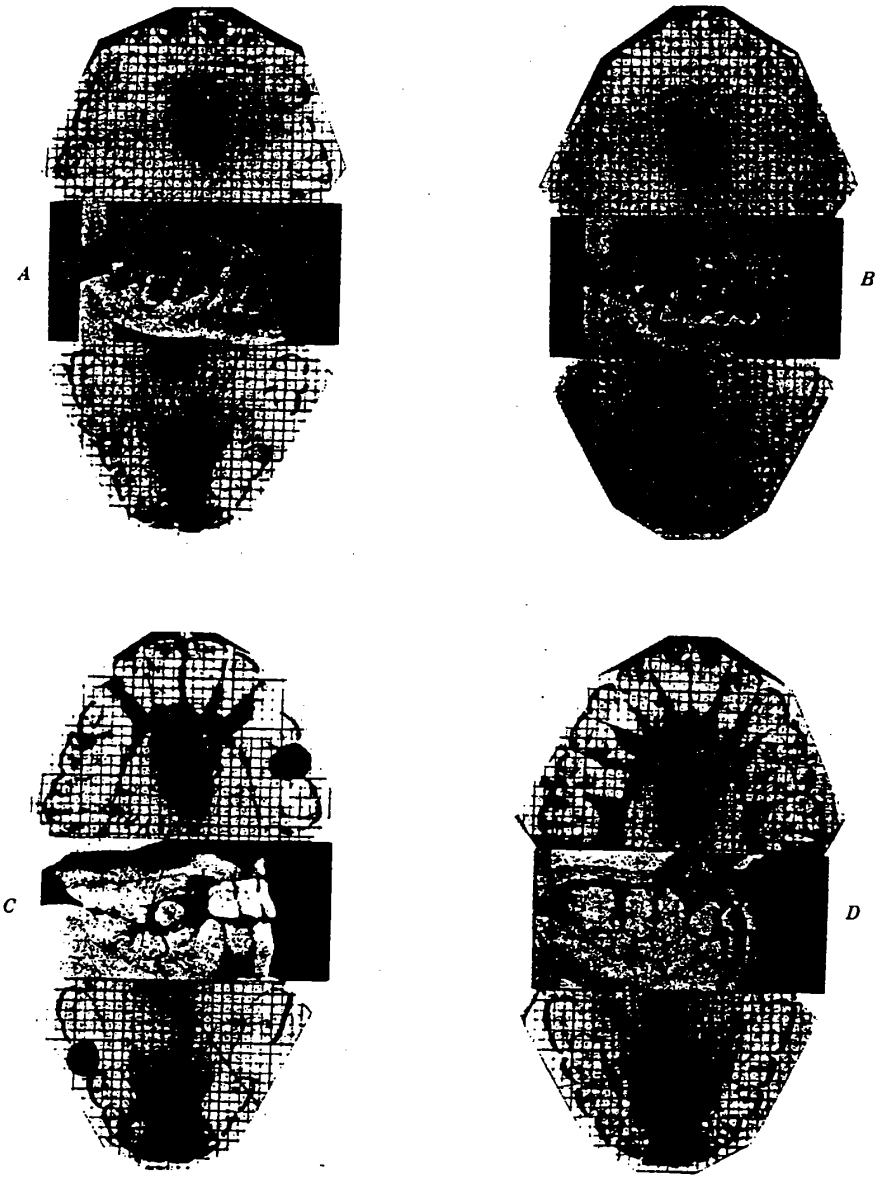


Figure 4. Photographs of Case 1's plaster models and set-up model's occlusal plane grid (1 unit = 2mm).
A: Before treatment B: After treatment C: No. 1 set-up model D: No. 3 set-up model

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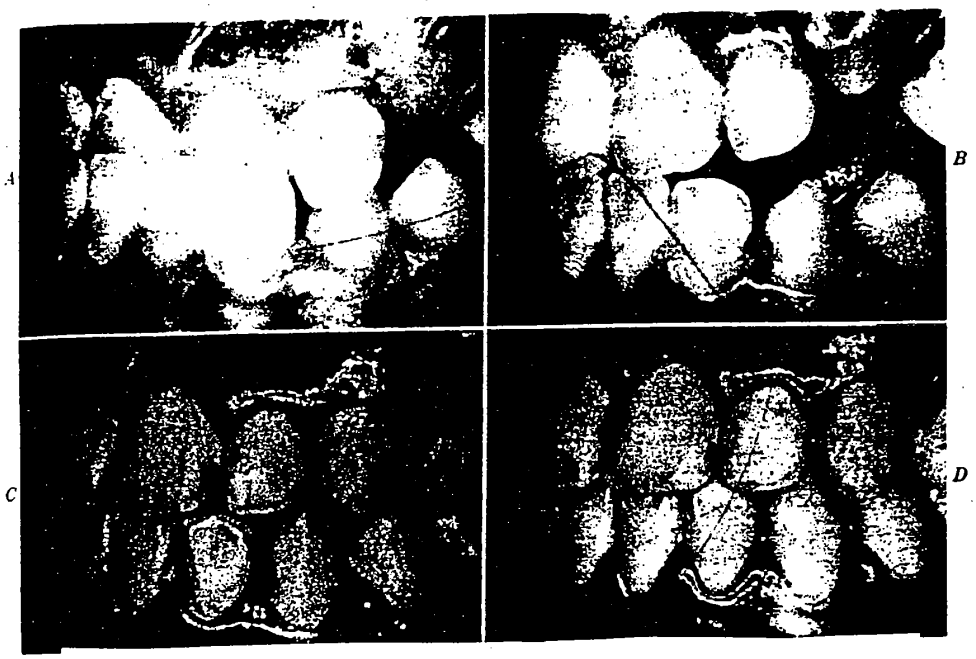


Figure 5. Case 1's treatment progress. A: When treatment began. B: Three months later. C: One year later. D: Two years later.

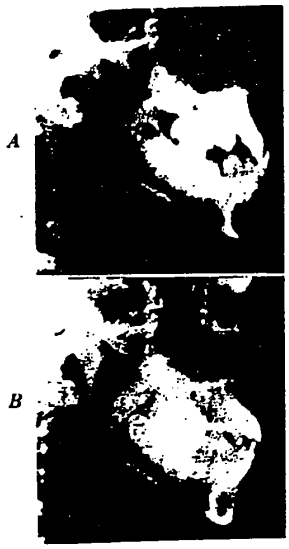


Figure 6: Trimmed maxillomandibular relationship, from lateral cephalometric radiograms.
A: Before treatment B: After treatment

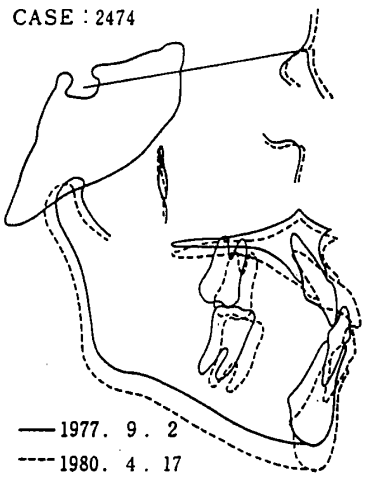


Figure 7. Superimposed (S-N criterion) lateral cephalometric radiograms. Solid line = before treatment, dotted line = after treatment.

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Case No. 2: Skeletal Reversed Occlusion Accompanying Maxillary Undergrowth; Age 10 years; Female

Diagnosis: Skeletal Reversed Occlusion with Maxillary Undergrowth.
Angle Class III

Treatment system: Nonextraction using D.P. method. Combined with chin cap.

D.P. Treatment Objectives:
First stage: Correct reverse overbite relationship through labial expansion of maxillary anterior area and eliminate irregularities.
Second stage: Aggressive labial and lateral expansion.
Third stage: Shift to retention.

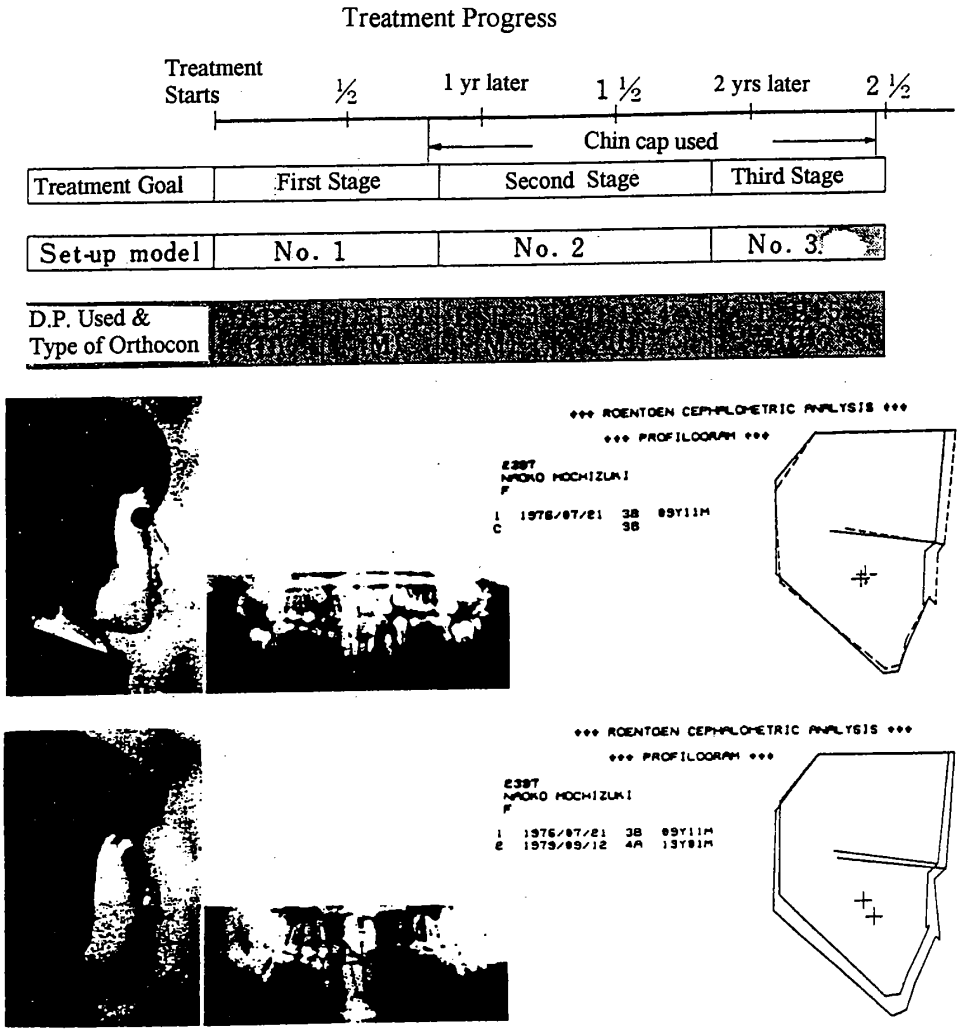


Figure 8. Case 2's profile view (left), panoramic X-ray view (center), and profilogram obtained from lateral cephalometric radiograms (right).
A: Before treatment B: After treatment

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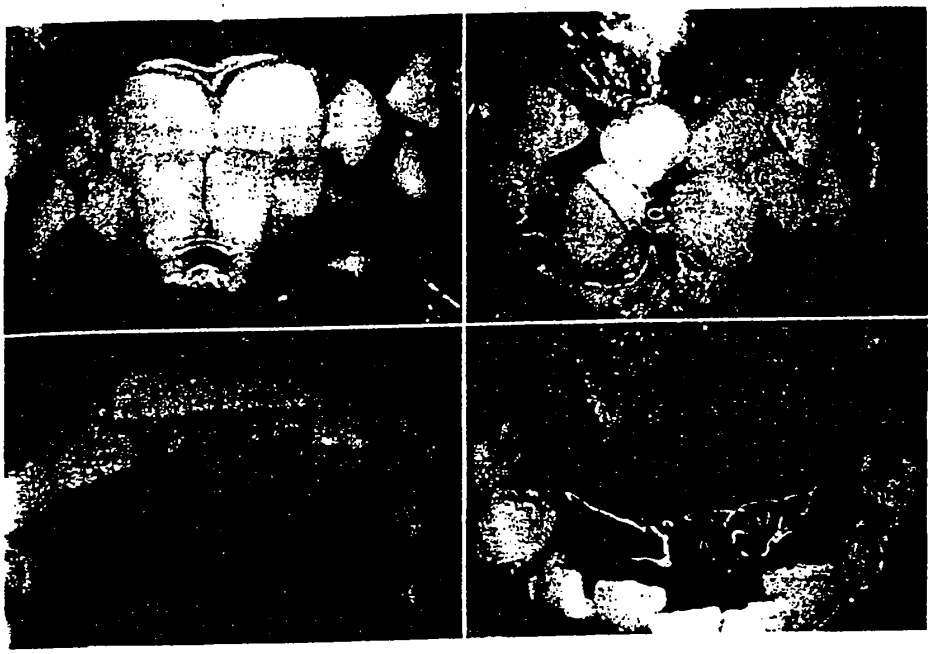


Figure 9. Photograph of oral cavity before beginning treatment. (Case 2)

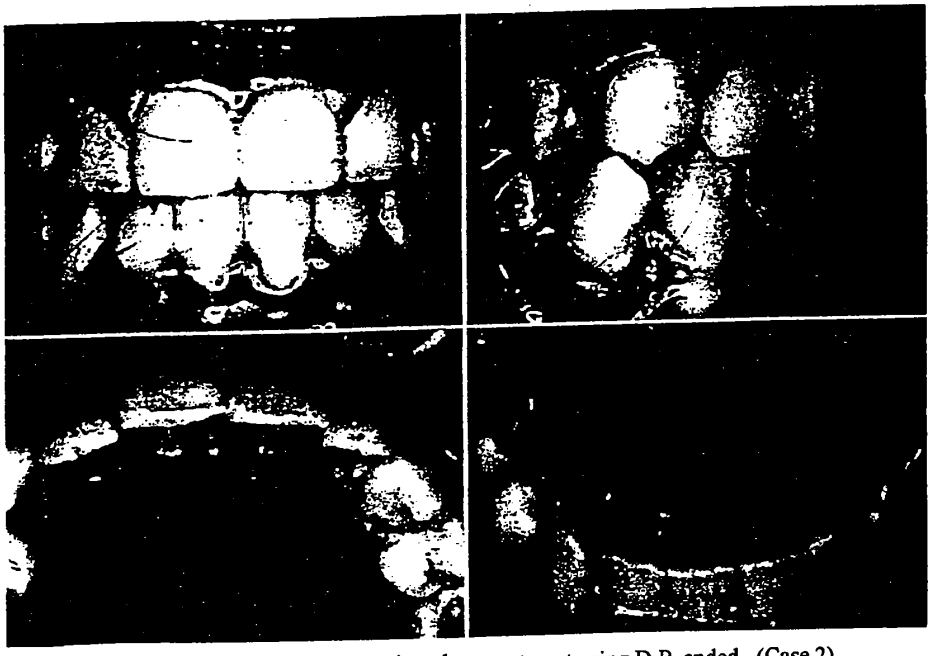


Figure 10. Photograph of oral cavity when treatment using D.P. ended. (Case 2)
Dynamic treatment period 1 year 10 months, retention period 8 months.

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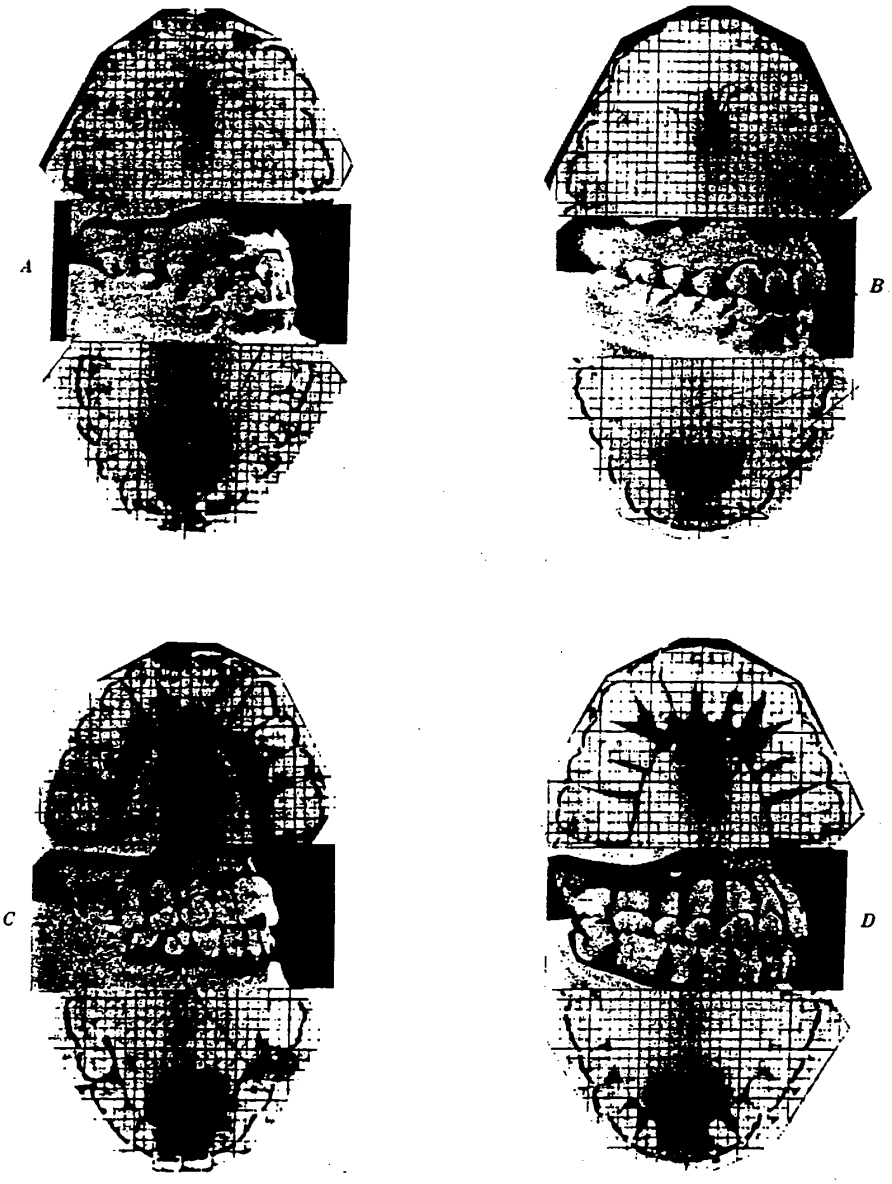


Figure 11. Photographs of Case 2's plaster models and set-up model's occlusal plane grid (1 unit = 2mm).
A: Before treatment B: After treatment C: No. 1 set-up model D: No. 2 set-up model

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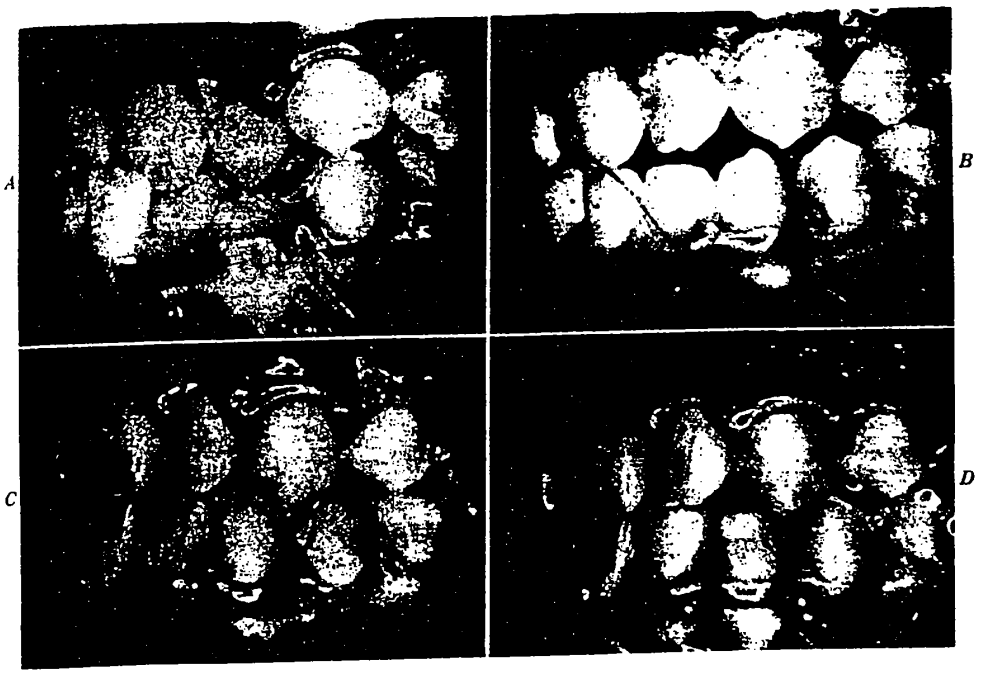


Figure 12. Case 2's treatment progress. A: When treatment began. B: Seven months later. C: One year 4 months later. D: Two years later.

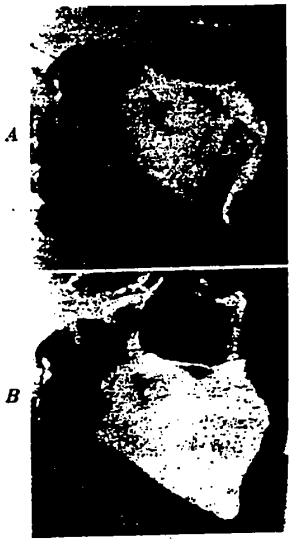


Figure 13: Trimmed maxillomandibular relationship, from lateral cephalometric radiograms.
A: Before treatment B: After treatment

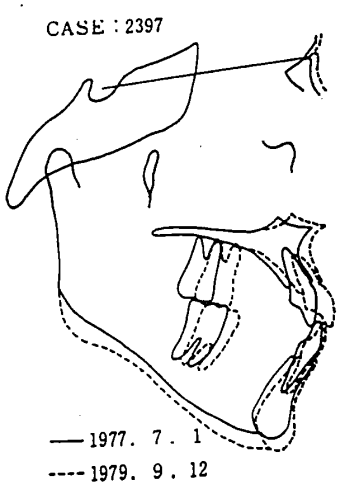


Figure 14. Superimposed (S-N criterion) lateral cephalometric radiograms. Solid line = before treatment, dotted line = after treatment.

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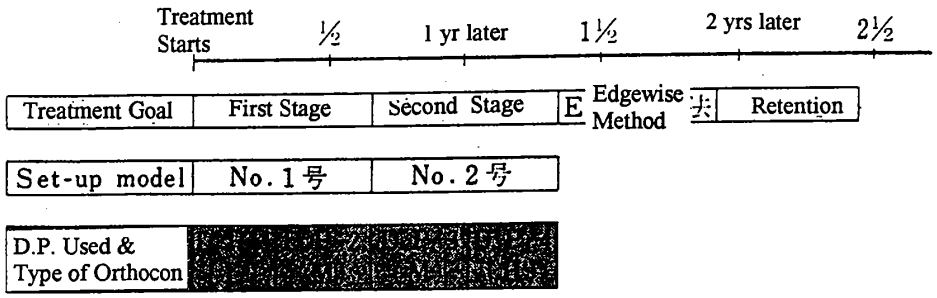
Case No. 3: Skeletal Reversed Occlusion Accompanying Pronounced Crowding; Age 9 years 11 months; Male

Diagnosis: Discrepancy Case with Mandibular Overgrowth. Angle Class III

Treatment system: $\frac{4|4}{4|4}$ extraction. Treat with combination of D.P. method and edgewise method.

D.P. Treatment Objectives:
First stage: Correct anterior reverse overbite relationship and simultaneously eliminate overcrowding.
Second stage: Guide eruption of second premolars and some space closing (subsequently, finish with edgewise method).

Treatment Progress



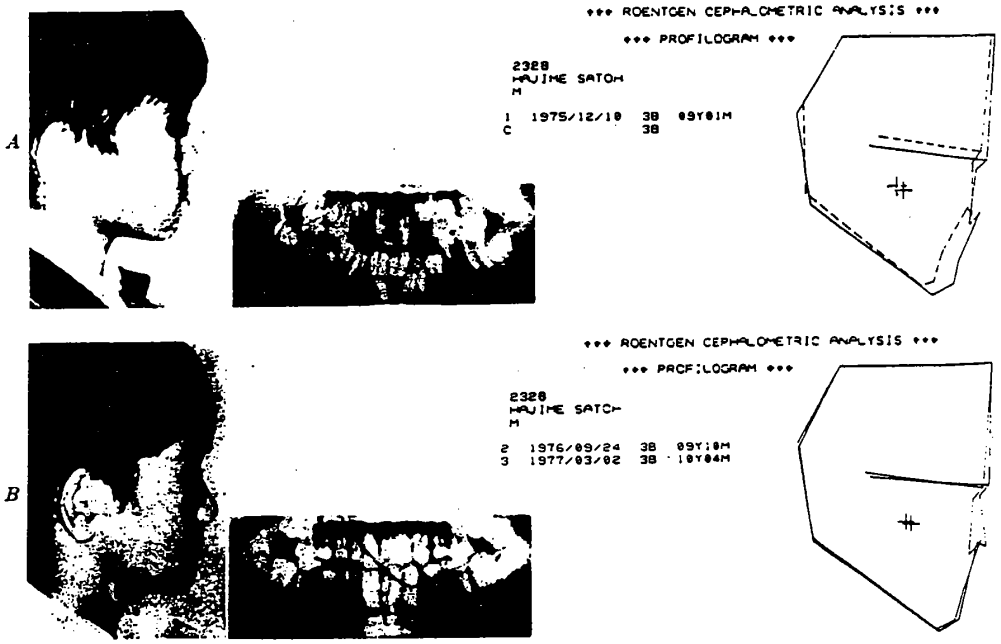


Figure 15. Case 3's profile view (left), panoramic X-ray view (center), and profilogram obtained from lateral cephalometric radiograms (right).
A: Before treatment B: When shifting to edgewise method. (Anterior overbite improved using D.P. only.)

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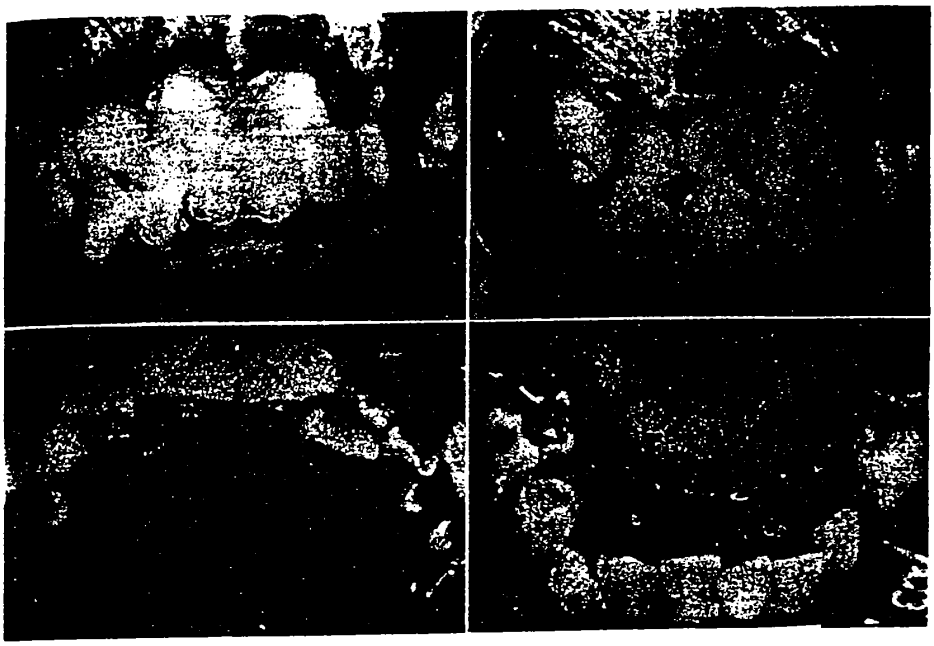


Figure 16. Photograph of oral cavity before beginning treatment. (Case 3)

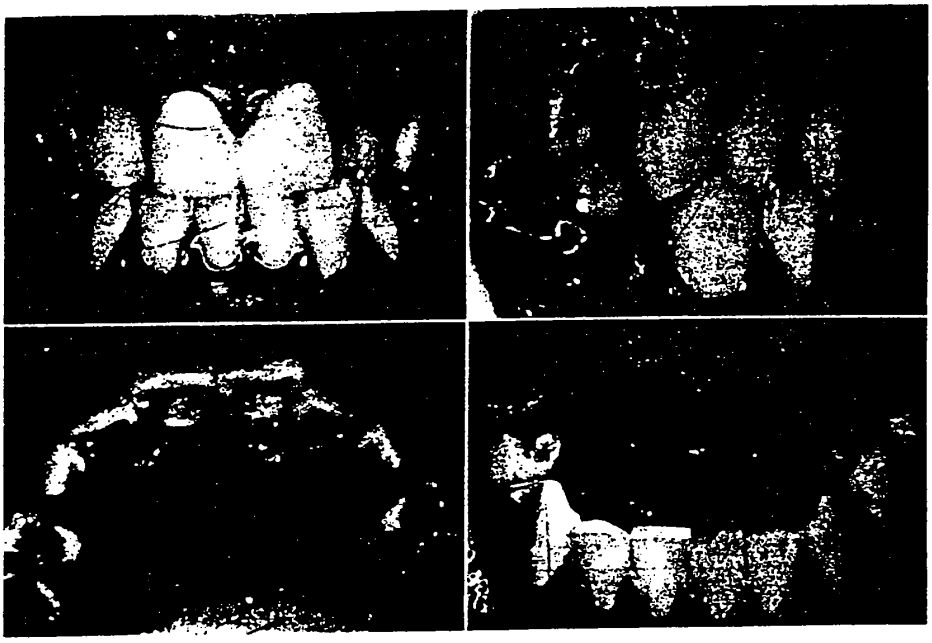


Figure 17. When shifting from D.P. method to edgewise method. (Case 3)

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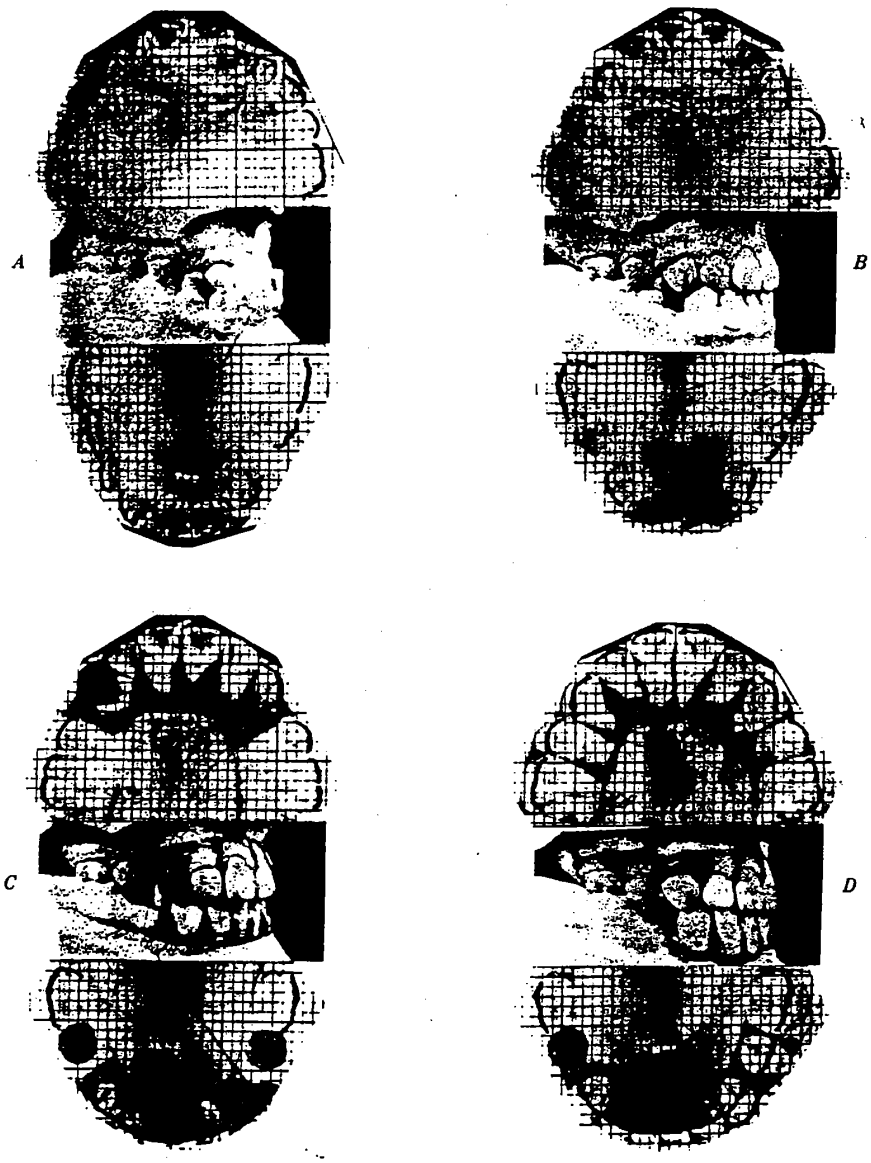


Figure 18. Photographs of Case 3's plaster models and set-up model's occlusal plane grid (1 unit = 2mm).
A: Before treatment B: When D.P. usage halted. C: No. 1 set-up model D: No. 2 set-up model

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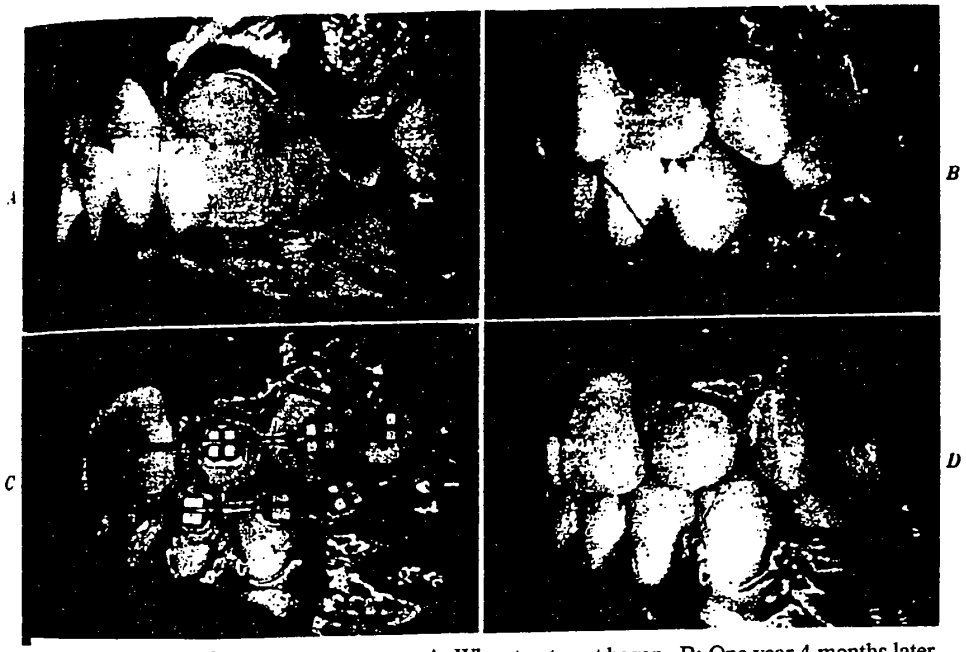


Figure 19. Case 3's treatment progress. A: When treatment began. B: One year 4 months later. C: One year 8 months later. D: Two years 11 months later.

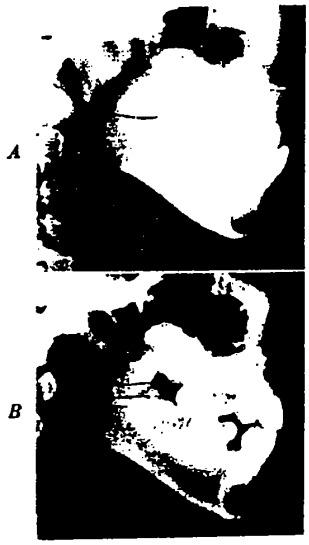


Figure 20: Trimmed maxillomandibular relationship, from lateral cephalometric radiograms.
A: Before treatment B: When shifted from D.P. method to edgewise method.

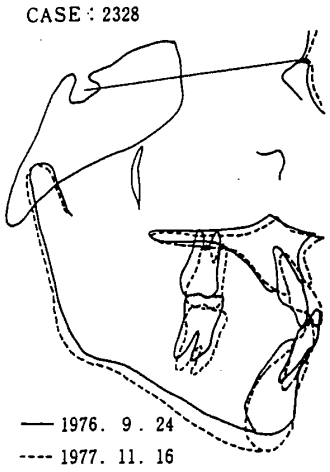


Figure 21. Superimposed (S-N criterion) lateral cephalometric radiograms. Solid line = before treatment, dotted line = when shifted from D.P. method to edgewise method.

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Case No. 1: Skeletal Reversed Occlusion Accompanying Mandibular Overgrowth (Figure 1~Figure 7)

Patient: Age 10 years 1 month; Male

1) Status Praesens

Facial impression: In profile the central facial region was slightly concave, and protrusion of the lower facial region was noted (Figure 1-A).

Occlusal impression: This case was a case presenting anterior reversed occlusion (overjet -3.5 mm, overbite 2.5 mm) at dental age III B (Figure 2). The midline of the lower jaw was deviated about 1.5 mm to the right of the upper jaw.

The molar occlusal relationship was Angle Class III (Figure 6-A), and there was inadequate space for eruption of the lateral teeth on the upper jaw (Figure 1-A). This case was one in which a so-called construction bite could not be obtained, so it was classified as a case which included absolutely no functional factors.

Cephalometric radiogram analysis impression: The maxilla in particular exhibited pronounced mesioversion, and the configuration of the ramus mandibulae and angulus mandibulae presented a pattern common to a skeletal reversed occlusion.

2) Diagnosis and Treatment System

The case was diagnosed as skeletal reversed occlusion accompanying mandibular overgrowth, Angle Class III. For the treatment system it was decided to use the D.P. method throughout, from start to end of treatment. It was decided to deal with the inadequate eruption space seen in the maxillary dental arch by resolving it primarily by aggressive labial expansion (nonextraction). Furthermore, since this case was studying the effect of D.P. treatment, it was decided to proceed without using a chin cap.

3) D.P. Treatment Goals

D.P. treatment goals were as described below. Set-up models were made based on these.

First stage: Shift the maxillary anterior area in the labial direction in order to correct the maxillary anterior area's overbite.

Second stage: Shift the entire maxillary dentition mesially and guide eruption of lateral permanent teeth.

Third stage: Shift to finishing and retention.

4) Treatment Progress

As seen in Figure 5, the effect of the first stage treatment was that the relationship between the upper and lower anterior teeth shifted to edge-to-edge occlusion three months after starting to use a D.P. However, the lateral teeth were not in occlusion (the molar area had an open bite). Therefore, in order to move the treatment ahead, a D.P. with harder rubber (Orthocon-M) was used, and a more highly active orthodontic force was applied to the maxillary anterior area. In the second stage, the entire maxillary dentition was shifted slightly mesially, and simultaneously space for the eruption of the lateral permanent teeth was created on the set-up model, and eruption of the lateral permanent teeth was guided. The dynamic treatment period required 1 year 1 month, the

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lateral teeth eruption guidance period required 7 months, and the retention period required 9 months, upon which treatment ended (Figure 3).

5) Treatment Results and Evaluation

When employing the D.P. method for reversed occlusion with a skeletal pattern, important points when realigning the typical set-up model are primarily the mesial shift of the maxillary dentition and the simultaneous labial expansion of the anterior area and lateral expansion. In this case too treatment proceeded by making set-up models in which these points were aggressively emphasized in the first stage and in the second stage.

As a result, as seen in Figure 7 and Table 1, the expected labial expansion of the maxillary anterior area was achieved, and the individual proper occlusion was obtained, as seen in Figure 3.

Therefore a comprehensive evaluation of these therapeutic results gives the following.

1) In cases of skeletal reversed occlusion, high treatment effects can be obtained if treatment begins when the growth and development period begins.
2) Labial expansion of the maxillary anterior area and forward growth and development of the bones at the base of the maxilla are slight but can be expected. This probably means that the rubber force from long-term D.P. use becomes orthopedic force and works on the jaw, and that the amount of growth can be controlled to some extent.

Figure 22 shows superimposed occlusal plane views, and Table 1 shows the results of analyzing angles from cephalometric radiograms (before and after treatment).

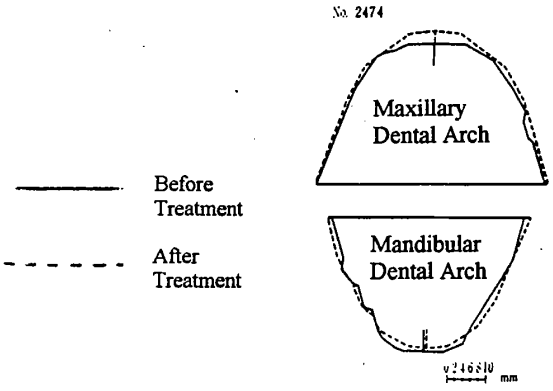


Figure 22. Superimposing Case 1's occlusal plane grid views.

Table 1. Analytical Values for Lateral Cephalometric Radiograms (Case 1)

	Before	After
SNA	83. 98	84. 67
SNB	85. 09	85. 92
ANB	− 1. 11	− 1. 24
MP-SN	32. 78	31. 38
Go. A	128. 49	129. 81
$\underline{1}$ to SN	104. 58	121. 23
$\overline{1}$ to MP	83. 86	89. 55

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Case No. 2: Reversed Occlusion Accompanying Maxillary Undergrowth
(Figure 8~Figure 14)

Patient: Age 10; Male

1) Status Praesens

Facial impression: In profile the central facial region was slightly concave, and protrusion of the lower facial region was noted. Also, a slight rollback of the lower lip was visible (Figure 8-A).

Occlusal impression: This case was dental age III B, a reversed occlusion with crowding in the anterior area (Figure 9). Also, the maxillary bilateral central incisors were wedged into the lower jaw, and gaps of 1.5~2 mm appeared distally to the canines on both sides. The midline of the lower jaw deviated about 1 mm to the right relative to the upper jaw.

The molar relationship was Angle Class III (Figure 13-A). This case was one in which absolutely no functional factors could be discerned.

Cephalometric radiogram analysis impression: The maxilla exhibited undergrowth, and the mandible exhibited a slight overgrowth (Figure 8-A).

2) Diagnosis and Treatment System

This case was diagnosed as skeletal reversed occlusion accompanying undergrowth of the maxilla, Angle Class III. The course of treatment decided upon was a combination of D.P. and chin cap, with no extraction.

3) D.P. Treatment Goals

Treatment proceeded with the treatment objectives divided into three stages.

First stage: Correct overbite and eliminate crowding through labial expansion of maxillary anterior area.

Second stage: Excessive labial expansion, and lateral expansion of the lateral teeth (use chin cap from this stage onward, and suppress growth of the mandible).

Third stage: Shift to occlusion finishing and retention.

4) Treatment Progress

As seen in Figure 12, set-up models were made to carry out aggressive labial expansion in the first stage and then a more aggressive shift in the second stage (shifting beyond the ideal position). Simultaneous with the labial expansion, anterior area crowding was eliminated. Dynamic treatment required 1 year 10 months, and shifted to retention.

On the set-up models the maxillary anterior area expanded a maximum of 3 mm in the labial direction, and the space seen in the mandibular anterior area became excellent when the lower jaw crowding was eliminated and a slight lingual inclination was used.

5) Treatment Results and Evaluation

This case was a so-called classic skeletal reversed occlusion, and was the sort of case in which control of the jaw largely controls the effect of treatment. I think that the question of whether or not the D.P. is the orthodontic appliance best for this objective is

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one which will be clarified by future research, but in this case, at least, it is clear from Figure 14's cephalometric radiogram results that the growth of the maxilla was promoted. In other words, it probably indicates that the D.P.'s recovery force shows the possibility of being fully realized as an orthopedic force.

