

Patent Owner Align's Oral Argument, July 31, 2026

ClearCorrect Operating LLC v. Align Technology, Inc.
Case No. IPR2025-00816 (U.S. Patent No. 11,369,456)

Representative Claim 1

[1(pre)] A computer-implemented method comprising:

[1(a)] 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;

[1(b)] calculating a respective treatment path for each of the dental objects between their respective initial position and respective final position;

[1(c)] **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;**

[1(d)] **performing a first modification of the schedule of movement in response to the identifying,** [1(e)] 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;

[1(f)] 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

[1(g)] 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.

Grounds of Challenge

Ground	Claims	Invalidity Theory	Prior Art
1	1-9, 11, 13-17	Obviousness	Chishti-511 in view of Chishti-876 and Sachdeva
2	10, 12, 18, 19	Obviousness	Chishti-511 in view of Chishti-876, Sachdeva, and Becker

Ground 1: Elements 1(c) and 1(d)

Petitioner relies on Chishti-511 alone or Chishti-511 and Sachdeva:

4. [1(c)] 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;

Chishti-511 alone or in view of Sachdeva renders this limitation obvious.

Ex-1003, ¶¶105-107. Chishti-511's solution seeks a "clinically viable sequence of

Pet., 36.

5. [1(d)] performing a first modification of the schedule of movement in response to the identifying,

Chishti-511 alone or in view of Sachdeva renders this feature obvious.

Ex-1003, ¶¶108-111. Chishti-511 discloses that, when aligners are unacceptable,

Pet., 39.

Ground 1: Elements 1(c) and 1(d)

Petitioner argues Chishti-511 alone discloses collision detection:

Ex-1003, ¶¶105-107. Chishti-511's solution seeks a "clinically viable sequence of tooth positions" that "do[] not result in a collision of teeth." Ex-1004, 4:7-22. Chishti-511 further states that new proposed aligners will be calculated if the system determines that teeth motion is not "orthodontically acceptable" or if "an acceptable end position is not reached by the teeth." Ex-1004, 5:25-32. A POSITA would have understood that a schedule of movement resulting in a collision would be orthodontically unacceptable and unlikely to reach an acceptable end position.

Pet., 36-37.

Ex-1003, ¶¶108-111. Chishti-511 discloses that, when aligners are unacceptable, "the process transfers control to a path definition process ... to redefine those parts of the treatment path having unacceptable aligners" Ex-1004, 8:42-61; *see also* Ex-1004, 4:7-50, 5:7-32, Figs. 1, 2, 4, 6; Ex-1003, ¶109 (citing Ex-1004, 6:57-7:8, 8:29-9:2). A POSITA would have understood this is performed in response to identifying a collision, as Chishti-511 discloses seeking a "sequence of tooth positions" that "does not result in a collision of teeth." Ex-1004, 4:7-22; *see also*

Pet., 39.

POR, 27-28.

Ground 1: Elements 1(c) and 1(d)

Petitioner relies on collision detection during Chishti-511's aligner calculation process:

Importantly, Chishti-511 recognizes that simulation may show that teeth will deviate from their ideal path/movements, such as moving “too slow,” “too far short of the desired end position,” “too far past the desired end position,” or “in a direction other than the desired direction.” Ex-1004, 7:37-51; Ex-1040, ¶¶10-11. A POSITA would understand that deviations from idealized movements may lead to collisions. Ex-1040, ¶11. This is consistent with real world applications, as teeth

Pet. Reply, 1-2.

idealized movements may result in collisions. Ex-1040, ¶12. Similarly, if aligners are unacceptable, the process can “relax” constraints, such as “a maximum rate of displacement of a tooth, a maximum force on a tooth, and a desired end position of a tooth.” Ex-1004, 2:30-33, 8:32-39. Changing these parameters likewise can result in different movements than the idealized movement, resulting in collisions. Ex-

Pet. Reply, 2.