Therefore evaluating the D.P. in this case yields the following.

1) The D.P. can control, within some range, the growth and development of the maxilla and mandible, and can realize a therapeutic effect with orthopedic force.

2) High treatment effects resulted from the combination of the D.P. and a chin cap. This is a new method and concept for cases of skeletal reversed occlusion.

Figure 23 shows superimposed occlusal plane views, and Table 2 shows the results of analyzing angles from cephalometric radiograms (before and after treatment).

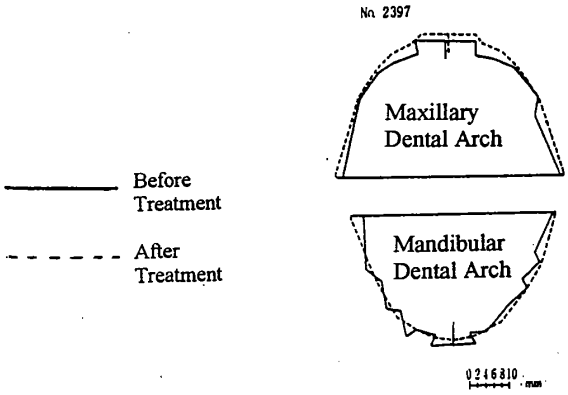


Figure 23. Superimposing Case 2's occlusal plane grid views.

Table 2. Analytical Values for Lateral Cephalometric Radiograms (Case 2)

	Before	After
SNA	78.79	80.33
SNB	78.78	79.44
ANB	0.01	0.89
MP-SN	42.93	40.18
Go.A	133.38	127.71
$\underline{1}$ to SN	101.31	107.99
$\overline{1}$ to MP	81.06	80.72

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Case No. 3: Skeletal Reversed Occlusion Accompanying Pronounced Crowding (Figure 15~Figure 21)

Patient: Age 9 years 11 months; Male

1) Status Praesens

Facial impression: In profile the same as the previous case: protrusion of the lower facial area and lower lip rollback (Figure 15-A).

Occlusal impression: This case was dental age III B, a reversed occlusion where pronounced crowding could be expected in the maxillary dentition (Figure 15-A). Also, the left maxillary lateral incisor exhibited a pronounced linguoversion, and a slight crowding was also noted in the mandibular anterior area. The midline matched almost perfectly.

The molar relationship was Angle Class III. Absolutely no functional factors could be discerned.

Cephalometric radiogram analysis impression: The mandible exhibited overgrowth, and the mandible had a pronounced mesioversion relative to the maxilla (Figure 15-A).

2) Diagnosis and Treatment System

This case was diagnosed as skeletal reversed occlusion accompanying mandibular overgrowth, Angle Class III. It was a discrepancy case, so one could predict a reversed occlusion with pronounced crowding developing in the future. Therefore it was decided to treat this as an extraction case, and to extract the four first premolars. First, since treatment was to start in the mixed dentition stage, it was decided to start by fully utilizing the special characteristics of the D.P. while correcting the overbite, which was the initial objective. When the permanent dentition stage was complete, it was decided to proceed by improving the final problem (inclination of the canines and second premolars, and closing the extracted teeth space, etc.) by using an all-band appliance (the edgewise method using D.B.S.).

3) D.P. Treatment Goals

For these reasons the role of the D.P. was played until the permanent dentition stage, focusing mainly on improving malpositioning as much as possible. The treatment objectives were as follows.

First stage: Perform serial extraction and correct the anterior overbite relationship. Simultaneously eliminate crowding in the anterior area.

Second stage: Guide eruption of lateral permanent teeth (canines and second premolars) and guide them to ideal position.

4) Treatment Progress

After using the D.P. for one year four months the anterior overbite relationship and crowding were corrected. Subsequently and continuously, treatment proceeded using the edgewise method (with D.B.S.) in order to achieve the final occlusal relationship. The brackets and wires used in the edgewise method were removed after six months.

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5) Treatment Results and Evaluation

This case was one in which a skeletal reversed occlusion with pronounced crowding was treated by a combination of the D.P. method and the edgewise method.

Therefore employing the D.P. method in an extraction case can be evaluated as follows.

1) Future orthodontic treatment can be improved to the point where it is easy and concludes in a short time by performing serial extraction in the mixed dentition stage and improving malpositioning with the D.P.
2) It is possible to correct the overbite relationship and set the growth and development of the jaw on the proper course early on.
3) Inclination of the permanent teeth occurs in an extraction case, so an all-band appliance is required in the finishing stage.

Figure 24 shows superimposed occlusal plane views, and Table 3 shows the results of analyzing angles from cephalometric radiograms.

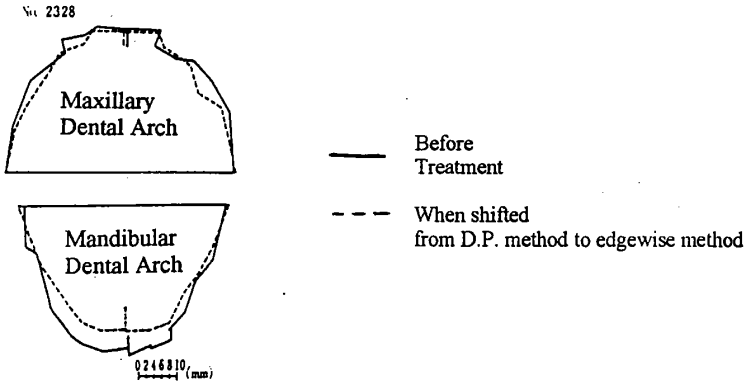


Figure 24. Superimposing Case 3's occlusal plane grid views.

Table 3. Analytical Values for Lateral Cephalometric Radiograms (Case 3)

	Before Treatment	When shifted from D.P. Method to Edgewise method
SNA	81. 28	84. 03
SNB	81. 80	82. 76
ANB	− 0. 52	1. 26
MP-SN	35. 85	35. 32
Go. A	134. 46	133. 57
$\underline{1}$ to SN	99. 58	114. 99
$\overline{1}$ to MP	86. 07	81. 12

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Conclusion

This time I have briefly described the D.P. method used in so-called skeletal reversed occlusions and its treatment concept, and provided three case reports in which treatment began in the mixed dentition stage, and described their therapeutic results.

Incidentally, if one evaluates the D.P. method from these cases, superior therapeutic effects are achieved if treatment begins in the individual's growth and development period, even in skeletal reversed occlusions, and the effect of controlling skeletal growth and development to some extent by using the D.P. for a long period can be expected. These points can be understood as the rubber's recovery force being transmitted directly to the alveolar bone's musosa and acting as orthopedic force. Another feature of the D.P. method is that a higher therapeutic effect can be realized by combining a D.P. with other orthodontic appliances. In extraction cases, if malpositioning is corrected as much as possible until the introduction of the edgewise method, and if treatment or occlusion management is carried out using a D.P. until permanent dentition is complete, [the D.P. method] offers the benefit of enabling removal of the edgewise appliance, which is a type of fixed orthodontic appliance, within a short time. In other words, replacing leveling carried out by the edgewise method with a D.P. in the mixed dentition stage is a treatment method which shifts teeth biologically and rationally, and achieves individual proper dentition.

(To be continued. References combined in final article.)

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UCLA BIOMEDICAL 0027019

新しい矯正装置—ダイナミック ポジショナー(D.P)—の研究

—Ⅲ. D.P法の概念とその治療効果—

その2. 顎性反対咬合の治験例

吉井 修
(関東逓信病院歯科医長)

はじめに

前回 (No. 457 55年11月号) は，いわゆるダイナミック ポジショナーを矯正臨床面に導入する際に，筆者が名づけた新しい矯正治療法の名称，すなわち D.P法 (Dynamic Positioner System) の紹介ならびにその治療法にともなう一般的な概念を簡単に述べた．また，本法を適用した臨床例として，歯性ならびに機能性反対咬合の治験例を併せて紹介し，その治療経過や臨床的効果などについても報告した．

ところで，上記した症例などに D.P法を適用する場合には，D.P のもつ特徴を十分に臨床面に活かすことができるため，従来の金属線を主体とした治療法に比べて，その治療効果はいうに及ばず，使用上の便利さや治療上の応用面などについても高く評価することができる．

しかし，反対咬合の症例の中でもいわゆる顎性 (skeletal pattern) をともなう症例では，その個体の潜在的要因 (遺伝にともなう因子) などから直接影響を受けると考えられている上下顎骨の成長発育パターンの変遷が，矯正治療の難易度を大きく決定づける要素となるだけに，治療期間も治療効果もこれらの影響を強く受けることになる．したがって，顎性をともなう反対咬合に D.P法を適用する場合には，特に矯正学的な検討を十分に行ってから開始することが是非とも必要となる．

そこで今回は，顎性をともなう反対咬合に対するD.P法の要点を簡単に述べるとともに，混合歯列期から治療を開始した治験例を紹介しながら，その治療効果を前回に引き続き臨床報告として述べてみたい．

Ⅰ. 顎性反対咬合に対する D.P法の要点

1. 治療開始時期

顎性をともなう反対咬合については，一般に上下前歯部の逆被蓋関係を正常な位置的関係に改善することだけでなく，上下顎骨の前後的な位置関係も改善する必要性があるだけに，ある種の宿命的な要素がそこに存在することが多い．

しかし，個体の成長発育が最も旺盛な時期に向かって治療を開始すれば，上下顎骨の発育成分を人為的な力によってある程度コントロールすることが可能であるといわれている．たとえば，この方法として一般に使用されている矯正装置に顎外固定装置があり，この装置から求められる顎矯正力 (orthopedic force) が，この目的に効果的に働く点については，多くの臨床経験から周知の事実として認めることができる．

そこで，顎性反対咬合の症例に対する治療開始時期について述べるとすれば，顎矯正力の作用を十分に活用する目的から，できるだけ早い時期に治療を開始することが望ましく，また，その必要性はその治療の成否を決定づける重要な条件を

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修

病院歯科医長）

ともなう反対咬合
述べるとともに，最
治験例を紹介し
き続き臨床報告と

対するD.P法の要点

開始時期

合については，一般
正常な位置的関係
下顎骨の前後的な位置
るだけに，ある種
ることが多い．
育が最も旺盛な時期
ら，上下顎骨の発育
程度コントロール
ている．たとえば，
れている矯正装置
置から求められる顎
が，この目的に効果
の臨床経験から同
きる．
の症例に対する治療
れば，顎矯正力の
，できるだけ早い時
ましく，また，そ
定づける重要な条件

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いるともいえる．

2. D.P と chin cap の組み合わせ

固定装置の一種である chin cap は，特に
が前下方へ過剰に発育している症例などに
れ，その過成長（over growth）を抑制す
的で使用される．

ころで，D.P 法で治療を開始する場合にも顎
の治療効果を十分に期待する立場から，し
D.P と chin cap の組み合わせ（使用時期
ては，その治療方針によって異なる）が行
る．すなわち，この方法では，歯を歯槽骨内
動するための目的をもった D.P と下顎骨の過
を抑制する目的をもった chin cap との一体
意味するもので，顎性反対咬合の基本的な治
念といえる．

3. Set-up model の再排列の要点

まず，反対咬合の性格やパターンを詳細に検討
そこから得られる治療方針に基じて set-up
del を段階ごとに製作する．特に，顎性をとも
症例においては，早期接触などによって生ず
顎位の移動（機能的因子によるもの）がほとん
期待できないため，不正位を示す歯の移動はす
て歯槽骨内で解決しなければならない．すなわ
D.P を口腔内に装着した時点から，より活性
高い矯正力を歯に与えることが必要となるた
set-up model 上での歯の再排列は積極的に
れなくてはならない．
たとえば，上顎骨が劣成長（under growth）を
反対咬合では，上顎歯列全体を唇側方向に
動（第1大白歯をⅠ級関係に獲得する）し，し
必要によっては上顎前歯部を同方向に大きく
し製作する．また，場合によっては，上顎前
の口蓋粘膜面にある種の人為的なゴムの力
この場合は，顎矯正力を意味する）を与えるこ
とによって，上顎骨の前方への発育を促進させる
力をもったステップを口蓋粘膜面に形成し set-
model を製作する．さて，実際の技工操作で
これらの手順を段階別に行い set-up model
数個（一般には治療終了まで3～4個となる）
製作する．まず第1段階では，逆被蓋関係を改善
する目的で，理想的な位置関係まで大きく移動し
再排列を行う．次いで，第2段階から第3段階の
過程の中で，理想とする位置よりも歯を過剰に移
動する．このような要領で再排列を行う点が，顎
性をともなう症例の set-up model の要点といえ
る．

4. 連続抜去法の導入

混合歯列期において，不正咬合を未然に防ぐ意味から，しばしばこの時期に連続抜去（一般には，第1乳臼歯に引き続き第1小臼歯を4本抜去する）が行われる．特に，歯冠幅径が大きくその総和と歯槽基底の大きさに不調和が明らかに認められる場合（いわゆる discrepancy を示す症例）に適用される．

ところで，顎性反対咬合の症例の中には，discrepancy が原因で便宜抜歯が行われる場合がしばしば認められる．このような症例では，D.P 法で治療を進める過程において連続抜去が行われる．しかし，抜歯症例に D.P 法を適用した場合には，特に側方永久歯群において歯軸の傾斜が発生するため，永久歯列完成時には全帯環装置（一般に edgewise 法が用いられる）で仕上げる必要性が生じてくる．そこで，抜歯症例を取り扱う場合には，D.P 法と edgewise 法との組み合わせが基本的な治療方針といえる．

以上，顎性をともなう反対咬合に対する D.P 法の要点を簡単に述べたが，ここで混合歯列期から治療を開始した治験例を紹介し，その治療効果について報告してみたい．

Ⅱ. D.P 法による顎性反対咬合の治験例

第1症例は下顎骨の過成長をともなう症例であり，第2症例は上顎骨の劣成長を示す症例で，ともに非抜歯の顎性反対咬合である．また第3症例は著しい叢生をともなう顎性反対咬合（discrepancy case）で，連続抜歯を行いながら D.P 法と edgewise 法の組み合わせで治療を進めた症例である．

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症例1　下顎骨の過成長をともなう顎性の反対咬合 10歳1カ月 男子

診断：下顎骨の過成長を認める顎性反対咬合.
　　Angle Ⅲ級
治療方針：D.P 法による非抜歯症例.
　　(D.P の治療効果を判定するために
　　chin cap は使用しなかった)

D.P の治療目的
第1段階：上顎前歯部の唇側拡大と逆被蓋関係の改善.
第2段階：側方永久歯群の前出誘導.
第3段階：保定に移る.

治療経過

治療開始	½	1年後	1½	2年後	2½

治療目的	第1段階	第2段階	第3段階
Set-up model	No. 1号	No. 2号	No. 3号

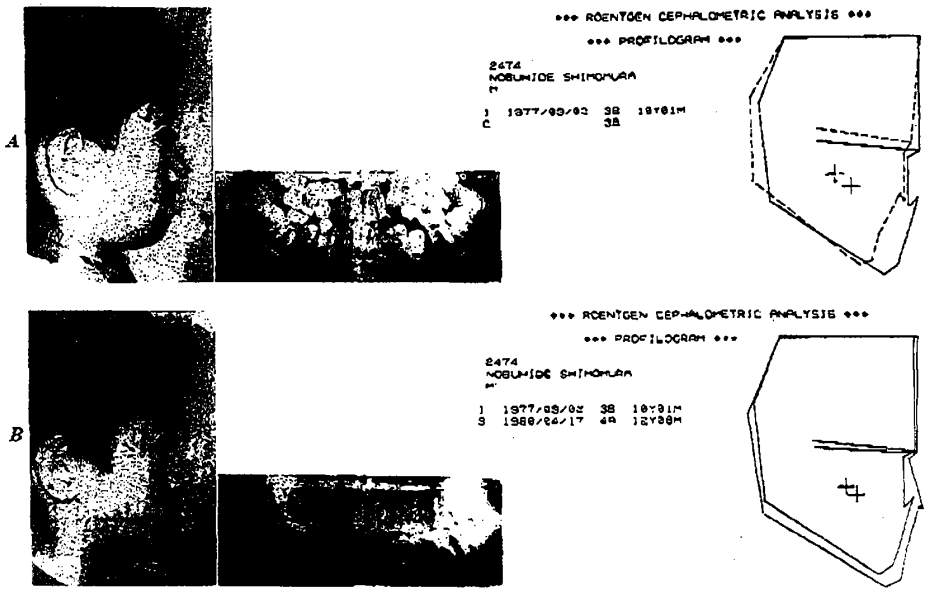


図1　症例1の顔面側貌写真（左），パノラマX線写真（中），側貌頭部X線規格写真より求めたプロフィログラム（右）（NEAC 3200コンピューター画像解析システムによるS-N重ね合わせ）
A：術前　B：術後

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月 男子

の軽側拡大

群の前出誘導.

2年後 2

3段階

0.3号

METRIC ANALYSIS

METRIC ANALYSIS

写真よる求め

るS-N

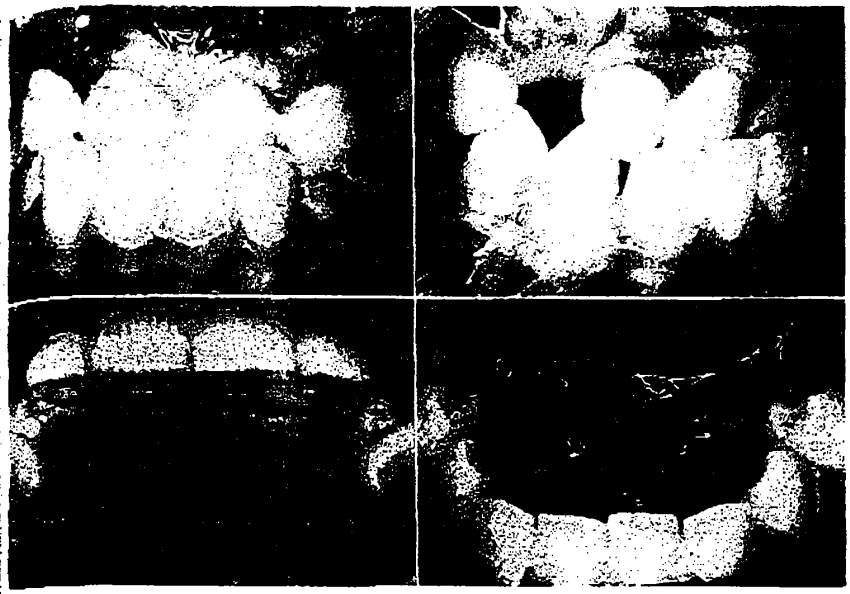


図2 治療開始時の口腔内写真（症例1）.



図3 D.Pによる治療終了時の口腔内写真（症例1）. 開始時年齢1年1ヶ月 終了時年齢
保定開始7ヵ月, 保定期間9ヶ月.

115

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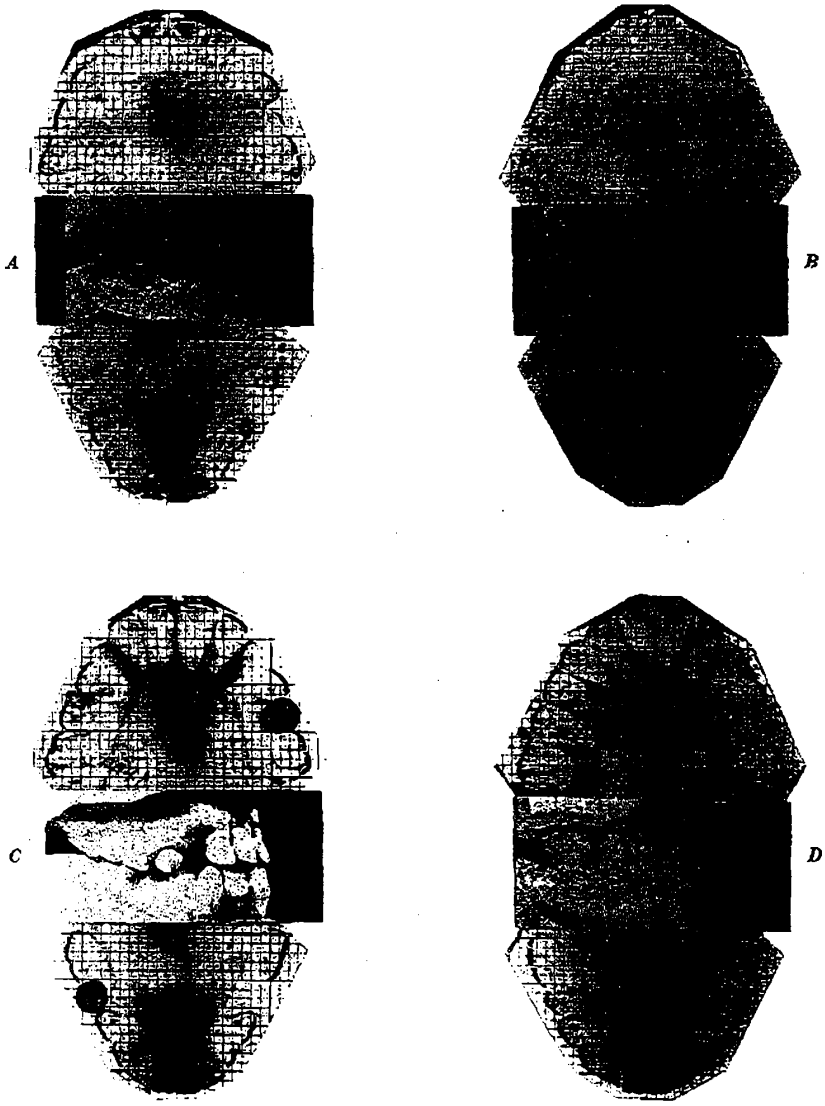
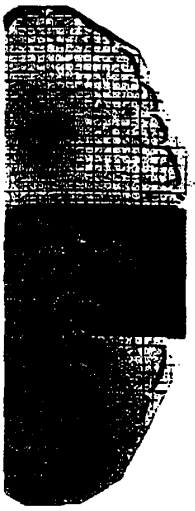


図 ... 例1の石膏模型と set-up model の咬合状態 ... mm).
A：術前　B：術後　C：No. 1号の set-up model
D：No. 3号の set-up model

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mm).

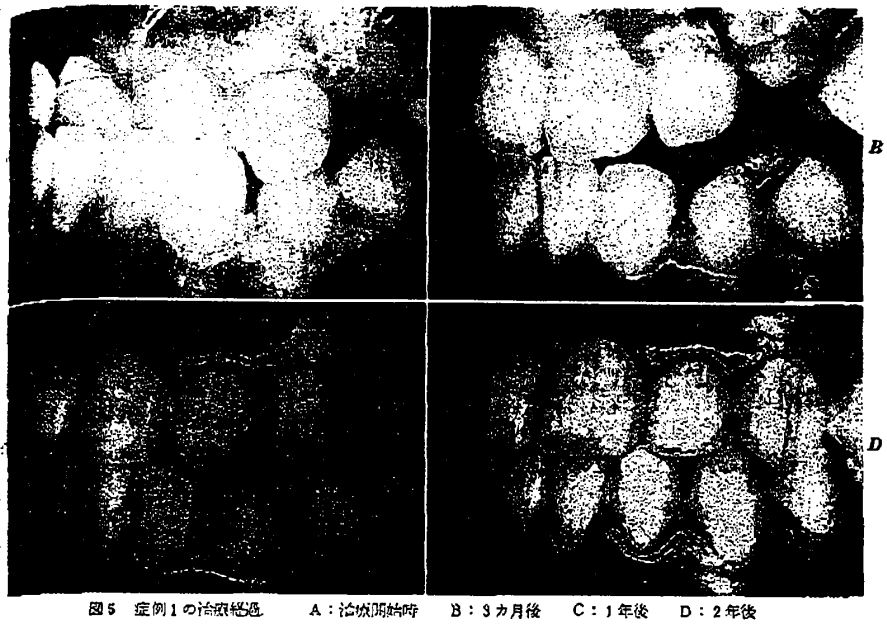


図5　症例1の治療経過　　A：治療開始時　B：3カ月後　C：1年後　D：2年後

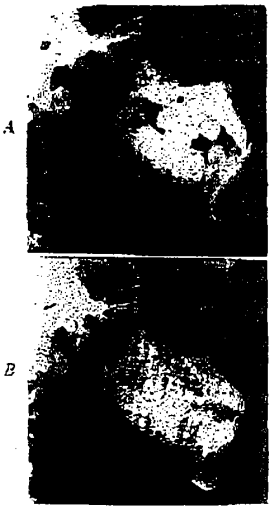


図6　側貌頭部X線規格写真と
トリミングした上下頭部像
A：治療前　B：治療後

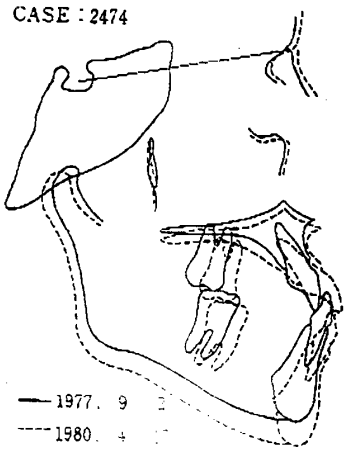


図7　側貌頭部X線規格写真上の重ね合わせ（S-N基準）．
実線は治療前，点線は治療後を示す．

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症例2 上顎骨の劣成長をともなう顎性の反対咬合 10歳 女子

診断：上顎骨の劣成長を認める顎性反対咬合.
Angle Ⅲ級

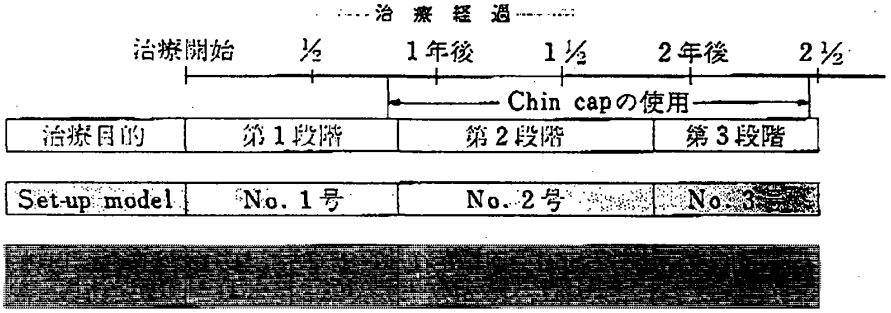
治療方針：D. P 法による非抜歯症例.
chin cap との併用

D. P の治療目的

第1段階：上顎前歯部の唇側拡大による逆被蓋関係の改善と乱排歯の解消.

第2段階：積極的な唇側ならびに側方拡大.

第3段階：保定に移る.



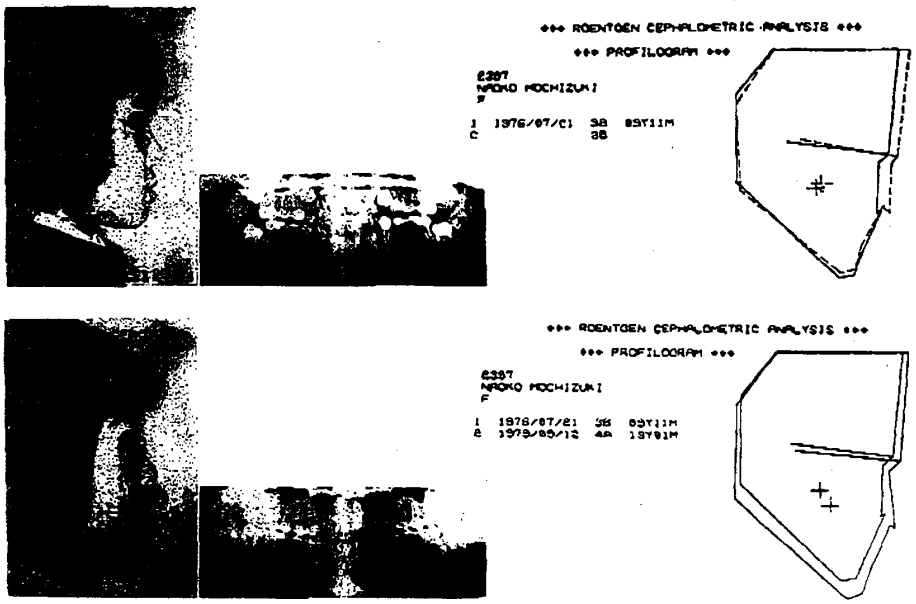
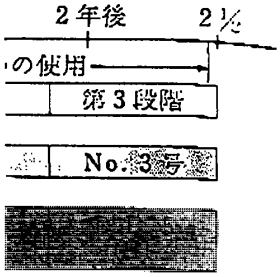


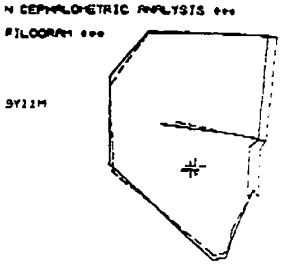
図8 症例2の顔面側貌写真（左），パノラマX線写真（中），側貌頭部X線規格写真より求めたプロフィログラム（右）.
A：術前　B：術後

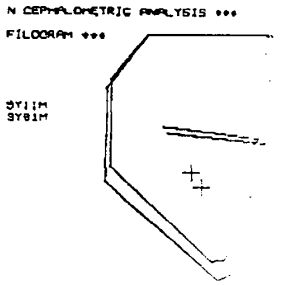
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10歳 女子

顎前歯部の唇側拡大による
係の改善と乱排歯の解消.
極的な舌側ならびに側方拡大
定に移る.







線規格写真より求めた

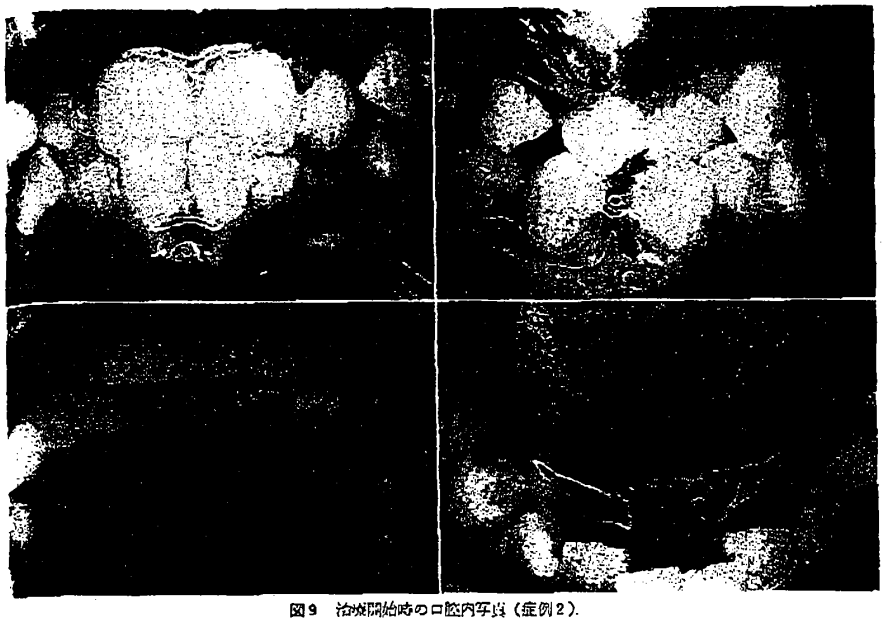


図9 治療開始時の口腔内写真(症例2).

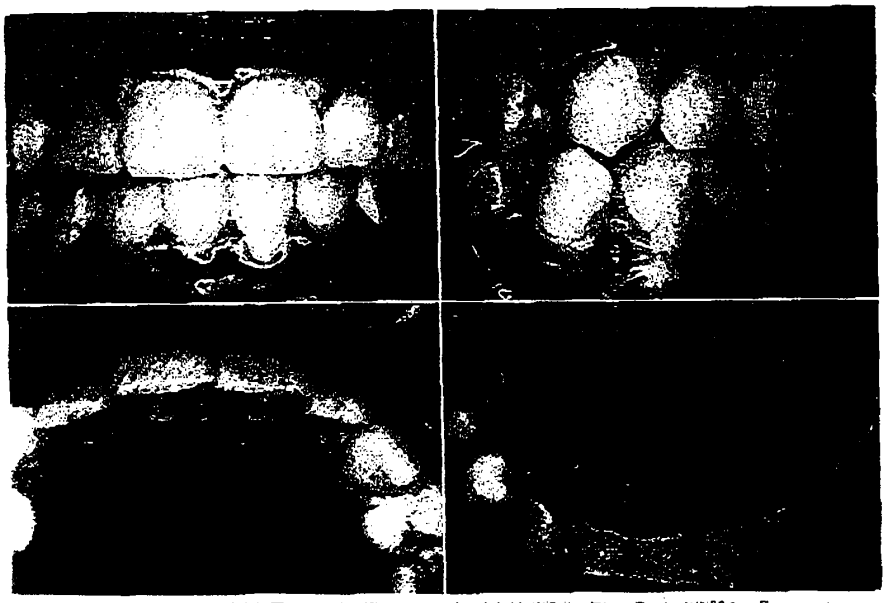


図10 D.Pによる治療終了時の口腔内写真(症例2). 動的治療期間1年10ヵ月, 保定期間8ヵ月.

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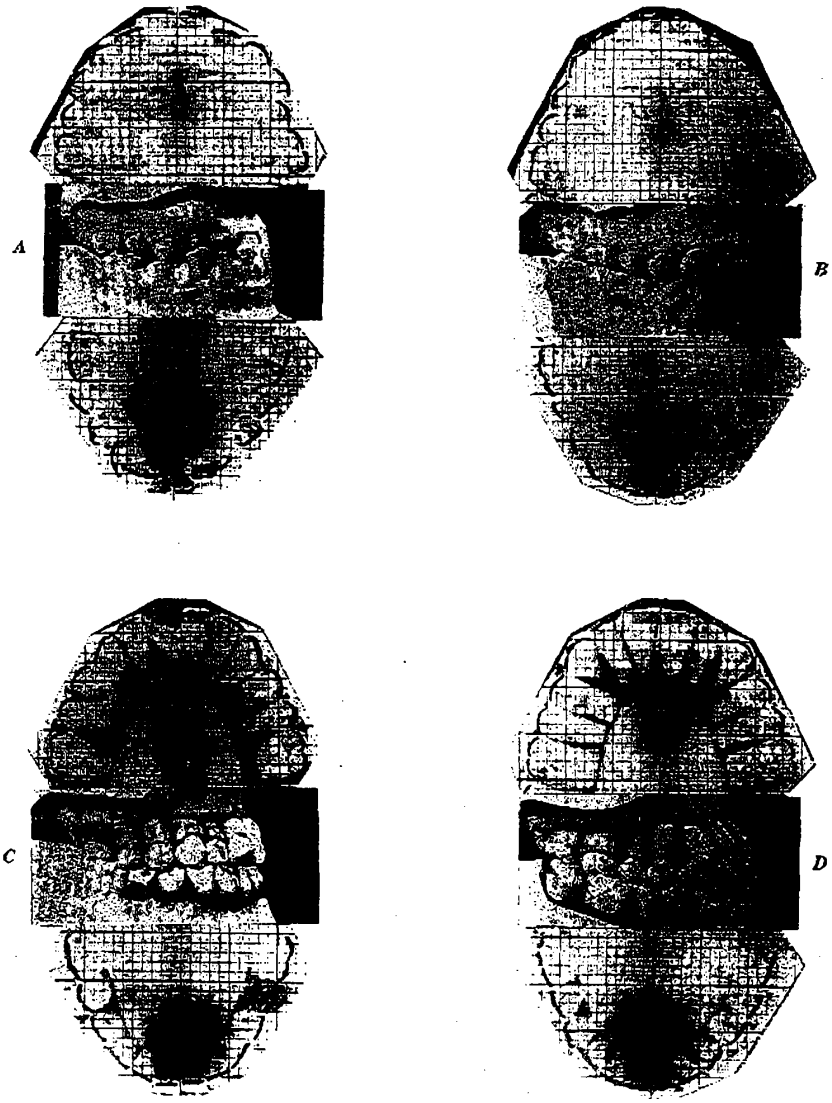


図1：正常2の石膏模型と set-up model の咬合面観写真 ... mm.
A：術前　B：術後　C：No. 1 号の set-up model
D：No. 2 号の set-up model

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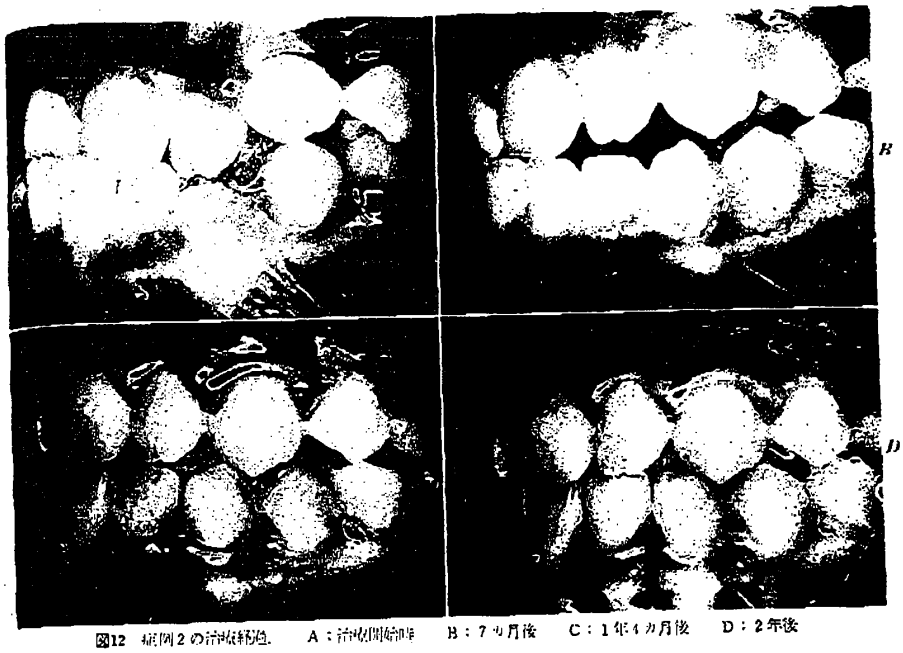
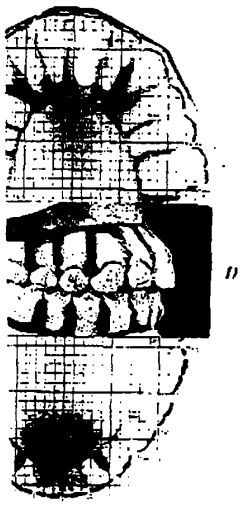
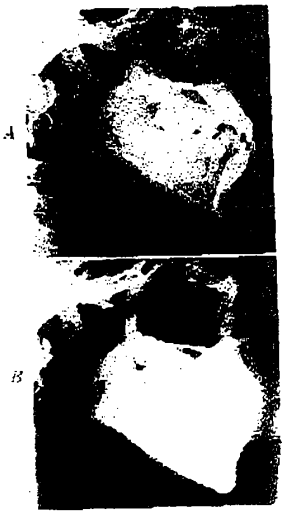
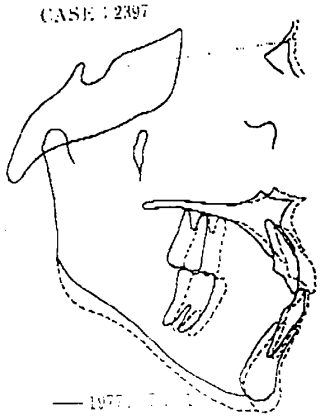


図12 症例2の治療経過. A：治療開始時 B：7ヵ月後 C：1年4カ月後 D：2年後





CASE : 2397



1977
1979

図14 側貌頭部X線規格写真の重ね合わせ (S-N 基準).

が 2 mm).

図13

121

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症例3　著しい叢生をともなう顎性の反対咬合　9歳11カ月　男子

診断：下顎過成長をともなう discrepancy case.
Angle Ⅲ級

治療方針：$\frac{4}{4}\frac{4}{4}$ 抜歯症例

D.P法と edgewise 法の組み合わせによる治療.

D.P の治療目的

第1段階：前歯部逆被蓋関係を改善すると同時に crowding の解消.

第2段階：第2小白歯の萌出誘導とわずかな space closing（以後，edgewise 法で仕上げる）.

治療経過

治療開始 ½ 1年後 1½ 2年後 2½

治療目的	第1段階	第2段階	Edgewise法	保定
Set-up model	No.1号	No.2号		

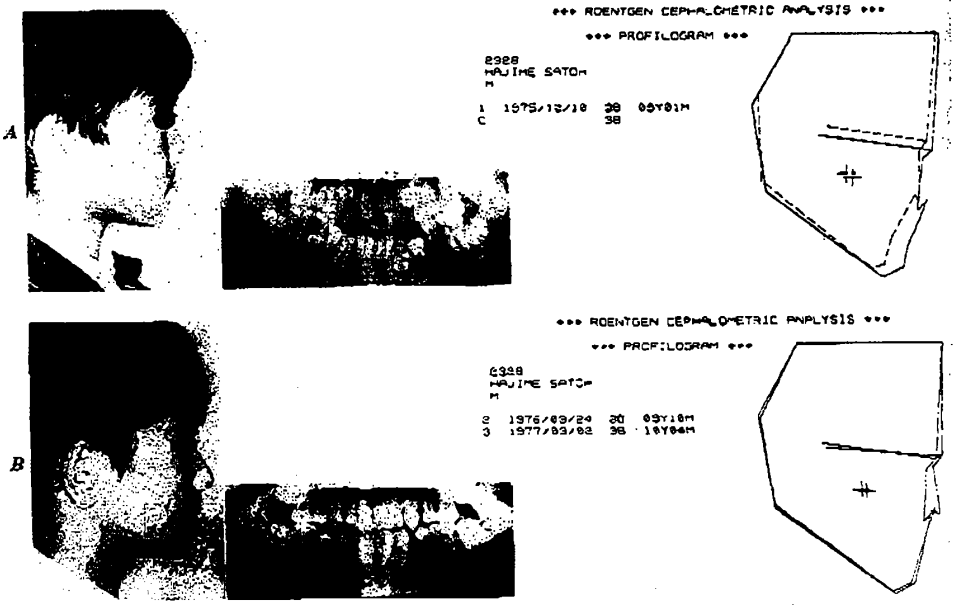


図15　症例3の顔面側貌写真（左），パノラマX線写真（中），側貌頭部X線規格写真より求めたプロフィログラム（右）
A：術前　B：edgewise 法に移行した時点（D.Pのみで前歯部の被蓋改善を行った）

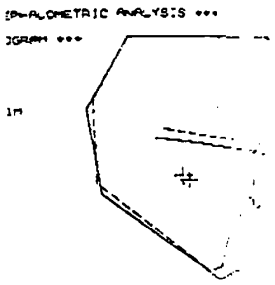
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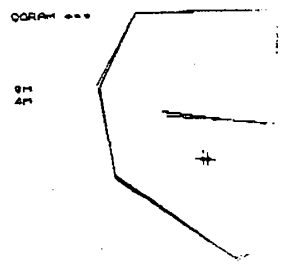
カ月 男子

部逆被蓋関係を改善す
crowding の解消、
小白歯の両側誘導と
e closing (以後, edgewise
上げる).

2年後 2½

決 保 定





線規格写真より求めた

矯正改善を行った)



図16 治療開始時の口腔内写真(症例3).

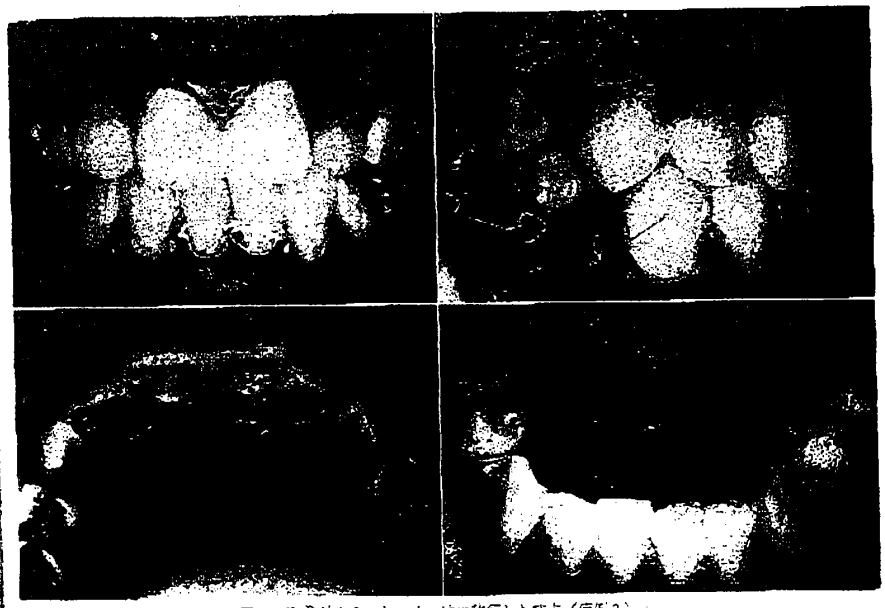
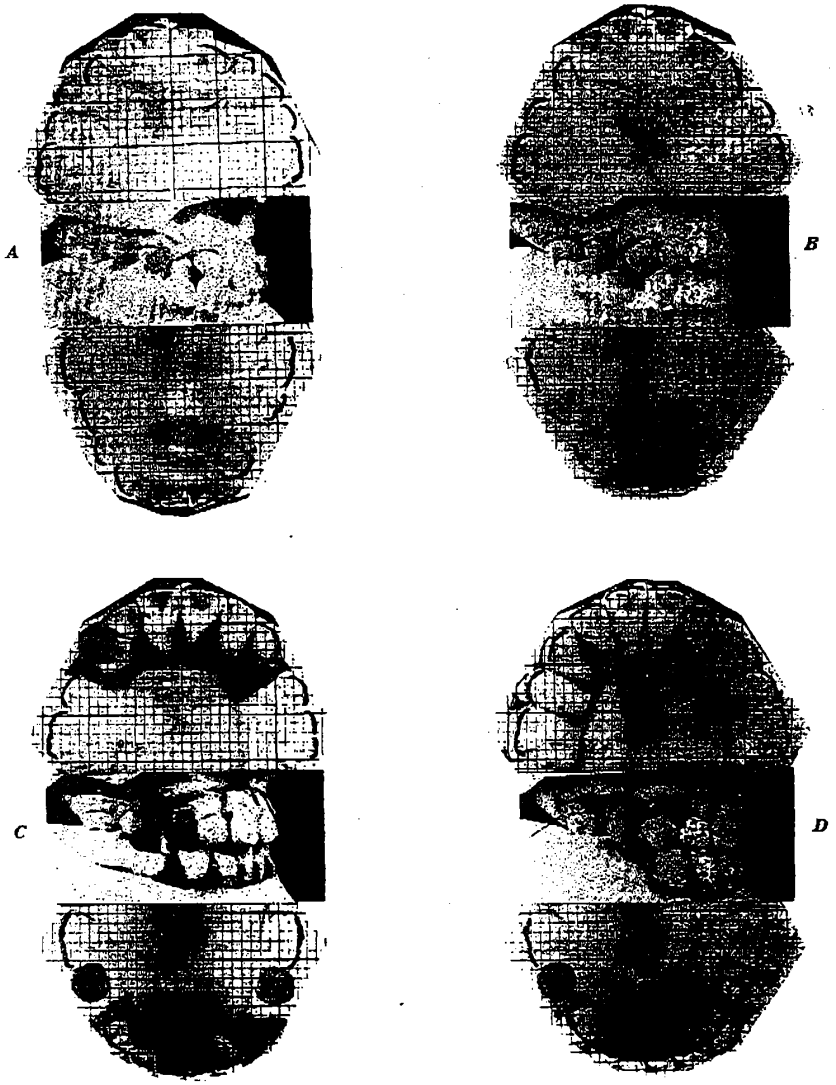


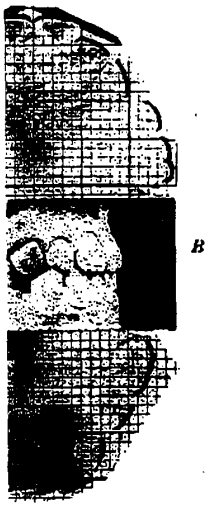
図17 D. P 法から edgewise 法に移行した時点(症例3).

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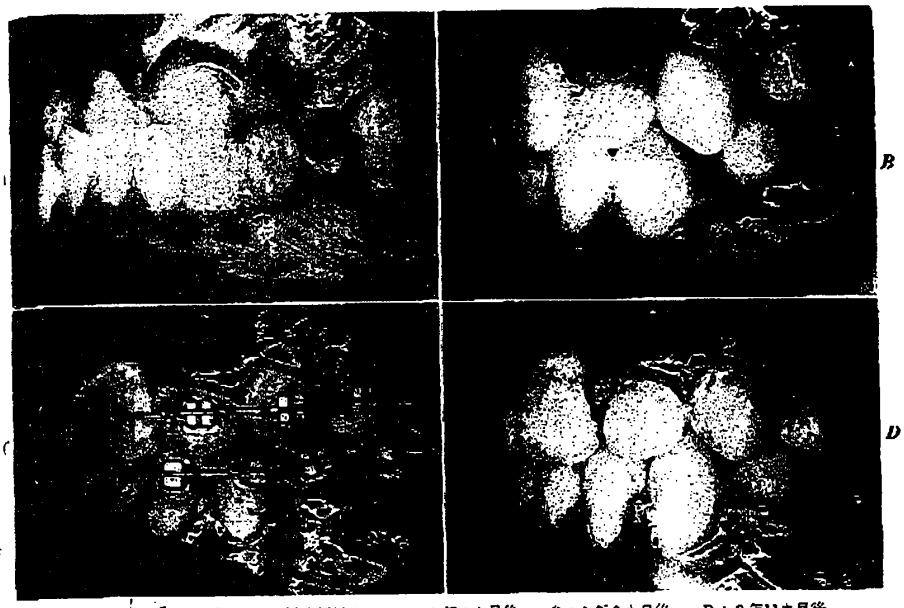


…の石膏模型と set-up model の咬合型…
A：術前　B：D. P を中止した時点　C：…
D：No. 2 号の set-up model

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B



B

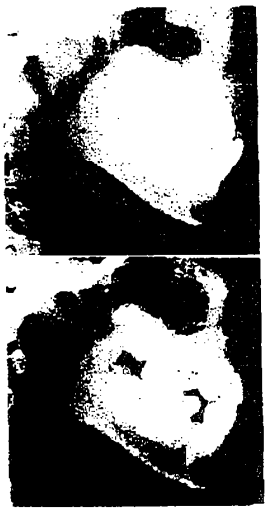
D

図19 症例3の治療経過. A：治療開始時 B：1年4カ月後 C：1年8カ月後 D：2年11カ月後



D

mm).
model



A

B

図20 [illegible]

edgewise [illegible]

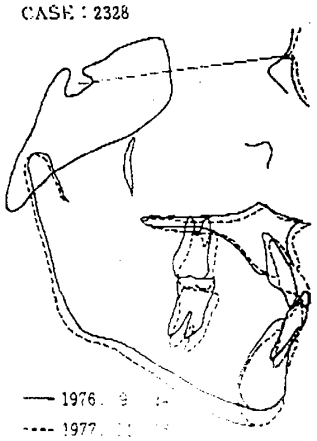


図21 [illegible] (S-N 基例).
[illegible] D.P [illegible] edgewise 法に移した時点

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【症例1】 下顎骨の過成長をともなう顎性反対咬合（図1～図7）

患者：10歳1カ月 男子

1) 現症

顔貌所見：側貌では，中顔面部がわずかに陥凹し，下顔面部の突出観が認められる（図1-A）．

咬合所見：本症例は，歯牙年齢がⅢBにあたる前歯部反対咬合（over jet が−3.5mm，over bite が 2.5mm）を示す症例である（図2）．正中線は，上顎に対して下顎が右側に約 1.5mm 偏位した状態を示している．

臼歯の咬合関係は Angle Ⅲ級（図6-A）であり，上下顎側方歯群の萌出余地は，上顎に不足分を認める（図1-A）．また本症例は，いわゆる構成咬合位を採得することができないことから，機能的因子は全く含まれていない症例と判断した．

頭部X線規格写真分析所見：特に下顎骨が著しく近心転位し，しかも下顎枝ならびに下顎角の形態が顎性反対咬合に共通したパターンを示している．

2) 診断および治療方針

下顎の過成長をともなう顎性反対咬合で，Angle Ⅲ級と診断した．治療方針は，治療開始時から終了まで一貫して D.P 法を適用し，上顎歯列弓に認められる萌出余地の不足分は主に唇側傾大を積極的に行うことにより解決する方針（非抜歯症例）で臨むことに決定した．なお本症例は，D.P の治療効果を検討する意味から，chin cap は使用しない方針で治療を進めることにした．

3) D.P の治療目的

D.P の治療目的を以下に述べる．Set-up model は，これらに準じて製作された．

第1段階：上顎前歯部の被蓋改善を行う目的で，上顎前歯部を唇側方向に移動する．

第2段階：上顎歯列全体を近心方向に移動するとともに，側方永久歯の萌出誘導を行う．

第3段階：仕上げと保定に移る．

4) 治療経過

治療経過は，図5で示すように第1段階の治療効果として，D.P の使用開始3カ月後に上下前歯部の関係が切端咬合位に移った．しかし，側方歯群は，咬合しない状態（臼歯部が開咬の状態）を示した．そこで，治療を一歩進める立場でゴムの硬度を一段高めた D.P（オーソコン-M に変える）を使用し，上顎前歯部により活性化の高い矯正力を加えた．第2段階では，上顎歯列全体をわずかに近心方向に移動すると同時に，側方永久歯の萌出余地を set-up model 上でつくり，側方永久歯の萌出誘導を行った．動的治療期間に1年1カ月，側方歯萌出誘導期間に7カ月，保定期間に9カ月を要し，治療を終了した（図3）．

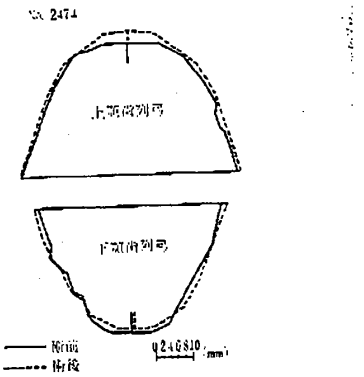


図2 症例1の咬合面規格写真の重ね合わせ．

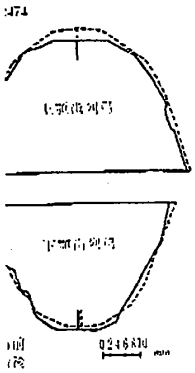
表1 側貌頭部X線規格写真の分析値（症例1）

	術前	術後
SNA	83.98	84.67
SNB	85.09	85.92
ANB	−1.11	−1.24
MP-SN	32.78	31.38
Go.A	128.49	129.81
1 to SN	104.58	121.23
$\overline{1}$ to MP	83.86	89.55

5) 治療成績と評価

顎性をともなう反対咬合に D.P 法を適用する場合，主に上顎歯列の近心移動と同時に前歯部の

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の咬合面規格写真の重ね合わせ．

X線規格写真の分析値（症例1）

術前	術後
83.98	84.67
85.09	85.92
− 1.11	− 1.24
32.78	31.38
128.49	129.81
104.58	121.23
83.86	89.55

の使用開始3カ月後に上下前歯咬合位に移った．しかし，側方歯い状態（白歯部が開咬の状態）

治療を一歩進める立場でD.P（オーソコン-Mに変える前歯部により活性化の高い矯正段階では，上顎歯列全体を前方移動すると同時に，側方永久歯のmodel上でつくり，側方永久歯った．動的治療期間に1年1誘導期間に7カ月，保定期間に9療を終了した（図3）．

と評価

う反対咬合にD.P法を適用して歯列の近心移動と同時に前歯部の唇側拡大，ならびに側方拡大が一般的なset-up modelの再排列時の要点といえる．本症例においては，第1段階に引き続き第2段階で積極的にこの点に主力をおいてset-up modelを製作し治療を進めた．

その結果，図7ならびに表1で示すように，上顎前歯部の唇側拡大が期待した通りに行われて，図8で示すような個性正常咬合を獲得することができた．

そこで，これらの治療結果を総合して評価してみると，以下に示す内容となる．

1) 顎性反対咬合の症例でも，治療開始時期を成長発育期に求めて開始すれば，高い治療結果を得ることができる．

2) 上顎前歯部の唇側拡大ならびに，上顎基底骨の前方発育もわずかであるが期待できる．これは，D.Pを長期間使用することによりゴムの力が顎矯正力となって顎骨に働き，成長をある程度コントロールすることができることを意味するものといえるだろう．

図22は，咬合面規格写真の重ね合わせ，表1は頭部X線規格写真の角度的分析結果（術前と術後）である．

【症例2】 上顎骨の劣成長をともなう反対咬合
（図8～図14）

患者：10歳 女子

1) 現症

顔貌所見：側貌では，中顔面部が陥凹し，下顔部の突出感が認められる．また，下唇にわずかにおとがいがみられる（図8-A）．

咬合所見：本症例は歯牙年齢がⅢBの症例で，上顎部にcrowdingが認められる反対咬合である（図9）．また，上顎両側中切歯は，くさび状に下顎と咬合し，特に両側犬歯遠心側に1.5～2mmの空隙が認められる．正中線は，上顎に対して下顎が1mm程度右側に偏位している．

口腔関係はAngle Ⅲ級を呈している（図13-A）．また本症例は，全く機能的因子を認めることができない症例である．

頭部X線規格写真分析所見：上顎骨は劣成長を示し，また下顎骨はわずかな過成長を示している（図8-A）．

2) 診断および治療方針

上顎骨の劣成長をともなう顎性反対咬合で，Angle Ⅲ級と診断した．治療方針は，D.Pとchin capとの組み合わせで進めることにし，非抜歯症例で行うことにした．

3) D.Pの治療目的

治療目的は3段階に分けて治療を進めることにした．

第1段階：上顎前歯部の唇側拡大による被蓋改善とcrowdingの解消．

第2段階：過剰な唇側拡大と側方歯群の側方拡大（この時期からchin capを使用し，下顎骨の成長成分を抑制する）．

第3段階：咬合の仕上げと保定に移る．

4) 治療経過

治療経過は図12で示すように，第1段階で積極的な唇側拡大を行い，引き続いて第2段階では，より積極的な移動（理想的な位置よりも過剰に移動する）を行ってset-up modelを製作した．また，唇側拡大と同時に前歯部のcrowdingを解消し，動的治療に1年10カ月を要し保定に移った．

特に，set-up model上では，上顎前歯部を最大3mmまで唇側方向に拡大し，また下顎前歯部に認められる空隙は，下顎のcrowdingの解消とわずかな舌側傾斜に使用したところ良好な経過を認めた．

5) 治療成績と評価

本症例は，いわゆる典型的な顎性の反対咬合であり，顎骨のコントロールがその治療結果を大きく左右するような症例である．D.Pがこの目的に適した矯正装置であるか否かは，今後の研究成果によって明確になるかと思われるが，本症例に限っていえば，図14の頭部X線規格写真の結果からも上顎骨の成長を促進させたことは明らかである．いいかえると，set-up modelの再排列いかんによっては，D.Pの復元力が顎矯正力（ortho-

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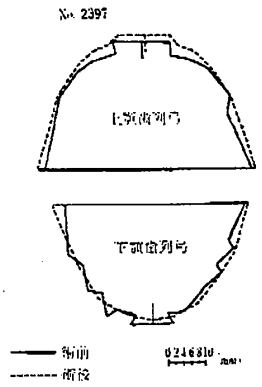


図23 症例2の咬合面規格写真の重ね合わせ.

表2 側貌頭部X線規格写真の分析値（症例2）.

	術前	術後
SNA	78.79	80.33
SNB	78.78	79.44
ANB	0.01	0.89
MP-SN	42.93	40.18
Go.A	133.38	127.71
1 to SN	101.31	107.99
$\overline{1}$ to MP	81.06	80.72

pedic force）として十分に期待できる可能性を示したものといえるだろう.

そこで，この症例から D.P を評価してみると以下の通りになる.

1) D.P は，上下顎骨の成長発育をある範囲内でコントロールすることが可能であり，顎矯正力の治療効果を認めることができる.

2) D.P と chin cap との組み合わせで，高い治療効果を認めた．これは，顎性反対咬合の症例に対する新しい方法および概念といえる.

図23は咬合面規格写真の重ね合わせ，表2は頭部X線規格写真の角度的分析結果である.

【症例3】 著しい叢生をともなう顎性の反対咬合（図15～図21）

患者：9歳11カ月 男子

1) 現症

顔貌所見：側貌は前症例と同様，下顔面部の突出感が認められ，下唇にほんてんがみられる（図15-A）.

咬合所見：本症例は歯牙年齢がⅢBの症例で，特に上顎歯列に著しい叢生が発生することが予測できる反対咬合である（図15-A）．また，左側上顎側切歯が著しく舌側に転位した状態を示し，下顎前歯部にもわずかな叢生が認められる．正中線はほぼ一致している.

臼歯関係は Angle Ⅲ級を呈し，機能的因子は全く認めることができない.

頭部X線規格写真分析所見：特に下顎骨が過成長を示し，上顎骨に対して下顎骨が著しく近心に転位している（図15-A）.

2) 診断および治療方針

下顎骨の過成長をともなう顎性の反対咬合で，Angle Ⅲ級と診断した．特に discrepancy をともなう症例であるので，将来は著しい叢生状態を生じる反対咬合と予測できた．したがって，治療方針は第1小臼歯を4本抜去する抜歯症例と決定された．まず，混合歯列期から開始する立場から，D.P の特徴を十分に活かしながら，初期の目的である被蓋の改善を行うことから始めることにした．また，永久歯列期が完成された時点で，最終的な問題（犬歯と第2小臼歯の傾斜ならびに抜歯空隙の閉鎖など）は全帯環装置（D.B.S. による edgewise 法）を用いて改善する方針で進めることにした.

3) D.P の治療目的

以上の理由から，D.P の役割は永久歯列期になるまで，できるだけ不正部位を改善する目的に主体がおかれる．その治療目的は以下の通りとなる.

第1段階：連続抜去を行いながら，前歯部の被蓋関係を改善する．同時に前歯部の叢生も解消する.

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い叢生をともなう顎性の反対咬
(図15～図21)
月　芳子

は前症例と同様，下顎両部に
下唇にほんてんがみられる．

例は歯牙年齢がⅢBの症例で，
しい叢生が発生することが予測
ある（図15-A）．また，左側
舌側に転位した状態を示し，
かな叢生が認められる．正中
る．
gle Ⅲ級を呈し，機能的因子
できない．
真分析所見：特に下顎骨が過
に対して下顎骨が著しく近心
15-A）．
治療方針
をともなう顎性の反対咬合で
所した．特に discrepancy を
ので，将来は著しい叢生状態
予測できた．したがって，前
を4本抜去する抜歯症例と決定
合歯列期から開始する立場，
十分に活かしながら，初期の
善を行うことから始めること
歯列期が完成された時点で，
と第2小臼歯の傾斜ならびに
）は全帯環装置（D.B.S.に
用いて改善する方針で進めた

目的
D.P の役割は永久歯列期に
け不正部位を改善する目的に
治療目的は以下の通りとな
抜去を行いながら，前歯部
同時に前歯部の叢生も解消

2段階：側方永久歯（犬歯ならびに第2小臼
牙萌出を行い，理想的な位置へ誘導する．

治療経過
Pを使用して1年4カ月後には，前歯部の被
咬ならびに叢生が改善された．その後引き続
edgewise 法（D.B.S. による）で最終的な咬
関係を達成する目的で治療を進めていった．
gewise 法で用いた bracket ならびにワイヤー
6カ月で除去することができた．

治療成績と評価
症例は，著しい叢生をともなった顎性反対咬
に対して，D.P法と edgewise 法を組み合わせ
た治療例である．
ここで，抜歯症例に D.P 法を適用する場合に
下の評価ができる．
1) 混合歯列期に連続抜去を行い，D.P で不正
部位を改善することによって，将来の矯正治
療が容易かつ短時間で終了する状態まで改善
できる．
2) 被蓋関係を正常にすることで，顎骨の発育
を早期に正常な軌道に乗せることが可能とな
る．
3) 抜歯症例の場合は，側方永久歯の傾斜が生
じるため，仕上げの段階に全帯環装置を必要
とする．
図24は咬合面規格写真の重ね合わせ，表3は頭
X線規格写真の角度的分析結果である．

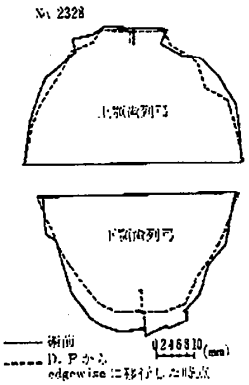


図24　症例3の咬合面規格写真の重ね合わせ．

表3　側貌頭部X線規格写真の分析値（症例3）

	術　前	D.Pから edgewise に移行した時点
SNA	81.28	84.03
SNB	81.80	82.76
ANB	− 0.52	1.26
MP-SN	35.85	35.32
Go.A	134.46	133.57
1 to SN	99.58	114.99
1 to MP	86.07	81.12

おわりに

本論は，いわゆる顎性反対咬合に用いる D.P について，その治療概念を簡単に述べるとともに，混合歯列期から治療を開始した治験例を3症例呈示し，その治療効果について述べた．

ところで，これらから D.P 法を評価してみると，顎性を示す反対咬合に対してもその個体の成長発育期に向けて治療を開始すれば優れた治療効果を発揮するばかりか，D.P を長期にわたって使用することにより，顎骨の成長発育をある程度コントロールする効果も期待できる点である．この点については，ゴムの復元力が直接歯槽部粘膜面に伝達され顎矯正力として作用しているものと理解することができよう．また，D.P と他の矯正装置との組み合わせを行うことにより，より高い治療効果を発揮できる点も D.P 法の特徴といえる．特に，抜歯症例においては，edgewise 法を導入するまでに不正部位を可及的に改善し，永久歯列完成まで治療もしくは咬合の管理を D.P で行えば，固定式矯正装置の一種である edgewise 装置を短期間で除去できる利点を意味するものである．換言すれば，edgewise 法で行われる標準化（leveling）を D.P が混合歯列期に肩代わりしながら，歯を生物学的にしかも合理的に移動し，個性正常咬合を達成する治療法であるといえる．

（つづく，文献は最終回に一括掲載）

ClearCorrect Exhibit 1002, Page 3079 of 3373



Find out if you're a candidate for this *nearly invisible* no-braces treatment. Ask your doctor about Red, White & Blue today!

AOA/Pro
ALLESEE ORTHODONTIC APPLIANCES • PRO LAB

Lit No 070-5928 Rev A

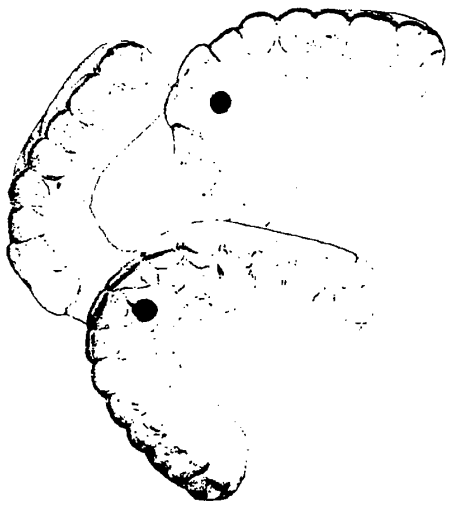
AOA000621

You May
A Candid
For This
Invisible
No-Brace
Treatmer



AOA000621

ClearCorrect Exhibit 1002, Page 3080 of 3373



If all you need is a little cosmetic improvement for a great smile and you'd prefer not to have braces, the *nearly invisible* Red, White and Blue no-braces system may be the treatment for you. A quick evaluation will tell if you're a candidate for this convenient treatment and, if so, you can have a dazzling new smile in just a few months.

Here's How It Works

If your doctor determines that you're a candidate for the system, we'll take an impression of your teeth and send it to the laboratory where they'll create a series of active aligners, custom-made for you. Each appliance is a tray made of light-weight plastic with an impression of your teeth in the shape of your arches.



You'll wear each appliance approximately 2-4 weeks in the easy-to-remember Red, White and Blue sequence. The nearly invisible appliances are so easy to wear and talk with, few people will even know you have them on. And in just a few months, you'll be enjoying your beautiful new smile. Whether you're in school, on the go with a family, a professional in the public eye or active in sports, Red White and Blue fits easily into your busy life.

It's So Convenient

Red, White and Blue is simple to follow. Start with the Red, transition to the White and end with the Blue. Your doctor will give you more explicit directions. Each aligner is clearly marked with color-coded dots for easy identification. Each one works to coax your teeth in small incremental movements, each getting you progressively closer to your new smile. In some cases, the doctor will slenderize your front teeth to make room for tooth movement.

When you begin wearing the aligners, you may experience minor discomfort, but they'll soon loosen and become comfortable. The final Blue appliance is designed with all the desired correction and can be worn at night as a long-term retainer. It couldn't be any easier!

Ask Your Doctor

Red, White and Blue is not for everyone. Your doctor will be able tell you if you're a candidate. Make your consultation appointment today. After all, your dazzling new smile...simple, affordable and convenient...may be just three dots away.



AOA000622

ClearCorrect Exhibit 1002, Page 3081 of 3373

AOA000622

Electronic Acknowledgement Receipt	
EFS ID:	38190828
Application Number:	16723706
International Application Number:	
Confirmation Number:	1026
Title of Invention:	AUTOMATED TREATMENT STAGING FOR TEETH
First Named Inventor/Applicant Name:	Ian Kitching
Customer Number:	107046
Filer:	Charles C. Hagadorn III/John Macalagay
Filer Authorized By:	Charles C. Hagadorn III
Attorney Docket Number:	22773-774.305
Receipt Date:	02-JAN-2020
Filing Date:	
Time Stamp:	19:55:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	Z-SIEMENS-CEREC-COMPUTER-RECONSTRUCTION.PDF	3574192 e472ed6e44c87d51674bdfa409e5437d028ec7c1	no	14

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2	Non Patent Literature	Z-SINCLAIR-THE-READERS-369.PDF	243096 b017dbcb44ab944246e15575c9e43bc28324cf73	no	5
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3	Non Patent Literature	Z-SIRONA-DENTAL-SYSTEMS-2003.PDF	2825521 8df072d0636415e2806ffaefc3324f6e8a1ce349	no	114
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Information:					
4	Non Patent Literature	Z-STOLL-COMPUTER-AIDED-314.PDF	6480374 08633c44557ce0e8c7ac32812ee450960dc5c6bb	no	30
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5	Non Patent Literature	Z-STURMAN-INTERACTIVE-KEYFRAME-35.PDF	495663 9fd20cb874bcf9ab8be147b0e592589a413dd795	no	7
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6	Non Patent Literature	Z-THE-CHOICE-IS-CLEAR-6.PDF	567749 5fc8cffbc2687ce510a6e7ec67db27628fea515f	no	6
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7	Non Patent Literature	Z-THE-CHOICE-IS-CLEAR-5.PDF	330691 defd6b280b567c3b6099aa6c60ea14d210976c6d	no	5
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8	Non Patent Literature	Z-THE-CHOICE-IS-CLEAR-2.PDF	137879 12f4dc2b08184086ae95545b3c3380f9adb92205	no	2
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9	Non Patent Literature	Z-THE-RED-WHITE-BLUE-1992.PDF	139057 fa6c6f7d3582d52d1c28071c22621a2b15dcbc2a	no	2
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10	Non Patent Literature	Z-TRUAX-TRUAX-CLASP-1992.PDF	2719664 2affc07d8b897b4744e73f2a044dc0f19d373aef	no	9
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11	Non Patent Literature	Z-TRU-TAIN-ORTHODONTIC-AND-DENTAL.PDF	1009705 3718715b4e2bf79720bd322034286929eb4eb975	no	16
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12	Non Patent Literature	Z-USDC-AUTOMATED-CROWN-1977.PDF	3008645 beb6962fecc1c70e350022a2676587c9392985d2	no	19
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13	Non Patent Literature	Z-USDC-HOLODONTOGRAPHY-AN-1973.PDF	8186194 bf90fded9eeba83c5ce6138a491b2c368e3cddf5	no	40
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15	Non Patent Literature	Z-VAN-DER-LINDEN-THREE-DIMENSIONAL-1100.PDF	155031 f4d85bb4196beeabd511191ba64a2fa2a4ac5b86	no	1
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16	Non Patent Literature	Z-VAN-DER-LINDEN-A-NEW-1104.PDF	147117 536daa9d4cbaa37c7853367b0bdf1ebae096a9f3	no	1
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17	Non Patent Literature	Z-VAN-DER-ZEL-CERAMIC-FUSED-769.PDF	1276830 7522f9d9a38441a013377d7ba56e938ba79612d1	no	11
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23	Non Patent Literature	Z-WILLIAMS-DENTISTRY-AND-1987.PDF	344850 8e96c969daabd083f075232f818cfba0829631ec	no	4
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24	Non Patent Literature	Z-WILLIAMS-THE-SWITZERLAND-50.PDF	527730 033443c911139a515af33600dd32eb33af6ce157	no	6
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29	Non Patent Literature	Z-YAMAMOTO-THREE-DIMENSIONAL-2051.PDF	141862 3e9b531f6cb290c7637cd08fef4c823f8947e20f	no	3
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Information:					
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	001	US-10420631	09-24-2019	KITCHING; Ian et al.	
	002	US-10456217	10-29-2019	KITCHING; Ian et al.	
	003	US-20180092715	04-05-2018	KITCHING; Ian et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]–Number[4]–Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
		None				

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author(in CAPITAL LETTERS),title of the article(when appropriate), title of the item (book,magazine,journal,serial,symposium,catalog,etc.),date,page(s),volume-issue number(s),publisher, city and/or country where published.	T[2]
		None	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Electronic Acknowledgement Receipt

EFS ID:	38190866
Application Number:	16723706
International Application Number:	
Confirmation Number:	1026
Title of Invention:	AUTOMATED TREATMENT STAGING FOR TEETH
First Named Inventor/Applicant Name:	Ian Kitching
Customer Number:	107046
Filer:	Charles C. Hagadorn III/John Macalagay
Filer Authorized By:	Charles C. Hagadorn III
Attorney Docket Number:	22773-774.305
Receipt Date:	02-JAN-2020
Filing Date:	
Time Stamp:	20:00:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		22773-774-305_IDS-2.pdf	295541 86c5b9f3abdadc00c12451aab6b78230ad2dbb21	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	4
	Information Disclosure Statement (IDS) Form (SB08)	5	5
Warnings:			
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	Total Files Size (in bytes):	295541	

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New Applications Under 35 U.S.C. 111
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National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor:	KITCHING, Ian et al.	Group Art Unit:	3772
Serial Number:	16/723,706	Examiner:	Not yet assigned.
Filing or 371 (c) Date:	2019-12-20	**CONFIRMATION NO:**	**1026**
Title:	AUTOMATED TREATMENT STAGING FOR TEETH		

FILED ELECTRONICALLY ON: January 02, 2020

Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR § 1.97

Commissioner for Patents:

An Information Disclosure Statement along with attached PTO/SB/08 is hereby submitted. A copy of each listed publication is submitted, if required, pursuant to 37 CFR §§1.97-1.98, as indicated below.

The Examiner is requested to review the information provided and to make the information of record in the above-identified application. The Examiner is further requested to initial and return the attached PTO/SB/08 in accordance with MPEP § 609.

The right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered, is hereby reserved.

This statement is not intended to represent that a search has been made or that the information cited in the statement is, or is considered to be, prior art or material to patentability as defined in § 1.56.

A. ☒ *37 CFR § 1.97 (b).* This Information Disclosure Statement should be considered by the Office because:

☐ (1) It is being filed within 3 months of the filing date of a national application and is other than a continued prosecution application under § 1.53 (d);

-- OR --

☐ (2) It is being filed within 3 months of entry of the national stage as set forth in § 1.491 in an international application;

-- OR --

☒ (3) It is being filed before the mailing of a first Office action on the merits;

-- OR --

☐ (4) It is being filed before the mailing of a first Office action after the filing of a request for continued examination under § 1.114.

B. ☐ *37 CFR § 1.97(c).* Although this Information Disclosure Statement is being filed after the period specified in *37 CFR § 1.97(b),* above, it is filed before the mailing date of the earlier of (1) a final office action under § 1.113, (2) a notice of allowance under § 1.311, or (3) an action that otherwise closes prosecution in the application, this Information Disclosure Statement should be considered because it is accompanied by one of:

☐ a statement as specified in §1.97 (e) provided concurrently herewith;

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☐ a fee of $240.00 as set forth in § 1.17 (p) authorized below, enclosed, or included with the payment of other papers filed together with this statement.

C. ☐ *37 CFR § 1.97 (d).* Although this Information Disclosure Statement is being filed after the mailing date of the earlier of (1) a final office action under § 1.113, (2) a notice of allowance under § 1.311, or (3) an action that otherwise closes prosecution in the application, it is being filed before payment of the issue fee and should be considered because it is accompanied by:

i. a statement as specified in § 1.97 (e);

-- AND --

ii. a fee of $240.00 as set forth in §1.17(p) is authorized below, enclosed, or included with the payment of other papers filed together with this Statement.

D. ☐ *37 CFR §1.97 (e).* Statement.

☐ A statement is provided herewith to satisfy the requirement under 37 CFR §§ 1.97 (c);

-- AND/OR --

☐ A statement is provided herewith to satisfy the requirement under 37 CFR §§ 1.97 (d);

-- AND/OR --

☐ A copy of a dated communication from a foreign patent office clearly showing that the information disclosure statement is being submitted within 3 months of the filing date on the communication is provided in lieu of a statement under 37 C.F.R. § 1.97(e) (1) as provided for under MPEP 609.04(b) V.

E. ☐ *Statement Under 37 C.F.R. §1.704(d).* Each item of information contained in the information disclosure statement was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office or is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office that was received by an individual designated in § 1.56(c) not more than thirty (30) days prior to the filing of this information disclosure statement. This statement is made pursuant to the requirements of 37 C.F.R. §1.704(d) to avoid reduction of the period of adjustment of the patent term for Applicant(s) delay.

F. ☒ *37 CFR §1.98 (a) (2).* The content of the Information Disclosure Statement is as follows:

☐ Copies of each of the references listed on the attached Form PTO/SB/08 are enclosed herewith.

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☒ Copies of U.S. Patent Documents (issued patents and patent publications) listed on the attached Form PTO/SB/08 are not enclosed.

-- AND/OR --

☐ Copies of Foreign Patent Documents and/or Non Patent Literature Documents listed on the attached Form PTO/SB/08 are enclosed in accordance with 37 CFR §1.98 (a)(2).

-- AND/OR --

☐ Copies of pending unpublished U.S. patent applications are enclosed in accordance with 37 CFR §1.98 (a) (2) (iii).

G. ☐ *37 CFR §1.98(a)(3).* The Information Disclosure Statement includes non-English patents and/or references.

☐ Pursuant to 37 CFR §1.98(a)(3)(i), a concise explanation of the relevance of each patent, publication or other information provided that is not in English is provided herewith.

☐ Pursuant to MPEP 609(B), an English language copy of a foreign search report is submitted herewith to satisfy the requirement for a concise explanation where non-English language information is cited in the search report.

-- OR --

☐ A concise explanation of the relevance of each patent, publication or other information provided that is not in English is as follows: _____

☐ Pursuant to 37 CFR §1.98(a) (3) (ii), a copy of a translation, or a portion thereof, of the non-English language reference(s) is provided herewith.

H. ☐ *37 CFR §1.98(d).* Copies of patents, publications and pending U.S. patent applications, or other information specified in 37 C.F.R. § 1.98(a) are not provided herewith because:

☐ Pursuant to 37 CFR §1.98(d)(1) the information was previously submitted in an Information Disclosure Statement, or cited by examiner for another application under which this application claims priority for an earlier effective filing date under 35 U.S.C. 120.

Application in which the information was submitted: _____

Information Disclosure Statement(s) filed on: _____

AND

☐ The information disclosure statement submitted in the earlier application complied with paragraphs (a) through (c) of 37 CFR §1.98.

I. ☒ *Fee Authorization*. The Commissioner is hereby authorized to charge the above-referenced fees of $0.00 and charge any additional fees or credit any overpayment associated with this communication to Deposit Account No. 23-2415 (Docket No.22773-774.305).

Respectfully submitted,

WILSON SONSINI GOODRICH & ROSATI

Dated: December 31, 2019

By: /Charles Hagadorn III/
Charles Hagadorn III
Reg. No. 62,367

650 Page Mill Road
Palo Alto, CA 94304-1050
(650) 493-9300
Customer No. 107046

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/723,706

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	30 minus 20 =	* 10			OR	x 100 =	1000
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	* 1				x 460 =	460
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	3180

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/723,706	12/20/2019	3772	3180	22773-774.305	30	4

CONFIRMATION NO. 1026

107046
WSGR / Align Technology , Inc.
650 Page Mill Road
Palo Alto, CA 94304

FILING RECEIPT

OC000000113972540

Date Mailed: 01/17/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Ian Kitching, Saratoga, CA;
Alexander Dmitriev, Moscow, RUSSIAN FEDERATION;
Alexey Vishnevskiy, Moscow, RUSSIAN FEDERATION;

Applicant(s)

ALIGN TECHNOLOGY, INC., San Jose, CA;

Power of Attorney: The patent practitioners associated with Customer Number 107046

Domestic Priority data as claimed by applicant

This application is a CON of 15/834,649 12/07/2017 PAT 10524879
which is a CON of 15/086,491 03/31/2016 PAT 10420631
which is a CON of 13/209,276 08/12/2011 PAT 9326830
which is a CON of 11/848,172 08/30/2007 PAT 8038444
which claims benefit of 60/824,022 08/30/2006
and claims benefit of 60/824,024 08/30/2006

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

ClearCorrect Exhibit 1002, Page 3097 of 3373

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/14/2020
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/723,706**
Projected Publication Date: 04/23/2020
Non-Publication Request: No
Early Publication Request: No
Title

AUTOMATED TREATMENT STAGING FOR TEETH

Preliminary Class

433

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

ClearCorrect Exhibit 1002, Page 3100 of 3373

To: patentdocket@wsgr.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 107046

Jan 17, 2020 03:42:33 AM

Dear PAIR Customer:

WSGR / Align Technology , Inc.
650 Page Mill Road
Palo Alto, CA 94304
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 107046 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Disclaimer:
The list of documents shown below is provided as a courtesy and is not part of the official file wrapper. The content of the images shown in PAIR is the official record.

Application	Document	Mailroom Date	Attorney Docket No.
16723706	APP.FILE.REC	01/17/2020	22773-774.305

To view your correspondence online or update your email addresses, please visit us anytime at https://sportal.uspto.gov/secure/myportal/privatepair.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	22773-774.305	1026

107046 7590 01/22/2020

WSGR / Align Technology , Inc.
650 Page Mill Road
Palo Alto, CA 94304

EXAMINER	
ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
01/22/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@wsgr.com

Decision Granting Request for Prioritized Examination (Track I)	**Application No.** 16/723,706	**Applicant(s)** Kitching et al.	
	Examiner CHERYL P GIBSON BAYLOR	**Art Unit** OPET	**AIA (FITF) Status** No

1. THE REQUEST FILED 20 December 2019 IS **GRANTED** .

The above-identified application has met the requirements for prioritized examination

A. ☑ for an original nonprovisional application (Track I).
B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination**. The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;

B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims** , or a multiple dependent claim;

C. filing a **request for continued examination** ;

D. filing a notice of appeal;

E. filing a request for suspension of action;

F. mailing of a notice of allowance;

G. mailing of a final Office action;

H. completion of examination as defined in 37 CFR 41.102; or

I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to CHERYL GIBSON BAYLOR at (571)272-3213. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.

/CHERYL GIBSON BAYLOR/ Paralegal Specialist, OPET	

To: patentdocket@wsgr.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 107046

Jan 23, 2020 03:38:32 AM

Dear PAIR Customer:

WSGR / Align Technology , Inc.
650 Page Mill Road
Palo Alto, CA 94304
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 107046 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Disclaimer:
The list of documents shown below is provided as a courtesy and is not part of the official file wrapper. The content of the images shown in PAIR is the official record.

Application	Document	Mailroom Date	Attorney Docket No.
16723706	TRACK1.GRANT	01/22/2020	22773-774.305

To view your correspondence online or update your email addresses, please visit us anytime at https://sportal.uspto.gov/secure/myportal/privatepair.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	22773-774.305	1026

107046 7590 02/26/2020

WSGR / Align Technology , Inc.
650 Page Mill Road
Palo Alto, CA 94304

EXAMINER
APONTE, MIRAYDA ARLENE

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
02/26/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@wsgr.com

PTOL-90A (Rev. 04/07)

Office Action Summary	**Application No.** 16/723,706	**Applicant(s)** Kitching et al.	
	Examiner MIRAYDA A APONTE	**Art Unit** 3772	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 20 December 2019.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-30 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☐ Claim(s) _____ is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☑ Claim(s) 1-30 are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Election/Restriction

This application contains claims directed to the following patentably distinct species as follow;

Species I, described in claims 1-12,

Species II, described in claims 13-19,

Species III, described in claims 20-23, and

Species IV, described in claims 24-30.

The species are independent or distinct because:

Species I relates to a computer-implemented method including the steps of determining a movement pattern that defines a schedule of movement from moving dental objects from an initial to a final arrangement defining an schedule of movement, calculating the respective path of each dental object from the initial position to the final position, identifying a collision between the a first dental object and a second dental object based on the on the schedule of movement and the respective treatment paths, performing a first modification of the schedule of movement in response to the step of identifying, and performing a second modification of the schedule of movement after determining a collision was not avoid from the first modification;

Species II relates to a computer-implemented method generally including the steps of determining and calculating, and further including the step of performing a first modification to the schedule of movement to avoid collision or obstruction between two dental objects then determining if collision is avoided, then performing a second modification of the schedule of movement after the determining step;

Species III relates to a method includes the step of generally including the steps of determining and calculating, and further including the step of attempting a first modification of the schedule of movement by slowing or stopping movement of the first of the dental objects, attempting a second modification of the schedule of movement after identifying collision including moving the first of the dental objects away from the respective route of the second of the dental objects and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision, then attempting a third modification of the schedule of movement as a response to identifying the collision to determine a third number of stages for a third treatment option, the third modification including delaying one or more teeth from moving one or more stages where it would otherwise move in order to prevent another tooth from colliding with and/or obstructing the path of the delayed tooth; then selecting the first, second, or third option based on the least of the number of stages of the first, second and third treatment options; and performing the respective modification to the movement pattern based on the selection of the first, second, or third treatment option; and

Species IV relates to a computer-implemented method generally including the steps of determining and calculating and further including the step of modifying by adding that the schedule of movement with a first modification to avoid a collision or obstruction between two of the dental objects on their respective routes by: moving a first of the dental objects away from the respective route of a second of the dental objects; and moving the first dental object toward its respective final position after the second dental object has

sufficiently traversed its respective route to avoid the collision. In addition, these species are not obvious variants of each other based on the current record.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species, or a single grouping of patentably indistinct species, for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no generic claim is found.

There is a search and/or examination burden for the patentably distinct species as set forth above because at least the following reason(s) apply:

a) the inventions require a different field of search (e.g., employing different search strategies or search queries).

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected species or grouping of patentably indistinct species**, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

The election may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the election of species requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election,

applicant must indicate which of these claims are readable on the elected species or grouping of patentably indistinct species.

Should applicant traverse on the ground that the species, or groupings of patentably indistinct species from which election is required, are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing them to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the species unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other species.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141.