5:25-32. Align attempts to divorce “orthodontically acceptable” from collision avoidance (POR, 30-31), but these concepts are inseparable. An orthodontic treatment plan that produces collisions between teeth is, by definition, not orthodontically acceptable. Ex-1003, ¶106. Chishti-511 uses functional language—

Pet. Reply, 3.

PO Sur-Reply, 1-12.

Ground 1: Elements 1(c) and 1(d)

Petitioner's reply shifts theories on Chishti-511:

“changing the path followed by one or more teeth.” Ex-1004, 8:54-61. Thus, during Chishti-511’s treatment-planning process, the system identifies unacceptable movements, including those resulting in a collision based at least on the schedule of movement and respective teeth paths, so that the schedule of movement can be redefined. Ex-1003, ¶106.

Pet., 37.

Ex-1004, Fig. 6 (annotated). Thus, this path redefinition will be performed “in response to the identifying” of a collision. Ex-1003, ¶109.

Pet., 40.

direction other than the desired direction.” Ex-1004, 7:37-51; Ex-1040, ¶¶10-11. A POSITA would understand that deviations from idealized movements may lead to collisions. Ex-1040, ¶11. This is consistent with real world applications, as teeth

Pet. Reply, 2.

Moreover, Align fails to even acknowledge that Chishti-511’s idealized paths are created before movement is simulated, and that the simulated movement can reveal unplanned movement (even in different directions than expected) and further relaxed constraints, any of which a POSITA would have understood may result in collisions. Ex-1004, 2:30-33, 7:37-51, 8:32-39, Fig. 6, 2:30-33; Ex-1040,

Pet. Reply, 3-4.

Ground 1: Elements 1(c) and 1(d)

Petitioner's theory is not supported by Chishti-511:

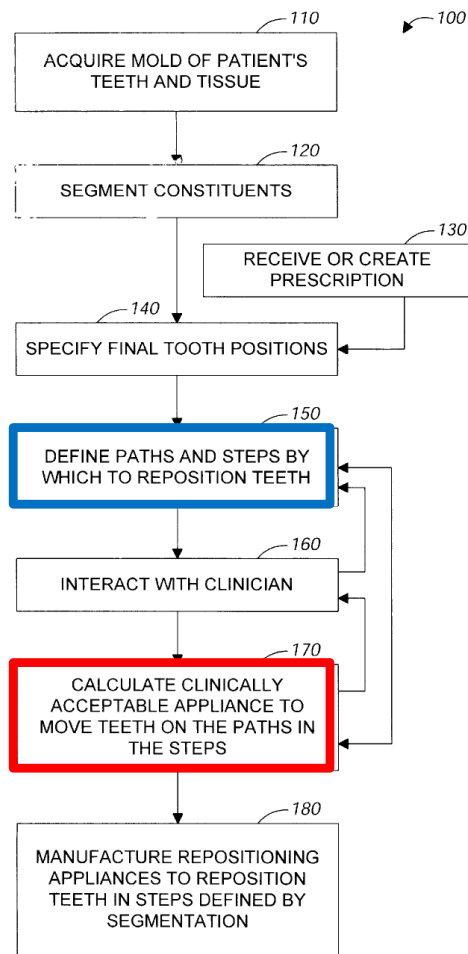


FIG. 1

Having both a beginning position and a final position for each tooth, the process next defines a tooth path for the motion of each tooth. The tooth paths are optimized in the aggregate so that the teeth are moved in the quickest fashion with the least amount of round-tripping to bring the teeth from their initial positions to their desired final positions. (Round-tripping is any motion of a tooth in any direction other than directly toward the desired final position. Round-tripping is sometimes necessary to allow teeth to move past each other.) The tooth paths are segmented. The segments are calculated so that each tooth's motion within a segment stays within threshold limits of linear and rotational translation. In this way, the end points of each path segment can constitute a clinically viable repositioning, and the aggregate of segment end points constitute a clinically viable sequence of tooth positions, so that moving from one point to the next in the sequence does not result in a collision of teeth.