A telephone call was made to Charles Hagadorn on 14 February 2020 to request an oral election to the above restriction requirement, but did not result in an election being made.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be corrected in compliance with 37 CFR 1.48(a) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. A request to correct inventorship under 37 CFR 1.48(a) must be accompanied by an application data sheet in accordance with 37 CFR 1.76 that identifies each inventor by his or her legal name and by the processing fee required under 37 CFR 1.17(i).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIRAYDA ARLENE APONTE whose telephone number is (571)270-1933. The examiner can normally be reached on M-F 8-5.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cris Rodriguez can be reached on 571-272-4964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/MIRAYDA A APONTE/
Examiner, Art Unit 3772
/SEAN M MICHALSKI/
Primary Examiner, Art Unit 3724

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/14/2020								
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To: patentdocket@wsgr.com,,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 107046

Feb 26, 2020 03:37:49 AM

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Application	Document	Mailroom Date	Attorney Docket No.
16723706	CTRS	02/26/2020	22773-774.305

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Application Number	16/723,706 Conf. No. 1026
Filing Date	December 20, 2019
First Named Inventor	Ian Kitching
Title	AUTOMATED TREATMENT STAGING FOR TEETH
Art Unit	3772
Examiner Name	Aponte, Mirayda Arlene
Attorney Docket Number	11353.018US5

SIGNATURE of Applicant or Patent Practitioner

Signature	/Charles C. Hagadorn, III/	Date (Optional)	
Name	Charles C. Hagadorn, III	Registration Number	62367
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 161191

OR

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I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Align Technology, Inc.

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

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SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	
Name	Arthur S. Hsieh		
Title	Vice President, Intellectual Property & Licensing		

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Electronic Acknowledgement Receipt	
EFS ID:	39150325
Application Number:	16723706
International Application Number:	
Confirmation Number:	1026
Title of Invention:	AUTOMATED TREATMENT STAGING FOR TEETH
First Named Inventor/Applicant Name:	Ian Kitching
Customer Number:	107046
Filer:	Charles C. Hagadorn III/Jayna Lofgran
Filer Authorized By:	Charles C. Hagadorn III
Attorney Docket Number:	22773-774.305
Receipt Date:	14-APR-2020
Filing Date:	20-DEC-2019
Time Stamp:	11:17:15
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	11353-018US5_16723706_aia0082_POA_Signed.pdf	1272805 8fc04638add811a1583e327fbf615af208a3779e	no	2
Warnings:					

Information:	
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/723,706	12/20/2019	Ian Kitching	22773-774.305

CONFIRMATION NO. 1026

107046
WSGR / Align Technology , Inc.
650 Page Mill Road
Palo Alto, CA 94304

POWER OF ATTORNEY NOTICE

OC000000116278374

Date Mailed: 04/21/2020

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/14/2020.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

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/mbeyene/

ClearCorrect Exhibit 1002, Page 3118 of 3373

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/723,706	12/20/2019	Ian Kitching	11353.018US5

CONFIRMATION NO. 1026

161191
FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

POA ACCEPTANCE LETTER

OC000000116278405

Date Mailed: 04/21/2020

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

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From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
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Application	Document	Mailroom Date	Attorney Docket No.
16723706	N570	04/21/2020	11353.018US5
	N570	04/21/2020	11353.018US5

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/723,706	12/20/2019	Ian Kitching	11353.018US5

CONFIRMATION NO. 1026

161191
FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

PUBLICATION NOTICE

OC000000116469529

Title:AUTOMATED TREATMENT STAGING FOR TEETH

Publication No.US-2020-0121421-A1
Publication Date:04/23/2020

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The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

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Subject: Private PAIR Correspondence Notification for Customer Number 161191

Apr 24, 2020 04:27:20 AM

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Application	Document	Mailroom Date	Attorney Docket No.
16723706	NTC.PUB	04/23/2020	11353.018US5

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Date: April 27, 2020 Signature: /Jayna Lofgran/
Name: Jayna Lofgran

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	ALIGN TECHNOLOGY, INC.	Examiner:	Aponte, Mirayda Arlene
Appln. No.:	16/723,706	Art Unit:	3772
Filed:	December 20, 2019	Conf. No.:	1026
For:	AUTOMATED TREATMENT STAGING FOR TEETH	Customer No:	161191
Attorney Docket No:	11353.018US5		

RESPONSE TO RESTRICTION REQUIREMENT AND ELECTION OF SPECIES

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

In response to the Office Action dated February 26, 2020, in the above-referenced application, Applicant hereby elects without traverse Species I. Application respectfully submits that claims 1-19 are generic or directed to the elected species and respectfully requests examination of claims 1-19.

Amendments to the claims begin on Page 2.

Remarks begin on Page 8.

ClearCorrect Exhibit 1002, Page 3123 of 3373

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Original) A computer-implemented method comprising:

determining a movement pattern for moving dental objects from an initial arrangement toward a final arrangement, the movement pattern defining a schedule of movement of the dental objects during treatment stages as each of the dental objects moves from a respective initial position toward a respective final position;

calculating a respective treatment path for each of the dental objects between their respective initial and final positions;

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths;

performing a first modification of the schedule of movement in response to the identifying;

determining that the first modification does not avoid a collision between the first and second dental objects; and

performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision.

2. (Original) The method of claim 1, wherein the movement pattern is determined by selection by a user.

3. (Original) The method of claim 1, wherein the movement pattern includes one of an all-equal pattern, an A-shaped pattern, a V-shaped pattern, a mid-line shift patter, or a M-shaped pattern.

4. (Original) The method of claim 1, wherein the determining the movement pattern comprises analyzing, by a computer processor, the dental objects in their respective initial and final positions.

5. (Original) The method of claim 4, wherein the analyzing comprises determining a respective distance needed to move each of the dental objects from their respective initial positions to their respective final positions.

6. (Original) The method of claim 1, wherein the first modification comprises delaying initial movement of the first dental object.

7. (Original) The method of claim 6, wherein the second modification comprises slowing or stopping movement of the first dental object during one or more of the treatment stages following a previous one of the treatment stages in which the first dental object moved.

8. (Original) The method of claim 7, further comprising:

performing, after determining that the second modification does not avoid a collision, a third modification of the schedule of movement, the third modification comprising:

moving a first of the dental objects away from the respective route of a second of the dental objects; and

moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision.

9. (Original) The method of claim 1, wherein the second modification comprises one or more of:

delaying initial movement of the first dental object; and

slowing or stopping movement of the first dental object during one or more of the treatment stages following a previous one of the treatment stages during which the first dental object moved.

10. (Original) The method of claim 1, wherein the second modification comprises:

moving a first of the dental objects away from the respective route of a second of the dental objects; and

moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision.

ClearCorrect Exhibit 1002, Page 3125 of 3373

11. (Original) The method of claim 1, further comprising producing a series of orthodontic appliances based at least on the modified schedule of movement, wherein each of the orthodontic appliances corresponds to a respective one of the treatment stages.

12. (Original) The method of claim 11, wherein the producing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming a respective one of the orthodontic appliances over each of the respective positive molds.

13. (Original) A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages, wherein the schedule of movement indicates whether each of the dental objects moves during each of the treatment stages;

calculating a respective route from an initial position toward a final position for each of the dental objects during the treatment stages; and

performing a first modification to the schedule of movement to avoid a collision or obstruction between two of the dental objects on their respective routes;

determining that the first modification does not avoid the collision or obstruction between the first and second dental objects; and

performing a second modification of the schedule of movement after determining that the first modification does not avoid the collision or obstruction.

14. (Original) The computer-implemented method of claim 13, wherein determining the schedule of movement comprises selecting a movement pattern from a plurality of predetermined movement patterns.

15. (Original) The computer-implemented method of claim 13, further comprising recalculating at least one of the respective routes based on the first or second modified schedule of movement.

ClearCorrect Exhibit 1002, Page 3126 of 3373

16. (Original) The computer-implemented method of claim 13, further comprising manufacturing at least two orthodontic aligners, each of the orthodontic aligners corresponding to a respective one of the treatment stages.

17. (Original) The computer-implemented method of claim 16, wherein the manufacturing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming an orthodontic aligner over each respective positive mold.

18. (Original) The computer-implemented method of claim 13, wherein the first or second modification comprises:

moving a first of the dental objects away from the respective route of a second of the dental objects; and

moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision.

19. (Original) The computer-implemented method of claim 13, wherein the first or second modification comprises:

moving a first of the dental objects away from the respective route of a second of the dental objects; and

moving the first dental object toward its previous position.

20. (Original) A method comprising:

determining a movement pattern for moving dental objects from an initial arrangement toward a final arrangement, the movement pattern defining a schedule of movement of the dental objects during treatment stages as each of the dental objects moves from a respective initial position toward a respective final position;

calculating a respective treatment path for each of the dental objects between their respective initial and final positions;

ClearCorrect Exhibit 1002, Page 3127 of 3373

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths;

attempting a first modification of the schedule of movement in response to identifying the collision to determine a first number of stages for a first treatment option, the first modification including slowing or stopping movement of the first of the dental objects;

attempting a second modification of the schedule of movement in response to identifying the collision to determine a second number of stages for a second treatment option, the second modification including moving the first of the dental objects away from the respective route of the second of the dental objects and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision;

attempting a third modification of the schedule of movement in response to identifying the collision to determine a third number of stages for a third treatment option, the third modification including delaying one or more teeth from moving one or more stages where it would otherwise move in order to prevent another tooth from colliding with and/or obstructing the path of the delayed tooth; and

selecting the first, second, or third option based on the least of the number of stages of the first, second and third treatment options; and

performing the respective modification to the movement pattern based on the selection of the first, second, or third treatment option.

21. (Original) The method of claim 20, further comprising producing a series of orthodontic appliances based at least on the modified schedule of movement, wherein each of the orthodontic appliances corresponds to a respective one of the treatment stages.

22. (Original) The method of claim 21, wherein the producing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming a respective one of the orthodontic appliances over each of the respective positive molds.

ClearCorrect Exhibit 1002, Page 3128 of 3373

23. (Original) The method of claim 22, wherein the movement pattern includes one of an all-equal pattern, an A-shaped pattern, a V-shaped pattern, a mid-line shift pattern, or a M-shaped pattern.

24. – 30. (Canceled)

ClearCorrect Exhibit 1002, Page 3129 of 3373

REMARKS

Upon entry of this amendment, claims 1-23 will be pending in the application. Claims 24-30 have been canceled without prejudice or disclaimer.

Applicant does not believe that any fees are due at this time since this response is timely filed. If the Examiner should believe that any fees are due at this or any other time during the prosecution of this application, he is authorized to charge such fees, or credit any overpayments, to Deposit Account No. 50-6974.

Applicant submits that the application is in condition for allowance. If any issues exist that can be resolved with an Examiner's Amendment or a telephone conference, please contact Applicant's representative at, 206-537-9809.

Respectfully submitted,

Dated: April 27, 2020

/Charles C. Hagadorn, III/

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ClearCorrect Exhibit 1002, Page 3130 of 3373

Electronic Acknowledgement Receipt	
EFS ID:	39279802
Application Number:	16723706
International Application Number:	
Confirmation Number:	1026
Title of Invention:	AUTOMATED TREATMENT STAGING FOR TEETH
First Named Inventor/Applicant Name:	Ian Kitching
Customer Number:	161191
Filer:	Charles C. Hagadorn III/Jayna Lofgran
Filer Authorized By:	Charles C. Hagadorn III
Attorney Docket Number:	11353.018US5
Receipt Date:	27-APR-2020
Filing Date:	20-DEC-2019
Time Stamp:	19:05:00
Application Type:	Utility under 35 USC 111(a)

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Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		11353-018US5-Response-to-RR_200427.pdf	92355 2300d032b118c3878f2f5a507989db6fa5adfc2a	yes	8

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Response to Election / Restriction Filed	1	1
	Claims	2	7
	Applicant Arguments/Remarks Made in an Amendment	8	8
Warnings:			
Information:			
	Total Files Size (in bytes):	92355	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/723,706	Filing Date 12/20/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT	04/27/2020	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 23	Minus	** 30	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 4	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/JOHN W EPPS/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

161191 7590 08/10/2020

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

EXAMINER
APONTE, MIRAYDA ARLENE

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
08/10/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@fisherbroyles.com
patent@fisherbroyles.com

PTOL-90A (Rev. 04/07)

Office Action Summary	**Application No.** 16/723,706	**Applicant(s)** Kitching et al.	
	Examiner MIRAYDA A APONTE	**Art Unit** 3772	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 20 December 2019.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-30 is/are pending in the application.

5a) Of the above claim(s) 20-23 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-19 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Election/Restrictions

2. Applicant's election without traverse of **Species I** including **claims 1-19** in the reply filed on 27 April 2020 is acknowledged.

3. **Claims 20-23** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 27 April 2020.

Claim Rejections - 35 USC § 112

4. The following is a quotation of 35 U.S.C. 112(b):

> (b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 6-8 and 13-19** are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

6. **Regarding claim 6,** it is confusing the term "delaying initial movement". It is not understood if the step of "delaying" means that stating the movement of the tooth is delayed, or if by "delaying" means slowing the movement the tooth is delayed. For

examination purposes, the recitation will be treated as it means that stating the movement of the tooth is delayed.

7. **Claim 13** recites the limitation "first and second dental objects" in line 10. There is insufficient antecedent basis for this limitation in the claim.

Claim Objections

8. **Claim 1** is objected to because of the following informalities:

a. **In line 7** of the claim uses the recitation "respective initial and final positions", but in lines 4 and 5 of the claim refers to the same limitation as "respective initial position ... respective final position". In order to avoid potential confusion, it is suggested to maintain the same nomenclature across the claims. Therefore, one way to avoid said potential confusion is to use one of the above recitations "respective initial position" and "respective final position", or "respective initial and final positions" across the claims.

b. **In lines 13-14** of the claim uses the recitation “first and second dental objects”, but in lines 8 - 9 of the claim it is used the “first of the dental objects” and “second of the dental objects”. It is believed that all of the recitations refer to the same limitations. Therefore, it is suggested to use only of the above-mentioned recitations.

Appropriate correction is required.

9. **Claims 8 and 10** are objected to because of the following informalities: Both claims include the following recitation “a first of the dental objects” when in claim 1 also uses “a first of the dental objects” in line 8. It is suggested to amend the claims by changing the recitation as follow “~~a~~the first of the dental objects” in order to avoid a potential confusion

that said "first of the dental objects" is a different one than that of the claim 1. Appropriate correction is required.

10. **Regarding claim 16**, the claims set forth a plurality of elements, which are separated by a line indentation, and are joined by the use of a plurality of the function word "and". At the end of line 6 of the claim uses the term "and", which it is usually used when indicating the last element of a list of element. However, as used in the claim, said term is not indicating an additional last step, but it describes three additional steps. It is believed that said term in line 6 is not necessary. Appropriate correction is required.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

12. **Claims 1-9, 11 and 13-16 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Chishti et al. (US 20040137400 A1)**.

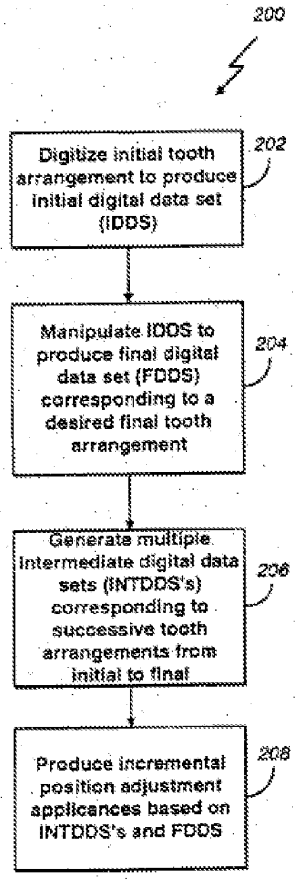

200
Digitize initial tooth arrangement to produce initial digital data set (IDDS)
202
Manipulate IDDS to produce final digital data set (FDDS) corresponding to a desired final tooth arrangement
204
Generate multiple intermediate digital data sets (INTDDS's) corresponding to successive tooth arrangements from initial to final
206
Produce incremental position adjustment applicances based on INTDDS's and FDDS
208

FIG._3

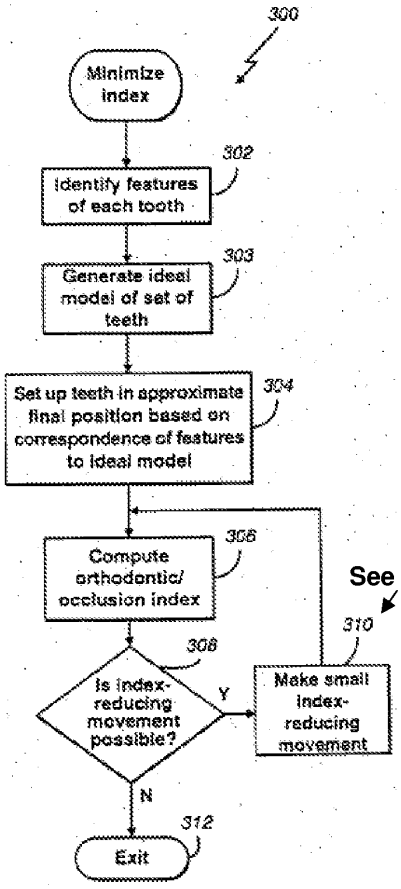

300
Minimize index
302
Identify features of each tooth
303
Generate ideal model of set of teeth
304
Set up teeth in approximate final position based on correspondence of features to ideal model
306
Compute orthodontic/ occlusion index
See Fig. 5 for details
308
Is index-reducing movement possible?
Y
N
310
Make small index-reducing movement
312
Exit

FIG._4

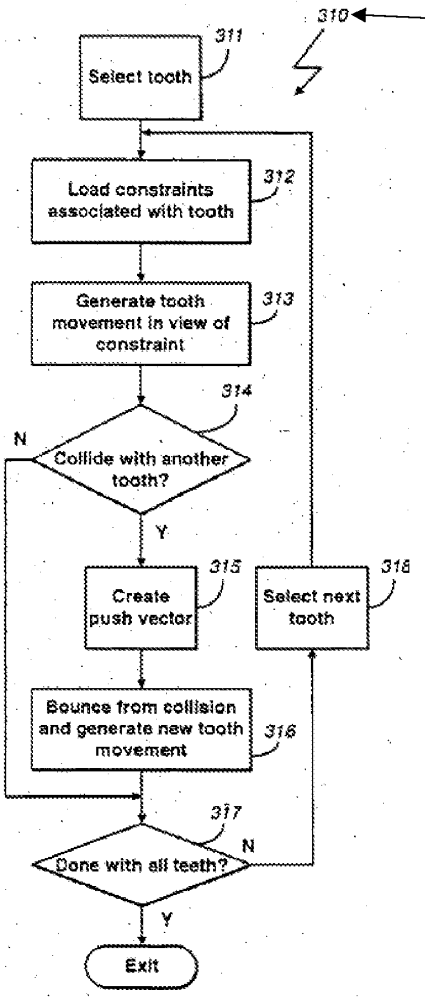

310
See Fig. 4 for details
311
Select tooth
312
Load constraints associated with tooth
313
Generate tooth movement in view of constraint
314
Collide with another tooth?
N
Y
315
Create push vector
316
Bounce from collision and generate new tooth movement
317
Done with all teeth?
N
Y
318
Select next tooth
Exit

FIG._5

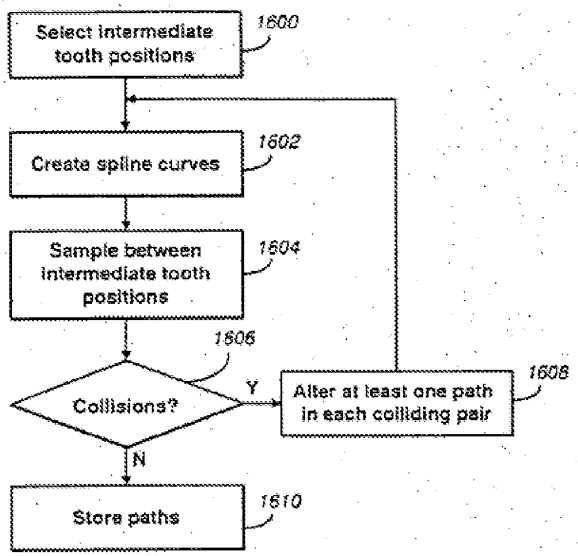


FIG._6

13. **Regarding claim 1,** Chishti et al. discloses a computer-implemented method including:

determining a movement pattern (INTDDS's) (206) for moving dental objects from an initial arrangement (IDDS) (202) toward a final arrangement (FDDS) (204) (see Fig. 3 above), the movement pattern (INTDDS's) defining a schedule of movement of the dental objects during treatment stages as each of the dental objects moves from a respective initial position (IDDS) (202) toward a respective final position (FDDS) (204) (see Fig. 3 above and [0012] – "computer-implemented method to prepare a malocclusion treatment plan includes selecting a tooth treatment pattern from a library of predetermined tooth treatment patterns", where the malocclusion treatment plan is considered to be the schedule of movement of the dental objects);

calculating a respective treatment path for each of the dental objects between their respective initial and final positions (see Fig. 4 and 6 above, and [0091-0113, 0131-0133]);

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths (see step 314 in Fig. Fig. 5 above and [0119] – "The process of FIG. 5 then detects whether the planned movements would cause collisions with neighboring teeth (step 314). The collision detection process determines if any of the geometries describing the tooth surfaces intersect", and step 1606 in Fig. 6 above [0131] – "program then samples each spline curve between the intermediate positions (step 1604) and applies the collision detection algorithm to the samples (step 1606)");

performing a first modification of the schedule of movement in response to the identifying (see step 315 in Fig. 5 above and [0120] – "If a collision occurs, a "push" vector is created to shift the path of the planned movement (step 315)", and step 1606 of Fig. 6 above and [0131] – "If any collisions are detected, the program alters the path of at least one tooth in each colliding pair by selecting a new position for one of the intermediate steps (step 1608) and creating a new spline curve (1602)");

determining that the first modification does not avoid a collision between the first and second dental objects (see Fig. 5 above and [0119] – "Next, a tooth movement plan which takes into consideration the constraints is generated (step 313). The process of FIG. 5 then detects whether the planned movements would cause collisions with neighboring teeth (step 314). The collision detection process determines if any of the geometries describing the tooth surfaces intersect. If there are no obstructions, the space is considered free; otherwise it is obstructed", the method provides step in a loop sequence that verify if each modification to the path avoids a collision, if not it creates a push vector to generate a new tooth movement until no collision is determined); and

performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision (see Fig. 5 above and [0120] – "If a collision occurs, a "push" vector is created to shift the path of the planned movement (step 315). Based on the push vector, the current tooth "bounces" from the collision and a new tooth movement is generated (step 316)").

14. **Regarding claim 2**, Chishti et al. discloses that wherein the movement pattern is selected by a user. ([0021] – "*than one candidate treatment path for each tooth can be generated and graphically displayed for each candidate treatment path to a human user for selection.*")

15. **Regarding claim 3,** Chishti et al. discloses that the movement pattern includes one of an all-equal pattern, an A-shaped pattern, a V-shaped pattern, a mid-line shift patter, or a M- shaped pattern (see [0013] – "The library of treatment patterns includes at least one or more of the following: all equal movement pattern, A-shaped movement pattern, V-shaped movement pattern, M-shaped movement pattern, W-shaped movement pattern, symmetric staircase pattern, asymmetric staircase pattern, and equal equal movement pattern").

16. **Regarding claim 4**, Chishti et al. discloses that when determining the movement pattern includes analyzing, by a computer processor, the dental objects in their respective initial and final positions (see Fig. 3 and [0055] – "first step, an initial digital data set (IDDS) representing an initial tooth arrangement is obtained (step 202)", in [0056] – "The IDDS is then manipulated using a computer having a suitable graphical user interface (GUI) and software appropriate for viewing and modifying the images", in [0057] – "After segmenting or isolating the components, the user will often reposition the tooth in the

model by following a prescription or other written specification provided by the treating professional. Alternatively, the user may reposition one or more teeth based on a visual appearance or based on rules and algorithms programmed into the computer. Once the user is satisfied, the final teeth arrangement is incorporated into a final digital data set (FDDS) (step 204)", and in [0058] – "step 204, final positions for the upper and lower teeth in a masticatory system of a patient are determined by generating a computer representation of the masticatory system", if the IDDS and the FDDS are digital data in the computer, where the data is analyzed and manipulated, it is understood that a computer processor is used to perform those steps).

17. **Regarding claim 5**, Chishti et al. discloses that when doing the analyzing, it includes determining a respective distance needed to move each of the dental objects from their respective initial positions to their respective final positions (see [0049] – "while the point will usually follow a nonlinear path, there is a linear distance between any point in the tooth when determined at any two times during the treatment. Thus, an arbitrary point P.sub.1 may in fact undergo a true side-to-side translation as indicated by arrow d.sub.1, while a second arbitration point P.sub.2 may travel along an arcuate path, resulting in a final translation d.sub.2. Many aspects of the present invention are defined in terms of the maximum permissible movement of a point P.sub.1 induced on any particular tooth. Such maximum tooth movement, in turn, is defined as the maximum linear translation of that point P.sub.1 on the tooth which undergoes the maximum movement for that tooth in any treatment step", and in [0092] – "step 302, the process 300 positions the model of the teeth in its approximate final position based on a correspondence of features to the ideal model (step 304). In that step, each tooth model

is moved so that its features are aligned to the features of a corresponding tooth in the ideal model. The features may be based on cusps, fossae, ridges, distance-based metrics").

18. **Regarding claim 6,** Chishti et al. discloses that the first modification includes delaying initial movement of the first dental object (see [0053] – "*Often, only certain one(s) of the teeth will be repositioned while others of the teeth will provide a base or an anchor region for holding the appliance 111 in place as the appliance 111 applies a resilient repositioning force against the tooth or teeth to be repositioned. In complex cases, however, multiple teeth may be repositioned at some point during the treatment. In such cases, the teeth which are moved can also serve as a base or anchor region for holding the repositioning appliance*", and [0097-0113], where it is understood that a tooth is provided as an anchor it can be considered a dental object that it is delayed an initial movement).

19. **Regarding claim 7,** Chishti et al. discloses that the second modification includes slowing or stopping movement of the first dental object during one or more of the treatment stages following a previous one of the treatment stages in which the first dental object moved ([0116] – "*One component may accelerate along a curve between one pair of stages (e.g., stages 3 and 8 in a treatment plan having that many stages), while another moves linearly between another pair of stages (e.g., stages 1 to 5), and then changes direction suddenly and slows down along a linear path to a later stage (e.g., stage 10)*").

20. **Regarding claim 8,** Chishti et al. discloses that it further includes: performing, after determining that the second modification does not avoid a collision, a third modification of the schedule of movement, the third modification comprising: moving a first of the

dental objects away from the respective route of a second of the dental objects; and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision (step 1606 of Fig. 6 above and [0131] – "If any collisions are detected, the program alters the path of at least one tooth in each colliding pair by selecting a new position for one of the intermediate steps (step 1608) and creating a new spline curve (1602). The program then samples the new path (1604) and again applies the collision detection algorithm (1606). The program continues in this manner until no collisions are detected", therefore if after a second modification does not avoid a collision.).

21. **Regarding claim 9**, Chishti et al. disclose that the second modification includes one or more of: delaying initial movement of the first dental object; and slowing or stopping movement of the first dental object during one or more of the treatment stages following a previous one of the treatment stages during which the first dental object moved (see [0053] – "*Often, only certain one(s) of the teeth will be repositioned while others of the teeth will provide a base or an anchor region for holding the appliance 111 in place as the appliance 111 applies a resilient repositioning force against the tooth or teeth to be repositioned. In complex cases, however, multiple teeth may be repositioned at some point during the treatment. In such cases, the teeth which are moved can also serve as a base or anchor region for holding the repositioning appliance*", and [0097-0113], where it is understood that a tooth is provided as an anchor it can be considered a dental object that it is delayed an initial movement, and [0116] – "One component may accelerate along a curve between one pair of stages (e.g., stages 3 and 8 in a treatment plan having that many stages), while another moves linearly between another pair of stages (e.g., stages

1 to 5), and then changes direction suddenly and slows down along a linear path to a later stage (e.g., stage 10)").

22. **Regarding claim 11**, Chishti et al. discloses that it further includes producing a series of orthodontic appliances based at least on the modified schedule of movement, wherein each of the orthodontic appliances corresponds to a respective one of the treatment stages (see[0201] – "Fabrication machine 522 fabricates dental appliances based on intermediate and final data set information received from data processing system 500").

23. **Regarding claim 13,** Chishti et al. discloses a computer-implemented method including:

determining a schedule of movement for dental objects during treatment stages, wherein the schedule of movement indicates whether each of the dental objects moves during each of the treatment stages (see Fig. 3 above and [0012] – "computer-implemented method to prepare a malocclusion treatment plan includes selecting a tooth treatment pattern from a library of predetermined tooth treatment patterns", where the malocclusion treatment plan is considered to be the schedule of movement of the dental objects);

calculating a respective route from an initial position toward a final position for each of the dental objects during the treatment stages (see Fig. 4 and 6 above, and [0091-0113, 0131-0133]); and

performing a first modification to the schedule of movement to avoid a collision or obstruction between two of the dental objects on their respective routes (see step 314 in Fig. 5 above and [0119] – "The process of FIG. 5 then detects whether the planned

movements would cause collisions with neighboring teeth (step 314). The collision detection process determines if any of the geometries describing the tooth surfaces intersect", and step 1606 in Fig. 6 above [0131] – "program then samples each spline curve between the intermediate positions (step 1604) and applies the collision detection algorithm to the samples (step 1606)");;

determining that the first modification does not avoid the collision or obstruction between the first and second dental objects (see Fig. 5 above and [0119] – "Next, a tooth movement plan which takes into consideration the constraints is generated (step 313). The process of FIG. 5 then detects whether the planned movements would cause collisions with neighboring teeth (step 314). The collision detection process determines if any of the geometries describing the tooth surfaces intersect. If there are no obstructions, the space is considered free; otherwise it is obstructed", the method provides step in a loop sequence that verify if each modification to the path avoiding a collision. If not, it creates a push vector to generate a new tooth movement until no collision is determined); and

performing a second modification of the schedule of movement after determining that the first modification does not avoid the collision or obstruction (see Fig. 5 above and [0120] – "If a collision occurs, a "push" vector is created to shift the path of the planned movement (step 315). Based on the push vector, the current tooth "bounces" from the collision and a new tooth movement is generated (step 316)").

24. **Regarding claim 14**, Chishti et al. discloses that when determining the schedule of movement includes selecting a movement pattern from a plurality of predetermined movement patterns (see Fig. 3 above and [0012] – "computer-implemented method to

prepare a malocclusion treatment plan includes selecting a tooth treatment pattern from a library of predetermined tooth treatment patterns").

25. **Regarding claim 15,** Chishti et al. discloses further including recalculating at least one of the respective routes based on the first or second modified schedule of movement (see Fig. 5, steps 313-316 where it is recalculated the respective routes based on if a collision is identified after every tooth movement generation, and in Fig. 6, steps 1602-1608 where it is recalculated the intermediate tooth position if a collision is identified, this is done after an alter path is identified).

26. **Regarding claim 16,** Chishti et al. discloses that it further includes manufacturing at least two orthodontic aligners, each of the orthodontic aligners corresponding to a respective one of the treatment stages ([0016] – "The medium can include code to fabricate an appliance for each tooth arrangement", "The medium can include code to control a fabrication machine to produce successive appliances for the tooth arrangement", and [0201] –" Fabrication machine 522 fabricates dental appliances based on intermediate and final data set information received from data processing system 500").

Claim Rejections - 35 USC § 103

27. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

28. **Claims 8, 10, 18 and 19 rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti et al. (US 20040137400 A1) aka Chishti ('400) as applied to claim 13 above, and further in view of Chishti et al. (US 6471511 B1) aka Chishti ('511)**.

29. **Regarding claim 8,** Chishti ('400) discloses that it further includes: performing, after determining that the second modification does not avoid a collision, a third modification of the schedule of movement, (step 1606 of Fig. 6 above and [0131] – "If any collisions are detected, the program alters the path of at least one tooth in each colliding pair by selecting a new position for one of the intermediate steps (step 1608) and creating a new spline curve (1602). The program then samples the new path (1604) and again applies the collision detection algorithm (1606). The program continues in this manner until no collisions are detected", therefore if after a second modification does not avoid a collision).

30. **However,** Chishti ('400) does not disclose that the third modification includes moving a first of the dental objects away from the respective route of a second of the dental objects; and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision.

31. **Regarding claim 10**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 1.

32. However, Chishti ('400) does not disclose that the second modification includes: moving a first of the dental objects away from the respective route of a second of the dental objects; and moving the first dental object toward its respective final position after

the second dental object has sufficiently traversed its respective route to avoid the collision.

33. **Regarding claim 18**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 13.

34. However, Chishti ('400) does not disclose that the first or second modification includes: moving a first of the dental objects away from the respective route of a second of the dental objects; and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision.

35. **Regarding claim 19**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 13.

36. However, Chishti ('400) does not disclose that the first or second modification includes: moving a first of the dental objects away from the respective route of a second of the dental objects; and moving the first dental object toward its previous position.

37. **With respect to claims 8, 10, 18 and 19**, Chishti ('511) teaches the movement of a first of the dental objects/first tooth "in any direction other than directly towards the desired final position", so when moving the first of the dental objects from one point to the next in the sequence does not result in a collision of the first and second of the dental objects when moving them to their respective final positions (col. 4, lines 7-22). Due to it is disclosed that the movement can be "in any direction", it is understood that includes a movement of the first of the dental objects away from the respective route of a second of the dental objects; and due to the final results is that the dental object moves to the

desired final position, it is understood that the first dental object moves toward its previous position.

38. It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to modify the first or second modifications of Chishti ('400), with the movement in any direction that is other than directly towards the second dental object of Chishti ('511), in order to move the first of the dental objects in a loop condition to avoid a collision with the second of the dental objects during the movement pattern, continuing to the final position at the end of the loop condition.

39. **Claims 12 and 17 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti et al. (US 20040137400 A1) aka Chishti ('400), in view of Chishti et al. (US 6471511 B1) aka Chishti ('511), in further view of Phan et al. (US 6309215 B1)**.

40. **Regarding claim 12**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 11.

41. However, Chishti ('400) does not disclose that wherein the producing includes: fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and thermoforming a respective one of the orthodontic appliances over each of the respective positive molds.

42. **Regarding claim 17**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 16.

43. However, Chishti ('400) does not disclose that the manufacturing includes: fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and thermoforming an orthodontic aligner over each respective positive mold.

44. **With respect to claims 12 and 17**, Chishti ('511) teaches the producing includes fabricating a respective positive mold of the dental objects for at least two of the treatment stages (col. 9, ln 43-47), and that it is used a polymeric material over a positive physical model.

45. However, they are silenced disclosing thermoforming the respective one of the orthodontic appliances over each of the respective positive molds.

46. Phan et al. teaches that the orthodontic appliance is of a thermoformable polymer material (col. 2, line 26-46).

47. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Chishti ('400)/Chishti ('511)'s orthodontic appliance, to the Phan's thermoformable polymer material, in order to provide an orthodontic appliance with the stiffness from the polymeric material to impart a resilient repositioning force against one or a portion of the remaining teeth.

Double Patenting

48. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993);

In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

49. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

50. The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

51. **Claims 1, 2, 4-9, 11-14, 16 and 17** are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-6, 8-11, 18 and 19 of U.S. Patent No. 10456217 B2. Although the claims at issue are not identical, they are not patentably

distinct from each other because both set of claims include the same steps of the method describe as followed;

- the step of determining a movement pattern for moving dental objects from an initial arrangement toward a final arrangement, where the movement pattern is defining a schedule of movement of the dental objects during treatment stages from a respective initial position toward a respective final position;
- the step of calculating a respective treatment path for each of the dental objects between their respective initial and final positions;
- the step of identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement;
- the step of performing a first modification of the schedule of movement as a response to the identifying step;
- the step of determining that the first modification does not avoid a collision between the first and second dental objects; and
- the step of performing a second modification of the schedule of movement after it is determined that the first modification does not avoid a collision;
- wherein the movement pattern is determined by selection by a user,
- wherein the determining step includes analyzing the dental objects in their respective initial and final positions,
- wherein the first modification includes a delaying of the initial movement of the first dental object, and/or wherein the second modification includes slowing or stopping the movement of the first dental object during one or more of the treatment stages,

- performing, after determining that the second modification does not avoid a collision, a third modification of the schedule of movement, the third modification comprising: moving a first of the dental objects away from the respective route of a second of the dental objects; and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision,
- wherein the second modification includes the steps of delaying initial movement of the first dental object; and slowing or stopping movement of the first dental object during one or more of the treatment stages following a previous one of the treatment stages during which the first dental object moved, and
- producing a series of orthodontic appliances based at least on the modified schedule of movement by fabricating a respective positive mold of the dental objects, and thermoforming the respective orthodontic appliances over each of the respective positive molds.

Conclusion

52. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIRAYDA ARLENE APONTE whose telephone number is (571)270-1933. The examiner can normally be reached on M-F 8-5.

53. Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

54. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cris Rodriguez can be reached on 571-272-4964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

55. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MIRAYDA A APONTE/
Examiner, Art Unit 3772
/SEAN M MICHALSKI/
Primary Examiner, Art Unit 3724

Notice of References Cited	Application/Control No. 16/723,706	Applicant(s)/Patent Under Reexamination Kitching et al.	
	Examiner MIRAYDA A APONTE	Art Unit 3772	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20040137400-A1	07-2004	Chishti, Muhammad	A61C7/00	433/24
*	B	US-6471511-B1	10-2002	Chishti; Muhammad	A61C7/00	1/1
*	C	US-6309215-B1	10-2001	Phan; Loc X.	A61C7/00	433/24
	D					
	E					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

CPC - Searched*		
Symbol	Date	Examiner
A61C7/002,00	08/01/2020	MA
A61C3/00	08/01/2020	MA

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
433	24	08/01/2020	MA

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
EAST search	08/01/2020	MA
Word search on dental and ((move movement) near tooth) same (pattern stagger$4 "round-tipping") and (collision obstruction) and (computer program code), (delay$4 stop$4 slow$4 "hold up" decelerate postpone) same move$4 and delay$4 same move$4, orthodont$4 and schedule and (teeth tooth) same delay$4 same move$4, orthodont$4 and (teeth tooth) same delay$4 same move$4, orthodontic and computer and digital and treatment and appliance and (display same force) and (gingival with force),	08/01/2020	

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/14/2020	08/01/2020							
	1	÷	✓							
	2	÷	✓							
	3	÷	✓							
	4	÷	✓							
	5	÷	✓							
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	12	÷	✓							
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Complete if Known	
Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	001	US-RE35169	03-05-1996	LEMCHEN; Marc S. et al.	
	002	US-2467432	04-19-1949	KESLING; Harold D. et al.	
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Examiner Signature	/MIRAYDA A APONTE/	Date Considered	08/01/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 2 of 28

Complete if Known	
Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

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Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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Examiner Signature	/MIRAYDA A APONTE/	Date Considered	08/01/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 3 of 28

Complete if Known	
Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	045	US-4889238	12-26-1989	BATCHELOR; Jay A. et al.	
	046	US-4890608	01-02-1990	STEER; Peter L. et al.	
	047	US-4935635	06-19-1990	O'HARRA; Dale G. et al.	
	048	US-4936862	06-26-1990	WALKER; Peter S. et al.	
	049	US-4937928	07-03-1990	VAN; Der Zel Joseph M. et al.	
	050	US-4941826	07-17-1990	LORAN; William et al.	
	051	US-4964770	10-23-1990	STEINBICHLER; Hans et al.	
	052	US-4975052	12-04-1990	SPENCER; William et al.	
	053	US-4983334	01-08-1991	ADELL; Loren S. et al.	
	054	US-5011405	04-30-1991	LEMCHEN; Marc S.	
	055	US-5017133	05-21-1991	MIURA; Fujio et al.	
	056	US-5027281	06-25-1991	REKOW; Elizabeth D. et al.	
	057	US-5035613	07-30-1991	BREADS; Peter R. et al.	
	058	US-5055039	10-08-1991	ABBATTE; Gerard P. et al.	
	059	US-5059118	10-22-1991	BREADS; Peter R. et al.	
	060	US-5100316	03-31-1992	WILDMAN; Alexander J. et al.	
	061	US-5121333	06-09-1992	RILEY; Donald R. et al.	
	062	US-5125832	06-30-1992	KESLING; Peter C.	
	063	US-5128870	07-07-1992	ERDMAN; Arthur G. et al.	
	064	US-5130064	07-14-1992	SMALLEY; Dennis R. et al.	
	065	US-5131843	07-21-1992	HILGERS; James J. et al.	
	066	US-5131844	07-21-1992	MARINACCIO; Paul J. et al.	

Examiner Signature	/MIRAYDA A APONTE/	Date Considered	08/01/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 4 of 28

Complete if Known	
Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	067	US-5139419	08-18-1992	ANDREIKO; Craig A. et al.	
	068	US-5145364	09-08-1992	MARTZ; Martin G. et al.	
	069	US-5176517	01-05-1993	TRUAX; Lloyd H. et al.	
	070	US-5184306	02-02-1993	ERDMAN; Arthur G. et al.	
	071	US-5186623	02-16-1993	BREADS; Peter R. et al.	
	072	US-5257203	10-26-1993	RILEY; Donald R. et al.	
	073	US-5273429	12-28-1993	REKOW; Dianne et al.	
	074	US-5278756	01-11-1994	LEMCHEN; Marc S. et al.	
	075	US-5328362	07-12-1994	WATSON; Sherman L. et al.	
	076	US-5338198	08-16-1994	WU; Chuang-Jy et al.	
	077	US-5340309	08-23-1994	ROBERTSON; James G. et al.	
	078	US-5342202	08-30-1994	DESHAYES; Marie-Josephe et al.	
	079	US-5368478	11-29-1994	ANDREIKO; Craig A. et al.	
	080	US-5382164	01-17-1995	STERN; Sylvan S. et al.	
	081	US-5395238	03-07-1995	ANDREIKO; Craig A. et al.	
	082	US-5431562	07-11-1995	ANDREIKO; Craig A. et al.	
	083	US-5440326	08-08-1995	QUINN; Thomas J. et al.	
	084	US-5440496	08-08-1995	ANDERSSON; Matts et al.	
	085	US-5447432	09-05-1995	ANDREIKO; Craig A. et al.	
	086	US-5452219	09-19-1995	DEHOFF; Barry D. et al.	
	087	US-5454717	10-03-1995	ANDREIKO; Craig A. et al.	
	088	US-5456600	10-10-1995	ANDREIKO; Craig A. et al.	

Examiner Signature	/MIRAYDA A APONTE/	Date Considered	08/01/2020

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Sheet 5 of 28

Complete if Known	
Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

U. S. PATENT DOCUMENTS

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	089	US-5474448	12-12-1995	ANDREIKO; Craig A. et al.	
	090	US-5518397	05-21-1996	ANDREIKO; Craig A. et al.	
	091	US-5528735	06-18-1996	STRASNICK; Steven L. et al.	
	092	US-5533895	07-09-1996	ANDREIKO; Craig A. et al.	
	093	US-5542842	08-06-1996	ANDREIKO; Craig A. et al.	
	094	US-5549476	08-27-1996	STERN; Sylvan S. et al.	
	095	US-5562448	10-08-1996	MUSHABAC; David R.	
	096	US-5587912	12-24-1996	ANDERSSON; Matts et al.	
	097	US-5605459	02-25-1997	KURODA; Takayuki et al.	
	098	US-5607305	03-04-1997	ANDERSSON; Matts et al.	
	099	US-5614075	03-25-1997	ANDRE; Sr Larry E. et al.	
	100	US-5621648	04-15-1997	CRUMP; Craig D. et al.	
	101	US-5645420	07-08-1997	BERGERSEN; Earl O. et al.	
	102	US-5645421	07-08-1997	SLOOTSKY; Gary Lee et al.	
	103	US-5655653	08-12-1997	CHESTER; Bruce E. et al.	
	104	US-5683243	11-04-1997	ANDREIKO; Craig A. et al.	
	105	US-5692894	12-02-1997	SCHWARTZ; Dann A. et al.	
	106	US-5725376	03-10-1998	POIRIER; Michel et al.	
	107	US-5725378	03-10-1998	WANG; Hong-Chi et al.	
	108	US-5733126	03-31-1998	ANDERSSON; Matts et al.	
	109	US-5740267	04-14-1998	ECHERER; Scott J. et al.	
	110	US-5742700	04-21-1998	YOON; Douglas C. et al.	

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Sheet 6 of 28

Complete if Known	
Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

U. S. PATENT DOCUMENTS

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	111	US-5799100	08-25-1998	CLARKE; Laurence P. et al.	
	112	US-5800174	09-01-1998	ANDERSSON; Matts et al.	
	113	US-5823778	10-20-1998	SCHMITT; Stephen M. et al.	
	114	US-5848115	12-08-1998	LITTLE; Francis H. et al.	
	115	US-5857853	01-12-1999	VAN; Nifterick Willem Frederick et al.	
	116	US-5866058	02-02-1999	BATCHELDER; John Samuel et al.	
	117	US-5879158	03-09-1999	DOYLE; Walter A. et al.	
	118	US-5880961	03-09-1999	CRUMP; Craig D. et al.	
	119	US-5880962	03-09-1999	ANDERSSON; Matts et al.	
	120	US-5934288	08-10-1999	AVILA; Ricardo Scott et al.	
	121	US-5957686	09-28-1999	ANTHONY; Wayne L. et al.	
	122	US-5964587	10-12-1999	SATO; Mikio et al.	
	123	US-5971754	10-26-1999	SONDHI; Anoop et al.	
	124	US-5975893	11-02-1999	CHISHTI; Muhammad et al.	
	125	US-6015289	01-18-2000	ANDREIKO; Craig A. et al.	
	126	US-6044309	03-28-2000	HONDA; Kenichi et al.	
	127	US-6049743	04-11-2000	BABA; Masami et al.	
	128	US-6062861	05-16-2000	ANDERSSON; Matts	
	129	US-6068482	05-30-2000	SNOW; Michael Desmond et al.	
	130	US-6099314	08-08-2000	KOPELMAN; Avi et al.	
	131	US-6123544	09-26-2000	CLEARY; James D.	

Examiner Signature	/MIRAYDA A APONTE/	Date Considered	08/01/2020

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Sheet 7 of 28

Complete if Known	
Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

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	132	US-6152731	11-28-2000	JORDAN; Russell A. et al.	
	133	US-6183248	02-06-2001	CHISHTI; Muhammad et al.	
	134	US-6190165	02-20-2001	ANDREIKO; Craig A. et al.	
	135	US-6217325	04-17-2001	CHISHTI; Muhammad et al.	
	136	US-6217334	04-17-2001	HULTGREN; Bruce Willard et al.	
	137	US-6244861	06-12-2001	ANDREIKO; Craig A. et al.	
	138	US-6309215	10-30-2001	PHAN; Loc X. et al.	
	139	US-6315553	11-13-2001	SACHDEVA; Rohit et al.	
	140	US-6318994	11-20-2001	CHISHTI; Muhammad Ziaullah Khan et al.	
	141	US-6322359	11-27-2001	JORDAN; Russell A. et al.	
	142	US-6350120	02-26-2002	SACHDEVA; Rohit et al.	
	143	US-6382975	05-07-2002	POIRIER; Michel et al.	
	144	US-6398548	06-04-2002	MUHAMMAD; Chishti et al.	
	145	US-6402707	06-11-2002	ERNST; Maurice M. et al.	
	146	US-6409504	06-25-2002	JONES; Timothy N. et al.	
	147	US-6471511	10-29-2002	CHISHTI; Muhammad et al.	
	148	US-6482298	11-19-2002	BHATNAGAR; Parijat et al.	
	149	US-6514074	02-04-2003	CHISHTI; Muhammad et al.	
	150	US-6524101	02-25-2003	PHAN; Loc X. et al.	
	151	US-6554611	04-29-2003	SHISHTI; Muhammad et al.	
	152	US-6572372	06-03-2003	PHAN; Loc X. et al.	

Examiner Signature	/MIRAYDA A APONTE/	Date Considered	08/01/2020

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Sheet 8 of 28

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Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

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	153	US-6629840	10-07-2003	CHISHTI; Muhammad et al.	
	154	US-6682346	01-27-2004	CHISHTI; Muhammad et al.	
	155	US-6705863	03-16-2004	PHAN; Loc X. et al.	
	156	US-6722880	04-20-2004	CHISHTI; Muhammad et al.	
	157	US-6729876	05-04-2004	MUHAMMAD; Chishti et al.	
	158	US-7063532	06-20-2006	JONES; Timothy N. et al.	
	159	US-7331783	02-19-2008	CHISHTI; Muhammad et al.	
	160	US-7377778	05-27-2008	CHISHTI; Muhammad Ziaullah Khan et al.	
	161	US-7435083	10-14-2008	CHISHTI; Muhammad et al.	
	162	US-7578674	08-25-2009	CHISHTI; Muhammad et al.	
	163	US-7637740	12-29-2009	KNOPP; Peter G.	
	164	US-7658610	02-09-2010	KNOPP; Peter G.	
	165	US-7819659	10-26-2010	WEN; Huafeng	
	166	US-7844356	11-30-2010	MATOV; Vadim et al.	
	167	US-7844429	11-30-2010	MATOV; Vadim et al.	
	168	US-7904307	03-08-2011	ABOLFATHI; Amir et al.	
	169	US-8038444	10-18-2011	KITCHING; Ian et al.	
	170	US-9326830	05-03-2016	KITCHING; Ian et al.	
	171	US-20020006597	01-17-2002	ANDREIKO; Craig A. et al.	
	172	US-20020064746	05-30-2002	MUHAMMAD; Chishti et al.	
	173	US-20030009252	01-09-2003	PAVLOVSKAIA; Elena et al.	

Examiner Signature	/MIRAYDA A APONTE/	Date Considered	08/01/2020

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 9 of 28

Complete if Known	
Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	174	US-20030139834	07-24-2003	NIKOLSKIY; Sergey et al.	
	175	US-20030224311	12-04-2003	CRONAUER; Edward A. et al.	
	176	US-20040128010	07-01-2004	PAVLOVSKAIA; Elena et al.	
	177	US-20040137400	07-15-2004	CHISHTI; Muhammad et al.	
	178	US-20050055118	03-10-2005	NIKOLSKIY; Sergey et al.	
	179	US-20060275736	12-07-2006	WEN; Huafeng et al.	
	180	US-20120035901	02-09-2012	KITCHING; Ian et al.	

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	001	AU-3031677-A	05-10-1979	SUYEHIRO H .		☐
	002	AU-517102-B2	07-09-1981	HITO SUYEHIRO.		☐
	003	AU-5598894-A	06-08-1994	ORMCO CORP.		☐
	004	CA-1121955-A	04-20-1982	SUYEHIRO HITO.		☐
	005	DE-2749802-A1	05-11-1978	SUYEHIRO HITO.	Abstract:	☒

Examiner Signature	/MIRAYDA A APONTE/	Date Considered	08/01/2020

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Art Unit	3772
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	006	DE-69327661-T2	07-20-2000	ORMCO CORP [US]	Abstract:	☒
	007	EP-0091876-A1	10-19-1983	DURET FRANCOIS [FR], et al.	Abstract:	☒
	008	EP-0299490-A2	01-18-1989	STEINBICHLER HANS [DE]	Abstract:	☒
	009	EP-0376873-A2	07-04-1990	SHAFIR AARON [IL], et al.		☐
	010	EP-0490848-A2	06-17-1992	NOBELPHARMA AB [SE]		☐
	011	EP-0541500-A1	05-12-1993	NOBELPHARMA AB [SE]		☐
	012	EP-0667753-B1	01-19-2000	ORMCO CORP [US]		☐
	013	EP-0731673-B1	05-30-2001	NOBEL BIOCARE AB [SE]		☐
	014	EP-0774933-B1	12-06-2000	SANDVIK AB [SE], et al.		☐
	015	ES-463897-A1	01-01-1980	HITO SUYEHIRO D [US]	Abstract:	☒

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First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

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	016	FR-2369828-A1	06-02-1978	SUYEHIRO HITO [US]	Abstract:	☒
	017	FR-2652256-A1	03-29-1991	JOURDA GERARD., et al.	Abstract:	☒
	018	GB-1550777-A	08-22-1979	SUYEHIRO H.		☐
	019	JP-H0428359-A	01-30-1992	MITSUBISHI PETROCHEMICAL CO.	Abstract:	☒
	020	JP-H08508174-A	09-03-1996	ORMCO CORP.	Abstract:	☒
	021	JP-S5358191-A	05-25-1978	YOSHII OSAMU., et al.	Abstract:	☒
	022	WO-9008512-A1	08-09-1990	DOLPHIN IMAGING SYSTEMS INC [US]		☐
	023	WO-9104713-A1	04-18-1991	JOURDA GERARD [FR], et al.	Abstract:	☒
	024	WO-9410935-A1	05-26-1994	ORMCO CORP [US]		☐
	025	WO-9832394-A1	07-30-1998	HULTGREN BRUCE WILLARD [US]		☐

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Sheet 12 of 28

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First Named Inventor	KITCHING, Ian
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Attorney Docket Number	22773-774.305

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	026	WO-9844865-A1	10-15-1998	NOBEL BIOCARE AB [SE], et al.		☐
	027	WO-9858596-A1	12-30-1998	ALIGN TECHNOLOGY INC [US], et al.		☐

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NON-PATENT LITERATURE DOCUMENTS			
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	001	AADR. AMERICAN ASSOCIATION FOR DENTAL RESEARCH, Summary of Activities, March 20-23,1980, Los Angeles, CA, p. 195.	☐
	002	ALCANIZ, et aL, "An Advanced System for the Simulation and Planning of Orthodontic Treatments," Karl Heinz Hohne and Ron Kikinis (eds.), Visualization in Biomedical Computing, 4th Intl. Conf., VBC '96, Hamburg, Germany, September 22-25, 1996, Springer-Verlag, pp. 511-520.	☐
	003	ALEXANDER et al., "The DigiGraph Work Station Part 2 Clinical Management," JCO, pp. 402-407 (July 1990).	☐
	004	ALTSCHULER et al., "Analysis of 3-D Data for Comparative 3-D Serial Growth Pattern Studies of Oral-Facial Structures, " IADR Abstracts, Program and Abstracts of Papers, 57th General Session, IADR Annual Session, March 29, 1979 - April 1, 1979, New Orleans Marriot, Journal of Dental Research, Vol. 58, January 1979, Special Issue A, p. 221.	☐
	005	ALTSCHULER et al., "Laser Electro-Optic System for Rapid Three-Dimensional (3D) Topographic Mapping of Surfaces," Optical Engineering, 20(6):953-961 (1981).	☐
	006	ALTSCHULER et al., "Measuring Surfaces Space-Coded by a Laser-Projected Dot Matrix," SPIE Imaging Applications for Automated Industrial Inspection and Assembly, Vol. 182, p. 187-191 (1979).	☐
	007	ALTSCHULER, "3D Mapping of Maxillo-Facial Prosthesis," AADR Abstract #607, 2 pages total, (1980).	☐
	008	ANDERSSON et al., "Clinical Results with Titanium Crowns Fabricated with Machine Duplication and Spark Erosion," Acta. Odontol. Scand., 47:279-286 (1989).	☐
	009	ANDREWS, The Six Keys to Optimal Occlusion Straight Wire, Chapter 3, pp 13-24 (1989).	☐

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	010	BARTELS, et al., An Introduction to Splines for Use in Computer Graphics and Geometric Modeling, Morgan Kaufmann Publishers, pp. 422-425 (1987).	☐
	011	BAUMRIND et al., "A Stereophotogrammetric System for the Detection of Prosthesis Loosening in Total Hip Arthroplasty," NATO Symposium on Applications of Human Biostereometrics," July 9-13, 1978, SPIE, Vol. 166, pp. 112-123.	☐
	012	BAUMRIND et al., "Mapping the Skull in 3-D," reprinted from J. Calif. Dent. Assoc., 48(2), 11 pages total, (1972 Fall Issue).	☐
	013	BAUMRIND, "A System for Craniofacial Mapping Through the Integration of Data from Stereo X-Ray Films and Stereo Photographs," an invited paper submitted to the 1975 American Society of Photogram Symposium on Close-Range Photogram Systems, University of Ill., Aug. 26-30, 1975, pp. 142-166.	☐
	014	BAUMRIND, "Integrated Three-Dimensional Craniofacial Mapping: Background, Principles, and Perspectives," Semin. in Orthod., 7(4):223-232 (December 2001).	☐
	015	BEGOLE et al., "A Computer System for the Analysis of Dental Casts," The Angle Orthod., 51(3):253-259 (July 1981).	☐
	016	BERNARD et al.," Computerized Diagnosis in Orthodontics for Epidemiological Studies: A Progress Report," Abstract, J. Dental Res. Special Issue, Vol. 67, p. 169, paper presented at International Association for Dental Research 66th General Session, March 9-13, 1988, Montreal, Canada.	☐
	017	BHATIA et al., "A Computer-Aided Design for Orthognathic Surgery," Br. J. Oral Maxillofac. Surg., 22:237- 253 (1984).	☐
	018	BIGGERSTAFF et al., "Computerized Analysis of Occlusion in the Postcanine Dentition," Am. J. Orthod., 61(3): 245-254 (March 1972).	☐

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	019	BIGGERSTAFF, "Computerized Diagnostic Setups and Simulations," Angle Orthod., 40(1):28-36 (January 1970).	☐
	020	BIOSTAR OPEATION & TRAINING MANUAL. Great Lakes Orthodontics, Ltd. 199 Fire Tower Drive, Tonawanda, New York. 14150-5890, 20 pages total (1990).	☐
	021	BLU, et al., "Linear interpolation revitalized", IEEE Trans. Image Proc., 13(5):710-719 (May 2004.	☐
	022	BOURKE, "Coordinate System Transformation," (June 1996), p. 1, retrieved from the Internet 11/05/2004, URL< http://astronomy.swin.edu.au/—pbourke/prolection/coords>.	☐
	023	BOYD et al., "Three Dimensional Diagnosis and Orthodontic Treatment of Complex Malocclusions With the Invisalign Appliance," Semin. Orthod., 7(4):274-293 (December 2001).	☐
	024	BRANDESTINI et al., "Computer Machined Ceramic Inlays: In Vitro Marginal Adaptation," J. Dent. Res. Special Issue, Abstract 305, Vol. 64, p. 208 (1985).	☐
	025	BROOK et al., "An Image Analysis System for the Determination of Tooth Dimensions from Study Casts: Comparison with Manual Measurements of Mesio-distal Diameter," J. Dent. Res., 65(3):428-431 (March 1986).	☐
	026	BURSTONE (interview), "Dr. Charles J. Burstone on The Uses of the Computer in Orthodontic Practice (Part 1)," J. Clin. Orthod., 13(7):442-453 (July 1979).	☐
	027	BURSTONE (interview), "Dr. Charles J. Burstone on The Uses of the Computer in Orthodontic Practice (Part 2)," J. Clin. Orthod., 13(8):539-551 (August 1979).	☐
	028	BURSTONE et al., Precision Adjustment of the Transpalatal Lingual Arch: Computer Arch Form IN Predetermination, Am, Journal of Orthodontics, Vol. 79, No. 2 (Feb. 1981), pp. 115-133.	☐

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Sheet 16 of 28

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Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

NON-PATENT LITERATURE DOCUMENTS

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	060	GIM-ALLDENT Deutschland, "Das DUX System: Die Technik," 2 pages total (2002).	☐
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 23 of 28

Complete if Known	
Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

NON-PATENT LITERATURE DOCUMENTS

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EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S116	183	("10420631" | "10456217" | "20020006597" | "20020064746" | "20030009252" | "20030139834" | "20030224311" | "20040128010" | "20040137400" | "20050055118" | "20060275736" | "20120035901" | "20180092715" | "2467432" | "3407500" | "3600808" | "3660900" | "3683502" | "3738005" | "3860803" | "3916526" | "3922786" | "3950851" | "3983628" | "4014096" | "4195046" | "4253828" | "4324546" | "4324547" | "4348178" | "4478580" | "4500294" | "4504225" | "4505673" | "4526540" | "4575330" | "4575805" | "4591341" | "4609349" | "4611288" | "4656860" | "4663720" | "4664626" | "4676747" | "4742464" | "4755139" | "4763791" | "4793803" | "4798534" | "4836778" | "4837732" | "4850864" | "4850865" | "4856991" | "4877398" | "4880380" | "4889238" | "4890608" | "4935635" | "4936862" | "4937928" | "4941826" | "4964770" | "4975052" | "4983334" | "5011405" | "5017133" | "5027281" | "5035613" | "5055039" | "5059118" | "5100316" | "5121333" | "5125832" | "5128870" | "5130064" | "5131843" | "5131844" | "5139419" | "5145364" | "5176517" | "5184306" | "5186623" | "5257203" | "5273429" | "5278756" | "5328362" | "5338198" | "5340309" | "5342202" | "5368478" | "5382164" | "5395238" | "5431562" | "5440326" | "5440496" | "5447432" | "5452219" | "5454717" | "5456600" | "5474448" | "5518397" | "5528735" | "5533895" | "5542842" | "5549476" | "5562448" | "5587912" | "5605459" | "5607305" | "5614075" | "5621648" | "5645420" | "5645421" | "5655653" | "5683243" | "5692894" | "5725376" | "5725378" | "5733126" | "5740267" | "5742700" | "5799100" | "5800174" | "5823778" | "5848115" | "5857853" | "5866058" | "5879158" | "5880961" | "5880962" |	US-PGPUB; USPAT	OR	ON	2020/02/06 08:55

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S118	1	("6729876").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/06 09:18
S119	0	"16723706"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/06 12:27

S120	0	("16723706").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/02/06 12:27
S121	3	(("6471511") or ("20020064746") or ("20040137400")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/31 06:33
S122	5	(("8038444") or ("9326830") or ("10420631") or ("10456217") or ("10524879")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/31 07:09
S123	5	S122 and collision	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/31 07:10
S124	5	S122 and (collision).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/31 07:10
S125	1	("20040137400").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/31 07:43
S126	9,951	(A61C7/002 or A61C7/00 or A61C3/00).cpc. or (433/24).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2020/07/31 15:52
S127	74	S126 and dental and ((move movement) near tooth) same (pattern stagger$4 "round-tipping") and (collision obstruction) and (computer program code)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2020/07/31 15:53
S128	1	("6471511").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/31 16:59
S129	54	(US-20160206402-$ or US-20010002310-$ or US-20020042038-$ or US-20020064747-$ or US-20050192835-$ or US-20050208449-$ or US-20060099547-$ or US-20040137400-$ or US-20080057462-$ or US-20080076086-$ or US-20080294405-$ or US-20080305451-$ or US-20060223023-$ or US-20030059736-$ or US-20100138025-$	US-PGPUB; USPAT	OR	ON	2020/08/01 07:58

		or US-20100028825-$ or US-20090191503-$ or US-20090191502-$ or US-20080268400-$ or US-20080182220-$ or US-20070212659-$ or US-20060257815-$ or US-20050244791-$ or US-20040161722-$ or US-20040152036-$ or US-20060275736-$).did. or (US-20080248443-$ or US-20110270583-$ or US-20020064746-$).did. or (US-6729876-$ or US-6318994-$ or US-6554611-$ or US-6471511-$ or US-6398548-$ or US-6802713-$ or US-9326830-$ or US-6309215-$ or US-6736638-$ or US-6120287-$ or US-5975893-$ or US-8075306-$ or US-8029277-$ or US-7972134-$ or US-7905725-$ or US-7869983-$ or US-7641473-$ or US-7543511-$ or US-6406292-$ or US-6227850-$ or US-5879158-$ or US-5533895-$ or US-5447432-$ or US-6450807-$ or US-7241142-$).did.				
S130	29	S129 and (delay$4 stop$4 slow$4 "hold up" decelerate postpone) same move$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/01 08:00
S131	3	S130 and delay$4 same move$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/01 08:03
S132	9,951	(A61C7/002 or A61C7/00 or A61C3/00).cpc. or (433/24).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2020/08/01 08:05
S133	48	S132 and delay$4 same move$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/01 08:05
S135	22	orthodont$4 and schedule and (teeth tooth) same delay$4 same move$4	US-PGPUB; USPAT;	OR	ON	2020/08/01 08:16

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S136	87	orthodont$4 and (teeth tooth) same delay$4 same move$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/01 08:25
S137	65	S136 not S135	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/01 08:25
S138	36	orthodont$4 and (teeth tooth) same delay$4 with move$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/01 08:57
S139	35	orthodontic and (teeth tooth) same delay$4 with move$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/01 08:58
S140	9,951	(A61C7/002 or A61C7/00 or A61C3/00).cpc. or (433/24).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2020/08/01 10:51
S141	10	S140 and orthodontic and computer and digital and treatment and appliance and (display same force) and (gingival with force)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2020/08/01 10:51
S142	183	("10420631" | "10456217" | "20020006597" | "20020064746" | "20030009252" | "20030139834" | "20030224311" | "20040128010" | "20040137400" | "20050055118" | "20060275736" | "20120035901" | "20180092715" | "2467432" |	US-PGPUB; USPAT	OR	ON	2020/08/01 11:01

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S143	5	"15834608"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	2020/08/01 11:21

EAST Search History (Interference)

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8/1/2020 3:04:32 PM
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	16/723,706
Filing Date	12-20-2019
First Named Inventor	KITCHING, Ian
Art Unit	3772
Examiner Name	Not yet assigned.
Attorney Docket Number	22773-774.305

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	001	US-10420631	09-24-2019	KITCHING; Ian et al.	
	002	US-10456217	10-29-2019	KITCHING; Ian et al.	
	003	US-20180092715	04-05-2018	KITCHING; Ian et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
		None				

NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author(in CAPITAL LETTERS),title of the article(when appropriate), title of the item (book,magazine,journal,serial,symposium,catalog,etc.),date,page(s),volume-issue number(s),publisher, city and/or country where published.	T[2]
		None	

Examiner Signature	/MIRAYDA A APONTE/	Date Considered	08/01/2020

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.A.A/

Bibliographic Data

Application No: 16/723,706

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged: /MIRAYDA A APONTE/ (Examiner's Signature) | (Initials)

Title: AUTOMATED TREATMENT STAGING FOR TEETH

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/20/2019	433	3772	11353.018US5
RULE			

APPLICANTS

ALIGN TECHNOLOGY, INC., San Jose, CA, UNITED STATES

INVENTORS

Ian Kitching, Saratoga, CA, UNITED STATES

Alexander Dmitriev, Moscow, RUSSIAN FEDERATION

Alexey Vishnevskiy, Moscow, RUSSIAN FEDERATION

CONTINUING DATA

This application is a CON of 15834649 12/07/2017 PAT 10524879

15834649 is a CON of 15086491 03/31/2016 PAT 10420631

15086491 is a CON of 13209276 08/12/2011 PAT 9326830

13209276 is a CON of 11848172 08/30/2007 PAT 8038444

11848172 has PRO of 60824024 08/30/2006

11848172 has PRO of 60824022 08/30/2006

FOREIGN APPLICATIONS

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Atlanta, GA 30326
UNITED STATES

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Aug 10, 2020 03:36:38 AM

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Application	Document	Mailroom Date	Attorney Docket No.
16723706	CTNF	08/10/2020	11353.018US5
	892	08/10/2020	11353.018US5
	1449	08/10/2020	11353.018US5
	1449	08/10/2020	11353.018US5

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

161191 7590 09/21/2020

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

EXAMINER
APONTE, MIRAYDA ARLENE

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
09/21/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@fisherbroyles.com
patent@fisherbroyles.com

Applicant-Initiated Interview Summary	**Application No.** 16/723,706	**Applicant(s)** Kitching et al.	
	Examiner MIRAYDA A APONTE	**Art Unit** 3772	**AIA (FITF) Status** No

All participants (applicant, applicants representative, PTO personnel):

(1) MIRAYDA ARLENE. APONTE.

(2) HEIDI, EIDE (Prim. Exam.).

(3) CHARLES HAGADORN (Attorney).

(4) _____.

Date of Interview: 15 September 2020.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☑ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☑102 ☐103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1-9,11 and 13-16.

Identification of prior art discussed: Chishti et al. (US 20040137400 A1).

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

See Continuation Sheet.

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☑ Attachment

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	/HEIDI M EIDE/ Primary Examiner, Art Unit 3772

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiners responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicants correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,-
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicants record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiners version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, Interview Record OK on the paper recording the substance of the interview along with the date and the examiners initials.

Continuation of Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments:
The attorney explained the proposed amendment in claim 1, specifically the added language of " schedule of movement indicates whether each of the dental objects moves during each of the treatments stages". The Office understood the method claimed and what the schedule of movement indicates.
Therefore, it was indicated that the added language in combination with the limitations of claim 1 is not found in Chishti.
No final agreement was reached at this time. The attorney will submit the amendments discussed here, also including amendments fixing the indicated 112 rejections and objections for further examination.

Proposed Claim Amendments

1. (Currently amended) A computer-implemented method comprising:

determining a movement pattern for moving dental objects from an initial arrangement toward a final arrangement, the movement pattern defining a schedule of movement of the dental objects during treatment stages as each of the dental objects moves from a respective initial position toward a respective final position, wherein the schedule of movement indicates whether each of the dental objects moves during each of the treatment stages;

calculating a respective treatment path for each of the dental objects between their respective initial position and respective final position ~~positions~~;

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths;

performing a first modification of the schedule of movement in response to the identifying;

determining that the first modification does not avoid a collision between the first of the dental objects and the second of the dental objects; and

performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision.

2. (Original) The method of claim 1, wherein the movement pattern is determined by selection by a user.

3. (Currently amended) The method of claim 1, wherein the movement pattern includes one of an all-equal pattern, an A-shaped pattern, a V-shaped pattern, a mid-line shift ~~patter-~~pattern, or a M-shaped pattern.

4. (Original) The method of claim 1, wherein the determining the movement pattern comprises analyzing, by a computer processor, the dental objects in their respective initial and final positions.

5. (Original) The method of claim 4, wherein the analyzing comprises determining a respective distance needed to move each of the dental objects from their respective initial positions to their respective final positions.

6. (Currently amended) The method of claim 1, wherein the first modification comprises delaying initial movement of the first of the dental objects ~~object~~.

7. (Currently amended) The method of claim 6, wherein the second modification comprises slowing or stopping movement of the first of the dental objects ~~object~~ during one or more of the treatment stages following a previous one of the treatment stages in which the first dental object moved.

8. (Currently amended) The method of claim 7, further comprising:

performing, after determining that the second modification does not avoid a collision, a ~~third~~ modification of the ~~schedule of~~ movement of the dental objects, the ~~third~~ modification comprising:

moving [[a]] the first of the dental objects away from the respective route of [[a]] the second of the dental objects; and

moving the first of the dental objects ~~object~~ toward its respective final position after the second of the dental objects ~~object~~ has sufficiently traversed its respective route to avoid the collision.

9. (Currently amended) The method of claim 1, wherein the second modification comprises one or more of:

delaying initial movement of the first of the dental objects ~~object~~; and

slowing or stopping movement of the first of the dental objects ~~object~~ during one or more of the treatment stages following a previous one of the treatment stages during which the first of the dental objects ~~object~~ moved.

10. (Currently amended) The method of claim 1, wherein the second modification comprises:

moving [[a]] the first of the dental objects away from the respective route of [[a]] the second of the dental objects; and

moving the first of the dental objects ~~object~~ toward its respective final position after the second of the dental objects ~~object~~ has sufficiently traversed its respective route to avoid the collision.

11. (Original) The method of claim 1, further comprising producing a series of orthodontic appliances based at least on the modified schedule of movement, wherein each of the orthodontic appliances corresponds to a respective one of the treatment stages.

12. (Original) The method of claim 11, wherein the producing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming a respective one of the orthodontic appliances over each of the respective positive molds.

To: docketing@fisherbroyles.com,patent@fisherbroyles.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 161191

Sep 21, 2020 03:43:46 AM

Dear PAIR Customer:

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 161191 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

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Application	Document	Mailroom Date	Attorney Docket No.
16723706	INTV.SUM.APP	09/21/2020	11353.018US5
	OA.APPENDIX	09/21/2020	11353.018US5

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I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office, Commissioner for Patents, via the EFS pursuant to 37 C.F.R. § 1.8.

Date: September 24, 2020 Signature: /Jayna Lofgran/
Name: Jayna Lofgran

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	ALIGN TECHNOLOGY, INC.	Examiner:	Mirayda Arlene Aponte
Appln. No.:	16/723,706	Art Unit:	3772
Filed:	December 20, 2019	Conf. No.:	1026
For:	AUTOMATED TREATMENT STAGING FOR TEETH	Customer No:	161191
Attorney Docket No:	11353.018US5		

AMENDMENT AND RESPONSE TO NON-FINAL OFFICE ACTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

This Amendment and Response to Office Action is filed in answer to the Office Action mailed August 10, 2020. A three-month period for response was set, making a response initially due on or before November 10, 2020. This response is timely filed, and no fees are believed to be due, however, the Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 506974.

Amendments to the claims begin on page 2.
Remarks begin on page 8.

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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A computer-implemented method comprising:

determining a movement pattern for moving dental objects from an initial arrangement toward a final arrangement, the movement pattern defining a schedule of movement of the dental objects during treatment stages as each of the dental objects moves from a respective initial position toward a respective final position, wherein the schedule of movement indicates whether each of the dental objects moves during each of the treatment stages;

calculating a respective treatment path for each of the dental objects between their respective initial position and respective final position ~~positions~~;

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths;

performing a first modification of the schedule of movement in response to the identifying;

determining that the first modification does not avoid a collision between the first of the dental objects and the second of the dental objects; and

performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision.

2. (Original) The method of claim 1, wherein the movement pattern is determined by selection by a user.

3. (Currently amended) The method of claim 1, wherein the movement pattern includes one of an all-equal pattern, an A-shaped pattern, a V-shaped pattern, a mid-line shift ~~patter~~ pattern, or a M-shaped pattern.

4. (Original) The method of claim 1, wherein the determining the movement pattern comprises analyzing, by a computer processor, the dental objects in their respective initial and final positions.

5. (Original) The method of claim 4, wherein the analyzing comprises determining a respective distance needed to move each of the dental objects from their respective initial positions to their respective final positions.

6. (Currently amended) The method of claim 1, wherein the first modification comprises delaying initial movement of the first of the dental objects ~~object~~.

7. (Currently amended) The method of claim 6, wherein the second modification comprises slowing or stopping movement of the first of the dental objects ~~object~~ during one or more of the treatment stages following a previous one of the treatment stages in which the first dental object moved.

8. (Currently amended) The method of claim 7, further comprising:

performing, after determining that the second modification does not avoid a collision, a ~~third~~ modification of the ~~schedule of~~ movement of the dental objects, the ~~third~~ modification comprising:

moving [[a]] the first of the dental objects away from the respective route of [[a]] the second of the dental objects; and

moving the first of the dental objects ~~object~~ toward its respective final position after the second of the dental objects ~~object~~ has sufficiently traversed its respective route to avoid the collision.

9. (Currently amended) The method of claim 1, wherein the second modification comprises one or more of:

delaying initial movement of the first of the dental objects ~~object~~; and

slowing or stopping movement of the first of the dental objects ~~object~~ during one or more of the treatment stages following a previous one of the treatment stages during which the first of the dental objects ~~object~~ moved.

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10. (Currently amended) The method of claim 1, wherein the second modification comprises:

moving [[a]] the first of the dental objects away from the respective route of [[a]] the second of the dental objects; and

moving the first of the dental objects ~~object~~ toward its respective final position after the second of the dental objects ~~object~~ has sufficiently traversed its respective route to avoid the collision.

11. (Original) The method of claim 1, further comprising producing a series of orthodontic appliances based at least on the modified schedule of movement, wherein each of the orthodontic appliances corresponds to a respective one of the treatment stages.

12. (Original) The method of claim 11, wherein the producing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming a respective one of the orthodontic appliances over each of the respective positive molds.

13. (Currently amended) A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages, wherein the schedule of movement indicates whether each of the dental objects moves during each of the treatment stages;

calculating a respective route from an initial position toward a final position for each of the dental objects during the treatment stages;[[and]]

performing a first modification to the schedule of movement to avoid a collision or obstruction between [[two]] a first dental object and a second dental object of the dental objects on their respective routes;

determining that the first modification does not avoid the collision or obstruction between the first and second dental objects; and

performing a second modification of the schedule of movement after determining that the first modification does not avoid the collision or obstruction.

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14. (Original) The computer-implemented method of claim 13, wherein determining the schedule of movement comprises selecting a movement pattern from a plurality of predetermined movement patterns.

15. (Original) The computer-implemented method of claim 13, further comprising recalculating at least one of the respective routes based on the first or second modified schedule of movement.

16. (Original) The computer-implemented method of claim 13, further comprising manufacturing at least two orthodontic aligners, each of the orthodontic aligners corresponding to a respective one of the treatment stages.

17. (Original) The computer-implemented method of claim 16, wherein the manufacturing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming an orthodontic aligner over each respective positive mold.

18. (Currently amended) The computer-implemented method of claim 13, wherein the first or second modification comprises:

moving a first of the dental objects away from the respective route of a second of the dental objects;

stopping movement of the first of the dental objects; and

moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision.

19. (Currently amended) The computer-implemented method of claim 13, wherein the first or second modification comprises:

moving a first of the dental objects away from the respective route of a second of the dental objects;

stopping movement of the first of the dental objects; and

moving the first dental object toward its previous position.

20. (Withdrawn) A method comprising:

determining a movement pattern for moving dental objects from an initial arrangement toward a final arrangement, the movement pattern defining a schedule of movement of the dental objects during treatment stages as each of the dental objects moves from a respective initial position toward a respective final position;

calculating a respective treatment path for each of the dental objects between their respective initial and final positions;

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths;

attempting a first modification of the schedule of movement in response to identifying the collision to determine a first number of stages for a first treatment option, the first modification including slowing or stopping movement of the first of the dental objects;

attempting a second modification of the schedule of movement in response to identifying the collision to determine a second number of stages for a second treatment option, the second modification including moving the first of the dental objects away from the respective route of the second of the dental objects and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision;

attempting a third modification of the schedule of movement in response to identifying the collision to determine a third number of stages for a third treatment option, the third modification including delaying one or more teeth from moving one or more stages where it would otherwise move in order to prevent another tooth from colliding with and/or obstructing the path of the delayed tooth; and

selecting the first, second, or third option based on the least of the number of stages of the first, second and third treatment options; and

performing the respective modification to the movement pattern based on the selection of the first, second, or third treatment option.

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21. (Withdrawn) The method of claim 20, further comprising producing a series of orthodontic appliances based at least on the modified schedule of movement, wherein each of the orthodontic appliances corresponds to a respective one of the treatment stages.

22. (Withdrawn) The method of claim 21, wherein the producing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming a respective one of the orthodontic appliances over each of the respective positive molds.

23. (Withdrawn) The method of claim 22, wherein the movement pattern includes one of an all-equal pattern, an A-shaped pattern, a V-shaped pattern, a mid-line shift pattern, or a M-shaped pattern.

24. – 30. (Cancelled)

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REMARKS

Claims 1-23 are pending in this application. Claims 20-23 were withdrawn from consideration as being drawn to a nonelected invention. Claims 24-30 were previously cancelled. Claims 1, 3, 6-10, 13, 18, and 19 have been amended herein. All amendments made herein have been made solely to expedite prosecution and shall not be construed as an acquiescence to any grounds of rejection. No new matter has been added with the present amendment.

Reconsideration is respectfully requested in view of the following remarks and claim amendments.

Examiner Interview

Applicant thanks Examiner Aponte and Examiner Eide for participating in a telephonic interview on September 15, 2020, with Applicant's representative, Charles Hagadorn. During the interview claims 1 and 13 were discussed. During the interview it was agreed that amending the claims to include subject matter directed to, "the schedule of movement indicating whether each of the dental objects moves during each of the treatment stages" would overcome the rejection and the examiner acknowledged that Chishti does not teach such subject matter. Claim 1 has been amended to recite "the schedule of movement indicating whether each of the dental objects moves during each of the treatment stages." Claim 13 already included this subject matter.

35 U.S.C. § 112 Claim Rejections

Claims 6-8 and 13-19 stand rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention. Counsel respectfully submits that the present amendments address these § 112 rejections and request that they be withdrawn.

Without conceding the merits of the rejection and solely to advance prosecution, Applicant has amended the claims to more clearly comply with the requirements of 35 U.S.C. 112.

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Claim Objections

Claims 1, 8, 10, and 16 have been objected to because of informalities. Applicant believes that examiner meant claim 13 inasmuch as claim 16 does not have separate line indentations and does not use the term "and". Claims 1, 8, 10, and 13 and have been amended herein as suggested by the Examiner.

35 U.S.C. § 102 Rejections

Claims 1-9, 11, and 13-16 stand rejected under 35 U.S.C. 102(a)(1) as being anticipated by U.S. Pregrant Publication No. 2004/0137400 (hereinafter "Chishti '400"). Counsel for the Applicants respectfully submits that Chishti fails to disclose or suggest all of the features of claims 1-9, 11, and 13-16. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." MPEP § 2131 (citing to *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Id.* (citing to *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)).

Without conceding the merits of the rejection and solely to expedite prosecution, Applicant has amended claim 1 to recite, in part, "the schedule of movement indicating whether each of the dental objects moves during each of the treatment stages." As agreed during the interview, this subject matter is not found in Chishti. Accordingly, Chishti fails to anticipate claim 1. Claims 2-9 and 11 are likewise patentable at least by virtue of their dependency from claim 1 and on their own merits. Claim 13, although different in scope, is patentable for at least the same reasons discussed with reference to claim 1 and claims 14-16 are likewise patentable at least by virtue of their dependency from claim 13 and on their own merits.

35 U.S.C. § 103 Obviousness Rejections

Claims 8, 10, 18, and 19 stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti '400 as applied to claim 13 above, and further in view of U.S. Patent No. 6471511 (hereinafter "Chishti '511"). Claims 8, 10, 18, and 19 depend from one of claims 1 and 13 and are therefore allowable over Chishti '400 for at least the same reasons as claims 1 and 13. Moreover, Chishti '511, cited for purportedly teaching aspects of movement paths does not

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cure the deficiencies of Chishti '400. Accordingly, claims 8, 10, 18, and 19 are allowable over Chishti '400 and Chishti '511, taken alone or as combined.

Claims 12 and 17 stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti '400, in view of Chishti '511, in further view of U.S. Patent No. 6309215 (hereinafter "Phan"). Claims 12 and 17 depend from one of claims 1 and 13 and are therefore allowable over Chishti '400 for at least the same reasons as claims 1 and 13. Moreover, Chishti '511, cited for purportedly teaching aspects of molds and Phan, cited for purportedly teaching aspects of thermoformable polymer materials do not cure the deficient of Chishti '400. Accordingly, claims 12 and 17 are allowable over Chishti '400, Chishti '511, and Phan, taken alone or as combined.

Double Patenting Rejection

Claims 1, 2, 4-9, 11-14, 16, and 17 stand rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-6, 8-11, 18 and 19 of U.S. Patent No. 10456217. In order to avoid further expenses and time delay, Applicant elects to expedite the prosecution of the present application by filing a Terminal Disclaimer to obviate the double patenting rejections in compliance with 37 CFR §1.321 (b) and (c). Applicant respectfully requests that this rejection be held in abeyance until final resolution of the claims should the Office maintain these rejections. Should this case be in condition for allowance, Applicant respectfully requests the examiner contact Applicant's representative so Applicant may consider the filing of a terminal disclaimer.

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Conclusion

Applicant submits that the application is in condition for allowance. If any issues exist that can be resolved with an Examiner's Amendment or a telephone conference, please contact Applicant's representative at (206) 537-9809.

Respectfully submitted,

Dated: September 24, 2020

/Charles C. Hagadorn, III/
Charles C. Hagadorn, III, Reg. No. 62367
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Seattle, Washington 98104-5119
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UNITED STATES PATENT AND TRADEMARK OFFICE
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Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/723,706	09/24/2020 06:52:09 PM ET	11353.018US5

Title of Invention

AUTOMATED TREATMENT STAGING FOR TEETH

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1026	FILED BY	Jayna Lofgran
PATENT CENTER #	60087026	FILING DATE	12/20/2019
CUSTOMER #	161191	FIRST NAMED INVENTOR	Ian Kitching
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Charlie Hagadorn

Documents

TOTAL DOCUMENTS: 3

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
11353-018US5_Response-NFOA_200924.pdf		11	-	129 KB
11353-018US5_Response-NFOA_200924-A....pdf	(1-1)	1	Amendment/Req. Reconsideration-After Non-Final Reject	80 KB
11353-018US5_Response-NFOA_200924-CLM.pdf	(2-7)	6	Claims	90 KB
11353-018US5_Response-NFOA_200924-REM.pdf	(8-11)	4	Applicant Arguments/Remarks Made in an Amendment	109 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
11353-018US5_Response-NFOA_200924.pdf	CC88C2D8ED6B25D8189E28C91A6042A320DEC28A5892ED67715DD28E416A8746A4B40744BA06DBC9F06C882183951F672E54D62EB42DC7D39A39AC85482C74C4
11353-018US5_Response-NFOA_200924-A....pdf	5AC7316F3F2E44EE945F0B45C32AC50AD565EF536775167489 86CF6A157984D43809CD1F74DB3FCFDB93BD3D596FB71DF5 B4DB1226BAE607C9C43FB831EFCFC5
11353-018US5_Response-NFOA_200924-CLM.pdf	7E23B09086092EF9A253AECB2A412D7329BA6ECEC0E14BDA 7F4F33FB4057FB57BFBF3EE1357841DA404D9DA248E4E10E6 98F80E19D76FA37ACADBD6CC2A987C3
11353-018US5_Response-NFOA_200924-REM.pdf	A41D30A5A91FA16B08242D705C5D2BEAF00E66C9ACAA638B D498D992C7E5DE8A52A805706507A7D99A84951511AB9846E9 5A763CF062695F81B41EF74743BE09

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/723,706	Filing Date 12/20/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT	09/24/2020	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 23	Minus	** 30	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 4	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/KIMBERLY D WILLIAMS/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

161191 7590 02/01/2021

FisherBroyles, LLP - Align Technology, Inc.
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Atlanta, GA 30326

EXAMINER
APONTE, MIRAYDA ARLENE

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
02/01/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@fisherbroyles.com
patent@fisherbroyles.com

PTOL-90A (Rev. 04/07)

Office Action Summary	**Application No.** 16/723,706	**Applicant(s)** Kitching, Ian	
	Examiner MIRAYDA A APONTE	**Art Unit** 3772	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 24 September 2020.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☑ This action is **FINAL.** 2b) ☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-19 is/are pending in the application.

5a) Of the above claim(s) 20-23 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-19 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. **Claims 1-9, 11 and 13-16 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Chishti et al. (US 20040137400 A1)**.