EX1004 (Chishti-511), 4:7-22.

The segmented tooth paths and associated tooth position data are used to calculate clinically acceptable appliance configurations (or successive changes in appliance configuration) that will move the teeth on the defined treatment path in the steps specified by the path segments (step 170). Each appliance configuration represents a step

EX1004 (Chishti-511), 4:51-56.

Ground 1: Elements 1(c) and 1(d)

Petitioner's theory is not supported by Chishti-511:

avoidance (POR, 30-31), but these concepts are inseparable. An orthodontic treatment plan that produces collisions between teeth is, by definition, not orthodontically acceptable. Ex-1003, ¶106. Chishti-511 uses functional language—

Pet. Reply, 3.

of the following. Appliances specified in accordance with the invention apply no more than orthodontically acceptable levels of force, cause no more than an acceptable amount of patient discomfort, and achieve the desired increment of tooth repositioning in an acceptable period of time. The invention can be used to augment a computational or manual process for defining tooth paths in orthodontic treatment by confirming that proposed paths can be achieved by the appliance under consideration and within user-selectable constraints of good orthodontic practice. Use of the inven-

EX1004 (Chishti-511), 5:21-30.

tissue (step 220). The analysis runs until an exit condition is reached, at which time the process evaluates whether the teeth have reached the desired end position for the current path segment, or a position sufficiently close to the desired end position (step 230). If an acceptable end position is not reached by the teeth, the process calculates a new candidate aligner shape (step 240). If an acceptable end position is reached, the motions of the teeth calculated by the finite elements analysis are evaluated to determine whether they are orthodontically acceptable (step 232). If they are not, the

EX1004 (Chishti-511), 5:21-30.

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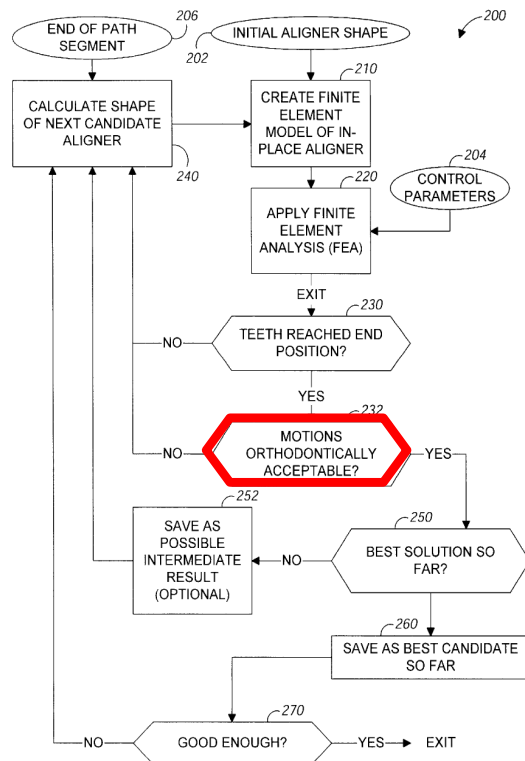


FIG. 2

POR, 30-34; PO Sur-Reply, 7-8.

Ground 1: Elements 1(c) and 1(d)

Petitioner's theory is not supported by Chishti-511:

Importantly, Chishti-511 recognizes that simulation may show that teeth will deviate from their ideal path/movements, such as moving “too slow,” “too far short of the desired end position,” “too far past the desired end position,” or “in a direction other than the desired direction.” Ex-1004, 7:37-51; Ex-1040, ¶¶10-11. A POSITA would understand that deviations from idealized movements may lead to collisions. Ex-1040, ¶11. This is consistent with real world applications, as teeth

Pet. Reply, 1-2.