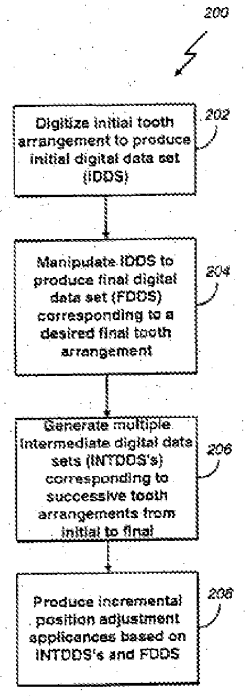


FIG._3

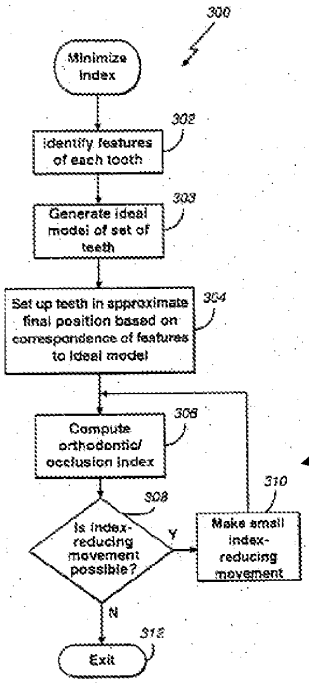


FIG._4

See Fig. 5 for details

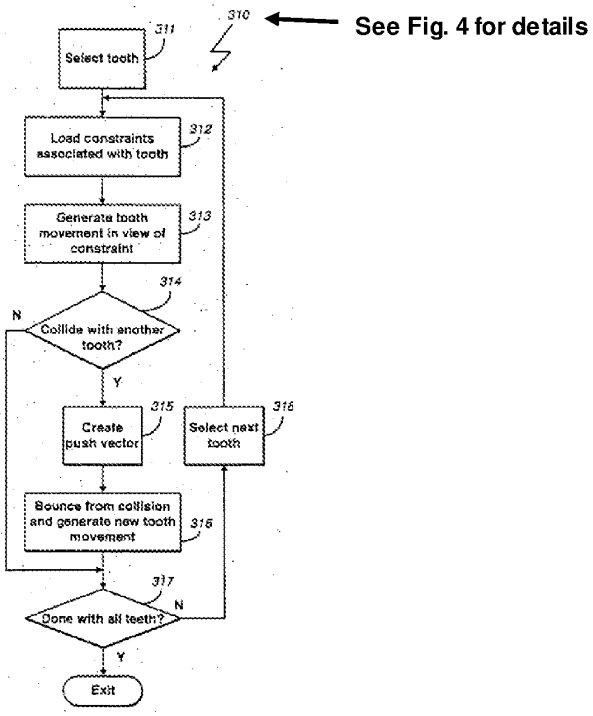

See Fig. 4 for details
310
311
Select tooth
312
Load constraints associated with tooth
313
Generate tooth movement in view of constraint
314
Collide with another tooth?
N
Y
315
Create push vector
316
Select next tooth
Bounce from collision and generate new tooth movement
317
Done with all teeth?
N
Y
Exit

FIG._5

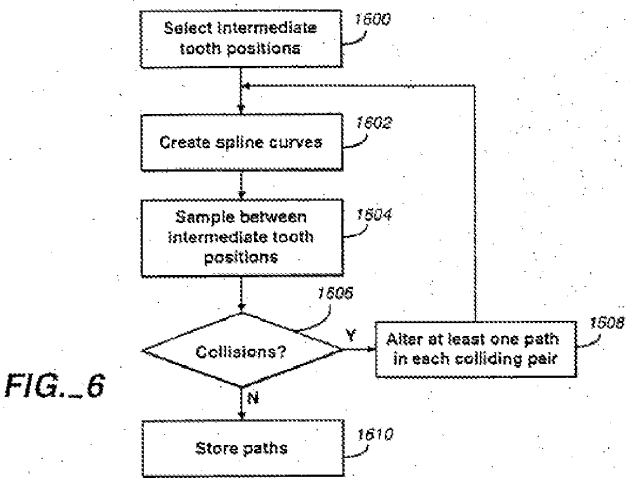

1600
Select intermediate tooth positions
1602
Create spline curves
1604
Sample between intermediate tooth positions
1606
Collisions?
Y
1608
Alter at least one path in each colliding pair
N
1610
Store paths

FIG._6

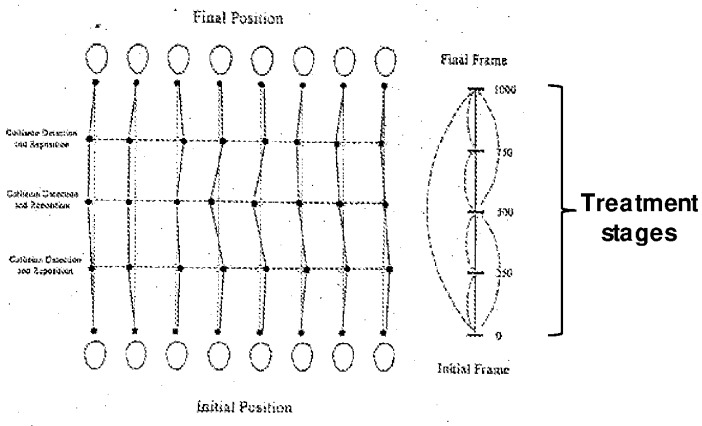


FIG. 10

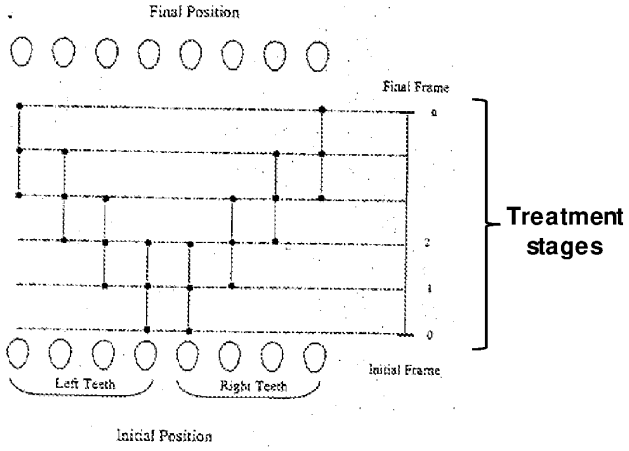


FIG. 11

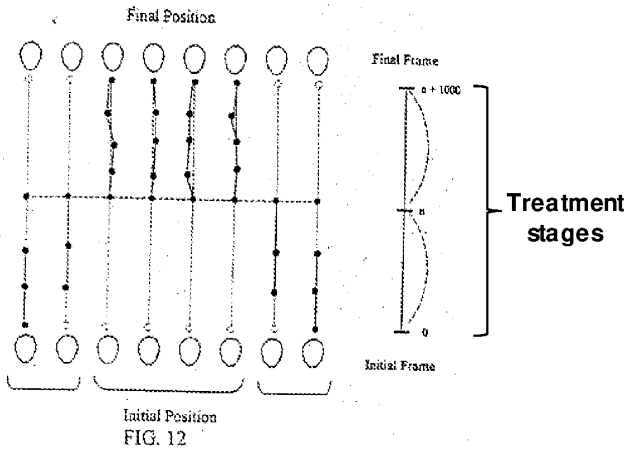


FIG. 12

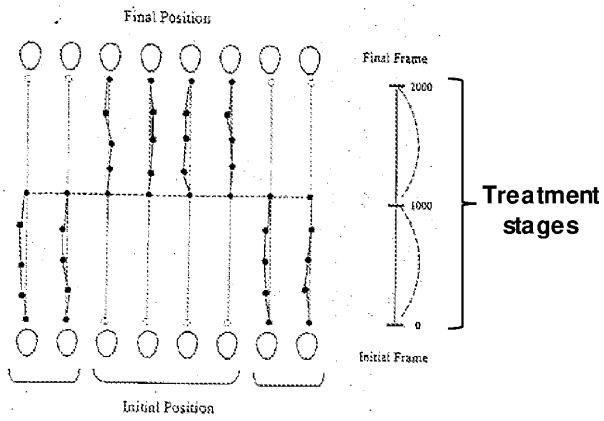


FIG. 13

4. **Regarding claim 1,** Chishti et al. discloses a computer-implemented method including:

determining a movement pattern (INTDDS's) (206) for moving dental objects from an initial arrangement (IDDS) (202) toward a final arrangement (FDDS) (204) (see Fig. 3 above), the movement pattern (INTDDS's) defining a schedule of movement of the dental objects during treatment stages as each of the dental objects moves from a respective initial position (IDDS) (202) toward a respective final position (FDDS) (204) (see Fig. 3 above and [0012] – "computer-implemented method to prepare a malocclusion treatment plan includes selecting a tooth treatment pattern from a library of predetermined tooth treatment patterns", where the malocclusion treatment plan is considered to be the schedule of movement of the dental objects), wherein the schedule of movement indicates whether each of the dental objects moves during each of the treatment stages (see [0013] – "the library of treatment patterns includes at least one or more of the following: all equal movement pattern, A-shaped movement pattern, V-shaped movement pattern, M-shaped movement pattern, W-shaped movement pattern, symmetric staircase pattern, asymmetric staircase pattern, and equal equal movement pattern", and Figs. 10-

13 – the figures shows examples of schedule of movements (all equal movement pattern, A-shaped movement pattern, V-shaped movement pattern) indicating in what treatment stage each tooth moves);

calculating a respective treatment path for each of the dental objects between their respective initial position and respective final position (see Fig. 4 and 6 above, and [0091-0113, 0131-0133]);

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths (see step 314 in Fig. Fig. 5 above and [0119] – "The process of FIG. 5 then detects whether the planned movements would cause collisions with neighboring teeth (step 314). The collision detection process determines if any of the geometries describing the tooth surfaces intersect", and step 1606 in Fig. 6 above [0131] – "program then samples each spline curve between the intermediate positions (step 1604) and applies the collision detection algorithm to the samples (step 1606)");

performing a first modification of the schedule of movement in response to the identifying (see step 315 in Fig. 5 above and [0120] – "If a collision occurs, a "push" vector is created to shift the path of the planned movement (step 315)", and step 1606 of Fig. 6 above and [0131] – "If any collisions are detected, the program alters the path of at least one tooth in each colliding pair by selecting a new position for one of the intermediate steps (step 1608) and creating a new spline curve (1602)");

determining that the first modification does not avoid a collision between the first of the dental objects and the second of the dental objects (see Fig. 5 above and [0119] – "Next, a tooth movement plan which takes into consideration the constraints is generated

(step 313). The process of FIG. 5 then detects whether the planned movements would cause collisions with neighboring teeth (step 314). The collision detection process determines if any of the geometries describing the tooth surfaces intersect. If there are no obstructions, the space is considered free; otherwise it is obstructed", the method provides step in a loop sequence that verify if each modification to the path avoids a collision, if not it creates a push vector to generate a new tooth movement until no collision is determined); and

performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision (see Fig. 5 above and [0120] – "If a collision occurs, a "push" vector is created to shift the path of the planned movement (step 315). Based on the push vector, the current tooth "bounces" from the collision and a new tooth movement is generated (step 316)").

5. **Regarding claim 2**, Chishti et al. discloses that wherein the movement pattern is selected by a user. ([0021] – "*than one candidate treatment path for each tooth can be generated and graphically displayed for each candidate treatment path to a human user for selection.*")

6. **Regarding claim 3,** Chishti et al. discloses that the movement pattern includes one of an all-equal pattern, an A-shaped pattern, a V-shaped pattern, a mid-line shift pattern, or a M- shaped pattern (see [0013] – "The library of treatment patterns includes at least one or more of the following: all equal movement pattern, A-shaped movement pattern, V-shaped movement pattern, M-shaped movement pattern, W-shaped movement pattern, symmetric staircase pattern, asymmetric staircase pattern, and equal equal movement pattern").

7. **Regarding claim 4**, Chishti et al. discloses that when determining the movement pattern includes analyzing, by a computer processor, the dental objects in their respective initial and final positions (see Fig. 3 and [0055] – "first step, an initial digital data set (IDDS) representing an initial tooth arrangement is obtained (step 202)", in [0056] – "The IDDS is then manipulated using a computer having a suitable graphical user interface (GUI) and software appropriate for viewing and modifying the images", in [0057] – "After segmenting or isolating the components, the user will often reposition the tooth in the model by following a prescription or other written specification provided by the treating professional. Alternatively, the user may reposition one or more teeth based on a visual appearance or based on rules and algorithms programmed into the computer. Once the user is satisfied, the final teeth arrangement is incorporated into a final digital data set (FDDS) (step 204)", and in [0058] – "step 204, final positions for the upper and lower teeth in a masticatory system of a patient are determined by generating a computer representation of the masticatory system", if the IDDS and the FDDS are digital data in the computer, where the data is analyzed and manipulated, it is understood that a computer processor is used to perform those steps).

8. **Regarding claim 5**, Chishti et al. discloses that when doing the analyzing, it includes determining a respective distance needed to move each of the dental objects from their respective initial positions to their respective final positions (see [0049] – "while the point will usually follow a nonlinear path, there is a linear distance between any point in the tooth when determined at any two times during the treatment. Thus, an arbitrary point P.sub.1 may in fact undergo a true side-to-side translation as indicated by arrow d.sub.1, while a second arbitration point P.sub.2 may travel along an arcuate path,

resulting in a final translation d.sub.2. Many aspects of the present invention are defined in terms of the maximum permissible movement of a point P.sub.1 induced on any particular tooth. Such maximum tooth movement, in turn, is defined as the maximum linear translation of that point P.sub.1 on the tooth which undergoes the maximum movement for that tooth in any treatment step", and in [0092] – "step 302, the process 300 positions the model of the teeth in its approximate final position based on a correspondence of features to the ideal model (step 304). In that step, each tooth model is moved so that its features are aligned to the features of a corresponding tooth in the ideal model. The features may be based on cusps, fossae, ridges, distance-based metrics").

9. **Regarding claim 6,** Chishti et al. discloses that the first modification includes delaying initial movement of the first of the dental objects (see [0053] – "*Often, only certain one(s) of the teeth will be repositioned while others of the teeth will provide a base or an anchor region for holding the appliance 111 in place as the appliance 111 applies a resilient repositioning force against the tooth or teeth to be repositioned. In complex cases, however, multiple teeth may be repositioned at some point during the treatment. In such cases, the teeth which are moved can also serve as a base or anchor region for holding the repositioning appliance*", and [0097-0113], where it is understood that a tooth is provided as an anchor it can be considered a dental object that it is delayed an initial movement).

10. **Regarding claim 7,** Chishti et al. discloses that the second modification includes slowing or stopping movement of the first of the dental objects during one or more of the treatment stages following a previous one of the treatment stages in which the first dental

object moved ([0116] – "*One component may accelerate along a curve between one pair of stages (e.g., stages 3 and 8 in a treatment plan having that many stages), while another moves linearly between another pair of stages (e.g., stages 1 to 5), and then changes direction suddenly and slows down along a linear path to a later stage (e.g., stage 10)*").

11. **Regarding claim 8,** Chishti et al. discloses that it further includes: performing, after determining that the second modification does not avoid a collision, a third modification of the movement of the dental objects, the modification including:

moving the first of the dental objects away from the respective route of the second of the dental objects; and

moving the first of the dental objects toward its respective final position after the second of the dental objects has sufficiently traversed its respective route to avoid the collision (step 1606 of Fig. 6 above and [0131] – "If any collisions are detected, the program alters the path of at least one tooth in each colliding pair by selecting a new position for one of the intermediate steps (step 1608) and creating a new spline curve (1602). The program then samples the new path (1604) and again applies the collision detection algorithm (1606). The program continues in this manner until no collisions are detected", therefore if after a second modification does not avoid a collision).

12. **Regarding claim 9**, Chishti et al. disclose that the second modification includes one or more of:

delaying initial movement of the first of the dental objects; and

slowing or stopping movement of the first of the dental objects during one or more of the treatment stages following a previous one of the treatment stages during which the first of the dental objects moved (see [0053] – "*Often, only certain one(s) of the teeth will*

be repositioned while others of the teeth will provide a base or an anchor region for holding the appliance 111 in place as the appliance 111 applies a resilient repositioning force against the tooth or teeth to be repositioned. In complex cases, however, multiple teeth may be repositioned at some point during the treatment. In such cases, the teeth which are moved can also serve as a base or anchor region for holding the repositioning appliance", and [0097-0113], where it is understood that a tooth is provided as an anchor it can be considered a dental object that it is delayed an initial movement, and [0116] – "One component may accelerate along a curve between one pair of stages (e.g., stages 3 and 8 in a treatment plan having that many stages), while another moves linearly between another pair of stages (e.g., stages 1 to 5), and then changes direction suddenly and slows down along a linear path to a later stage (e.g., stage 10)").

13. **Regarding claim 11**, Chishti et al. discloses that it further includes producing a series of orthodontic appliances based at least on the modified schedule of movement, wherein each of the orthodontic appliances corresponds to a respective one of the treatment stages (see[0201] – "Fabrication machine 522 fabricates dental appliances based on intermediate and final data set information received from data processing system 500").

14. **Regarding claim 13,** Chishti et al. discloses a computer-implemented method including:

determining a schedule of movement for dental objects during treatment stages, wherein the schedule of movement indicates whether each of the dental objects moves during each of the treatment stages (see Fig. 3 above and [0012] – "computer-implemented method to prepare a malocclusion treatment plan includes selecting a tooth

treatment pattern from a library of predetermined tooth treatment patterns", where the malocclusion treatment plan is considered to be the schedule of movement of the dental objects);

calculating a respective route from an initial position toward a final position for each of the dental objects during the treatment stages (see Fig. 4 and 6 above, and [0091-0113, 0131-0133]); and

performing a first modification to the schedule of movement to avoid a collision or obstruction between a first dental object and a second dental object of the dental objects on their respective routes (see step 314 in Fig. 5 above and [0119] – "The process of FIG. 5 then detects whether the planned movements would cause collisions with neighboring teeth (step 314). The collision detection process determines if any of the geometries describing the tooth surfaces intersect", and step 1606 in Fig. 6 above [0131] – "program then samples each spline curve between the intermediate positions (step 1604) and applies the collision detection algorithm to the samples (step 1606)");

determining that the first modification does not avoid the collision or obstruction between the first and second dental objects (see Fig. 5 above and [0119] – "Next, a tooth movement plan which takes into consideration the constraints is generated (step 313). The process of FIG. 5 then detects whether the planned movements would cause collisions with neighboring teeth (step 314). The collision detection process determines if any of the geometries describing the tooth surfaces intersect. If there are no obstructions, the space is considered free; otherwise it is obstructed", the method provides step in a loop sequence that verify if each modification to the path avoiding a collision. If not, it

creates a push vector to generate a new tooth movement until no collision is determined); and

performing a second modification of the schedule of movement after determining that the first modification does not avoid the collision or obstruction (see Fig. 5 above and [0120] – "If a collision occurs, a "push" vector is created to shift the path of the planned movement (step 315). Based on the push vector, the current tooth "bounces" from the collision and a new tooth movement is generated (step 316)").

15. **Regarding claim 14**, Chishti et al. discloses that when determining the schedule of movement includes selecting a movement pattern from a plurality of predetermined movement patterns (see Fig. 3 above and [0012] – "computer-implemented method to prepare a malocclusion treatment plan includes selecting a tooth treatment pattern from a library of predetermined tooth treatment patterns").

16. **Regarding claim 15,** Chishti et al. discloses further including recalculating at least one of the respective routes based on the first or second modified schedule of movement (see Fig. 5, steps 313-316 where it is recalculated the respective routes based on if a collision is identified after every tooth movement generation, and in Fig. 6, steps 1602-1608 where it is recalculated the intermediate tooth position if a collision is identified, this is done after an alter path is identified).

17. **Regarding claim 16,** Chishti et al. discloses that it further includes manufacturing at least two orthodontic aligners, each of the orthodontic aligners corresponding to a respective one of the treatment stages ([0016] – "The medium can include code to fabricate an appliance for each tooth arrangement", "The medium can include code to control a fabrication machine to produce successive appliances for the tooth

arrangement", and [0201] –" Fabrication machine 522 fabricates dental appliances based on intermediate and final data set information received from data processing system 500").

Claim Rejections - 35 USC § 103

18. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

19. **Claims 12 and 17 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti et al. (US 20040137400 A1) aka Chishti ('400), as applied to claim 1 and 13 above, in further view of Chishti et al. (US 6471511 B1) aka Chishti ('511), and in further view of Phan et al. (US 6309215 B1)**.

20. **Regarding claim 12**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 11.

21. However, Chishti ('400) does not disclose that wherein the producing includes: fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and thermoforming a respective one of the orthodontic appliances over each of the respective positive molds.

22. **Regarding claim 17**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 16.

23. However, Chishti (‘400) does not disclose that the manufacturing includes fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and thermoforming an orthodontic aligner over each respective positive mold.

24. **With respect to claims 12 and 17**, Chishti ('511) teaches the producing includes fabricating a respective positive mold of the dental objects for at least two of the treatment stages (col. 9, ln 43-47), and that it is used a polymeric material over a positive physical model.

25. However, they are silenced disclosing thermoforming the respective one of the orthodontic appliances over each of the respective positive molds.

26. Phan et al. teaches that the orthodontic appliance is of a thermoformable polymer material (col. 2, line 26-46).

27. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Chishti (‘400)/Chishti (‘511)'s orthodontic appliance, to the Phan’s thermoformable polymer material, in order to provide an orthodontic appliance with the stiffness from the polymeric material to impart a resilient repositioning force against one or a portion of the remaining teeth.

28. **Claims 8 and 10 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti et al. (US 20040137400 A1) aka Chishti (‘400) as applied to claim 1 above, and further in view of Chishti et al. (US 6471511 B1) aka Chishti (‘511)**.

29. **Regarding claim 8,** Chishti (‘400) discloses the claimed invention substantially as claimed, as set forth above for claim 7, and where Chishti (‘400) discloses that it further includes: performing, after determining that the second modification does not avoid a

collision, a third modification of the schedule of movement, (step 1606 of Fig. 6 above and [0131] – "If any collisions are detected, the program alters the path of at least one tooth in each colliding pair by selecting a new position for one of the intermediate steps (step 1608) and creating a new spline curve (1602). The program then samples the new path (1604) and again applies the collision detection algorithm (1606). The program continues in this manner until no collisions are detected", therefore if after a second modification does not avoid a collision).

30. However, Chishti ('400) does not disclose that the third modification includes moving a first of the dental objects away from the respective route of a second of the dental objects; and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision.

31. **Regarding claim 10**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 1.

32. However, Chishti ('400) does not disclose that the second modification includes: moving a first of the dental objects away from the respective route of a second of the dental objects; and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision.

33. **With respect to claims 8 and 10**, Chishti ('511) teaches the movement of a first of the dental objects/first tooth "in any direction other than directly towards the desired final position", so when moving the first of the dental objects from one point to the next in the sequence does not result in a collision of the first and second of the dental objects

when moving them to their respective final positions (col. 4, lines 7-22). Due to it is disclosed that the movement can be "in any direction", it is understood that includes a movement of the first of the dental objects away from the respective route of a second of the dental objects; and due to the final results is that the dental object moves to the desired final position, it is understood that the first dental object moves toward its previous position.

34. It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to modify the first or second modifications of Chishti ('400), with the movement in any direction that is other than directly towards the second dental object of Chishti ('511), in order to move the first of the dental objects in a loop condition to avoid a collision with the second of the dental objects during the movement pattern, continuing to the final position at the end of the loop condition.

35. **Claims 18 and 19 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti et al. (US 20040137400 A1) aka Chishti ('400) as applied to claim 1 or 13 above, and further in view of Chishti et al. (US 6471511 B1) aka Chishti ('511) and in further view of Chishti (US 20020072027 A1) aka Chishti ('027)**.

36. **Regarding claim 18**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 13.

37. However, Chishti ('400) does not explicitly state that the first or second modification includes:

moving a first of the dental objects away from the respective route of a second of the dental objects; and

moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision.

38. **Regarding claim 19**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 13.

39. However, Chishti ('400) does not explicitly state that the first or second modification includes:

moving a first of the dental objects away from the respective route of a second of the dental objects; and

moving the first dental object toward its previous position.

40. **With respect to claims 18 and 19**, Chishti ('511) teaches the movement of a first of the dental objects/first tooth "in any direction other than directly towards the desired final position", so when moving the first of the dental objects from one point to the next in the sequence does not result in a collision of the first and second of the dental objects when moving them to their respective final positions (col. 4, lines 7-22). Due to it is disclosed that the movement can be "in any direction", it is understood that this inherently includes a movement of the first of the dental objects away from the respective route of a second of the dental objects; and due to the final results is that the dental object moves to the desired final position, it is understood that this inherently includes that the first dental object moves toward its previous position.

41. However, Chishti ('400)/Chishti ('511) does not disclose the step of stopping movement of the first of the dental objects between the moving the first of the dental objects away and towards the previous position.

42. Chishti ('027) teaches a method for positioning teeth that each stage of the schedule of movements, the tooth movement is determined by selected points to generate a final digital data set representing a final acceptable tooth arrangement [0040]. Based on the final digital data set, a sequence of tooth movements can be generated in order to achieve the final tooth arrangement. For each movement, the system stops the movement of the tooth when the relative position is achieved and satisfies a predetermined target ([0040-0041]).

43. It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to modify the performing step of the first and second modification between the moving the first of the dental objects away from the respective rout and moving it towards its previous position of Chishti ('400)/Chishti ('511), with the step of stopping the movement of the tooth after each relative position is achieved of Chishti ('027), in order to be able to change the direction of the tooth and put it back on track towards the previous position.

Double Patenting

44. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d

1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

45. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

46. The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

47. **Claims 1, 2, 4-9, 11-14, 16 and 17** are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-6, 8-11, 18 and 19 of U.S. Patent

No. 10456217 B2. Although the claims at issue are not identical, they are not patentably distinct from each other because both set of claims include the same steps of the method described as follows;

- the step of determining a movement pattern for moving dental objects from an initial arrangement toward a final arrangement, where the movement pattern is defining a schedule of movement of the dental objects during treatment stages from a respective initial position toward a respective final position, where the schedule of movement indicates whether each of the dental objects moves during each of the treatment stages;
- the step of calculating a respective treatment path for each of the dental objects between their respective initial position and final position;
- the step of identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement;
- the step of performing a first modification of the schedule of movement as a response to the identifying step;
- the step of determining that the first modification does not avoid a collision between the first of the dental objects and the second of the dental objects; and
- the step of performing a second modification of the schedule of movement after it is determined that the first modification does not avoid a collision;
- wherein the movement pattern is determined by selection by a user,
- wherein the determining step includes analyzing the dental objects in their respective initial and final positions,

- wherein the first modification includes a delaying of the initial movement of the first dental object, and/or wherein the second modification includes slowing or stopping the movement of the first dental object during one or more of the treatment stages,
- performing, after determining that the second modification does not avoid a collision, a third modification of the movement of the dental objects, the modification comprising: moving a first of the dental objects away from the respective route of a second of the dental objects; and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision,
- wherein the second modification includes the steps of delaying initial movement of the first of the dental objects; and slowing or stopping movement of the first of the dental objects during one or more of the treatment stages following a previous one of the treatment stages during which the first of the dental objects moved, and
- producing a series of orthodontic appliances based at least on the modified schedule of movement by fabricating a respective positive mold of the dental objects, and thermoforming the respective orthodontic appliances over each of the respective positive molds.

Response to Arguments

48. Applicant's arguments filed 24 September 2020 have been fully considered but they are not persuasive.

49. **Regarding Interview on 15 September 2020 in page 1 of the Remarks**, although the Examiner at the interview of 21 September 2020 discussed that the added language of claim 1 was not in the specification of prior art of Chishti, after further analysis and consideration of the prior art in issue, it is understood that the Figs. 10-13 show schedule of movements for different patterns including when each of the dental objects moves during each of the treatment stages.

50. **Regarding 35 USC 102 rejections of page 2 of the Remarks,** applicant argues that Chishti ('400) does not disclose claim 1, by the added language of "the schedule of movement indicating whether each of the dental objects moves during each of the treatment stages". In addition, claim 13 includes the same limitation as the one added to claim 1. Therefore, applicant argues that the combination of all the limitations described in claims 1 and 13 are not found in the prior art of Chishti ('400).

51. However, due to the same reasons explained in the section 44 above, that Figs. 10-13 show the schedule of movements for different patterns including when each of the dental objects moves during each of the treatment stages.

52. It is understood for at least the reasons given above, that the claims are not ready for allowance.

53. **Regarding 35 USC 103 Obviousness rejections of page 2 of the Remarks,** due to the same reasons given above for claims 1 and 13, the claims are not ready for allowance.

54. **Regarding Double Patenting Rejection of page 3 of the Remarks,** the Office will maintain the rejection until the claims no longer describe the same subject matter found in the claims of the U.S. Patent No. 10456217 B2.

55. For all the reasons given above, it is understood that the present application is not in condition of allowance.

Conclusion

56. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

57. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

58. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIRAYDA ARLENE APONTE whose telephone number is (571)270-1933. The examiner can normally be reached on M-F 8-5.

59. Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

60. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cris Rodriguez can be reached on 571-272-4964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

61. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MIRAYDA A APONTE/
Examiner, Art Unit 3772

/NICHOLAS D LUCCHESI/
Primary Examiner, Art Unit 3772

Notice of References Cited	Application/Control No. 16/723,706	Applicant(s)/Patent Under Reexamination Kitching et al.	
	Examiner MIRAYDA A APONTE	Art Unit 3772	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20020072027-A1	06-2002	Chishti, Zia	A61C7/00	433/24
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching, Ian
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

CPC - Searched*		
Symbol	**Date**	**Examiner**
A61C7/002,00	08/01/2020	MA
A61C3/00	08/01/2020	MA
Updated search	01/22/2021	MA

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
433	24	08/01/2020	MA
	Updated search	01/22/2021	MA

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching, Ian
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

Search Notes		
Search Notes	**Date**	**Examiner**
EAST search	08/01/2020	MA
Word search on dental and ((move movement) near tooth) same (pattern stagger$4 "round-tipping") and (collision obstruction) and (computer program code), (delay$4 stop$4 slow$4 "hold up" decelerate postpone) same move$4 and delay$4 same move$4, orthodont$4 and schedule and (teeth tooth) same delay$4 same move$4, orthodont$4 and (teeth tooth) same delay$4 same move$4, orthodontic and computer and digital and treatment and appliance and (display same force) and (gingival with force),	08/01/2020	
Word search on stop same2 collision, dental AND orthodontic AND ((tooth teeth) SAME (position aligne*)) AND stop same2 collision, dental AND orthodontic AND ((tooth teeth) SAME (position aligne*)) AND stop same2 collision SAME predetermined	01/22/2021	MA

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching, Ian
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/14/2020	08/01/2020	01/22/2021						
	1	÷	✓	✓						
	2	÷	✓	✓						
	3	÷	✓	✓						
	4	÷	✓	✓						
	5	÷	✓	✓						
	6	÷	✓	✓						
	7	÷	✓	✓						
	8	÷	✓	✓						
	9	÷	✓	✓						
	10	÷	✓	✓						
	11	÷	✓	✓						
	12	÷	✓	✓						
	13	÷	✓	✓						
	14	÷	✓	✓						
	15	÷	✓	✓						
	16	÷	✓	✓						
	17	÷	✓	✓						
	18	÷	✓	✓						
	19	÷	✓	✓						
	20	÷	N	N						
	21	÷	N	N						
	22	÷	N	N						
	23	÷	N	N						
	24	÷	-	-						
	25	÷	-	-						
	26	÷	-	-						
	27	÷	-	-						
	28	÷	-	-						
	29	÷	-	-						
	30	÷	-	-						

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L146	2	"20040137400"	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/01/20 06:26 AM
L147	3	"16723706"	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/01/21 11:11 AM
L148	11	("2004/0137400").urpn. AND (PGPB | USPT | USOC).dbnm.	US-PGPUB; USPAT; USOCR	OR	ON	ON	2021/01/21 11:59 AM
L149	5	(6471511$).did.	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/01/22 09:37 AM
L150	158	("3660900" | "3860803" | "4504225" | "4505673" | "4755139" | "4793803" | "4798534" | "4856991" | "4936862" | "5011405" | "5017133" | "5035613" | "5055039" | "5059118" | "5139419" | "5186623" | "5273429" | "5338198" | "5340309" | "5342202" | "5368478" | "5382164" | "5395238" | "5431562" | "5447432" | "5452219" | "5454717" | "5456600" | "5474448" | "5533895" | "5542842" | "5549476" | "5587912" | "5605459" | "5607305" | "5645421" | "5848115" | "6217334").pn. OR ("6471511").urpn. AND (PGPB | USPT |	US-PGPUB; USPAT; USOCR	OR	ON	ON	2021/01/22 09:38 AM

ClearCorrect Exhibit 1002, Page 3253 of 3373

		USOC).dbnm.					
L151	44	L150 AND stop	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/01/22 09:39 AM
L152	8	L150 AND stop same2 collision	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/01/22 09:40 AM
L153	116	dental AND orthodontic AND ((tooth teeth) SAME (position aligne*)) AND stop same2 collision	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/01/22 09:45 AM
L154	21	dental AND orthodontic AND ((tooth teeth) SAME (position aligne*)) AND stop same2 collision SAME predetermined	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/01/22 11:16 AM
L155	12	"10456217"	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/01/22 12:57 PM
L157	10870	(A61C7/002 OR A61C7/00 OR A61C3/00).cpc. OR (433/24).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO	OR	ON	ON	2021/01/22 01:19 PM
L158	18	L157 AND L154	US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	ON	2021/01/22 01:19 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

161191 7590 03/23/2021

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Atlanta, GA 30326

EXAMINER
APONTE, MIRAYDA ARLENE

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
03/23/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@fisherbroyles.com
patent@fisherbroyles.com

PTOL-90A (Rev. 04/07)

Applicant-Initiated Interview Summary	**Application No.** 16/723,706	**Applicant(s)** Kitching et al.		
	Examiner MIRAYDA A APONTE	**Art Unit** 3772	**AIA (First Inventor to File) Status** No	**Page** 1 of 2

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
MIRAYDA A APONTE	Examiner	Telephonic
Heidi Eide	Primary Examiner	
Charles Hagadom	Attorney of Record	

Date of Interview: 18 March 2021

Issues Discussed:

35 U.S.C. 102

The attorney discussed the differences between the '"push" vector' in Chishti (See Office Action at page 6, second paragraph, and Chishti at [0120] and [0131]) and "the schedule of movement indicating whether each of the dental objects moves during each of the treatment stages," recited in the pending claims.
Specifically, the attorney argued that Chishti teaches a series of intermediate digital data sets (INTDDS) corresponding to successive intermediate tooth arrangements from initial to final and relies of Chishti at FIG. 3. Also, alleges that Chishti teaches a schedule of movement of teeth, relying on Chishti at FIGS. 10-13. Then, in the case of a collision, a modification is made by way of a '"push" vector' created to shift the path of the planned movement." However, the attorney argues that such a "push" vector is not a modification to the schedule of movement, it is a change to the position of a tooth in the successive intermediate tooth positions. Because claim 1 describes that "the schedule of movement indicates whether each of the dental objects moves during each of the treatment stages." Therefore, moving a dental object to a different intermediate position is not a change in whether each of the dental objects moves.
The examiners explained how the step "determining" in claim 1 can be understood that it describes that the schedule of movement of the dental objects during the treatment stages already includes the modification based on the identification of a collision.
The attorney understood where in the claim can create confusion and will amend it to better clarify the movement pattern and the schedule of movement during the treatment stages. The amendments will be submitted through an AFCP 2.0 or a RCE after consulting with the applicant.
No final agreement was reached at this time.

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	/HEIDI M EIDE/ Primary Examiner, Art Unit 3772

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant-Initiated Interview Summary	**Application No.** 16/723,706	**Applicant(s)** Kitching et al.		
	Examiner MIRAYDA A APONTE	**Art Unit** 3772	**AIA (First Inventor to File) Status** No	**Page** **2 of 2**

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

To: docketing@fisherbroyles.com,patent@fisherbroyles.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 161191

Mar 23, 2021 03:59:35 AM

Dear PAIR Customer:

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 161191 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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Application	Document	Mailroom Date	Attorney Docket No.
16723706	EXIN	03/23/2021	11353.018US5

To view your correspondence online or update your email addresses, please visit us anytime at https://sportal.uspto.gov/secure/myportal/privatepair.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

Doc Code: A.NE.AFCP
Document Description: After Final Consideration Pilot Program Request

PTO/SB/434 (05-13)

CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0

Practitioner Docket No.:	Application No.:	Filing Date:
11353.018US5	16/723,706	December 20, 2019
First Named Inventor:	**Title:**	
Ian Kitching	AUTOMATED TREATMENT STAGING FOR TEETH	

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116.

1. The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (*e.g.*, a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).
2. The above-identified application contains an outstanding final rejection.
3. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect.
4. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection.
5. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response.
6. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web).
7. Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.]
8. By filing this certification and request, applicant acknowledges the following:

- Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0.
- The examiner will verify that the AFCP 2.0 submission is compliant, *i.e.*, that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions:
  - The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, by mailing an advisory action.
  - If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview.
    - The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate.
    - If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116.

Signature	Date
/Charles C. Hagadorn, III/	March 23, 2021
Name (Print/Typed) Charles C. Hagadorn, III	**Practitioner Registration No.** 62367

***Note**: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.*

☐ * Total of _____ forms are submitted.

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office, Commissioner for Patents, via the EFS pursuant to 37 C.F.R. § 1.8.

Date: March 23, 2021 Signature: /Jayna Lofgran/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	ALIGN TECHNOLOGY, INC.	Examiner: Mirayda Arlene Aponte
Appln. No.:	16/723,706	Art Unit: 3772
Filed:	December 20, 2019	Conf. No.: 1026
For:	AUTOMATED TREATMENT STAGING FOR TEETH	Customer No: 161191
Attorney Docket No:	11353.018US5	

AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

This Amendment and Response to Office Action is filed in answer to the Office Action mailed February 1, 2021. A three-month period for response was set, making a response initially due on or before May 1, 2021. This response is timely filed, and no fees are believed to be due, however, the Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 506974.

Amendments to the claims begin on page 2.
Remarks begin on page 8.

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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages of an orthodontic treatment ~~movement pattern for moving dental objects from an initial arrangement toward a final arrangement, the movement pattern defining a schedule of movement of the dental objects during treatment stages as each of the dental objects moves from a respective initial position toward a respective final position~~, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages;

calculating a respective treatment path for each of the dental objects between their respective initial position and respective final position;

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths;

performing a first modification of the schedule of movement in response to the identifying;

determining that the first modification does not avoid a collision between the first of the dental objects and the second of the dental objects; and

performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision.

2. (Original) The method of claim 1, wherein the movement pattern is determined by selection by a user.

3. (Currently amended) The method of claim 1, wherein the schedule of movement ~~pattern~~ includes one of an all-equal pattern, an A-shaped pattern, a V-shaped pattern, a mid-line shift pattern, or a M-shaped pattern.

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4. (Currently amended) The method of claim 1, wherein the determining the schedule of movement ~~pattern~~ comprises analyzing, by a computer processor, the dental objects in their respective initial and final positions.

5. (Original) The method of claim 4, wherein the analyzing comprises determining a respective distance needed to move each of the dental objects from their respective initial positions to their respective final positions.

6. (Previously presented) The method of claim 1, wherein the first modification comprises delaying initial movement of the first of the dental objects.

7. (Previously presented) The method of claim 6, wherein the second modification comprises slowing or stopping movement of the first of the dental objects during one or more of the treatment stages following a previous one of the treatment stages in which the first dental object moved.

8. (Currently amended) The method of claim 7, further comprising:

performing, after determining that the second modification does not avoid a collision, a modification of the schedule of movement of the dental objects, the modification comprising:

moving the first of the dental objects away from the respective route of the second of the dental objects; and

moving the first of the dental objects toward its respective final position after the second of the dental objects has sufficiently traversed its respective route to avoid the collision.

9. (Previously presented) The method of claim 1, wherein the second modification comprises one or more of:

delaying initial movement of the first of the dental objects; and

slowing or stopping movement of the first of the dental objects during one or more of the treatment stages following a previous one of the treatment stages during which the first of the dental objects moved.

10. (Previously presented) The method of claim 1, wherein the second modification comprises:

moving the first of the dental objects away from the respective route of the second of the dental objects; and

moving the first of the dental objects toward its respective final position after the second of the dental objects has sufficiently traversed its respective route to avoid the collision.

11. (Original) The method of claim 1, further comprising producing a series of orthodontic appliances based at least on the modified schedule of movement, wherein each of the orthodontic appliances corresponds to a respective one of the treatment stages.

12. (Original) The method of claim 11, wherein the producing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming a respective one of the orthodontic appliances over each of the respective positive molds.

13. (Currently amended) A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages;

calculating a respective route from an initial position toward a final position for each of the dental objects during the treatment stages;

performing a first modification to the schedule of movement to avoid a collision or obstruction between a first dental object and a second dental object of the dental objects on their respective routes;

determining that the first modification does not avoid the collision or obstruction between the first and second dental objects; and

performing a second modification of the schedule of movement after determining that the first modification does not avoid the collision or obstruction.

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14. (Original) The computer-implemented method of claim 13, wherein determining the schedule of movement comprises selecting a movement pattern from a plurality of predetermined movement patterns.

15. (Original) The computer-implemented method of claim 13, further comprising recalculating at least one of the respective routes based on the first or second modified schedule of movement.

16. (Original) The computer-implemented method of claim 13, further comprising manufacturing at least two orthodontic aligners, each of the orthodontic aligners corresponding to a respective one of the treatment stages.

17. (Original) The computer-implemented method of claim 16, wherein the manufacturing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming an orthodontic aligner over each respective positive mold.

18. (Previously presented) The computer-implemented method of claim 13, wherein the first or second modification comprises:

moving a first of the dental objects away from the respective route of a second of the dental objects;

stopping movement of the first of the dental objects; and

moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision.

19. (Previously presented) The computer-implemented method of claim 13, wherein the first or second modification comprises:

moving a first of the dental objects away from the respective route of a second of the dental objects;

stopping movement of the first of the dental objects; and

moving the first dental object toward its previous position.

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20. (Withdrawn) A method comprising:

determining a movement pattern for moving dental objects from an initial arrangement toward a final arrangement, the movement pattern defining a schedule of movement of the dental objects during treatment stages as each of the dental objects moves from a respective initial position toward a respective final position;

calculating a respective treatment path for each of the dental objects between their respective initial and final positions;

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths;

attempting a first modification of the schedule of movement in response to identifying the collision to determine a first number of stages for a first treatment option, the first modification including slowing or stopping movement of the first of the dental objects;

attempting a second modification of the schedule of movement in response to identifying the collision to determine a second number of stages for a second treatment option, the second modification including moving the first of the dental objects away from the respective route of the second of the dental objects and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision;

attempting a third modification of the schedule of movement in response to identifying the collision to determine a third number of stages for a third treatment option, the third modification including delaying one or more teeth from moving one or more stages where it would otherwise move in order to prevent another tooth from colliding with and/or obstructing the path of the delayed tooth; and

selecting the first, second, or third option based on the least of the number of stages of the first, second and third treatment options; and

performing the respective modification to the movement pattern based on the selection of the first, second, or third treatment option.

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21. (Withdrawn) The method of claim 20, further comprising producing a series of orthodontic appliances based at least on the modified schedule of movement, wherein each of the orthodontic appliances corresponds to a respective one of the treatment stages.

22. (Withdrawn) The method of claim 21, wherein the producing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming a respective one of the orthodontic appliances over each of the respective positive molds.

23. (Withdrawn) The method of claim 22, wherein the movement pattern includes one of an all-equal pattern, an A-shaped pattern, a V-shaped pattern, a mid-line shift pattern, or a M-shaped pattern.

24. – 30. (Cancelled)

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REMARKS

Claims 1-23 are pending in this application. Claims 20-23 were withdrawn from consideration as being drawn to a nonelected invention. Claims 24-30 were previously cancelled. Claims 1, 3, 4, 8, and 13 have been amended herein. All amendments made herein have been made solely to expedite prosecution and shall not be construed as an acquiescence to any grounds of rejection. No new matter has been added with the present amendment.

Reconsideration is respectfully requested in view of the following remarks and claim amendments.

Examiner Interview

Applicant thanks Examiners Aponte and Eide for participating in a telephonic interview on March 18, 2021, with Applicant's representative, Charles Hagadorn. During the interview the claims and the rejections of record were discussed. It was agreed that amended the claims to clarify the schedule of movement indicating whether or not a dental object moved during a treatment stage, as comparted to where the dental object moved during a treatment stage, would overcome the rejection, subject to review of the amended claims and further search and consideration.

35 U.S.C. § 102 Rejections

Claims 1-9, 11, and 13-16 stand rejected under 35 U.S.C. 102(a)(1) as being anticipated by U.S. Pregrant Publication No. 2004/0137400 (hereinafter "Chishti '400"). Counsel for the Applicants respectfully submits that Chishti fails to disclose or suggest all of the features of claims 1-9, 11, and 13-16. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." MPEP § 2131 (citing to *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). "The identical invention must be shown in as complete detail as is contained in the … claim." *Id.* (citing to *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)).