Rules 452 have the conventional two-part form: an if-part defining a condition and a then-part defining a conclusion or action that is asserted if the condition is satisfied. Conditions can be simple or they can be complex conjunctions or disjunctions of multiple assertions. An exemplary set of rules, which defines changes to be made to the aligner, includes the following: if the motion of the tooth is too slow, add driving material to the aligner opposite the desired direction of motion; if the motion of the tooth is too slow, add driving material to overcorrect the position of the tooth; if the tooth is too far short of the desired end position, add material to overcorrect; if the tooth has been moved too far past the desired end position, add material to stiffen the aligner where the tooth moves to meet it; if a maximum amount of driving material has been added, add material to overcorrect the repositioning of the tooth and do not add driving material; if the motion of the tooth is in a direction other than the desired direction, remove and add material so as to redirect the tooth.

EX1004 (Chishti-511), 7:33-51.

Ground 1: Elements 1(c) and 1(d)

Petitioner's theory is not supported by Chishti-511:

idealized movements may result in collisions. Ex-1040, ¶12. Similarly, if aligners are unacceptable, the process can “relax” constraints, such as “a maximum rate of displacement of a tooth, a maximum force on a tooth, and a desired end position of a tooth.” Ex-1004, 2:30-33, 8:32-39. Changing these parameters likewise can result in different movements than the idealized movement, resulting in collisions. Ex-1040, ¶12.

Pet. Reply, 2.

steps for repositioning the teeth of a patient. The methods include providing a digital finite element model of the shape and material of each of a sequence of appliances to be applied to a patient; providing a digital finite element model of the teeth and related mouth tissue of the patient; computing the actual effect of the appliances on the teeth by analyzing the finite elements models computationally; and evaluating the effect against clinical constraints. The appli-

EX1004 (Chishti-511), Abstract.

First, one or more of the constraints on the aligners is relaxed (step 612). Then, for each path segment with an unacceptable aligner, the process 200 of shaping an aligner is performed with the new constraints (step 614). If all the aligners are now acceptable, the overall process 600 exits (step 616).

EX1004 (Chishti-511), 8:36-41.

the aligner over the crowns of the teeth”). Thus, by relaxing such constraints, an aligner that was previously determined unacceptable (e.g., because it caused a tooth to move at a rate greater than the set maximum, it exerted a force on a tooth greater than the set maximum, or it did not move the tooth within the constraints of a desired end position) can be recalculated as acceptable.

EX2013 (Valley Dec.), ¶56.

POR, 9-17; PO Sur-Reply, 11.



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DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Ground 1: Elements 1(c) and 1(d)

Petitioner argues Sachdeva teaches collision identification:

A POSITA also would have been motivated to modify Chishti-511 to include Sachdeva's collision-identification teachings. *Supra* Section VIII. Sachdeva's treatment-planning system "simulate[s] tooth movement based on each tooth's direct path" and determines if "a conflict in movement arose" between at least two teeth." Ex-1007, 5:3-8, Fig. 4; Ex-1003, ¶107.

Pet., 37.



Ground 1: Elements 1(c) and 1(d)

No basis that Sachdeva teaches collision identification:

Q. Okay. And what is that? What is a tooth collisions?

A. When two teeth collides or when we plan if we see that two teeth are colliding, it's called tooth collision.

Q. One moving tooth strikes against another; is that fair?

A. Fair enough.

EX2015 (Yadav Dep.Tr.), 47:24-48:6.

teeth in conflict effect other teeth in movement. For an intra-arch conflict, the actual position of the tooth will dictate whether the upper tooth is priority or the lower tooth is priority. If the lower tooth protrudes preventing the upper tooth from moving back, the lower tooth must be moved before the upper tooth can be positioned. Conversely, if the upper tooth is interfering with the lower tooth from being moved out, the upper tooth must first be moved.

EX1007 (Sachdeva), 5:22-26.

Q. Okay. Okay. And then a few lines down, Sachdeva discusses a lower tooth that protrudes and blocks movement of the upper tooth. Do you see that?

A. I see that.

Q. Okay. The conflict here is that the lower tooth is preventing the movement of the upper tooth; is that fair?

A. It's fair.

EX2015 (Yadav Dep.Tr.), 79:10-17.

Ground 1: Elements 1(c) and 1(d)

No basis that Sachdeva teaches collision identification:

48. At step 48 a determination is made as to whether a conflict exists for a single tooth. Such a conflict arises when the tooth cannot obtain its desired position due to distance of movement and treatment constraints, which include, but are not limited to, number of treatments, orthodontic apparatus used, patient cooperation, and biological conditions. If so,

EX1007 (Sachdeva), 5:39-44.

100. Moreover, Sachdeva also describes that a “conflict” can “exist[] for a single tooth,” which “arises when the tooth cannot obtain its desired position due to distance of movement and treatment constraints.” EX1007 (Sachdeva), 5:37-44; *see also supra*, section VII.B. Sachdeva explains that, if this is the case, the tooth should be extracted. Collision of teeth is not included.

EX2013 (Valley Dec.), ¶100.

Ground 1: No Motivation to Combine

Petitioner proposes inserting Sachdeva’s process into Chishti-511’s aligner calculation process:

A POSITA would have recognized that integrating Sachdeva’s automated collision identification, avoidance, and adjustment features into Chishti-511 would provide implementation details for the features disclosed in Chishti-511 and would help achieve the “clinically viable sequence of tooth positions” sought by Chishti-511—that is, helping prevent aligners that might cause a collision. Ex-1003, ¶79;

Pet., 20.

The Petition argued it would have been obvious to use “Sachdeva’s collision-identification process [as] an option for determining the acceptability of aligners (e.g., triggering whether a new aligner should be calculated).” Pet., 21.

Pet. Reply, 12.

Ground 1: No Motivation to Combine

No basis for proposed combination:

114. However, in my opinion, a POSITA would not have been motivated to use Sachdeva's technique as part of "determining the acceptability of aligners." *See id.*, ¶80. As I noted above, Chishti-511 does not discuss identifying collisions with respect to determining aligner acceptability. *See supra*, sections VII.A, VIII.A.i.a. More importantly, Chishti-511 discloses that its aligner calculation process is based on receiving, as input, treatment paths that have already been determined to be collision-free. Thus, a POSITA would not have understood Sachdeva's process to be applicable to Chishti-511's process of calculating acceptable aligner configurations because a POSITA would have appreciated that the references are assessing different aspects of the treatment process.

EX2013 (Valley Dec.), ¶114.



Ground 1: No Motivation to Combine

No basis for proposed combination:

115. For instance, as I noted above, Chishti-511's aligner calculation process is based on receiving treatment paths that have already been determined as collision-free as an input for its calculations, with the aligner calculation process focusing on modeling the effects of a given aligner configuration to determine whether the configuration can actually perform the desired treatment path within acceptable constraints (e.g., within acceptable force levels). *See supra*, sections

EX2013 (Valley Dec.), ¶¶ 115.

116. Sachdeva, on the other hand, is focused only on "simulating tooth movement," in which "a three-dimensional direct path of movement is determined" for each tooth and identifying "a conflict in movement." *See* EX1007 (Sachdeva), 3:33-36, 4:50-54, 5:3-5. Such a generic analysis would have been viewed by a POSITA as inapplicable to Chishti-511's aligner calculation process because it is assessing a different aspect of the treatment process (*i.e.*, identifying whether a tooth can generally move along its direct path, as in Sachdeva, versus the ability of an aligner to achieve a particular movement, as in Chishti-511).

EX2013 (Valley Dec.), ¶¶ 116.

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Ground 2: Round-Tripping Claims

Claims 10, 12, and 18-19 recite round-tripping:

10. The method of claim 9, 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.

EX1001 ('456 Patent), claim 10.