Without conceding the merits of the rejection and solely to advance prosecution, Applicant has amended claim 1 to recite, in part,

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> determining a schedule of movement for dental objects during treatment stages of an orthodontic treatment for moving dental objects from an initial arrangement toward a final arrangement, the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages;
>
> . . .
>
> performing a first modification of the schedule of movement in response to the identifying;

Applicant respectfully submits that Chishti '400 has not been shown to teach or suggest at least this subject matter of amended claim 1. As discussed during the interview, claim 1 has been amended to clarify that the "schedule of movement indicates *whether or not each of the dental objects moves* during each of the treatment stages" as compared to modifying the movement path or position of a tooth during a stage of treatment, such as the "push" vector discussed in Chishti '400. As agreed during the interview, this amendment overcome the rejection, subject to further review and consideration.

Accordingly, Applicant respectfully submits that claim 1 is allowable over Chishti '400. Claim 13, although different in scope has been amended to recite similar subject matter and is therefor allowable at least for the same reason as amended claim 1 and on its own merits. Claims 2-9, 11, and 14-16 depend from one of claim 1 and 13 and are therefore allowable over Chishti '400 for at least the same reasons as claims 1 and 13 and on their own merits.

Therefore, Applicant respectfully requests withdrawal of the rejection of claims 1-9, 11, and 13-16 under 35 U.S.C. 102 in view of Chishti '400.

35 U.S.C. § 103 Obviousness Rejections

Claims 12 and 17 stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti '400, as applied to claim 1 and 13 above, in further view of U.S. Patent No. 6471511 (hereinafter "Chishti '511"), and in further view of U.S. Patent No. 6309215 (hereinafter "Phan"). Claims 12 and 17 are patentable at least because Chishti '400, Chishti '511, and Phan, taken alone or as combined, fail to disclose or suggest all of the features of claims 12 and 17. See MPEP § 706.02(j).

Claims 8 and 10 stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti '400 as applied to claim 1 above, and further in view of Chishti '511. Claims 8 and

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10 are patentable at least because Chishti '400 and Chishti '511, taken alone or as combined, fail to disclose or suggest all of the features of claims 8 and 10.

Claims 18 and 19 stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti '400 as applied to claim 1 or 13 above, and further in view of Chishti '511 and in further view of U.S. Pregrant Publication No. 2002/0072027 (hereinafter "Chishti '027"). Claims 18 and 19 are patentable at least because Chishti '400, Chishti '511, and Chishti '027, taken alone or as combined, fail to disclose or suggest all of the features of claims 18 and 19.

Accordingly, Applicant respectfully requests withdrawal of the rejections of claims 8, 10, 12, and 17-19 under 35 U.S.C. 103.

Double Patenting Rejection

Claims 1, 2, 4-9, 11-14, 16, and 17 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-6, 8-11, 18 and 19 of U.S. Patent No. 10456217. Applicant requests that the Office hold the provisional non-statutory obviousness-type double patenting rejection in abeyance pending identification of allowable subject matter in the current application.

Conclusion

Applicant submits that the application is in condition for allowance. If any issues exist that can be resolved with an Examiner's Amendment or a telephone conference, please contact Applicant's representative at (206) 537-9809.

Respectfully submitted,

Dated: March 23, 2021

/Charles C. Hagadorn, III/
Charles C. Hagadorn, III, Reg. No. 62367
Attorney for Applicant

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UNITED STATES PATENT AND TRADEMARK OFFICE
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Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/723,706	**03/23/2021 06:28:43 PM ET**	**11353.018US5**

Title of Invention

AUTOMATED TREATMENT STAGING FOR TEETH

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1026	FILED BY	Jayna Lofgran
PATENT CENTER #	60164369	FILING DATE	12/20/2019
CUSTOMER #	161191	FIRST NAMED INVENTOR	Ian Kitching
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Charlie Hagadorn

Documents

TOTAL DOCUMENTS: 4

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
11353-018US5_Response-FOA_210323.pdf		10	-	128 KB
11353-018US5_Response-FOA_210323-A.NE.pdf	(1-1)	1	Response After Final Action	79 KB
11353-018US5_Response-FOA_210323-CLM.pdf	(2-7)	6	Claims	89 KB
11353-018US5_Response-FOA_210323-REM.pdf	(8-10)	3	Applicant Arguments/Remarks Made in an Amendment	109 KB
11353-018US5_sb0434_AFCP_210		1	After Final Consideration Program Request	167 KB

323.pdf

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
11353-018US5_Response-FOA_210323.pdf	34A48E73E7915DF0020BD9CCF4E5BD29D375DA6E01EFED541015282ED28674FC91D7D4992F106EC6534FE0CC08C02F1FC2A542157629BBD26C354A3E7CA4340A
11353-018US5_Response-FOA_210323-A.NE.pdf	22924CA8BF9EF90302DABE1D726AE9D235C58561A318A33BDADB764503AE1D2EB3DA7C2D9A08FB1EE972437FFC712EECA2EC3CA3992AB0628C291F2DA3B35F25
11353-018US5_Response-FOA_210323-CLM.pdf	25245C2DEF8E8074C2128B7EB8ED9F69B8B20D0C8DC6C70402B0D96E2E92917CCD261DD8C2C13639EB984E6B3557342D372D0F5EDE81CAD8CAD96450DD2F853D
11353-018US5_Response-FOA_210323-REM.pdf	D7CF2E22D3CFE9183D25C9F7C904736ADD49E2E5AFECB27E5E034B8C325FE2F0E5954E3870EAAD7E11D17099057973184536313BCACCD8AAD3DEC968E647B3EB
11353-018US5_sb0434_AFCP_210323.pdf	71FF24D441C3F70ACB30B946A9EA185F9144DC5D6B59F9C5459BC0C6C3A483517E449D93A93E826544527DF5475DF019609F3DA46CBDCF4BAC7C88246AACCDDE

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an

international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/723,706	Filing Date 12/20/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	03/23/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 23	Minus	** 30	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 4	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/POLIN ANG/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

161191 7590 04/27/2021

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

EXAMINER	
APONTE, MIRAYDA ARLENE	

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
04/27/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@fisherbroyles.com
patent@fisherbroyles.com

PTOL-90A (Rev. 04/07)

Advisory Action Before the Filing of an Appeal Brief	**Application No.** 16/723,706	**Applicant(s)** Kitching et al.	
	Examiner MIRAYDA A APONTE	**Art Unit** 3772	**AIA (FITF) Status** No

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 23 March 2021 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

NO NOTICE OF APPEAL FILED

1. ☑ The reply was filed after a final rejection. No Notice of Appeal has been filed. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114 if this is a utility or plant application. Note that RCEs are not permitted in design applications. The reply must be filed within one of the following time periods:
   a) ☐ The period for reply expires ____ months from the mailing date of the final rejection.
   b) ☑ The period for reply expires on: (1) the mailing date of this Advisory Action; or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.
   c) ☐ A prior Advisory Action was mailed more than 3 months after the mailing date of the final rejection in response to a first after-final reply filed within 2 months of the mailing date of the final rejection.The current period for reply expires ____ months from the mailing date of *the prior Advisory Action* or SIX MONTHS from the mailing date of the final rejection, whichever is earlier.
   Examiner Note: If box 1 is checked, check either box (a), (b) or (c). ONLY CHECK BOX (b) WHEN THIS ADVISORY ACTION IS THE FIRST RESPONSE TO APPLICANTS FIRST AFTER-FINAL REPLY WHICH WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. ONLY CHECK BOX (c) IN THE LIMITED SITUATION SET FORTH UNDER BOX (c). See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) or (c) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37CFR 41.37(a).

AMENDMENTS

3. ☑ The proposed amendments filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   a) ☑ They raise new issues that would require further consideration and/or search (see NOTE below);
   b) ☐ They raise the issue of new matter (see NOTE below);
   c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.
   NOTE: See Continuation Sheet (See 37CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicants reply has overcome the following rejection(s): _____
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☑ For purposes of appeal, the proposed amendment(s):(a) ☑ will not be entered, or (b) ☐ will be entered, and an explanation of how the new or amended claims would be rejected is provided below or appended.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____
9. ☐ The affidavit or other evidence filed after final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
10. ☐ The affidavit or other evidence filed after the date of filing the Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
11. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

12. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: _____.
13. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). _____
14. ☑ Other: PTO - 2323.

STATUS OF CLAIMS

15. The status of the claim(s) is (or will be) as follows:
    Claim(s) allowed:_____.
    Claim(s) objected to:_____.
    Claim(s) rejected:1-19.
    Claim(s) withdrawn from consideration:_____.

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	/NICHOLAS D LUCCHESI/ Primary Examiner, Art Unit 3772

Continuation of 3. NOTE:
- **Regarding claim 1**, the amendment to the claim changes the interpretation of the step determining that would require further consideration and search.
- **Regarding claim 13**, based on the discussion of the last interview of 23 March 2021 and the amendment to the claim, interpretation of the step determining would require further consideration and search.
Therefore, Applicant' s request for entry into AFCP 2.0 is acknowledged, but is denied because the response cannot be reviewed and a search conducted in the limited amount of time authorized for this pilot program. Therefore, the response is being reviewed under pre-pilot practice.

AFCP 2.0 Decision	Application No.	Applicant(s)	
	16/723,706	Kitching et al.	
	Examiner	Art Unit	AIA (FITF) Status
	MIRAYDA A APONTE	3772	No

This is in response to the After Final Consideration Pilot request filed 23 March 2021.

1. **Improper Request** – The AFCP 2.0 request is improper for the following reason(s) and the after final amendment submitted with the request will be treated under pre-pilot procedure.

   ☐ An AFCP 2.0 request form PTO/SB/434 (or equivalent document) was not submitted.

   ☐ A non-broadening amendment to at least one independent claim was not submitted.

   ☐ The request is not the first proper AFCP 2.0 request submitted in response to the most recent final rejection.

   ☐ Other: _____

2. **Proper Request**

   A. After final amendment submitted with the request will not be treated under AFCP 2.0.
   The after final amendment cannot be reviewed and a search conducted within the guidelines of the pilot program.

   ☑ The after final amendment will be treated under pre-pilot procedure.

   B. Updated search and/or completed additional consideration.
   The examiner performed an updated search and/or completed additional consideration of the after final amendment within the time authorized for the pilot program. The result(s) of the updated search and/or completed additional consideration are:

   ☐ 1. All of the rejections in the most recent final Office action are overcome and a Notice of Allowance is issued herewith.

   ☐ 2. The after final amendment would not overcome all of the rejections in the most recent final Office action . See attached interview summary for further details.

   ☐ 3. The after final amendment was reviewed, and it raises a new issue(s). See attached interview summary for further details.

   ☐ 4. The after final amendment raises new issues, but would overcome all of the rejections in the most recent final Office action. A decision on determining allowability could not be made within the guidelines of the pilot. See attached interview summary for further details, including any newly discovered prior art.

   ☐ 5. Other: _____

   Examiner Note: Please attach an interview summary when necessary as described above.

DO NOT ENTER: /M.A.A/
04/16/2021

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office, Commissioner for Patents, via the EFS pursuant to 37 C.F.R. § 1.8.

Date: March 23, 2021 Signature: /Jayna Lofgran/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	ALIGN TECHNOLOGY, INC.	Examiner:	Mirayda Arlene Aponte
Appln. No.:	16/723,706	Art Unit:	3772
Filed:	December 20, 2019	Conf. No.:	1026
For:	AUTOMATED TREATMENT STAGING FOR TEETH	Customer No:	161191
Attorney Docket No:	11353.018US5		

AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

This Amendment and Response to Office Action is filed in answer to the Office Action mailed February 1, 2021. A three-month period for response was set, making a response initially due on or before May 1, 2021. This response is timely filed, and no fees are believed to be due, however, the Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 506974.

Amendments to the claims begin on page 2.
Remarks begin on page 8.

ClearCorrect Exhibit 1002, Page 3280 of 3373

To: docketing@fisherbroyles.com,patent@fisherbroyles.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 161191

Apr 27, 2021 04:39:42 AM

Dear PAIR Customer:

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 161191 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Disclaimer:
The list of documents shown below is provided as a courtesy and is not part of the official file wrapper. The content of the images shown in PAIR is the official record.

Application	Document	Mailroom Date	Attorney Docket No.
16723706	CTAV	04/27/2021	11353.018US5
	A.NE.AFCP.D	04/27/2021	11353.018US5

To view your correspondence online or update your email addresses, please visit us anytime at https://sportal.uspto.gov/secure/myportal/privatepair.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	16723706	Filing Date	2019-12-20	Docket Number (if applicable)	11353.018US5	Art Unit	3772
First Named Inventor	Ian Kitching			Examiner Name	Mirayda Arlene Aponte		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☒ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

☒ Other Amendment and Response to Final Office Action filed on March 23, 2021

☐ Enclosed

☐ Amendment/Reply

☐ Information Disclosure Statement (IDS)

☐ Affidavit(s)/ Declaration(s)

☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 506974

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Signature of Registered U.S. Patent Practitioner			
Signature	/Charles Hagadorn III/	Date (YYYY-MM-DD)	2021-04-30
Name	Charles Hagadorn III	Registration Number	62367

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal	
Application Number:	16723706
Filing Date:	20-Dec-2019
Title of Invention:	AUTOMATED TREATMENT STAGING FOR TEETH
First Named Inventor/Applicant Name:	Ian Kitching
Filer:	Charles C. Hagadorn III/Jayna Lofgran
Attorney Docket Number:	11353.018US5
Filed as Large Entity	
Filing Fees for Utility under 35 USC 111(a)	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
RCE- 1ST REQUEST	1801	1	1360	1360
		Total in USD ($)		**1360**

Electronic Acknowledgement Receipt	
EFS ID:	42606622
Application Number:	16723706
International Application Number:	
Confirmation Number:	1026
Title of Invention:	AUTOMATED TREATMENT STAGING FOR TEETH
First Named Inventor/Applicant Name:	Ian Kitching
Customer Number:	161191
Filer:	Charles C. Hagadorn III/Jayna Lofgran
Filer Authorized By:	Charles C. Hagadorn III
Attorney Docket Number:	11353.018US5
Receipt Date:	30-APR-2021
Filing Date:	20-DEC-2019
Time Stamp:	16:03:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1360
RAM confirmation Number	E20214TG05210071
Deposit Account	506974
Authorized User	Jayna Lofgran
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.17 (Patent application and reexamination processing fees)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	11353-018US5_sb0030e_RCE_210430.pdf	697661 d4cac0fad8fc646dc8c150a45f488802412d0990	no	3
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30229 215b7b8dea15bce469afd1fbe4ac62fcfd6f0e7f	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	727890		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office, Commissioner for Patents, via the EFS pursuant to 37 C.F.R. § 1.8.

Date: March 23, 2021 Signature: /Jayna Lofgran/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	ALIGN TECHNOLOGY, INC.	Examiner:	Mirayda Arlene Aponte
Appln. No.:	16/723,706	Art Unit:	3772
Filed:	December 20, 2019	Conf. No.:	1026
For:	AUTOMATED TREATMENT STAGING FOR TEETH	Customer No:	161191
Attorney Docket No:	11353.018US5		

AMENDMENT AND RESPONSE TO FINAL OFFICE ACTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

This Amendment and Response to Office Action is filed in answer to the Office Action mailed February 1, 2021. A three-month period for response was set, making a response initially due on or before May 1, 2021. This response is timely filed, and no fees are believed to be due, however, the Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 506974.

Amendments to the claims begin on page 2.
Remarks begin on page 8.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/723,706	Filing Date 12/20/2019	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)			
FOR	NUMBER FILED	NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	04/30/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 23	Minus	** 30	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 4	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/LASHAWN R MORGAN/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

161191 7590 10/05/2021

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

EXAMINER
APONTE, MIRAYDA ARLENE

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
10/05/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@fisherbroyles.com
patent@fisherbroyles.com

PTOL-90A (Rev. 04/07)

Office Action Summary	**Application No.** 16/723,706	**Applicant(s)** Kitching et al.	
	Examiner MIRAYDA A APONTE	**Art Unit** 3772	**AIA (FITF) Status** No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 23 March 2021.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-19 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-5,11-14 and 16-17 is/are rejected.

8) ☑ Claim(s) 6-10,15 and 18-19 is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Continued Examination under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 30 April 2021 has been entered.

Specification

3. The disclosure is objected to because of the following informalities: In line 3 of [0007] begins with the term "pmlicular" which is believed that it is an unintended error.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claim 2** is rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the

subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

6. **Claim 2** recites the limitation "movement pattern" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Objections

7. **Claim 4** is objected to because of the following informalities: In line 3 of the claim uses the term “respective initial and final positions”. Even when the Office understands that said term refers to the “respective initial position” and “respective final position” used in claim 1. In order to avoid potential confusion, it is suggested to maintain the same nomenclature across the claims. Appropriate correction is required.

8. **Claim 13** is objected to because of the following informalities: In line 11 uses the term “first and second dental objects”. Even when the Office understands that said term refers to the “first dental object” and the “second dental object” described in line 8 of the claim. In order to avoid potential confusion, it is suggested to maintain the same nomenclature across the claims. Appropriate correction is required.

9. **Claim 18** is objected to because of the following informalities:

a. In line 2 uses the term “first or second modification”. Even when the Office understands that said term refers to the “first modification” and “second modification” described in claim 13. In order to avoid potential confusion, it is suggested to maintain the same nomenclature across the claims.

b. In line 3-4 uses the terms “first of the dental objects” and the “second of the dental objects” and in line lines 5-6 uses the term “”first dental object” and “second dental object”, but in claim 13 uses the terms “first dental object”, “second dental

object" and "first and second dental objects". Even when the Office understands that said term refers to the "first dental object" and the "second dental object" described in line 8 of the claim. In order to avoid potential confusion, it is suggested to maintain the same nomenclature across the claims. Appropriate correction is required.

10. **Claim 19** is objected to because of the following informalities:

a. In line 2 uses the term "first or second modification". Even when the Office understands that said term refers to the "first modification" and "second modification" described in claim 13. In order to avoid potential confusion, it is suggested to maintain the same nomenclature across the claims.

b. In line 3-4 uses the terms "first of the dental objects" and the "second of the dental objects", but in claim 13 uses the terms "first dental object", "second dental object" and "first and second dental objects". Even when the Office understands that said term refers to the "first dental object" and the "second dental object" described in line 8 of the claim. In order to avoid potential confusion, it is suggested to maintain the same nomenclature across the claims.

c. In line 6 uses the term "first dental object". Even when the Office understands that said term refers to the "first of the dental objects" described in the previous line, that it also refers to the term "first dental object" of claim 13. In order to avoid potential confusion, it is suggested to maintain the same nomenclature across the claims. Appropriate correction is required.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

13. Claims 1-5, 11, 13, 14 and 16 are rejected under pre-AIA 35 U.S.C. 102(a) as being anticipated by Chishti et al. (US 20040137400 A1).

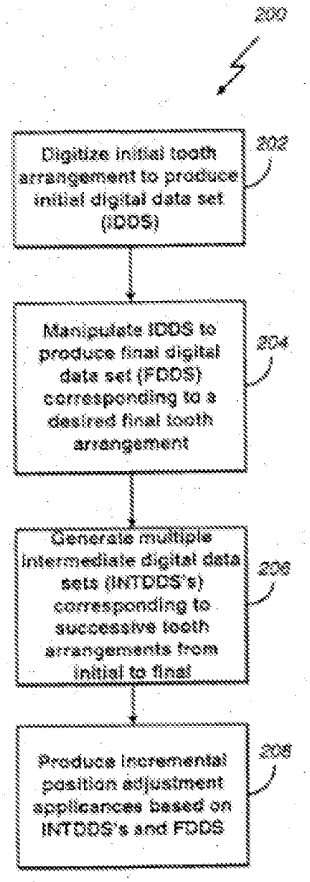


FIG._3

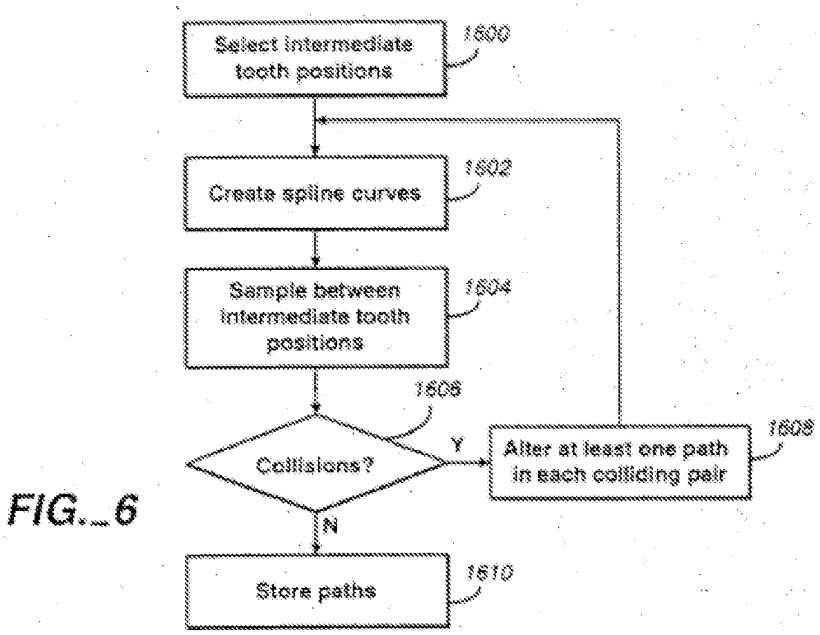

Select intermediate tooth positions
1600
Create spline curves
1602
Sample between intermediate tooth positions
1604
1606
Collisions?
Y
Alter at least one path in each colliding pair
1608
N
Store paths
1610

FIG._6

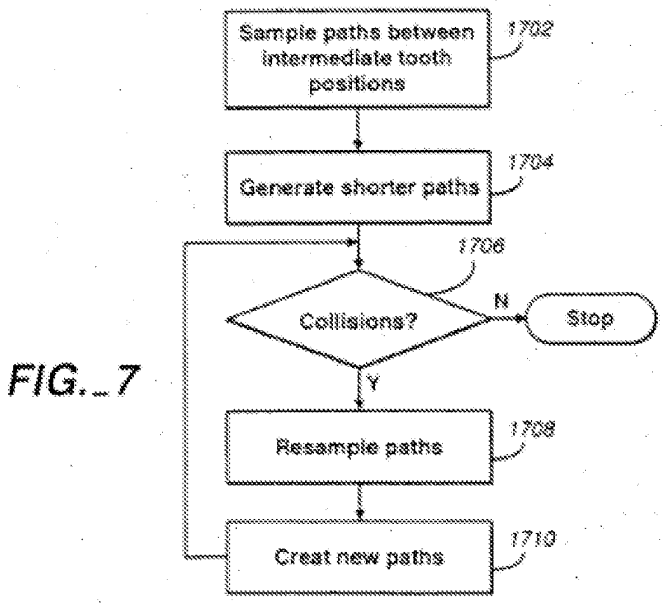

Sample paths between intermediate tooth positions
1702
Generate shorter paths
1704
1706
Collisions?
N
Stop
Y
Resample paths
1708
Creat new paths
1710

FIG._7

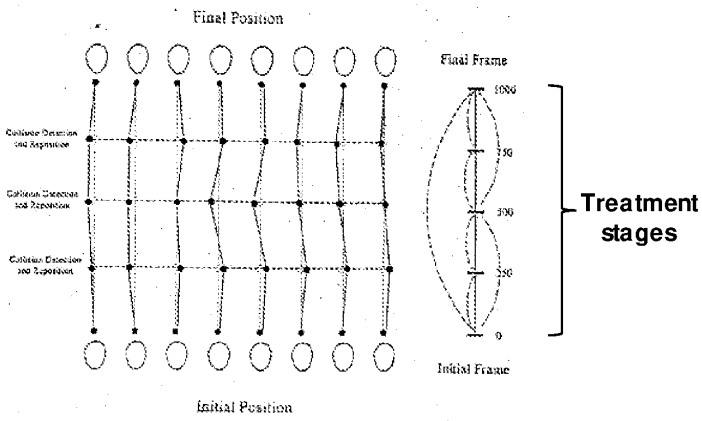


FIG. 10

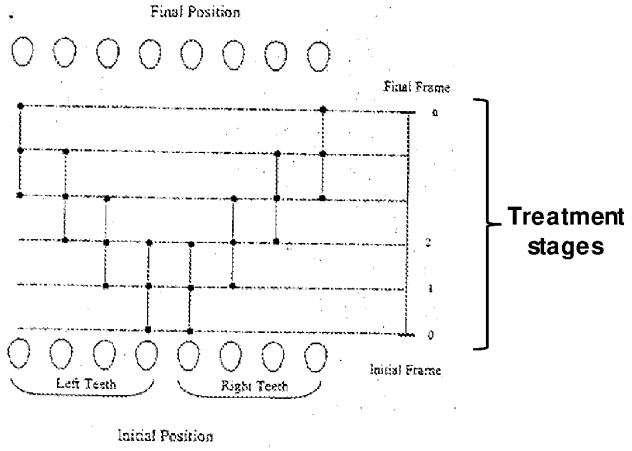


FIG. 11

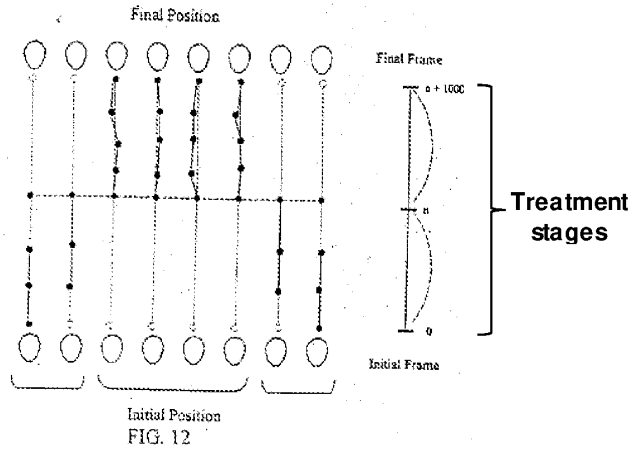


FIG. 12

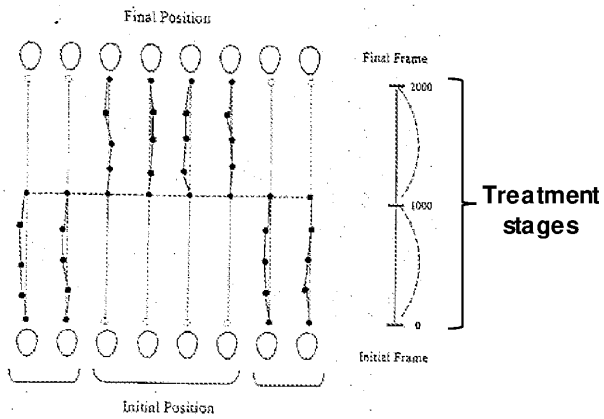


FIG. 13

14. **Regarding claim 1,** Chishti et al. discloses a computer-implemented method including:

determining a schedule of movement for dental objects during treatment stages of an orthodontic treatment, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages (see annotated Fig. 10-13 and [0013] and [0150]-[0153] above);

calculating a respective treatment path for each of the dental objects between their respective initial position and respective final position (see Fig. 6, [0131] – the Fig. 6 shows a flow chart of a computer-implemented process for generating non-linear treatment paths along which a patient's teeth will travel during treatment);

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths (see Fig. 7, [0031], [0135] - Fig. 7 shows an optimization routine for making the transformation curve for each tooth between the initial and final

positions more linear", "the routine applies the collision detection algorithm to determine whether collisions result from the altered paths (step 1706)");

performing a first modification of the schedule of movement in response to the identifying; determining that the first modification does not avoid a collision between the first of the dental objects and the second of the dental objects; and performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision (see [0135] – if collisions result from the altered paths, "the routine resamples the altered paths (step 1708) and then constructs for each tooth an alternative path among the samples (step 1710). The routine continues in this manner until no collisions occur (step 1712)").

15. **Regarding claim 2**, Chishti et al. discloses that wherein the movement pattern is selected by a user. ([0021] – "… than one candidate treatment path for each tooth can be generated and graphically displayed for each candidate treatment path to a human user for selec*tion*.")

16. **Regarding claim 3,** Chishti et al. discloses that the schedule of movement includes one of an all-equal pattern, an A-shaped pattern, a V-shaped pattern, a mid-line shift pattern, or a M- shaped pattern (see [0013] – "The library of treatment patterns includes at least one or more of the following: all equal movement pattern, A-shaped movement pattern, V-shaped movement pattern, M-shaped movement pattern, W-shaped movement pattern, symmetric staircase pattern, asymmetric staircase pattern, and equal equal movement pattern").

17. **Regarding claim 4**, Chishti et al. discloses that when determining the schedule of movement includes analyzing, by a computer processor, the dental objects in their

respective initial and final positions (see Fig. 3 and [0055] – "first step, an initial digital data set (IDDS) representing an initial tooth arrangement is obtained (step 202)", in [0056] – "The IDDS is then manipulated using a computer having a suitable graphical user interface (GUI) and software appropriate for viewing and modifying the images", in [0057] – "After segmenting or isolating the components, the user will often reposition the tooth in the model by following a prescription or other written specification provided by the treating professional. Alternatively, the user may reposition one or more teeth based on a visual appearance or based on rules and algorithms programmed into the computer. Once the user is satisfied, the final teeth arrangement is incorporated into a final digital data set (FDDS) (step 204)", and in [0058] – "step 204, final positions for the upper and lower teeth in a masticatory system of a patient are determined by generating a computer representation of the masticatory system", if the IDDS and the FDDS are digital data in the computer, where the data is analyzed and manipulated, it is understood that a computer processor is used to perform those steps).

18. **Regarding claim 5**, Chishti et al. discloses that when doing the analyzing, it includes determining a respective distance needed to move each of the dental objects from their respective initial positions to their respective final positions (see [0049] – "while the point will usually follow a nonlinear path, there is a linear distance between any point in the tooth when determined at any two times during the treatment. Thus, an arbitrary point P.sub.1 may in fact undergo a true side-to-side translation as indicated by arrow d.sub.1, while a second arbitration point P.sub.2 may travel along an arcuate path, resulting in a final translation d.sub.2. Many aspects of the present invention are defined in terms of the maximum permissible movement of a point P.sub.1 induced on any

particular tooth. Such maximum tooth movement, in turn, is defined as the maximum linear translation of that point P.sub.1 on the tooth which undergoes the maximum movement for that tooth in any treatment step", and in [0092] – "step 302, the process 300 positions the model of the teeth in its approximate final position based on a correspondence of features to the ideal model (step 304). In that step, each tooth model is moved so that its features are aligned to the features of a corresponding tooth in the ideal model. The features may be based on cusps, fossae, ridges, distance-based metrics").

19. **Regarding claim 11**, Chishti et al. discloses that it further includes producing a series of orthodontic appliances based at least on the modified schedule of movement, wherein each of the orthodontic appliances corresponds to a respective one of the treatment stages (see[0201] – "Fabrication machine 522 fabricates dental appliances based on intermediate and final data set information received from data processing system 500").

20. **Regarding claim 13,** Chishti et al. discloses a computer-implemented method including:

determining a schedule of movement for dental objects during treatment stages, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages (see annotated Fig. 10-13 and [0013] and [0150]-[0153] above);

calculating a respective route from an initial position toward a final position for each of the dental objects during the treatment stages (see Fig. 6, [0131] – the Fig. 6 shows a

flow chart of a computer-implemented process for generating non-linear treatment paths along which a patient's teeth will travel during treatment);

performing a first modification to the schedule of movement to avoid a collision or obstruction between a first dental object and a second dental object of the dental objects on their respective routes; determining that the first modification does not avoid the collision or obstruction between the first and second dental objects; and performing a second modification of the schedule of movement after determining that the first modification does not avoid the collision or obstruction (see Fig. 7, [0031], [0135] - Fig. 7 shows an optimization routine for making the transformation curve for each tooth between the initial and final positions more linear", then "the routine applies the collision detection algorithm to determine whether collisions result from the altered paths (step 1706)". Finally, if collisions result from the altered paths, "the routine resamples the altered paths (step 1708) and then constructs for each tooth an alternative path among the samples (step 1710). The routine continues in this manner until no collisions occur (step 1712)").

21. **Regarding claim 14**, Chishti et al. discloses that determining the schedule of movement comprises selecting a movement pattern from a plurality of predetermined movement patterns. (See [0013] – "The library of treatment patterns includes at least one or more of the following: all equal movement pattern, A-shaped movement pattern, V-shaped movement pattern, M-shaped movement pattern, W-shaped movement pattern, symmetric staircase pattern, asymmetric staircase pattern, and equal equal movement pattern")

22. **Regarding claim 16**, Chishti et al. discloses that it further includes manufacturing at least two orthodontic aligners, each of the orthodontic aligners corresponding to a

respective one of the treatment stages (see[0201] – "Fabrication machine 522 fabricates dental appliances based on intermediate and final data set information received from data processing system 500").

Claim Rejections - 35 USC § 103

23. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

24. **Claims 12 and 17 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti et al. (US 20040137400 A1) aka Chishti ('400), as applied to claim 1 and 13 above, in further view of Chishti et al. (US 6471511 B1) aka Chishti ('511), and in further view of Phan et al. (US 6309215 B1)**.

25. **Regarding claim 12**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 11.

26. However, Chishti ('400) does not disclose that wherein the producing includes: fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and thermoforming a respective one of the orthodontic appliances over each of the respective positive molds.

27. **Regarding claim 17**, Chishti ('400) discloses the claimed invention substantially as claimed, as set forth above for claim 16.

28. However, Chishti (‘400) does not disclose that the manufacturing includes fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and thermoforming an orthodontic aligner over each respective positive mold.

29. **With respect to claims 12 and 17**, Chishti ('511) teaches the producing includes fabricating a respective positive mold of the dental objects for at least two of the treatment stages (col. 9, ln 43-47), and that it is used a polymeric material over a positive physical model.

30. However, they are silenced disclosing thermoforming the respective one of the orthodontic appliances over each of the respective positive molds.

31. Phan et al. teaches that the orthodontic appliance is of a thermoformable polymer material (col. 2, line 26-46).

32. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Chishti (‘400)/Chishti (‘511)'s orthodontic appliance, to the Phan’s thermoformable polymer material, in order to provide an orthodontic appliance with the stiffness from the polymeric material to impart a resilient repositioning force against one or a portion of the remaining teeth.

Allowable Subject Matter

33. **Claims 6-10, 15, 18 and 19** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

34. Applicant's arguments with respect to claims 1-19 have been considered but are moot because the new ground of rejection does not rely on any reference applied in the prior rejection of record for any teaching or matter specifically challenged in the argument.

35. Based on the latest amendments to the claims 1 and 13, the description of the latest computer implemented method is not found using the previous interpretation given the claims in the last rejections using the prior art of Chishti et al.

36. However, the new language have been given a new interpretation that it is understood that is found in the prior art of Chishti based on other subroutines, see rejection above.

37. It is understood that even when the claims overcomes Chishti based on the previous interpretation of the claims. After further consideration, Chishti includes others computer subroutines that includes the steps described in most of the claims.

38. Therefore, it is understood that the claims are not ready for allowance.

Conclusion

39. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIRAYDA ARLENE APONTE whose telephone number is (571)270-1933. The examiner can normally be reached on M-F 8-5.

40. Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

41. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cris Rodriguez can be reached on 571-272-4964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

42. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see https://ppair-my.uspto.gov/pair/PrivatePair. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MIRAYDA A APONTE/
Examiner, Art Unit 3772

/NICHOLAS D LUCCHESI/
Primary Examiner, Art Unit 3772

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

CPC - Searched*		
Symbol	**Date**	**Examiner**
A61C7/002,00	08/01/2020	MA
A61C3/00	08/01/2020	MA
Updated search	01/22/2021	MA
Updated search	09/30/2021	MA

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
433	24	08/01/2020	MA
	Updated search	01/22/2021	MA
	Updated search	09/30/2021	MA

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	

ClearCorrect Exhibit 1002, Page 3308 of 3373

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

Search Notes		
Search Notes	**Date**	**Examiner**
EAST search	08/01/2020	MA
Word search on dental and ((move movement) near tooth) same (pattern stagger$4 "round-tipping") and (collision obstruction) and (computer program code), (delay$4 stop$4 slow$4 "hold up" decelerate postpone) same move$4 and delay$4 same move$4, orthodont$4 and schedule and (teeth tooth) same delay$4 same move$4, orthodont$4 and (teeth tooth) same delay$4 same move$4, orthodontic and computer and digital and treatment and appliance and (display same force) and (gingival with force),	08/01/2020	
Word search on stop same2 collision, dental AND orthodontic AND ((tooth teeth) SAME (position aligne*)) AND stop same2 collision, dental AND orthodontic AND ((tooth teeth) SAME (position aligne*)) AND stop same2 collision SAME predetermined	01/22/2021	MA
Word search on dental and schedule and path with (("A" "M" "W"), orthodontic AND aligner AND pattern	09/30/2021	MA

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	

ClearCorrect Exhibit 1002, Page 3309 of 3373

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/14/2020	08/01/2020	01/22/2021	09/30/2021					
	1	÷	✓	✓	✓					
	2	÷	✓	✓	✓					
	3	÷	✓	✓	✓					
	4	÷	✓	✓	✓					
	5	÷	✓	✓	✓					
	6	÷	✓	✓	O					
	7	÷	✓	✓	O					
	8	÷	✓	✓	O					
	9	÷	✓	✓	O					
	10	÷	✓	✓	O					
	11	÷	✓	✓	✓					
	12	÷	✓	✓	✓					
	13	÷	✓	✓	✓					
	14	÷	✓	✓	✓					
	15	÷	✓	✓	O					
	16	÷	✓	✓	✓					
	17	÷	✓	✓	✓					
	18	÷	✓	✓	O					
	19	÷	✓	✓	O					
	20	÷	N	N	N					
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	28	÷	-	-	-					
	29	÷	-	-	-					
	30	÷	-	-	-					

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L161	62	((US-7543511-B2 OR US-5975893-A OR US-8075306-B2 OR US-8029277-B2 OR US-7972134-B2 OR US-7905725-B2 OR US-7869983-B2 OR US-7641473-B2 OR US-6729876-B2 OR US-6406292-B1 OR US-6227850-B1 OR US-5879158-A OR US-5533895-A OR US-5447432-A OR US-6450807-B1 OR US-7241142-B2 OR US-10456217-B2 OR US-6318994-B1 OR US-6554611-B2 OR US-6471511-B1 OR US-6398548-B1 OR US-6802713-B1 OR US-6309215-B1 OR US-6120287-A OR US-6736638-B1 OR US-9326830-B2 OR US-6726478-B1 OR US-7245977-B1 OR US-7092784-B1).did. AND USPT.dbnm.) OR ((US-20080182220-A1 OR US-20070212659-A1 OR US-20060257815-A1 OR US-20050244791-A1 OR US-20040161722-A1 OR US-20040152036-A1 OR US-20060275736-A1 OR US-20080248443-A1 OR US-20110270583-A1 OR US-20020064746-A1 OR US-20180092714-A1 OR US-20090191502-A1 OR US-20160206402-A1 OR US-20010002310-A1 OR US-20020042038-A1 OR US-20020064747-A1 OR US-20050192835-A1 OR US-20050208449-	(USPAT; US-PGPUB; FPRS; USOCR; IBM_TDB; EPO; JPO; DERWENT; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN))	OR	ON	ON	2021/09/29 06:30 AM

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		A1 OR US-20060099547-A1 OR US-20040137400-A1 OR US-20080268400-A1 OR US-20090191503-A1 OR US-20100028825-A1 OR US-20100138025-A1 OR US-20030059736-A1 OR US-20060223023-A1 OR US-20080305451-A1 OR US-20080294405-A1 OR US-20080076086-A1 OR US-20080057462-A1 OR US-20030235803-A1 OR US-20040224286-A1 OR US-20020072027-A1).did. AND PGPB.dbnm.)					
L162	21	L161 AND schedule	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/09/29 06:30 AM
L163	50	L161 AND path	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/09/29 06:34 AM
L164	29	L161 AND path WITH ("A" "M" "W")	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/09/29 07:08 AM
L165	1	L161 AND path WITH ("M" "W")	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/09/29 07:09 AM
L166	93	dental AND orthodontic AND aligner AND path	(US-PGPUB; USPAT; USOCR; FIT (AU, AP,	OR	ON	ON	2021/09/29 07:10 AM

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		WITH ("M" "W")	AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L167	63	dental AND orthodontic AND aligner AND path ADJ ("M" "W")	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/09/29 07:11 AM
L168	17	dental AND orthodontic AND aligner AND pattern ADJ ("M" "W")	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/09/29 07:21 AM
L169	11277	(A61C7/002 OR A61C7/00 OR A61C3/00).cpc. OR (433/24).ccls. AND (computer program)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	ON	ON	2021/09/30 06:23 AM
L170	1222	L169 AND orthodontic AND aligner AND pattern	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/09/30 06:23 AM
L171	63	L170 AND path ADJ ("M" "W")	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/09/30 06:23 AM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

To: docketing@fisherbroyles.com,patent@fisherbroyles.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
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Oct 05, 2021 06:20:36 AM

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Application	Document	Mailroom Date	Attorney Docket No.
16723706	CTNF	10/05/2021	11353.018US5

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

161191 7590 12/09/2021

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

EXAMINER
APONTE, MIRAYDA ARLENE

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
12/09/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@fisherbroyles.com
patent@fisherbroyles.com

PTOL-90A (Rev. 04/07)

Applicant-Initiated Interview Summary	**Application No.** 16/723,706	**Applicant(s)** Kitching et al.		
	Examiner MIRAYDA A APONTE	**Art Unit** 3772	**AIA (First Inventor to File) Status** No	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
MIRAYDA A APONTE	Examiner	Telephonic
HEIDI EIDE	Primary Examiner	
CHARLES HAGADORN	Attorney of Record	

Date of Interview: 02 December 2021

Issues Discussed:

35 U.S.C. 102

The attorney discussed the difference between the shifting or altering the tooth path of Chishti's prior art vs. the schedule of movement claimed in the present application.
It was explained that the language used in the claim can be interpreted that the treatment path is part of the schedule of movement. Wherein, based on the present discussion, the attorney explained that the schedule of movement and the treatment path are separated concepts in the method.
The Office suggested to define what the treatment path is in a way that is not interpreted that is part of the schedule of movement definition.
The attorney will consult with the inventor for the next amendment, in order to clarify the above two concepts in the claim.
No final agreement was reached at this time.

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	/HEIDI M EIDE/ Primary Examiner, Art Unit 3772

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

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Application	Document	Mailroom Date	Attorney Docket No.
16723706	EXIN	12/09/2021	11353.018US5

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Date: January 4, 2022 Signature: /Jayna Lofgran/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	ALIGN TECHNOLOGY, INC.	Examiner:	Mirayda Arlene Aponte
Appln. No.:	16/723,706	Art Unit:	3772
Filed:	December 20, 2019	Conf. No.:	1026
For:	AUTOMATED TREATMENT STAGING FOR TEETH	Customer No:	161191
Attorney Docket No:	11353.018US5		

AMENDMENT AND RESPONSE TO NON-FINAL OFFICE ACTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

This Amendment and Response to Non-Final Office Action is filed in answer to the Office Action mailed October 5, 2021. A three-month period for response was set, making a response initially due on or before January 5, 2022. This response is timely filed, and no fees are believed to be due, however, the Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 506974.

Amendments to the specification being on page 2.
Amendments to the claims begin on page 3.
Remarks begin on page 9.

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Amendments to the Specification

Please replace paragraph **[0007]** with the following amended paragraph:

[0007] Embodiments of the present invention provide apparatus, systems, and methods for automated staging of teeth, from an initial position to a final, corrected position. Depending upon the ~~pm licular~~ particular needs of the patient, the patient's teeth are scheduled to move according to various movement patterns, routes, rates, and/or distances; and the need for utilizing tooth staggering, round-tripping, and/or slowing techniques. Furthermore, the invention provides techniques for minimizing the treatment period of the patient based upon the pattern, route, rate, and/or distance selected for the patient's individual needs, as well as the need for any tooth staggering, round-tripping and/or slowing technique(s).