X. GROUND 2: CHISHTI-511 IN VIEW OF CHISHTI-876, SACHDEVA, AND BECKER RENDERS OBVIOUS CLAIMS 10, 12, 18, AND 19

A. Claim 10

Claim 10 is obvious based on Chishti-511 in view of Chishti-876, Sachdeva, and Becker. Ex-1003, ¶¶173-182.

Pet., 75.



Ground 2: Round-Tripping Claims

Chishti-876 teaches away from the combination:

is highly undesirable. Prelim. Resp. 53 (citing Ex. 1004, 14:50–51). We are persuaded that Patent Owner’s position is correct because Chishti ’876 uses the terms “while avoiding” and “highly undesirable” in connection with the use of “round tripping,” so that Chishti ’876 sufficiently discourages the practice of “round tripping” enough to teach away from that practice. *See*

EX1008 (’444 Inst. Dec.), 11.

negative effects on the patient.” Ex. 1005, 14:46–51. The Petition does not expressly address this teaching in Chishti-876, nor does it address the prior Board finding in the ’444 IPR, in which the Board recognized that this teaching constitutes a teaching away from round-tripping. *See* Ex. 1008, 11–12. On this record, it appears that Chishti-876 teaches away from “moving a tooth along a distance greater than absolutely necessary to straighten the teeth.”

In short, Chishti-876 disparages “moving a tooth along a distance greater than absolutely necessary to straighten the teeth” (Ex. 1005, 14:46–51) which is a broad statement that appears to encompass the more specific round-tripping movement taught in Becker. Petitioner itself concedes that “indirect movement was understood to be avoided if possible.” Pet. 17. Although Petitioner attempts to characterize indirect movement or round-tripping as a preferable or necessary option (*see, e.g.*, Pet. 15–17), these arguments are insufficiently supported on this record.

Inst. Dec., 28.

Ground 2: Round-Tripping Claims

No evidence that POSITA would have used aligners to effect Becker's movement:

Regarding Patent Owner's third argument, on this record we agree that Petitioner does not demonstrate a reasonable likelihood that a skilled artisan would have combined Becker's movement pattern with the Chishti systems and Sachdeva. We agree with Patent Owner that "Becker at best shows that round-tripping was an option in limited circumstances involving wire-and-bracket treatment." Prelim. Resp. 4. We are not directed to persuasive evidence that using aligners to effect Becker's tooth transposition "would be appropriate or even possible." *Id.* at 30. "In contrast to treatment

Inst. Dec., 28-29.

in Becker. Moreover, as I noted above in section VII.D, Becker describes a "rare" case involving bilaterally missing upper lateral incisors and transposed canines and first premolars, where movement was achieved using a complex appliance design that involved mechanically intricate equipment (*i.e.*, the use of a palatal arch for supporting artificial teeth and providing anchorage for tooth movement, along with a labial archwire and bands around the teeth). See EX1006 (Becker), 191 (second

Petitioner's Inconsistent POSITA Positions

record). Based on the references, it is likely that a POSITA would have a doctorate in dental science and three to five years of training and practical experience in orthodontics. (Ex. 1003 ¶¶ 27-28.)

EX1028 ('444 Pet.), 6.

claimed priority date), would have been part of an interdisciplinary team. This team would have included members with an advanced degree related to dentistry (e.g., BDS, MDS, DDS, DMD) with experience in orthodontics, including 1-3 years of orthodontic training or equivalent experience, and experience using clear aligners.

Pet., 6.

would have been part of an interdisciplinary team. This team would have included members with an advanced degree related to dentistry (e.g., BDS, MDS, DDS, DMD) with experience in orthodontics, including 1-3 years of orthodontic training or equivalent experience. The team may have also included members with a degree

EX1003 (Yadav Dec.), ¶24.

POR, 3-7.