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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages of an orthodontic treatment, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages;

calculating a respective treatment path for each of the dental objects between their respective initial position and respective final position;

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths;

performing a first modification of the schedule of movement in response to the identifying, the first modification of the schedule of movement modifying whether or not at least one of the dental objects move during at least one of the treatment stages;

determining that the first modification does not avoid a collision between the first of the dental objects and the second of the dental objects; and

performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision, the second modification of the schedule of movement modifying whether or not at least one of the dental objects move during at least one of the treatment stages.

2. (Currently Amended) The method of claim 1, wherein the ~~movement pattern~~ schedule of movement is determined by selection by a user.

3. (Previously presented) The method of claim 1, wherein the schedule of movement includes one of an all-equal pattern, an A-shaped pattern, a V-shaped pattern, a mid-line shift pattern, or a M-shaped pattern.

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4. (Currently Amended) The method of claim 1, wherein the determining the schedule of movement comprises analyzing, by a computer processor, the dental objects in their respective initial positions and respective final positions.

5. (Original) The method of claim 4, wherein the analyzing comprises determining a respective distance needed to move each of the dental objects from their respective initial positions to their respective final positions.

6. (Currently Amended) ~~The method of claim 1,~~ A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages of an orthodontic treatment, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages;

calculating a respective treatment path for each of the dental objects between their respective initial position and respective final position;

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths;

performing a first modification of the schedule of movement in response to the identifying, wherein the first modification comprises delaying initial movement of the first of the dental objects;

determining that the first modification does not avoid a collision between the first of the dental objects and the second of the dental objects; and

performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision.

7. (Previously presented) The method of claim 6, wherein the second modification comprises slowing or stopping movement of the first of the dental objects during one or more of the treatment stages following a previous one of the treatment stages in which the first dental object moved.

8. (Previously presented) The method of claim 7, further comprising:

performing, after determining that the second modification does not avoid a collision, a modification of the schedule of movement of the dental objects, the modification comprising:

moving the first of the dental objects away from the respective route of the second of the dental objects; and

moving the first of the dental objects toward its respective final position after the second of the dental objects has sufficiently traversed its respective route to avoid the collision.

9. (Currently Amended) ~~The method of claim 1,~~ A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages of an orthodontic treatment, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages;

calculating a respective treatment path for each of the dental objects between their respective initial position and respective final position;

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths;

performing a first modification of the schedule of movement in response to the identifying;

determining that the first modification does not avoid a collision between the first of the dental objects and the second of the dental objects; and

performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision, wherein the second modification comprises one or more of:

delaying initial movement of the first of the dental objects; and

slowing or stopping movement of the first of the dental objects during one or more of the treatment stages following a previous one of the treatment stages during which the first of the dental objects moved.

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10. (Currently Amended) ~~The method of claim 1,~~ A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages of an orthodontic treatment, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages;

calculating a respective treatment path for each of the dental objects between their respective initial position and respective final position;

identifying a collision between a first of the dental objects and a second of the dental objects based at least on the schedule of movement of the dental objects and the respective treatment paths;

performing a first modification of the schedule of movement in response to the identifying;

determining that the first modification does not avoid a collision between the first of the dental objects and the second of the dental objects; and

performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision, wherein the second modification comprises:

moving the first of the dental objects away from the respective route of the second of the dental objects; and

moving the first of the dental objects toward its respective final position after the second of the dental objects has sufficiently traversed its respective route to avoid the collision.

11. (Original) The method of claim 1, further comprising producing a series of orthodontic appliances based at least on the modified schedule of movement, wherein each of the orthodontic appliances corresponds to a respective one of the treatment stages.

12. (Original) The method of claim 11, wherein the producing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming a respective one of the orthodontic appliances over each of the respective positive molds.

13. (Currently Amended) A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages;

calculating a respective route from an initial position toward a final position for each of the dental objects during the treatment stages;

performing a first modification to the schedule of movement to avoid a collision or obstruction between a first dental object and a second dental object of the dental objects on their respective routes, the first modification of the schedule of movement modifying whether or not at least one of the dental objects move during at least one of the treatment stages;

determining that the first modification does not avoid the collision or obstruction between the first dental object and second dental object ~~objects~~; and

performing a second modification of the schedule of movement after determining that the first modification does not avoid the collision or obstruction, the second modification of the schedule of movement modifying whether or not at least one of the dental objects move during at least one of the treatment stages.

14. (Original) The computer-implemented method of claim 13, wherein determining the schedule of movement comprises selecting a movement pattern from a plurality of predetermined movement patterns.

15. (Currently Amended) ~~The computer-implemented method of claim 13, further comprising~~ A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages;

calculating a respective route from an initial position toward a final position for each of the dental objects during the treatment stages;

performing a first modification to the schedule of movement to avoid a collision or obstruction between a first dental object and a second dental object of the dental objects on their respective routes;

determining that the first modification does not avoid the collision or obstruction between the first dental object and second dental object; and

performing a second modification of the schedule of movement after determining that the first modification does not avoid the collision or obstruction; and

recalculating at least one of the respective routes based on the first or second modified schedule of movement.

16. (Original) The computer-implemented method of claim 13, further comprising manufacturing at least two orthodontic aligners, each of the orthodontic aligners corresponding to a respective one of the treatment stages.

17. (Original) The computer-implemented method of claim 16, wherein the manufacturing comprises:

fabricating a respective positive mold of the dental objects for at least two of the treatment stages; and

thermoforming an orthodontic aligner over each respective positive mold.

18. (Previously presented) ~~The computer-implemented method of claim 13,~~ A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages;

calculating a respective route from an initial position toward a final position for each of the dental objects during the treatment stages;

performing a first modification to the schedule of movement to avoid a collision or obstruction between a first dental object and a second dental object of the dental objects on their respective routes;

determining that the first modification does not avoid the collision or obstruction between the first dental object and second dental object; and

performing a second modification of the schedule of movement after determining that the first modification does not avoid the collision or obstruction,

wherein the first modification or second modification comprises:

moving the [[a]] first ~~of the~~ dental object ~~objects~~ away from the respective route of the [[a]] second ~~of the~~ dental object ~~objects~~;

stopping movement of the first of the dental objects; and

moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision.

19. (Previously presented) ~~The computer-implemented method of claim 13,~~ A computer-implemented method comprising:

determining a schedule of movement for dental objects during treatment stages, wherein the schedule of movement indicates whether or not each of the dental objects moves during each of the treatment stages;

calculating a respective route from an initial position toward a final position for each of the dental objects during the treatment stages;

performing a first modification to the schedule of movement to avoid a collision or obstruction between a first dental object and a second dental object of the dental objects on their respective routes;

determining that the first modification does not avoid the collision or obstruction between the first dental object and second dental object; and

performing a second modification of the schedule of movement after determining that the first modification does not avoid the collision or obstruction, wherein the first modification or second modification comprises:

moving the [[a]] first ~~of the~~ dental object ~~objects~~ away from the respective route of [[a]] the second ~~of the~~ dental object ~~objects~~;

stopping movement of the first of the dental objects; and

moving the first dental object toward its previous position.

20. – 23. (Canceled)

24. – 30. (Canceled)

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REMARKS

Upon entry of this amendment, claims 1-19 will be pending in this application. Previously withdrawn claims 20-23 are canceled herein solely to expedite prosecution of the application and without prejudice or disclaimer. Claims 1, 2, 4, 6, 9, 10, 13, 15, 18, and 19 have been amended herein. All amendments made herein have been made solely to expedite prosecution and shall not be construed as an acquiescence to any grounds of rejection. No new matter has been added with the present amendment.

Reconsideration is respectfully requested in view of the following remarks and claim amendments.

Examiner Interview

Applicant thanks Examiners Aponte and Eide for participating in a telephonic interview on December 2, 2021 with Applicant's representative, Charles Hagadorn. During the interview amending claim 1 and 13 to clarify that the second modification to the schedule of movement includes modifying whether or not at least one of the dental objects moves during at least one of the treatment stages. During the interview it was agreed that such a modification would advance prosecution. Accordingly, applicant has amended claims 1 and 13 to recite, in part, "the second modification of the schedule of movement modifying whether or not at least one of the dental objects move during at least one of the treatment stages." Applicant has further amended claims 1 and 13 so recite, in part, "the first modification of the schedule of movement modifying whether or not at least one of the dental objects move during at least one of the treatment stages."

Specification

The Examiner objects to paragraph **[0007]** of the specification. Applicant has amended paragraph **[0007]**. In light of this amendment, withdrawal of the objection to the specification is respectfully requested.

Allowable Subject Matter

Applicant thanks the Examiner for indicating that claims 6-10, 15, 18, and 19 contain allowable subject matter and would be allowable if placed in appropriate independent form. Accordingly, Applicant has amended claims 6, 9, 10, 15, 18, and 19 in independent form.

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35 U.S.C. § 112 Claim Rejections

Claim 2 is rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention. Without conceding the merits of the application and solely to expedite prosecution of the application, Applicant has amended claim 2 to more clearly comply with the requirements of 35 U.S.C. 112. Applicant respectfully submits that the present amendments address these § 112 rejections and request that they be withdrawn.

Claim Objections

Claims 4, 13, 18, and 19 have been objected to because of informalities and have been amended herein as suggested by the Examiner.

35 U.S.C. § 102 Rejections

Claims 1-5, 11, 13, 14 and 16 stand rejected under pre-AIA 35 U.S.C. 102(a) as being anticipated by USPrePub 2004/0137400 (Chishti '400). Without conceding the merits of the rejection and solely to expedite prosecution of the application, Applicant has amended claims 1 and 13, as discussed during the interview. For example, claim 1 has been amended to recite, in part,

> performing a first modification of the schedule of movement in response to the identifying, the first modification of the schedule of movement *modifying whether or not at least one of the dental objects move during at least one of the treatment stages*;
>
> . . .
>
> performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision, the second *modification of the schedule of movement modifying whether or not at least one of the dental objects move during at least one of the treatment stages*.

Claim 13, although different in scope, has been amended to recite similar subject matter. Applicant respectfully submits that such amendments address the Examiner's concerns regarding the first and second modifications.

ClearCorrect Exhibit 1002, Page 3328 of 3373

Applicant respectfully submits that claims 11 and 13 are allowable over Chishti '400. Claims 2-5, 11, 14, and 16 depend from one of allowable claims 11 and 13 and are therefore allowable over Chishti '400 for at least the same reasons as allowable claims 1 and 13, and on their own merits.

Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 1-5, 11, 13, 14 and 16 under 35 U.S.C. 102(a) in view of Chishti '400.

35 U.S.C. § 103(a) Obviousness Rejections

Claims 12 and 17 stand rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Chishti '400, as applied to claim 1 and 13 above, in further view of Chishti et al. Claims 12 and 17 depend from one of allowable claims 1 and 13 and are therefore allowable over Chishti '400 for at least the same reasons as allowable claims 1 and 13 and on their own merits. Moreover, Chishti et al., cited for purportedly teaching aspects of positive molds, has not been shown to cure the deficiencies of Chishti '400. Accordingly, Applicant requests withdrawal of the rejection of claims 12 and 17 under 35 U.S.C. 103(a) in view of Chishti '400 and Chishti et al.

Conclusion

Applicant submits that the application is in condition for allowance. If any issues exist that can be resolved with an Examiner's Amendment or a telephone conference, please contact Applicant's representative at (206) 537-9809.

Respectfully submitted,

Dated: January 4, 2022

/Charles Hagadorn III/

Charles Hagadorn III, Reg. No. 62367
Attorney for Applicant

FisherBroyles, LLP
701 Fifth Avenue, Suite 4200
Seattle, Washington 98104-5119
(206) 537-9809

ClearCorrect Exhibit 1002, Page 3329 of 3373

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/723,706	**01/05/2022 01:45:41 PM ET**	**11353.018US5**

Title of Invention

AUTOMATED TREATMENT STAGING FOR TEETH

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1026	FILED BY	Jayna Lofgran
PATENT CENTER #	60471710	FILING DATE	12/20/2019
CUSTOMER #	161191	FIRST NAMED INVENTOR	Ian Kitching
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Charlie Hagadorn

Documents

TOTAL DOCUMENTS: 4

DOCUMENT		PAGES	DESCRIPTION	SIZE (KB)
11353-018US5_Response-NFOA_220104.pdf		12	-	131 KB
11353-018US5_Response-NFOA_220104-A....pdf	(1-1)	1	Amendment/Req. Reconsideration-After Non-Final Reject	81 KB
11353-018US5_Response-NFOA_220104-SPEC.pdf	(2-2)	1	Specification	80 KB
11353-018US5_Response-NFOA_220104-CLM.pdf	(3-9)	7	Claims	95 KB
11353-018US5_Response-	(10-12)	3	Applicant Arguments/Remarks	107 KB

NFOA_220104-REM.pdf	Made in an Amendment

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
11353-018US5_Response-NFOA_220104.pdf	2A509711A4ECE0F8FA7CDEBD4B9DD3D25BFEFF3D766B57B571C9E607AD8809EC4A2E79D3DE432B5C17168495B1B3F10EB3A9571AB8A036D001E0B8F22BED4385
11353-018US5_Response-NFOA_220104-A....pdf	732C229A0022096458D7FEE138DBB98AF04F1258832CF399D7E2B0747B840BD4D720B99945FC4B90CB3AE5409EB4E85FF5A39C9451E42F5F442825B2C04E7CA6
11353-018US5_Response-NFOA_220104-SPEC.pdf	B686044810D67C1E418670249F6198DB66E8932144D53BAFD0BA2CA724FAFAF02DB6344CC9A99AD8A8AF29C04EA1C5431D0FB23A93ADD7B291430BEDCB107C33
11353-018US5_Response-NFOA_220104-CLM.pdf	5B9E42CBCFFA2D0BEC00E0B7C59A3B4C46AFE6E26E8A87E055D6E56FDF1F661599545249F13295AE963E5DB9B368FA791B113832F77F5CBFB7F6F62A43B401E3
11353-018US5_Response-NFOA_220104-REM.pdf	7D38FA812BF44E234586157D16F6213B90B96657479F849FBC811C5366CDEF36F324D0B13A0EFCDE205C0B71CA39F550709476A0899DC4368B73A7CEDC502B85

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an

international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/723,706	01/05/2022 01:45:41 PM ET	11353.018US5

Title of Invention

AUTOMATED TREATMENT STAGING FOR TEETH

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1026	FILED BY	Jayna Lofgran
PATENT CENTER #	60471710	AUTHORIZED BY	Charlie Hagadorn
CUSTOMER #	161191	FILING DATE	12/20/2019
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Ian Kitching

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 4256	E202215D48313587	Jayna Lofgran
PRE-AUTHORIZED ACCOUNT	**PRE-AUTHORIZED CATEGORY**	
506974	37 CFR 1.16 (National application filing, search, and examination fees)	

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1201	EACH INDEPENDENT CLAIM IN EXCESS OF THREE	480.00	4	1920.00
			TOTAL AMOUNT:	$1,920.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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NOTICE OF ALLOWANCE AND FEE(S) DUE

161191 7590 02/18/2022
FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

EXAMINER
APONTE, MIRAYDA ARLENE

ART UNIT	PAPER NUMBER
3772	

DATE MAILED: 02/18/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

TITLE OF INVENTION: AUTOMATED TREATMENT STAGING FOR TEETH

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/18/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PTOL-85 (Rev. 02/11)

ClearCorrect Exhibit 1002, Page 3335 of 3373

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

161191 7590 02/18/2022
FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

TITLE OF INVENTION: AUTOMATED TREATMENT STAGING FOR TEETH

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	05/18/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
APONTE, MIRAYDA ARLENE	3772	433-024000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑ Issue Fee ❑ Publication Fee (if required) ❑ Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

ClearCorrect Exhibit 1002, Page 3336 of 3373

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

161191 7590 02/18/2022

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

EXAMINER	
APONTE, MIRAYDA ARLENE	
ART UNIT	PAPER NUMBER
3772	

DATE MAILED: 02/18/2022

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/723,706	Applicant(s) Kitching et al.	
	Examiner MIRAYDA A APONTE	Art Unit 3772	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to Amendment in response to Non-Final action received on 5 January 2022.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-19 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	/NICHOLAS D LUCCHESI/ Primary Examiner, Art Unit 3772

DETAILED ACTION

Specification

1. The amended specification was received on 5 January 2022. This amended specification is **acceptable**.

Allowable Subject Matter

2. **Claims 1-19** are allowed.

3. The following is an examiner's statement of reasons for allowance:

a. **Regarding claim 1**, the added language for the steps of performing the first and the second modification of the schedule of movement is not found in the prior arts of Chishti ('400), Chishti ('511) or Phan.

b. Therefore, the art of record does not teach or render obvious, either alone or in combination, a computer-implemented method including the steps of performing a first modification of the schedule of movement in response to the identifying, the first modification of the schedule of movement modifying whether or not at least one of the dental objects move during at least one of the treatment stages, and performing a second modification of the schedule of movement after the determining that the first modification does not avoid a collision, the second modification of the schedule of movement modifying whether or not at least one of the dental objects move during at least one of the treatment stages in combination with the elements set forth in the claim.

c. **Regarding claim 6**, in page 14 of the last Office action of 5 October 2021 was indicated that claim 6 included allowable subject matter that if rewritten in independent form would be allowed.

d. Therefore, the art of record does not teach or render obvious, either alone or in combination, a computer-implemented method including that the first modification includes delaying initial movement of the first of the dental objects in combination with the elements set forth in the claim.

e. **Regarding claim 9**, in page 14 of the last Office action of 5 October 2021 was indicated that claim 9 included allowable subject matter that if rewritten in independent form would be allowed.

f. Therefore, the art of record does not teach or render obvious, either alone or in combination, a computer-implemented method including that the second modification includes one or more of: delaying initial movement of the first of the dental objects; and slowing or stopping movement of the first of the dental objects during one or more of the treatment stages following a previous one of the treatment stages during which the first of the dental objects moved in combination with the elements set forth in the claim.

g. **Regarding claim 10**, in page 14 of the last Office action of 5 October 2021 was indicated that claim 10 included allowable subject matter that if rewritten in independent form would be allowed.

h. Therefore, the art of record does not teach or render obvious, either alone or in combination, a computer-implemented method including that the second modification includes: moving the first of the dental objects away from the respective route of the second of the dental objects; and moving the first of the dental objects toward its respective final position after the second of the dental

objects has sufficiently traversed its respective route to avoid the collision in combination with the elements set forth in the claim.

i. **Regarding claim 13**, the added language for the steps of performing the first and the second modification of the schedule of movement is not found in the prior arts of Chishti ('400), Chishti ('511) or Phan.

j. Therefore, the art of record does not teach or render obvious, either alone or in combination, a computer-implemented method including the steps of performing a first modification to the schedule of movement to avoid a collision or obstruction between a first dental object and a second dental object of the dental objects on their respective routes, the first modification of the schedule of movement modifying whether or not at least one of the dental objects move during at least one of the treatment stages, and performing a second modification of the schedule of movement after determining that the first modification does not avoid the collision or obstruction, the second modification of the schedule of movement modifying whether or not at least one of the dental objects move during at least one of the treatment stages in combination with the elements set forth in the claim.

k. **Regarding claim 15**, the added language for the steps of performing the first and the second modification of the schedule of movement is not found in the prior arts of Chishti ('400), Chishti ('511) or Phan.

l. Therefore, the art of record does not teach or render obvious, either alone or in combination, a computer-implemented method including the step of recalculating at least one of the respective routes based on the first or second

modified schedule of movement in combination with the elements set forth in the claim.

m. **Regarding claim 18**, the added language for the steps of performing the first and the second modification of the schedule of movement is not found in the prior arts of Chishti ('400), Chishti ('511) or Phan.

n. Therefore, the art of record does not teach or render obvious, either alone or in combination, a computer-implemented method including that the first modification or second modification includes: moving the first dental object away from the respective route of the second dental object; stopping movement of the first of the dental objects; and moving the first dental object toward its respective final position after the second dental object has sufficiently traversed its respective route to avoid the collision in combination with the elements set forth in the claim.

o. **Regarding claim 19**, the added language for the steps of performing the first and the second modification of the schedule of movement is not found in the prior arts of Chishti ('400), Chishti ('511) or Phan.

p. Therefore, the art of record does not teach or render obvious, either alone or in combination, a computer-implemented method including that the first modification or second modification includes: moving the first dental object away from the respective route of the second dental object; stopping movement of the first of the dental objects; and moving the first dental object toward its previous position in combination with the elements set forth in the claim.

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIRAYDA ARLENE APONTE whose telephone number is (571)270-1933. The examiner can normally be reached M-F 8-5.

6. Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cris Rodriguez can be reached on 571-272-4964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

8. Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MIRAYDA A APONTE/
Examiner, Art Unit 3772

/NICHOLAS D LUCCHESI/
Primary Examiner, Art Unit 3772

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

CPC - Searched*		
Symbol	**Date**	**Examiner**
A61C7/002,00	08/01/2020	MA
A61C3/00	08/01/2020	MA
Updated search	01/22/2021	MA
Updated search	09/30/2021	MA
Updated search	02/07/2022	MA

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
433	24	08/01/2020	MA
	Updated search	01/22/2021	MA
	Updated search	09/30/2021	MA
	Updated search	02/07/2022	MA

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	

ClearCorrect Exhibit 1002, Page 3346 of 3373

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

Search Notes		
Search Notes	**Date**	**Examiner**
EAST search	08/01/2020	MA
Word search on dental and ((move movement) near tooth) same (pattern stagger$4 "round-tipping") and (collision obstruction) and (computer program code), (delay$4 stop$4 slow$4 "hold up" decelerate postpone) same move$4 and delay$4 same move$4, orthodont$4 and schedule and (teeth tooth) same delay$4 same move$4, orthodont$4 and (teeth tooth) same delay$4 same move$4, orthodontic and computer and digital and treatment and appliance and (display same force) and (gingival with force),	08/01/2020	MA
Word search on stop same2 collision, dental AND orthodontic AND ((tooth teeth) SAME (position aligne*)) AND stop same2 collision, dental AND orthodontic AND ((tooth teeth) SAME (position aligne*)) AND stop same2 collision SAME predetermined	01/22/2021	MA
Word search on dental and schedule and path with (("A" "M" "W"), orthodontic AND aligner AND pattern	09/30/2021	MA
Word search on orthodontic AND aligner AND pattem AND (move* WITH (modifica* change)), orthodontic AND aligner AND pattern	02/07/2022	MA

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
A61C7	002,00	02/07/2022	MA
A61C3	00	02/07/2022	MA

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

CPC						
Symbol					Type	Version
A61C	/	7	/	002	F	2013-01-01
A61C	/	7	/	00	I	2013-01-01

CPC Combination Sets								
Symbol					Type	Set	Ranking	Version
	/		/					

/MIRAYDA A APONTE/ Examiner, Art Unit 3772 (Assistant Examiner)	07 February 2022 (Date)	**Total Claims Allowed:** 19	
/NICHOLAS D LUCCHESI/ Primary Examiner, Art Unit 3772 (Primary Examiner)	10 February 2022 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2A

U.S. Patent and Trademark Office — Part of Paper No.: 20220207

ClearCorrect Exhibit 1002, Page 3348 of 3373

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

INTERNATIONAL CLASSIFICATION					
CLAIMED					
A61C7/00	/	7	/	00	

NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	07 February 2022	Total Claims Allowed:	
(Assistant Examiner)	(Date)	19	
/NICHOLAS D LUCCHESI/ Primary Examiner, Art Unit 3772	10 February 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2A

U.S. Patent and Trademark Office — Part of Paper No.: 20220207

ClearCorrect Exhibit 1002, Page 3349 of 3373

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/723,706	Kitching et al.
	Examiner	Art Unit
	MIRAYDA A APONTE	3772

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	12	10	19	19		28								
2	2	6	11		20		29								
3	3	7	12		21		30								
4	4	13	13		22										
5	5	14	14		23										
8	6	17	15		24										
9	7	15	16		25										
10	8	16	17		26										
11	9	18	18		27										

/MIRAYDA A APONTE/ Examiner, Art Unit 3772	07 February 2022	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	19	
/NICHOLAS D LUCCHESI/ Primary Examiner, Art Unit 3772	10 February 2022	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2A

U.S. Patent and Trademark Office — Part of Paper No.: 20220207

ClearCorrect Exhibit 1002, Page 3350 of 3373

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L173	11971	(A61C7/002 OR A61C7/00 OR A61C3/00).cpc. OR (433/24).ccls.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	ON	ON	2022/02/07 02:38 PM
L174	1328	L173 AND orthodontic AND aligner AND pattern	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/02/07 02:38 PM
L175	592	L173 AND orthodontic AND aligner AND pattern AND (move* WITH (modifica* change))	(US-PGPUB; USPAT; USOCR; FIT (AP, AT, AU, CA, CH, CN, DD, DE, EA, EP, ES, FR, GB, JP, KR, OA, RU, SU, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2022/02/07 02:47 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N116	4090	(A61C7/002 OR A61C7/00 OR A61C3/00).cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2022/02/07 02:52 PM
N117	331	L156 AND orthodontic AND aligner AND pattern AND (move* WITH (modifica* change))	(US-PGPUB; USPAT)	OR	ON	ON	2022/02/07 02:55 PM
N118	331	((A61C7/002 OR A61C7/00 OR A61C3/00).cpc. AND orthodontic AND aligner AND pattern AND (move* WITH (modifica* change)))	(US-PGPUB; USPAT)	OR	ON	ON	2022/02/07 02:56 PM

Bibliographic Data

Application No: 16/723,706

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☐ No ☐ Met After Allowance

Verified and Acknowledged: /MIRAYDA A APONTE/ (Examiner's Signature) | (Initials)

Title: AUTOMATED TREATMENT STAGING FOR TEETH

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/20/2019	433	3772	11353.018US5
RULE			

APPLICANTS

ALIGN TECHNOLOGY, INC., San Jose, CA, UNITED STATES

INVENTORS

Ian Kitching, Saratoga, CA, UNITED STATES

Alexander Dmitriev, Moscow, RUSSIAN FEDERATION

Alexey Vishnevskiy, Moscow, RUSSIAN FEDERATION

CONTINUING DATA

This application is a CON of 15834649 12/07/2017 PAT 10524879

15834649 is a CON of 15086491 03/31/2016 PAT 10420631

15086491 is a CON of 13209276 08/12/2011 PAT 9326830

13209276 is a CON of 11848172 08/30/2007 PAT 8038444

11848172 has PRO of 60824024 08/30/2006

11848172 has PRO of 60824022 08/30/2006

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

01/14/2020

STATE OR COUNTRY

UNITED STATES

ADDRESS

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326
UNITED STATES

FILING FEE RECEIVED

$7,320

To: docketing@fisherbroyles.com,patent@fisherbroyles.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 161191

Feb 18, 2022 04:52:35 AM

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Application	Document	Mailroom Date	Attorney Docket No.
16723706	NOA	02/18/2022	11353.018US5

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

161191 7590 03/14/2022

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

EXAMINER	
APONTE, MIRAYDA ARLENE	

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
03/14/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@fisherbroyles.com
patent@fisherbroyles.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 16723706
Applicant : Kitching
Filing Date : 12/20/2019
Date Mailed : 03/14/2022

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Chris Harmon/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 16723706 **Drawings filed: 12/20/2019**

IDENTIFICATION OF DRAWING DEFICIENCIES

- [ ] There is a hole or the image thereof within the illustration. FIG(s)
- [ ] The illustration is penetrated or traversed by a solid or broken line that is not intended to be part of the drawing, such as a dark line caused by a flaw in the copying process. FIG(s)
- [ ] An ink stamp or the image thereof obscures part of the illustration. FIG(s)
- [ ] The drawing is marred by black smudges, obliterations, or fax/copier marks (for example, speckles or dots in a substantial portion of the drawing). FIG(s)
- [ ] Figure numbers are duplicated or missing. FIG(s)
- [ ] Drawing sheet or figure is missing. FIG(s)
- [ ] Numbers, letters, or reference characters in the drawing have been crossed out or are illegibly handwritten. FIG(s)
- [ ] The character of the lines, numbers, and letters is poor. FIG(s)
- [ ] The drawing's background shows that the original drawing was made on graph paper or other paper with a pattern or decoration. FIG(s)
- [ ] The FIG. number label is placed in a location that causes the drawing to be read upside down. FIG(s)
- [X] Data, a reference number, or part of the drawing is truncated or missing, or a lead line has no reference number. FIG(s) 10B
- [ ] The drawing and/or the FIG. label contain(s) foreign language. FIG(s)
- [ ] This utility application contains a photograph of a view that is capable of being illustrated as a line drawing. FIG(s)
- [ ] A petition under 37 CFR 1.84(a)(2) to accept color drawings has been granted, but the brief description of the drawings in the specification does not contain (or has not been amended to contain) the paragraph required by 37 CFR 1.84(a)(2)(iii).
- [ ] This reissue application contains added and/or amended drawings that are not labeled as “New” or “Amended” or “Canceled” as required by 37 CFR 1.173(b)(3). FIG(s)
- [ ] This Design reissue application contains a drawing that is labeled as “Canceled” but is not surrounded by brackets, or a drawing that is surrounded by brackets but is not labeled as “Canceled.” See 37 CFR 1.173(b)(3). FIG(s)
- [ ] OTHER:
- [ ] COMMENTS:

To: docketing@fisherbroyles.com,patent@fisherbroyles.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 161191

Mar 14, 2022 03:57:54 AM

Dear PAIR Customer:

FisherBroyles, LLP - Align Technology, Inc.
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Application	Document	Mailroom Date	Attorney Docket No.
16723706	M327	03/14/2022	11353.018US5

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If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

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PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/723,706	**05/06/2022 01:58:44 PM ET**	**11353.018US5**

Title of Invention

AUTOMATED TREATMENT STAGING FOR TEETH

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1026	FILED BY	Jayna Lofgran
PATENT CENTER #	60656291	FILING DATE	12/20/2019
CUSTOMER #	161191	FIRST NAMED INVENTOR	Ian Kitching
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	Charlie Hagadorn

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
11353-018US5_Response-Notice-Correct-App-Papers_220506.pdf	4	Miscellaneous Incoming Letter	206 KB
11353-018US5_Replacement-Sheet_FIG-10B.pdf	1	Drawings-only black and white line drawings	85 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

11353-018US5_Response-Notice-Correct-App-Papers_220506.pdf	AF021340264A8E474EAC3F7BFC9B570686EC05C3314E13196476DFF376EE10C23223CCFAE87DBE957C94EC792E68C04A77C605DD109D27798BFB54E4749C308
11353-018US5_Replacement-Sheet_FIG-10B.pdf	708B32EE7B907EF8A264FC46D010A675D58110E40C757E63F3E2744DBE11D3A36B4C3941972030A27FF1DFF10E19B23C9F42BDB66401BF44F837B96A88FE6FD2

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

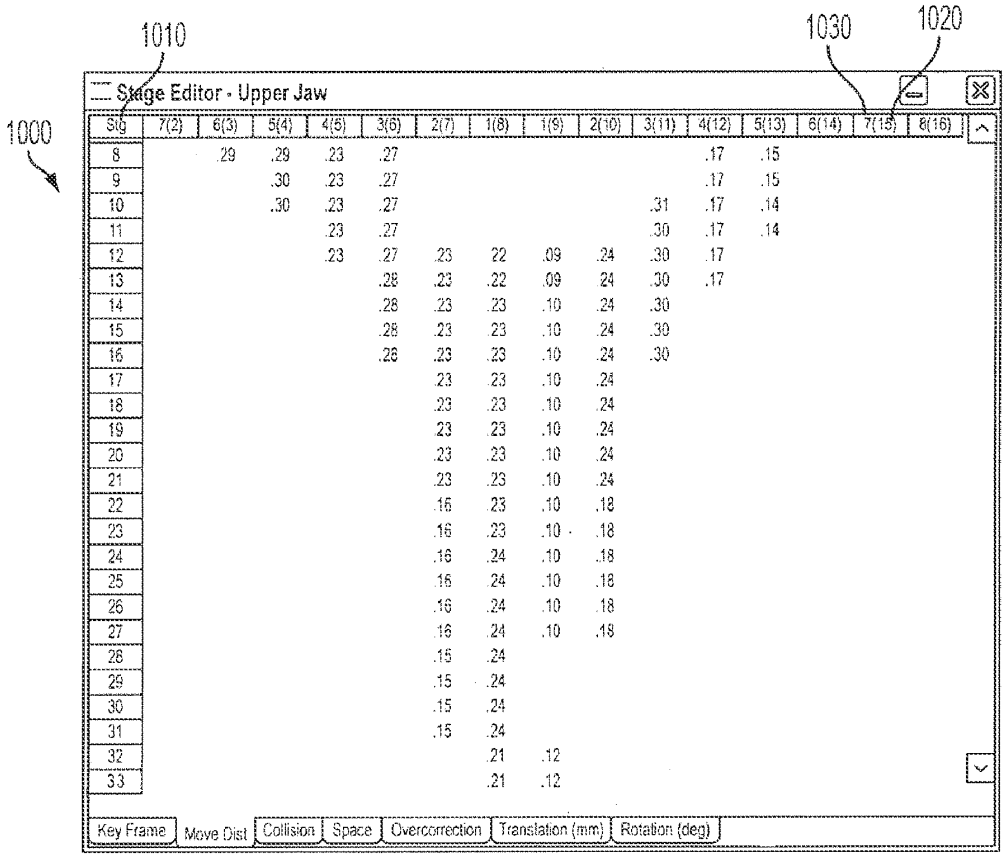

1000
1010
1020
1030
Stage Editor - Upper Jaw
Stg
7(2)
6(3)
5(4)
4(5)
3(6)
2(7)
1(8)
1(9)
2(10)
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4(12)
5(13)
6(14)
7(15)
8(16)
Key Frame
Move Dist
Collision
Space
Overcorrection
Translation (mm)
Rotation (deg)

FIG. 10B

CERTIFICATE OF ELECTRONIC TRANSMISSION

I hereby certify that this correspondence is being electronically transmitted to the United States Patent and Trademark Office, Commissioner for Patents, via the EFS pursuant to 37 C.F.R. § 1.8.

Date: May 6, 2022 Signature: /Jayna Lofgran/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Appln. of:	ALIGN TECHNOLOGY, INC.	Examiner:	Mirayda Arlene Aponte
Appln. No.:	16/723,706	Art Unit:	3772
Filed:	December 20, 2019	Conf. No.:	1026
For:	AUTOMATED TREATMENT STAGING FOR TEETH	Customer No:	161191
Attorney Docket No:	11353.018US5		

RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS *(Notice of Allowance Mailed)*

Mail Stop Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Commissioner:

Responsive to the Notice to File Corrected Application Papers – Notice of Allowance Mailed, dated March 14, 2022, attached herewith for filing is Replacement Sheet 14/15 for FIG. 10B which now fully shows the existing data for line 33. No new matter has been added.

Applicant believes no fees are due for this submission. However, the Commissioner is hereby authorized to charge any deficiencies in fees to Deposit Account No. 506974.

Respectfully submitted,

Dated: May 6, 2022

/Charles Hagadorn III/
Charles Hagadorn III, Reg. No. 62367
Attorney for Applicant

FisherBroyles, LLP
701 Fifth Avenue, Suite 4200
Seattle, Washington 98104-5119
(206) 537-9809

ClearCorrect Exhibit 1002, Page 3362 of 3373

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	12/20/2019	Ian Kitching	11353.018US5	1026

161191 7590 03/14/2022

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

EXAMINER	
APONTE, MIRAYDA ARLENE	

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
03/14/2022	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@fisherbroyles.com
patent@fisherbroyles.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 16723706
Applicant : Kitching
Filing Date : 12/20/2019
Date Mailed : 03/14/2022

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Chris Harmon/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 16723706 **Drawings filed: 12/20/2019**

IDENTIFICATION OF DRAWING DEFICIENCIES

- [ ] There is a hole or the image thereof within the illustration. FIG(s)
- [ ] The illustration is penetrated or traversed by a solid or broken line that is not intended to be part of the drawing, such as a dark line caused by a flaw in the copying process. FIG(s)
- [ ] An ink stamp or the image thereof obscures part of the illustration. FIG(s)
- [ ] The drawing is marred by black smudges, obliterations, or fax/copier marks (for example, speckles or dots in a substantial portion of the drawing). FIG(s)
- [ ] Figure numbers are duplicated or missing. FIG(s)
- [ ] Drawing sheet or figure is missing. FIG(s)
- [ ] Numbers, letters, or reference characters in the drawing have been crossed out or are illegibly handwritten. FIG(s)
- [ ] The character of the lines, numbers, and letters is poor. FIG(s)
- [ ] The drawing's background shows that the original drawing was made on graph paper or other paper with a pattern or decoration. FIG(s)
- [ ] The FIG. number label is placed in a location that causes the drawing to be read upside down. FIG(s)
- [X] Data, a reference number, or part of the drawing is truncated or missing, or a lead line has no reference number. FIG(s) 10B
- [ ] The drawing and/or the FIG. label contain(s) foreign language. FIG(s)
- [ ] This utility application contains a photograph of a view that is capable of being illustrated as a line drawing. FIG(s)
- [ ] A petition under 37 CFR 1.84(a)(2) to accept color drawings has been granted, but the brief description of the drawings in the specification does not contain (or has not been amended to contain) the paragraph required by 37 CFR 1.84(a)(2)(iii).
- [ ] This reissue application contains added and/or amended drawings that are not labeled as “New” or “Amended” or “Canceled” as required by 37 CFR 1.173(b)(3). FIG(s)
- [ ] This Design reissue application contains a drawing that is labeled as “Canceled” but is not surrounded by brackets, or a drawing that is surrounded by brackets but is not labeled as “Canceled.” See 37 CFR 1.173(b)(3). FIG(s)
- [ ] OTHER:
- [ ] COMMENTS:

Doc Code: IFEE PTOL/85B-EFS

Document Description: Issue Fee Payment (PTO-85B)

Issue Fee Transmittal Form

Application Number	Filing Date	First Named Inventor	Atty. Docket No.	Confirmation No.
16723706	20-Dec-2019	Ian Kitching	11353.018US5	1026

TITLE OF INVENTION :

AUTOMATED TREATMENT STAGING FOR TEETH

Entity Status	Application Type	Art Unit	Class - Subclass	EXAMINER
Regular Undiscounted	Utility under 35 USC 111(a)	3772	024000	

Issue Fee Due	Publication Due	Total Fee(s) Due	Date Due	Prev. Paid Fee
$1200	$0	$1200	18-May-2022	$0

1.Change of Correspondence Address and/or Indication Of Fee Address (37 CFR 1.33 & 1.363)

Current Correspondence Address:	Current Indicated Fee Address :
161191 FisherBroyles, LLP - Align Technology, Inc. 945 East Paces Ferry Road NE Suite 2000 Atlanta GA 30326 UNITED STATES 6787431125 docketing@fisherbroyles.com	
☐ Change of correspondence address requested, system generated AIA/122-EFS form attached	☐ Fee Address indication requested, system generated SB/47-EFS form attached

2.Entity Status

Change in Entity Status

○ Applicant certifying micro entity status; system generated Micro Entity certification form attached. See 37 CFR 1.29.
Note: Absent a valid certification of micro entity status, issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment. If this box is checked, you will be prompted to choose a micro entity status on the gross income basis (37 CFR 1.29(a)) or the institution of higher education basis (37 CFR 1.29(d)), and make the applicable certification online.

○ Applicant asserting small entity status. See 37 CFR 1.27.
Note: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

◉ Applicant changing to regular undiscounted fee status.
Note: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

Doc Code: IFEE PTOL/85B-EFS

Document Description: Issue Fee Payment (PTO-85B)

3.The Following Fee(s) Are Submitted:

☒ Issue Fee

☐ I authorize USPTO to apply my previously paid issue fee to the current fees due

☐ Publication Fee

☐ The Director is hereby authorized to apply my previously paid issue fee to the current fee due and to charge deficient fees to Deposit Account Number _____

☐ Advance Order - # of copies _____

☒ If **in addition to** the payment of the issue fee amount submitted with this form, there are any discrepancies in any amount(s) due, the Director is authorized to charge any deficiency or credit any overpayment, to Deposit Account Number 506974 . The **issue fee must be submitted** with this form. **If payment of the issue fee does not accompany this form, checking this box and providing a deposit account number will NOT be effective to satisfy full payment of the fee(s) due.**

4.Firm and/or Attorney Names To Be Printed

NOTE: If no name is listed, no name will be printed
For printing on the patent front page, list to be displayed as entered

1. FISHERBROYLES, LLP
2.
3.

5.Assignee Name(s) and Residence Data To Be Printed

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

Name	City	State	Country	Category
ALIGN TECHNOLOGY, INC.	San Jose	CALIFORNIA	UNITED STATES	corporation

6.Signature

I certify, in accordance with 37 CFR 1.4(d)(4) that I am an attorney or agent registered to practice before the Patent and Trademark Office who has filed and has been granted power of attorney in this application. I also certify that this Fee(s) Transmittal form is being transmitted to the USPTO via EFS-WEB on the date indicated below.

Signature	/Charles Hagadorn III/	**Date**	05-16-2022
Name	Charles Hagadorn III	**Registration Number**	62367

WEB IFEE 1.0

Electronic Patent Application Fee Transmittal

Application Number:	16723706
Filing Date:	20-Dec-2019
Title of Invention:	AUTOMATED TREATMENT STAGING FOR TEETH
First Named Inventor/Applicant Name:	Ian Kitching
Filer:	Charles C. Hagadorn III/Jayna Lofgran
Attorney Docket Number:	11353.018US5

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPL ISSUE FEE	1501	1	1200	1200
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1200**

Electronic Acknowledgement Receipt	
EFS ID:	45724309
Application Number:	16723706
International Application Number:	
Confirmation Number:	1026
Title of Invention:	AUTOMATED TREATMENT STAGING FOR TEETH
First Named Inventor/Applicant Name:	Ian Kitching
Customer Number:	161191
Filer:	Charles C. Hagadorn III/Jayna Lofgran
Filer Authorized By:	Charles C. Hagadorn III
Attorney Docket Number:	11353.018US5
Receipt Date:	16-MAY-2022
Filing Date:	20-DEC-2019
Time Stamp:	17:20:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1200
RAM confirmation Number	E20225FH20343327
Deposit Account	506974
Authorized User	Jayna Lofgran
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.20 (Post Issuance fees) 37 CFR 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	Web85b.pdf	62647 12a9d4f694eb1a6581874f3bc18f139faf5828c1	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	40225 13e4a3613802f5857ac0ca6d308e16af30f25b44	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	102872		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/723,706	06/28/2022	11369456	11353.018US5	1026

161191 7590 06/08/2022

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

Ian Kitching, Saratoga, CA;
Alexander Dmitriev, Moscow, RUSSIAN FEDERATION;
Alexey Vishnevskiy, Moscow, RUSSIAN FEDERATION;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

ALIGN TECHNOLOGY, INC., San Jose, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IR103 (Rev. 10/09)

To: docketing@fisherbroyles.com,patent@fisherbroyles.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 161191

Jun 09, 2022 12:49:14 PM

Dear PAIR Customer:

FisherBroyles, LLP - Align Technology, Inc.
945 East Paces Ferry Road NE
Suite 2000
Atlanta, GA 30326
UNITED STATES

The following USPTO patent application(s) associated with your Customer Number, 161191 , have new outgoing correspondence. This correspondence is now available for viewing in Private PAIR.

The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

Disclaimer:
The list of documents shown below is provided as a courtesy and is not part of the official file wrapper. The content of the images shown in PAIR is the official record.

Application	Document	Mailroom Date	Attorney Docket No.
16723706	ISSUE.NTF	06/08/2022	11353.018US5

To view your correspondence online or update your email addresses, please visit us anytime at https://sportal.uspto.gov/secure/myportal/privatepair.

If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov with 'e-Office Action' on the subject line or call 1-866-217-9197 during the following hours:

Monday - Friday 6:00 a.m. to 12:00 a.m.

Thank you for prompt attention to this notice,

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM