

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD
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4
5 ALIGN TECHNOLOGY, INC.,)
6)
7 Petitioner,)
8) Case No.
9 vs.) IPR2024-00110
10)
11 DENTAL MONITORING SAS,) IPR2024-00052
12)
13 Patent Owner.)
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REMOTE DEPOSITION OF
HASSAN FOROOSH, Ph.D.
Friday, June 28, 2024

STENOGRAPHICALLY REPORTED BY:
RHONDA HALL-BREUWET, RDR, CRR, CSR, CCR, LCR, FPR
Realtime Systems Administrator
JOB NO. SY009427

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June 28, 2024

8:58 a.m.

Deposition of HASSAN FOROOSH, PH.D.,
held remotely before Rhonda Hall-Breuwet,
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Notary Public of the State of Florida.

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1 CERTIFIED STENOGRAPHER: Raise
2 your right hand, please.

3 Do you solemnly swear the
4 testimony you are about to give will be the
5 truth, the whole truth, and nothing but the
6 truth?

7 THE WITNESS: I do.

8 HASSAN FOROOSH, Ph.D.
9 acknowledged having been duly sworn to tell
10 the truth and testified upon his oath as
11 follows:

12 EXAMINATION

13 BY MS. PARKS:

14 Q Good morning, Dr. Foroosh.

15 A Good morning.

16 Q I'm Allyson Parks, and I'm counsel
17 for Dental Monitoring.

18 Can you please state your full
19 name and address for the record.

20 A Yes. My name is Hassan Foroosh.
21 My address is 2444 River Rise Court, Orlando,
22 Florida 32828.

23 Q And I know you were deposed a few
24 weeks ago by my colleague, and that was your
25 third deposition; correct?

1 A Yes.

2 Q You know the general rules; so I'm
3 not going to go the full rigmarole that he
4 did, but you understand my questions and your
5 answers are being transcribed today?

6 A Yes.

7 Q And you understand that this
8 transcript will be submitted to the USPTO in
9 this matter and that they may rely on your
10 testimony?

11 A Yes.

12 Q And do you understand that you are
13 under oath?

14 A Yes.

15 Q And you understand you are
16 obligated to tell the truth?

17 A Yes.

18 Q Is there anything that will --
19 would prevent you from testifying truthfully
20 today?

21 A No.

22 Q And during the course of today,
23 I'll try to take breaks every so often; but if
24 you need a break, please let me know. Okay?

25 A I'll do that. Thank you.

1 Q And if you don't understand a
2 question that I ask you today, just please ask
3 me to clarify.

4 A Okay. I'll do that. Thank you.

5 Q And if you don't ask me to
6 clarify, I'm going to assume that you
7 understand the question.

8 Is that fair?

9 A That's fair.

10 Q And because we're not in the same
11 room together today, I'm just going to ask a
12 few questions about your remote setup.

13 So where are you located for
14 today's deposition?

15 A I'm in a room in my house. I use
16 it as an office.

17 Q Okay. Is there anyone else in the
18 room with you?

19 A No.

20 Q Okay. And if that changes at any
21 point today, will you let me know?

22 A Yes.

23 Q And apart from the computer you're
24 using to connect to this deposition, do you
25 have any devices in arm's reach?

1 A No, I don't.

2 Q Okay. And I understand that you
3 have a copy of your declarations and the cited
4 exhibits in front of you; is that correct?

5 A That's correct.

6 Q Do you have any other notes or
7 documents in front of you?

8 A No.

9 Q And apart from the Zoom and the
10 exhibit-sharing platform, do you have any
11 other applications open on your computer?

12 A No. Actually, I have my email
13 open because I wanted to access the link. Do
14 you want me to close that?

15 Q I think that would be best, yes,
16 if you could please close your email.

17 A I just closed it.

18 Q Okay. So the first document I'd
19 like to talk about today is Exhibit 1005,
20 which is the Kim reference.

21 So I just added it on the exhibit
22 platform. Does everyone see it?

23 A Can I take the hard copy out? Is
24 it okay if I access it through the hard copy?

25 Q Yes. Please feel free to use the

1 hard copy.

2 And just to make sure we're
3 looking at the same document, the version you
4 have in hard copy is stamped in the bottom
5 right corner, "Align Exhibit 1005"?

6 A That's correct.

7 Q Okay. Great.

8 And this exhibit is the Kim
9 reference that you rely on for both the '248
10 and '945 patents; correct?

11 A Correct.

12 Q When is the first time that you
13 came across Kim?

14 A I do not remember the exact date.
15 Sometime last year.

16 Q Were you familiar with Kim before
17 your work in this case?

18 A No.

19 Q Did you conduct any searches for
20 references in this case?

21 A Yes, I did some search.

22 Q Did any of your searches uncover
23 Kim?

24 A Yes.

25 Q What search terms were you using

1 when you found the Kim reference?

2 A Various different ones. I
3 don't -- I do not recall exactly what terms I
4 used.

5 Q Do you remember generally what
6 terms you used?

7 MR. ARGENTI: Objection. Form.

8 THE WITNESS: No, I don't recall.
9 I just used some key terms and searched for
10 prior art.

11 BY MS. PARKS:

12 Q Did you conduct multiple searches?

13 A Yes.

14 Q And did you use different search
15 terms in the different searches?

16 A As I was trying to find what prior
17 arts were available, I gradually changed,
18 added terms -- key terms, keywords; or I might
19 have removed key terms, keywords.

20 Q Did you conduct searches in
21 different databases?

22 A I used only Internet.

23 Q But did you access any different
24 platforms or databases via the Internet for
25 your searches?

1 A No, just simply going on Internet
2 and looking for prior art.

3 Q And so did you perform a search on
4 Google or a different search platform?

5 A I think I used Bing, but I might
6 have used Google. I just don't remember. I
7 might have used Google also to see if I see
8 any changes in my search.

9 Q And apart from Google and Bing,
10 did you use any other search engine?

11 A No.

12 Q And do you know if the first time
13 you saw Kim was from your searches, or had you
14 seen it before that?

15 A I had not seen this before.

16 Q Did you identify Kim to counsel?

17 MR. ARGENTI: Objection. Form.

18 And I'm going to caution the
19 witness not to disclose the content of
20 communications with counsel.

21 THE WITNESS: I don't recall.

22 BY MS. PARKS:

23 Q Okay. So just to sum that up, you
24 remember that the first time you saw Kim was
25 when it came up in your searches, but you

1 don't remember if you provided it to counsel
2 first or if they provided it to you first?

3 A I -- I don't even remember whether
4 this came up, I mean, Kim came up in my
5 research or the counsel -- counsel's search,
6 you know, led me to this. I don't remember.

7 Q Okay. So when you told me that
8 one or more of your searches covered Kim --
9 uncovered Kim, did you misspeak?

10 A What I meant is that I might have
11 come across that myself too or was suggested
12 maybe by the counsel also, and I don't
13 remember. It was a year ago. I don't think I
14 misspoke really, but I just don't remember,
15 you know, how I was led to go in that
16 direction and look at Kim.

17 Q Okay. So sitting here today, is
18 it fair to say you can't remember one way or
19 the other whether you performed any searches
20 that uncovered Kim?

21 A I'm sure that as I was searching I
22 might have come across, but I do not remember
23 whether I paid attention or it was suggested
24 to me or -- I do not recall. But, of course,
25 at some point I paid attention to it and, you

1 know, used it as one of my prior art
2 references.

3 Q Understood.

4 The referenced Kim does not
5 disclose the use of photographs taken by a
6 trained professional; correct?

7 A No, it does not disclose
8 photograph taken by a trained professional.
9 It says the photograph taken by the patient
10 himself or herself.

11 Q And Kim generally relates to
12 diagnosing and treating patients based on
13 those patient-created photographs in what Kim
14 calls a "teeth alignment report"; right?

15 A Yes.

16 Q And Kim also discloses that new
17 aligners can be manufactured based on that
18 teeth alignment report?

19 A Yes.

20 Q Can you take a look at Figure 6 of
21 Kim, which is on Sheet 6 in the beginning of
22 the document.

23 A Yes. I'm looking at it.

24 Q Okay. Great.

25 So do you see that in the first

1 step, Step (a), the method includes receiving
2 teeth alignment report information from the
3 orthodontic patient terminal?

4 MR. ARGENTI: Objection. Form.

5 THE WITNESS: You mean the second
6 box there?

7 BY MS. PARKS:

8 Q Yes. Yes. Oddly, yes, the second
9 box, but it's marked (a).

10 A Yes.

11 Q Do you see in the second box, it's
12 marked Step (a), and that is a method -- or
13 sorry. That's a method -- strike that.

14 Do you see in the second box of
15 Kim the step marked (a), the method includes
16 receiving teeth alignment report information
17 input from orthodontic patient terminal?

18 A I see that, yes.

19 Q And then do you see in a later
20 step, Step (f), the method includes receiving
21 clear aligner information about currently worn
22 clear aligner from orthodontic patient
23 terminal?

24 A I see that, yes.

25 Q And Step (f) also includes

1 transmitting that clear aligner information to
2 orthodontist terminal?

3 A I see that, yes.

4 MR. ARGENTI: Objection. Form.

5 BY MS. PARKS:

6 Q And there's -- and then there's a
7 further step, Step (c), which is below
8 Step (f), that says, "Transmit teeth alignment
9 report information to orthodontist terminal."

10 Do you see that?

11 A Yes.

12 Q So, in sum, Figure 6 of Kim
13 describes receiving and transmitting the clear
14 aligner information separate from the teeth
15 alignment information; right?

16 A I just said -- you know, I just
17 read what you asked me to read. It says what
18 it says.

19 Q And what it says is that teeth
20 alignment information and clear aligner
21 information are received and transmitted in
22 different steps; correct?

23 A Yes.

24 Q And if you could go back a few
25 pages to Figure 1. This is on Sheet 1.

1 Do you see Figure 1 of Kim?

2 A Yes.

3 Q And Figure 1 of Kim shows Kim's

4 system; correct?

5 A Yes.

6 Q On the left side of Figure 1

7 identified by numeral 64, there is a teeth

8 aligner report information input program.

9 Do you see that?

10 A I see that, yes.

11 Q And further down, identified by

12 numeral 69, there is a clear aligner

13 information transmission program.

14 Do you see that?

15 A I see that, yes.

16 Q And on the right side of Kim,

17 identified by numeral 83, do you see the teeth

18 alignment report information database?

19 A Identified by what number again?

20 Q 83.

21 A 83. Yes, I see that.

22 Q And a bit further down, identified

23 by numeral 86, do you see the clear aligner

24 information database?

25 A Yes, I see that.

1 Q So Figure 1 of Kim shows that
2 clear aligner information and teeth alignment
3 report information are stored and transmitted
4 separately; correct?

5 A I do not understand what you mean
6 by the word "separately." I understand that
7 Kim's disclosing that the information is both
8 stored in a database and transmitted to the
9 doctor.

10 Q But this figure of Kim is showing
11 that the teeth alignment report information
12 and clear aligner information are stored in
13 separate databases?

14 A Again, I don't understand what you
15 mean by "separate databases." It's a
16 database. It doesn't say a separate database.

17 Q Well, it refers to a teeth
18 alignment report information database that is
19 indicated by a separate numeral in a separate
20 box from the clear aligner information
21 database.

22 Do you see that?

23 A I see that different components of
24 the database are represented and referenced to
25 by different numbers, but I'm saying that I

1 don't understand what you mean by the word
2 "separate database." I don't think Kim is
3 disclosing anything about a separate database.

4 Q Okay. Would you agree that the --
5 there are two different programs, one for the
6 teeth alignment report information input and
7 one for the clear aligner information
8 transmission?

9 A Kim is reporting two programs.
10 That doesn't mean that they're two separate
11 programs. It could be part of two modules of
12 the same program.

13 Q Does Kim explicitly teach that the
14 teeth alignment report information and the
15 clear alignment information can be transmitted
16 as part of the same program?

17 A It doesn't say otherwise, either.
18 It just says that there is a program that is
19 doing these communications between the
20 terminals, and it says that program contains
21 this program, that program.

22 Q Okay. So, at a minimum, Kim is
23 teaching that the teeth alignment report
24 information and clear aligner information are
25 transmitted into different subprograms?

1 A No. I disagree with that. I
2 didn't see that saying that those two
3 information is transmitted into two separate
4 databases or programs.

5 In fact, it's just talking about
6 clear aligner information being transmitted
7 and the report being transmitted, and that
8 report both stored in the database and
9 transmitted to a doctor.

10 Q Does Kim disclose anywhere that
11 the clear aligner information and teeth
12 alignment report information can be
13 transmitted together?

14 A Well, Kim actually is disclosing
15 that one example of report is through an
16 image, and he says that -- you know, the image
17 transmitted -- taken by a cell phone by a
18 patient, that image transmitted is with clear
19 aligner worn by the patient.

20 Q And is it your understanding that
21 that particular image described in Kim
22 contains both teeth alignment report
23 information and clear aligner information?

24 A If -- you know, what Kim in the
25 text is reporting -- actually, I take the "if"

1 back.

2 Kim is reporting that clear
3 aligner information in an image is transmitted
4 while the patient is wearing the clear
5 aligner.

6 Q Do you have that particular
7 portion of Kim in mind right now and are you
8 looking at it?

9 A I have cited it in my declaration.
10 For instance, paragraph 66 is pointing out
11 that.

12 Q Okay. Are you thinking of
13 anything else in Kim right now?

14 A What do you mean by "anything
15 else"?

16 Q We can strike that.
17 So why don't we look at
18 paragraph 66 together.

19 A Sure.

20 Q And it's on page 6 of Kim.

21 A Yes, I'm looking at it.

22 Q Okay. And you see that
23 paragraph 66 of Kim is discussing the clear
24 aligner information transmission program?

25 A Yes.

1 Q And that's identified by numeral
2 69, which corresponds to Figure 1 that we were
3 just looking at?

4 A Yes.

5 Q And at the end of paragraph 66, it
6 says: ". . . that the orthodontist checks a
7 photo or a video of the clear aligner
8 currently worn by the orthodontic patient, and
9 determines whether the clear aligner is normal
10 and corresponds to an appropriate step."

11 Do you see that?

12 A Yes, that's correct.

13 Q And in this paragraph, "normal and
14 corresponds to an appropriate step," that
15 means that the clear aligner is in working
16 condition for treatment?

17 MR. ARGENTI: Objection. Form.

18 THE WITNESS: I think the term
19 "working condition" is not -- is not a term
20 used by Kim. Kim is always referring to
21 normal and corresponding to a particular step,
22 an appropriate step.

23 BY MS. PARKS:

24 Q And when it says "the clear
25 aligner is normal," does that mean that it is

1 in normal and usable condition for the
2 patient?

3 A Again, I relied more on other
4 prior art like Invisalign to interpret that
5 further. But, you know, generally speaking,
6 yes, I -- to -- my understanding is that those
7 two mean that first the clear aligner is
8 fitting well and seating well and -- on the
9 teeth and also corresponds to the appropriate
10 step for the treatment.

11 Q Okay. Just to make sure I
12 understand that, you're saying that you relied
13 on Invisalign to interpret what "normal and
14 corresponds to an appropriate step" means with
15 respect to the clear aligner information
16 transmission program of Kim?

17 A I relied on that combination to
18 further interpret that term of "normal and
19 corresponding to an appropriate step."

20 Q Okay. I'd like to take a look at
21 paragraph 41 of Kim, which is on page 4.

22 A Yes.

23 Q Let me know when you see it. Yes.
24 Okay?

25 A I'm seeing it.

1 Q Do you -- yes. Do you see in
2 paragraph 41 it refers to -- strike that.

3 In paragraph 41, do you see it
4 refers to "a device of an orthodontic patient
5 who desires to remotely receive information
6 about an accurate step of a clear aligner to
7 be currently worn by the orthodontic patient"?

8 A Yes.

9 Q Okay. And in this paragraph,
10 "currently worn" is not referring to an
11 aligner that is actually in place on the
12 patient's teeth; correct?

13 A That's an interesting point you're
14 bringing up, actually. If you go throughout
15 Kim's reference that I used for my
16 combination, you will see that Kim is using
17 "currently worn" in two different fashions.
18 He says "to be worn," and that's when he's
19 referring for the instructions coming from the
20 doctor to the patient or provided by a guide
21 to the patient.

22 And when he says "currently worn,"
23 not "currently to be worn," then that's when
24 the information is going from the patient to
25 the doctor for analysis of that information by

1 the doctor.

2 I interpret this as two different
3 ways and two different meanings of that, and I
4 think Kim is actually completely
5 distinguishing between the two. I completely
6 searched through that Kim reference, and I see
7 that every time the instruction is coming from
8 the doctor, it says, "This is the one to be
9 worn in order for you to send me the
10 information." And every time the patient is
11 sending the information, it says "currently
12 worn."

13 So I interpret that that one of
14 them means that instruction doctor is giving
15 to the -- to the patient, where this one, this
16 is the appropriate one; this is the correct
17 one to wear.

18 And when it says "currently worn,"
19 therefore, it means that it is currently worn
20 when the picture is taken and sent to the
21 doctor.

22 So the paragraph you're referring
23 to, it says "to be worn" as opposed to
24 "currently worn." So this is completely
25 distinguished in Kim.

1 Q But in paragraph 41, it's using
2 the phrase "currently worn," even though that
3 is referring to an aligner that is not
4 actually being worn by the patient at that
5 time; correct?

6 A Well, I need to correct you on
7 that. It says "to be currently worn." It
8 doesn't say "currently worn."

9 As I said, that -- when the doctor
10 instructs or the guide instructs the patient
11 what aligner needs to be worn, it says "to be
12 currently worn."

13 And that shows that it's not worn,
14 but it's -- this is the instruction coming
15 from the doctor. It's saying that "This is
16 the one that you need to wear before sending
17 the information to me."

18 And whenever it says that the
19 patient is sending the information to the
20 doctor, it says that "currently worn." And I
21 interpret that it means that it's -- that the
22 clear aligner is worn by the patient as he's
23 sending the information.

24 Q But just to be clear, it says "to
25 be currently worn," but part of that phrase is

1 "currently worn," and it refers to an aligner
2 that is not being worn by the orthodontic
3 patient; correct?

4 MR. ARGENTI: Objection. Form.

5 THE WITNESS: Well, that's -- I
6 call that mischaracterization of "to be
7 currently worn." I don't understand part of
8 it says "currently worn." I distinguish
9 between if somebody says, "This is the one to
10 be worn," I understand that that's an
11 instruction to me, "Wear this."

12 And when it says "currently worn,"
13 it means that -- it means what it means in
14 plain English. It means that it's currently
15 worn.

16 BY MS. PARKS:

17 Q And when Kim uses "currently worn"
18 in -- outside of when it says "to be currently
19 worn," like when it just says "currently
20 worn," in various places Kim is using that to
21 refer to the aligner that you're wearing in
22 the current stage of treatment as opposed to
23 that the patient is wearing in that particular
24 moment; correct?

25 MR. ARGENTI: Objection. Form.

1 THE WITNESS: Incorrect. I -- as
2 I said, that I see that two different uses of
3 the word "current" in the sense that one is
4 saying that "to be currently worn," which I
5 understand it means that this is the one that
6 should be worn in this stage of treatment.

7 And when it says that the
8 information sent with the aligner currently
9 worn, it means that it is currently worn. I
10 distinguish between these two.

11 And I think Kim throughout the --
12 not I think. I know because I went through
13 Kim thoroughly. Everywhere, he's making this
14 distinction between the two, that it's -- "to
15 be worn" means that this is the instruction
16 saying that this is the one for the current
17 stage, as you just asked me in this question.
18 But when it says "currently worn," it says
19 that it's currently worn.

20 BY MS. PARKS:

21 Q Would you agree that Kim never
22 discloses photographs of the aligner as part
23 of the teeth alignment information report?

24 A You mean an actual picture?

25 Q Either a picture or a verbal

1 description of an aligner being part of the
2 teeth alignment information report?

3 A No. I disagree with that. In the
4 text, it says that pictures, videos -- I mean,
5 photographs, videos could be sent to the
6 doctor with -- with aligner currently worn.

7 Q Can you point me to something in
8 Kim that describes that the teeth alignment
9 information report includes a picture, video,
10 or photograph of an aligner?

11 A I think I put it in my
12 declaration. If you point out to my
13 declaration -- in fact, paragraph 66 that we
14 talked about it says that with aligner
15 currently worn, and Kim actually discloses
16 that, you know, that report can include
17 photographs, videos.

18 Q Does paragraph 66 of Kim describe
19 the teeth alignment information report?

20 A "The clear aligner information
21 transmission" -- yeah, paragraph 66, you said;
22 is that right?

23 Q Correct. Well, you said
24 paragraph 66.

25 A Yes.

1 Q I'm just asking if paragraph 66
2 refers to the teeth alignment information
3 report.

4 A ". . . transmission program may be
5 a program for receiving the clear aligner
6 information about a currently worn clear
7 aligner from the orthodontic patient
8 terminal."

9 I can read that for you if you
10 want to. It says that: "The clear aligner
11 information transmission program 69 may be a
12 program for receiving the clear aligner
13 information about a currently worn clear
14 aligner from the orthodontic patient terminal
15 10, storing the clear aligner information, and
16 transmitting the clear aligner information to
17 the orthodontist terminal 20 in such a manner
18 that the orthodontist checks a photo or a
19 video of the clear aligner currently worn by
20 the orthodontic patient, and determines
21 whether the clear aligner is normal and
22 correspondence to an appropriate step."

23 I mean, it just spells it out
24 there that the photo or a video of the patient
25 is sent by the patient. That includes, you

1 know, the clear aligner currently worn in that
2 photo or video.

3 Q In that answer you just gave me,
4 you read the entirety of paragraph 66;
5 correct?

6 A Correct.

7 Q And nowhere does paragraph 66 say
8 "teeth alignment" or "teeth alignment
9 information"; correct?

10 A I do not see those words, yes.
11 Teeth alignment, teeth alignment -- yes.

12 Q Kim does not suggest any sort of
13 computer-implemented computer analysis; right?

14 A No, but I do not rely on Kim on
15 that for the obviousness.

16 Q Okay. Now I'd like to turn to the
17 Invisalign reference, which is Exhibit 1006.

18 A Yes.

19 Q Okay. Do you have the Invisalign
20 reference in front of you?

21 A Yes.

22 Q And this is the Invisalign
23 reference that you rely on for both the '248
24 and '945 patents; correct?

25 A Yes.

1 Q Were you familiar with this
2 Invisalign reference before your work in this
3 case?

4 A No.

5 Q Did any of the searches that you
6 performed uncover the Invisalign reference?

7 A Again, it was a year ago. I don't
8 remember whether my searches uncovered or I
9 was pointed out by the counsel or a
10 combination of both. I do not remember how I
11 came across and used, eventually, Invisalign.

12 Q Did you perform any searches for
13 clinical guidelines for orthodontic treatment?

14 A I might have done some. I don't
15 recall.

16 Q And if you had searched for
17 clinical guidelines for orthodontic treatment,
18 would you have used Google and Bing as your
19 search engines, or would you have used a
20 different platform?

21 A No. I used Internet.

22 Q And when you say you used the
23 Internet, are you saying that you just type in
24 the address bar your search terms? Like, can
25 you describe your process for how you search

1 on the Internet?

2 A I used search engines like Google,
3 Bing. I usually use Bing. But I might have
4 used Google to see if it would provide
5 alternative suggestions.

6 Q Do you ever use any specialized
7 search engines or databases like PubMed or
8 like Google scholar, for example?

9 A Not directly, but those show up in
10 my searches, whether you do it by Google or
11 Bing. And I -- I think most of the time they
12 show up, at least, and eventually they show up
13 if you search with correct keywords.

14 Q Before your work in this case, had
15 you ever reviewed clinical guidelines for
16 dentistry or orthodontic practitioners?

17 A What do you mean by "reviewed"?
18 Can you -- can you rephrase your question?
19 I'm not sure if I understand it correctly.

20 Q Before your work in this case, did
21 you ever have occasion to read any clinical
22 guidelines for dentistry or orthodontist
23 practitioners?

24 A I worked on a project years back.
25 I might have read some back then. I don't

1 remember. It was a project dealing with
2 dental imaging and some analysis of those
3 images.

4 Q Okay. So I'd like to refer you to
5 the second page in the Invisalign PDF, which
6 is numbered with lower case numeral "i."

7 Are you there?

8 A Yes.

9 Q Okay. And do you see that the
10 very first sentence in the right-hand column
11 says, "This guide is intended to help the
12 Invisalign practitioner"?

13 A I see that.

14 Q You have not ever been and you are
15 not now an Invisalign practitioner; correct?

16 A Correct.

17 Q Okay. And then do you see the
18 bolded heading under that that says
19 "Invisalign is a technique"?

20 A Yes.

21 Q And it says, "Invisalign is more
22 than a set of Aligners. It is the Aligners
23 plus other auxiliaries . . ."

24 What is an auxiliary?

25 MR. ARGENTI: Objection. Form.

1 THE WITNESS: I did not make an
2 opinion on what is an auxiliary, but I assume
3 it refers to guidelines in addition to just --
4 it's not just maybe -- maybe that's what it's
5 saying; it's not just something that you wear,
6 and additional practices and to be --
7 additional things need to be done around this
8 device that you are wearing.

9 But, again, as I said, I'm not a
10 doctor. My -- I cannot provide a dentist
11 opinion on this.

12 BY MS. PARKS:

13 Q What is your basis for saying that
14 maybe an auxiliary is something that you wear
15 and additional practice is to be done around
16 this device?

17 A Because the guide is going through
18 a whole process of saying that once a patient
19 is wearing this, how can you evaluate how it
20 fits, how it -- it goes through a number of
21 ways of quantifying how well it fits and
22 it's -- it says that these are the steps to
23 take. These are the, you know, problems that
24 you may encounter.

25 I'm assuming that it's referring

1 to that at the very beginning. That's an
2 introductory sentence. I'm assuming that it's
3 referring to that.

4 As I said, I'm not an
5 orthodontist. I'm not a dentist. I cannot
6 offer any dental opinion.

7 Q So your understanding of the terms
8 used in the Invisalign reference comes from
9 the Invisalign reference itself.

10 Fair to say?

11 A I rely on Invisalign for my
12 combination.

13 Q Is that a yes?

14 A Well, I'm not sure if I understood
15 your question correctly. I rely on the entire
16 Invisalign and every disclosure that they have
17 there in my combination, yes.

18 Q On the next page, which is marked
19 with the lower case numeral "ii" --

20 A Yes.

21 Q -- on the left-hand side column,
22 do you see the bolded header "Insufficient
23 Space"?

24 A Yes.

25 Q And about halfway through that

1 paragraph, do you see the sentence: "This may
2 be due to insufficient interproximal reduction
3 (IPR)"?

4 A I see that, yes.

5 Q What is interproximal reduction?

6 A It turns out that I have come
7 across this term back when I was working on
8 imaging sciences on that project; so I am
9 familiar with treatments for, you know,
10 creating spaces between the teeth. But, you
11 know, it's just because I worked on that
12 project, I'm familiar with some notions.

13 It's my general knowledge. I
14 cannot offer a doctor's opinion on what IPR is
15 and how it is performed and how it affects the
16 treatment. I cannot offer any opinion on
17 that.

18 I have a general knowledge that I
19 have obtained when I was working on a project
20 back -- quite a few years back -- I don't
21 remember the exact date -- on dental
22 treatment.

23 Q Fair enough.

24 To the best of your understanding,
25 what is interproximal reduction?

1 A Again, I think it's not -- it's
2 not a good idea for me to offer an opinion on
3 that, what is IPR. But as I said, you know, I
4 learned back then that IPR is a process that
5 you generate. You know, you try to generate
6 additional space between the teeth so that
7 they can be easily moved.

8 But that's the -- that's my best
9 knowledge from back then working on this
10 project. Again, this is not a -- I repeat,
11 it's not a dentist's point of view. I don't
12 have any, you know, formal education or
13 experience in dentistry. So I cannot offer
14 any opinion on IPR.

15 Q Okay. And just to be clear, I'm
16 not asking for your opinion, just your
17 understanding. But understood.

18 So further down under -- still
19 under "Insufficient Force," do you see
20 Bullet A?

21 A Yes.

22 Q Starting, "An unengaged
23 attachment"?

24 A Yes.

25 Q Is an unengaged attachment the

1 same as a poorly seated aligner?

2 A I don't know. It might be.

3 Q Okay. Is an unengaged attachment
4 the same as a poorly fitted aligner?

5 A Again, I don't know. It might be,
6 but I didn't rely on that specific term in my
7 combinations and in demonstrating the
8 obviousness.

9 Q Okay. And in Bullet B, it talks
10 about patient compliance or, more
11 specifically, a lack of patient compliance.

12 Do you see that?

13 A Bullet B -- where in Bullet B it
14 says "patient compliance"?

15 Q On the line that goes between the
16 first column and the second column.

17 A Oh, I see. Yes, I see that.

18 Q Does patient compliance require
19 wearing your aligner every day?

20 MR. ARGENTI: Objection. Form.

21 THE WITNESS: Again, you are --
22 you're asking me to offer the dentist opinion.
23 I'm not a dentist. So is it every day, how
24 many hours a day or every other? I have no
25 idea. I mean, I'm not a -- my knowledge about

1 dentistry is a general knowledge as a patient
2 myself, and, you know, I cannot offer an
3 opinion on that.

4 BY MS. PARKS:

5 Q Okay. Well, let me rephrase my
6 question.

7 Do you have an understanding of
8 whether patient compliance requires the
9 patient to wear their aligner every day?

10 MR. ARGENTI: Objection. Form.

11 THE WITNESS: Again, I mean,
12 you're asking me to offer an opinion there, I
13 think, because I do not know whether it's
14 required to wear the appliance every day or
15 not.

16 I think that's -- that would be a
17 recommendation coming -- or an instruction
18 coming from a doctor to a patient. I have no
19 idea.

20 It could be for a general, you
21 know, thing to do, or it could be
22 patient-specific. I'm not a dentist to judge
23 that and will make an -- offer an opinion on
24 that.

25 ///

1 BY MS. PARKS:

2 Q Do you have an understanding of
3 how long it typically takes for a tooth to
4 change its position in response to aligner
5 treatment?

6 MR. ARGENTI: Objection. Form.

7 THE WITNESS: The exact time, no,
8 but I know that it's done over many weeks or
9 maybe many months. But I think, again, that's
10 a general knowledge that if you have been to
11 an orthodontist, you would know.

12 BY MS. PARKS:

13 Q Okay. Moving to Bullet C, still
14 in the same section, do you see the reference
15 there to "absolute extrusion"?

16 A Yes.

17 Q Do you have an understanding of
18 what "absolute extrusion" means in this
19 context?

20 A I'm not a dentist. I'm repeating
21 myself. I'm not a doctor. You're asking me
22 my understanding of "absolute extrusion."

23 No, I do not know what it means.
24 But, again, as I said, I did not rely on these
25 specific terms for demonstrating obviousness

1 or for the combination that I'm providing.

2 Q And also in that same sentence, do
3 you see "rotation of round teeth," and do you
4 have an understanding of what Invisalign means
5 by reference to rotation of round teeth?

6 A Well, I understand that the -- the
7 plain and ordinary meaning of "rotation," but
8 that doesn't mean I understand what it means,
9 "rotation of round teeth."

10 I know that orthodontic treatment
11 is for moving teeth, but that doesn't mean
12 that I understand how it is done exactly
13 through orthodontic treatment.

14 So, again, you're asking me to
15 offer a dentist's point of view or perspective
16 of that term. I cannot do that.

17 Q And just to be clear, I'm not
18 asking you to offer a dentist's point of view.
19 I'm asking for your understanding based on
20 your personal and professional experience.

21 A Well --

22 Q Okay. Also in -- I didn't mean to
23 cut you off. Please go ahead.

24 A I said that -- as I said, I'm not
25 a -- I'm not a doctor. I'm not a dentist. So

1 my knowledge of, you know, treatments,
2 whether -- the length, how long you wear them,
3 and my understanding of what it means to
4 rotate or move a tooth are just general
5 knowledge of anybody who would understand --
6 any POSA would understand what orthodontist
7 treatment is.

8 Q And then at the very end of
9 Bullet C, do you know what a button or an
10 elastic or a sectional is?

11 A Again, no, because I'm not a
12 dentist. Again, I may have some general
13 knowledge I have seen or -- you know,
14 orthodontist treatment, they have some
15 elastics, but why they are used, how they are
16 used, I cannot offer any -- any opinion on
17 that or even describe my understanding of that
18 as you refer to it.

19 So I'm not a doctor. I cannot
20 correctly, you know, describe those terms in
21 the dentistry sense. So I rather avoid that.

22 Q Okay. And also same column but
23 now under that gray box, Numeral 2 says: "At
24 each appointment, review 4 things."

25 And it says that -- "a. That the

1 current Aligner is a good fit."

2 And then skipping down, it says:

3 "d. Evaluate for tight contacts with unwaxed
4 floss and relieve with finishing strips if
5 present."

6 A I see that.

7 Q Using -- using floss on a patient
8 to evaluate for tight contact would have to be
9 performed in person; correct?

10 A For that one, yes. Yes.

11 Q And backing up a little bit, at
12 Numeral 1, do you see it says: "Have patients
13 arrive with the previous stage Aligner and the
14 current Aligner, so you can evaluate any fit
15 concerns that may arise"?

16 A Yes, I see that.

17 Q So Invisalign teaches that the
18 patient has to bring at least those two
19 aligners to their appointment for the
20 orthodontist to evaluate fit concerns;
21 correct?

22 A That's correct. But I'm not
23 suggesting that Invisalign is suggesting a
24 remote treatment anywhere in my declaration.
25 I'm suggesting that, you know, Invisalign

1 pointed out that images can provide
2 information that relates to the separation of
3 tooth and the aligner and discloses that, the
4 number of images, and I'm saying that a POSA
5 would understand; therefore, that can be used.
6 I'm not saying that Invisalign is suggesting
7 that remote treatment can be done.

8 Q What did you mean when you said
9 that "Invisalign discloses that, the number of
10 images"?

11 A I didn't say "the number of
12 images." I said a number of -- it shows a
13 number of images, and I put one of them, for
14 instance, in my declaration, which is on
15 page 1, left-hand side on top of the page 1 of
16 Invisalign, and I'm showing that here it is.
17 It is an example of an image that Invisalign
18 shows and says that -- and puts two arrows and
19 says, "Hey, here is an example of an aligner
20 not fitting properly because the separation is
21 more than 1 millimeter."

22 I'm just saying that is disclosing
23 images like that, you know. I'm not anywhere
24 saying that Invisalign is suggesting remote
25 treatment or any remote assessment of -- of

1 aligner. I'm just saying that it's disclosing
2 such images. And he also provides, you know,
3 very -- you know, well defined --
4 quantifications and assessment, you know, when
5 do we know an aligner fits properly or not,
6 and specifically referring to some threshold
7 values like 1 millimeter.

8 Q Is it your view that the figure
9 you just referred to on page 1 of Invisalign
10 is representative of what an orthodontist
11 would encounter for an aligner that is fitting
12 poorly?

13 MR. ARGENTI: Objection. Form.

14 THE WITNESS: Again, the people
15 who have drafted this document, I know that
16 some of them are probably dentists or
17 orthodontist. I don't know what an
18 orthodontist would encounter. I mean, I don't
19 know the answer to a question.

20 I'm not relying on what an
21 orthodontist would encounter. I'm just saying
22 that here are examples of images that
23 Invisalign reference is providing, and I'm
24 saying that, you know, a POSA, you know, would
25 be motivated by seeing these images for that

1 combination that I'm providing.

2 BY MS. PARKS:

3 Q Is it fair to say that in the
4 image on page 1, the teeth look a little bit
5 more blurry with the aligner in place than
6 they would without the aligner?

7 A No. I don't understand what you
8 mean, the teeth look blurry.

9 Q Fair to say that the aligner
10 partially distorts or obscures the image of
11 the teeth?

12 A Again, those are -- you know,
13 define "distorted." And I forgot what was the
14 second term you used. What do you mean by
15 that?

16 No, I see clearly in that image
17 that -- I can see the teeth. I can
18 distinguish the aligner edges. I can
19 distinguish the teeth edges. I don't
20 understand what you mean, "blurred."

21 And what was the other term you
22 used? I'm not sure.

23 No. I see -- I mean, if you look
24 at my declaration, I put a bigger -- you know,
25 a zoomed-in version of that picture, and I

1 think everything is clearly defined. Both the
2 teeth and the aligner are clearly visible.

3 In fact, Invisalign puts two
4 arrows and says, "Look, here. You can see
5 easily that they are there, and they're
6 separated, you know, from the teeth edges."

7 Q Would it be easier to see the
8 teeth without the aligner in place?

9 MR. ARGENTI: Objection. Form.

10 THE WITNESS: Again, that's
11 subjective, and I don't know what you mean,
12 "easier." You know, define the word "easier."

13 But, also, again, if you're
14 thinking about would the doctor find it easier
15 to see? I don't know. I'm not a doctor. But
16 do I see as an image processing and computer
17 vision person, also based on my experience of
18 dealing with images for years and years? Yes,
19 I see the teeth. I see the edges of teeth. I
20 see the edges of the aligner.

21 And Invisalign actually points me
22 to that and says, "Look, these are the edges
23 of the" -- "of the aligner." And it says
24 that, as you can see, these are separate from
25 edges of the teeth.

1 BY MS. PARKS:

2 Q Are Invisalign aligners perfectly
3 transparent?

4 A Define "perfectly transparent." I
5 have no idea what that means.

6 Q Are they more -- are Invisalign
7 aligner more or less transparent than a glass
8 windowpane?

9 MR. ARGENTI: Objection. Form.

10 THE WITNESS: More or less
11 transparent than what? I'm sorry. Can you
12 repeat that?

13 BY MS. PARKS:

14 Q Than a windowpane made of glass.

15 A I don't know. I mean, that
16 comparison is -- first of all, I'm not sure,
17 you know, what does it mean, "more or less
18 transparent."

19 I'm not -- I'm not relying on
20 anything like that in my combination. I'm
21 saying that there are many images, you know,
22 disclosed in Invisalign, and one example of
23 that is this one.

24 And in that image, a POSA could
25 have easily seen what Invisalign is trying to

1 say, says that if it is not correctly fitting,
2 you know, this distance between the edges of
3 the aligner and the edges of the teeth would
4 be more than 1 millimeter.

5 That's all, you know, that I can
6 see in that image. And in the description of
7 that image, in the Invisalign reference, I --
8 I don't know about how transparent it is or
9 blurry it is, and none of that has been
10 discussed here.

11 Q But you would at least agree that
12 in Figure A on page 1 of Invisalign, the
13 portion of the teeth covered by the aligner
14 has glare; whereas, the portion of the teeth
15 not covered by the aligner does not have as
16 much glare. Correct?

17 A No. I don't know what is the
18 cause of glare. If I had to guess, I could
19 say that the glare is caused by the tooth, by
20 the enamel of tooth. It has nothing to do
21 with the aligner. I -- I'm not sure what you
22 mean about I agree that -- whether that's true
23 or not.

24 I mean -- no. I mean, I'm not
25 concerned first with the glare there. And,

1 secondly -- no, I don't know whether any glare
2 is caused by the aligner or not. I cannot
3 know that, no.

4 Q There is some glare that appears
5 on portions of the aligner that extend below
6 the tooth; correct?

7 A On the portion of aligner that
8 extends below the teeth, you said?

9 Q Yes. For example, on the third
10 tooth from the right.

11 A I don't see any glare there. Any
12 glare. In fact, I think it's more caused by
13 the enamel of teeth probably. But that would
14 be a general assessment as a POSA, not as a
15 dentist.

16 Q Well, I'm asking based on your
17 background in image analysis and computer
18 vision whether you see glare on the aligner in
19 this image.

20 A But you said below the tooth
21 edges. You mean the portion that is not
22 fitting on the teeth? Is that where you're
23 suggesting?

24 Q Yes. Correct.

25 A No. I don't see any glare there,

1 no.

2 Q Okay. And are you looking at a
3 color version of this image?

4 A Yes. I think those edges, you
5 know, from -- you said to give my opinion as
6 an image processing computer vision person.

7 I think those edges are very
8 clear, and many algorithms, including the one
9 I'm relying on, could easily detect those
10 edges and, therefore, do analysis based on
11 that.

12 Q Okay. And I think you touched on
13 this earlier, but it's your view that the two
14 arrows in this Figure A would instruct
15 orthodontists to measure the separation
16 between the aligner and the tooth at multiple
17 positions; right?

18 A Yes.

19 Q What is your basis for that
20 understanding?

21 A Well, if you look at, you know,
22 the guide, it says that basically the doctor
23 should be looking at -- you know, quantify the
24 separation as a means of measuring that --
25 whether the aligner fits or seating correctly

1 on the teeth, and the guide says that if that
2 separation is below 1 millimeter, then it
3 means that the seating is good; and then if
4 it's above 1 millimeter, he put a threshold,
5 then that could be an indication that it's not
6 good.

7 And then they show that picture.
8 They put the arrows to point to the edges of
9 the aligner. They say -- I mean, from my
10 point of view, they say, "Look, look. Here it
11 is. There's a separation between edges of the
12 aligner and edges of the" -- "of the teeth."

13 That's my interpretation based on
14 the text in the guide.

15 Q Can you point me to the text in
16 the guide that instructs orthodontists to take
17 measurements at multiple positions?

18 A Well, you have it in my -- in my
19 declaration. I don't recall off the top of my
20 head what page, but if you refer to any -- the
21 point where I'm discussing Invisalign in my
22 declaration, I would be glad to go through
23 that.

24 Q Yeah, why don't we do that now.
25 You have your declaration in front of you.

1 Just tell me which paragraph you're referring
2 to.

3 A Well, you point to the --

4 Q And I'll just note -- uh-huh.

5 (Simultaneous speaking.)

6 BY MS. PARKS:

7 Q Well, you told me -- you just told
8 me that your declaration points to text in
9 Invisalign that instructs orthodontists to
10 take measurements at multiple positions, and I
11 don't know what you're referring to. So I'm
12 asking you to look through your declaration
13 and point me to it.

14 The time is 10:00 a.m. Tell me
15 when you have it.

16 A Yeah, as I said, I mean, tell me
17 where to go in my declaration. I will be more
18 than glad to go there. I have my declaration
19 before me.

20 For that picture, for instance,
21 it's on page 39 of my declaration, and over
22 there in paragraphs covering that picture from
23 71 to -- 41 onwards, I'm discussing that
24 particular picture that we were talking about.

25 Q Are you looking at your

1 declaration for the '945 patent or the
2 '248 patent?

3 A I'm looking at my declaration for
4 '248 patent. I thought we were discussing
5 '248 patent.

6 Q Well, I mean I -- my -- we were
7 just discussing the Invisalign reference as a
8 whole, what you rely on for both patents. But
9 let me go to paragraph 39 in your declaration.

10 A No, 71.

11 Oh, you want me to go to
12 paragraph 39? Okay.

13 Q Oh, I thought you said 39. Do you
14 want me to go to 71? You tell me where to go.

15 A I'm saying that particular picture
16 of Invisalign is discussed around, you know,
17 starting from 71 -- paragraph 71 onward.

18 And then you asked me where I'm
19 discussing that. I'm just pointing to my
20 declaration where I'm discussing that picture.

21 Q I asked you to point to where in
22 your declaration you say that the text of
23 Invisalign instructs orthodontists to take
24 measurements at multiple positions.

25 Have you found that yet?

1 A So, for instance, I'm saying that:
2 "This type of separation is depicted in a
3 digital photograph where" -- this is in
4 paragraph 71, halfway down there.

5 Say: "This type of separation is
6 depicted in a digital photograph, where a
7 poorly seated aligner is shown being worn by a
8 patient in a service position, with arrows
9 indicating that the aligner surface
10 corresponding to teeth (i.e., the parts of the
11 aligner tooth-shaped surfaces that match with
12 the end of each given tooth) have a separation
13 of greater than 1 millimeter from the ends of
14 the teeth. The resulting gap is plainly
15 visible on the photograph. Describing the gap
16 in terms of appropriate for a computer vision
17 application, the gap corresponds to the space
18 between the contour defining the occlusal end
19 of the teeth and the matching contour defining
20 the occlusal surface of the clear aligner.
21 The photograph is reproduced below, and the
22 shapes of each surface can be naturally
23 perceived by the human eye, with the edge of
24 the teeth visible as a transition from white
25 to black and the edge of the aligner being

1 what the arrows point towards."

2 I don't know whether you want me
3 to continue reading that. And I'm referring
4 to that picture. I'm showing that here it is
5 that at least at two points it's referring
6 to -- you said multiple. Well, there are two
7 arrows there. It's referring -- it says,
8 "Look, look. These are the two ends if this
9 is more than 1 millimeter."

10 And to my opinion, this is --
11 those two arrows is just to instruct -- to
12 show or illustrate, rather, that here it is,
13 an example of separation that shows that in
14 two points here you can see that is not
15 seating properly.

16 And I don't take it as only two.
17 To my understanding is that basically they are
18 showing it as an example. But two is multiple
19 already. I mean, if you're saying where does
20 it say multiple, well, there are two arrows.
21 That's already multiple.

22 But I think it's clear from the
23 context that a POSA would understand that you
24 do that for multiple positions of the aligner
25 relative to the corresponding teeth edges.

1 Q Okay. And just for the record,
2 everything you just read to me from
3 paragraph 71 of your declaration are things
4 that you wrote and not quotes from Invisalign;
5 correct?

6 A Well, that image is actually a
7 direct copy from Invisalign. No, that's not
8 exactly true. And I said, you said where does
9 Invisalign -- Invisalign is illustrating that
10 with two arrows. That's at least two places.
11 It's saying that these are the places where
12 you can measure.

13 Q Okay. Just for the record,
14 everything -- all of the text that you just
15 read to me from paragraph 71 of your
16 declaration are things that you wrote and not
17 quotes from Invisalign; correct?

18 MR. ARGENTI: Objection. Form.

19 THE WITNESS: The parts I read
20 might have been, yes, but, you know, I'm
21 pretty certain that in my declaration I have
22 quotes. I mean, if you refer to them, I --
23 you know, I would be more than glad to discuss
24 them.

25 ///

1 BY MS. PARKS:

2 Q Okay. So it's been six minutes,
3 and you still haven't pointed me to anywhere
4 where you show me text from Invisalign that
5 tells an orthodontist to measure separation at
6 multiple positions.

7 Is there another place in your
8 declaration that you want to point me to?

9 A Well, I disagree with that.

10 MR. ARGENTI: Objection. Form.

11 THE WITNESS: I disagree with
12 that. Actually, in that image -- I just told
13 you, that image is a direct copy from
14 Invisalign. It shows two places, at least.
15 Two is more than one, is multiple places, two
16 places which shows that in those two places
17 the separation is more than 1 millimeter.

18 That's directly from Invisalign,
19 and it's not some -- my interpretation. Those
20 two arrows were not put there by me. They
21 were put there by Invisalign.

22 BY MS. PARKS:

23 Q Okay. Let's move on.

24 If Invisalign didn't tell you that
25 the gaps in this image were more than

1 1 millimeter, how would an orthodontist know
2 from this photo?

3 A I'm not an orthodontist to answer
4 that, whether an orthodontist would know that
5 or not, but I can answer you from the point of
6 view of a POSA with experiences in image
7 processing computer vision. I would have told
8 you that it's very easy. It's one of the most
9 classical techniques in computer vision to
10 convert pixels to measurements, to metric
11 measurements in terms of millimeters.

12 This is one of the most basic
13 things we teach in computer -- in a computer
14 vision class. It's a calibration process; so
15 a reference measure used to determine so many
16 pixels match to so many millimeters or any
17 metric length.

18 Q Do you know how big the gaps are
19 in Figure A of Invisalign?

20 A You mean just by looking at it?

21 Q I mean from your -- from
22 everything you've seen in this case.

23 Can you tell me the amount of
24 distance between the aligner and the tooth?

25 A Invisalign says this is an example

1 more than 1 millimeter. So I have no reason
2 to dispute that. But as I said, that -- it's
3 one of the most basic methods we teach in
4 computer vision. It's a calibration process,
5 and, you know, you can convert pixels to
6 metric measurements. You can, therefore, from
7 images perform measurements.

8 I have published plenty of papers
9 on that, and this is one of the oldest
10 techniques in computer vision. And it dates
11 back to decades, in fact, not -- nothing
12 recent. That's why I said it's one of the
13 most basic things we teach in computer vision,
14 and I think, to my opinion, a POSA would have
15 known that, would have been familiar with
16 techniques that convert pixel distances to
17 measured measurements.

18 Q How common is it for an
19 orthodontist to see an aligner that looks like
20 this in this position during a regular
21 checkup?

22 MR. ARGENTI: Objection. Form.

23 THE WITNESS: Again, you want me
24 to provide an opinion of how things may be
25 seen in a dentist's office. I'm not a

1 dentist. I've never practiced as a dentist.

2 I don't know how common it is, as you refer to
3 it, to see this particular situation. I don't
4 know. I have no idea.

5 BY MS. PARKS:

6 Q How thick is a clear aligner?

7 A Again, I'm not -- neither dentist
8 or manufacturer of orthodontic aligners, clear
9 aligners. I don't know.

10 Q Can you tell from this Picture A
11 if the photographer or the patient is using
12 any tools to better show the teeth?

13 A You want me to refer back to -- so
14 I have my declaration in front of me. So you
15 want me to refer back to Exhibit 1006? Is
16 that what --

17 Q Yeah, Exhibit -- Exhibit 1006.
18 Correct. Page 1.

19 A Yes.

20 Q Figure A.

21 A So what was your question again?

22 Q Can you tell from this photograph
23 if either the photographer or the patient is
24 using a tool to bare the teeth?

25 A I don't know. I don't have no

1 idea what tools they used. The only
2 disclosure is that it's -- a photograph was
3 taken, and then that picture was put in
4 this -- in this aligner reference. I cannot
5 make any assumptions about that.

6 Q Okay. And I guess since you have
7 Invisalign in front of you again, can you look
8 at the Image C on that same page.

9 A Yes.

10 Q And do you see on the right-hand
11 side it says that the orthodontist should use
12 a scaler to trim attachment flash as well as
13 check retention?

14 A I see that, yes.

15 Q That exercise would have to be
16 performed in person; correct?

17 A That is correct. But as I said
18 earlier, I'm never claiming that Invisalign is
19 talking about remote assessment or orthodontic
20 treatment. I just said that I rely on some of
21 the disclosures in the form of images or
22 quantification methods that Invisalign is
23 providing.

24 And I say that that would motivate
25 the -- a POSA to include that in the

1 combination that I'm providing. I never
2 claimed that Invisalign is talking about
3 remote treatment or remote assessment.

4 Q It's fair to say Invisalign is
5 instructing orthodontists to take certain
6 steps with their patients or with the aligners
7 that can only be performed in person; correct?

8 A In terms of the treatment and
9 follow-up, Invisalign is disclosing in-office
10 treatment. But as I said, Invisalign, at the
11 same time, is disclosing pictures and gives
12 illustrations of how some of those concepts
13 that can be seen in images. And it gives
14 specific quantification methods like, you
15 know, thresholds that would I think -- would
16 motivate a POSA for the combination that I am
17 providing.

18 MR. ARGENTI: Counsel, we've been
19 going quite a bit over an hour now. Is it
20 time for a break?

21 MS. PARKS: Sure. This is fine.
22 We can go off the record.

23 (Break taken from 10:14 a.m. to
24 10:25 a.m.)

25 ///

1 BY MS. PARKS:

2 Q Okay. So, Dr. Foroosh, do you
3 recall before the break we were looking at --
4 now I don't have it -- page 1 of Invisalign
5 together?

6 A You want me to take -- I put all
7 documents -- do you want me to take it out
8 again?

9 Q Yes. If you could just get the
10 Invisalign in front of you. I just have a few
11 more questions on it.

12 A Yes.

13 Q Is it fair to say that you were --
14 in your combination, you're just relying on
15 the quantification methods of Invisalign?

16 MR. ARGENTI: Objection. Form.

17 THE WITNESS: No. Just -- I mean,
18 that's not true. I'm relying on the entire
19 reference, but quantification is one of the
20 aspects I used in my combination.

21 BY MS. PARKS:

22 Q Okay. Okay. So still on
23 page 1 -- and, actually, still on Image C that
24 we were looking at just before the break,
25 remember we referred to the text talking about

1 trimming attachment flash and using a scaler.

2 What does it mean to trim
3 attachment flash?

4 A Again, that's -- I'm not a
5 dentist. That is beyond my expertise. I can
6 give you the point of view of a POSA, a
7 general knowledge. I'm assuming that means
8 that it -- you should, you know, adjust it.

9 But I don't know what it means,
10 no. I'm not a dentist. I cannot offer any
11 explanation of the meaning of that.

12 Q Do you have an understanding of
13 what a scaler is in this context?

14 A I know what scalers are. They're
15 in dentists' offices. But I don't know
16 what -- what the document is referring to in
17 this case and what operations a dentist should
18 perform. I don't know.

19 Q So you don't know how an
20 orthodontist would use a scaler to check
21 retention?

22 A No. I'm not a dentist. I cannot
23 know that. I'm not trained as a dentist. No.

24 Q Okay. And did you consider this
25 disclosure in Invisalign in forming your

1 opinion?

2 MR. ARGENTI: Objection. Form.

3 THE WITNESS: Well, you have my
4 declaration. You know that I considered all
5 the prior references in forming my opinions,
6 yes, and in my combinations.

7 BY MS. PARKS:

8 Q And if you don't know how a
9 dentist would use a scaler to check retention,
10 how did that teaching factor into your
11 opinions?

12 A It didn't. I said that that's
13 in-office operations or treatments, and I said
14 that I consider Invisalign not a remote
15 treatment disclosure, but it -- I say that it
16 would motivate a POSA based on the disclosures
17 and the quantification methods and the images
18 that are provided, examples that are given.

19 It would motivate a POSA with the
20 background that I described for a POSA that,
21 you know, that can be used in the combinations
22 in a remote treatment.

23 Q Okay. I think I understand.

24 So you're saying you only used
25 Invisalign for the portion that can be used in

1 remote treatment; is that right?

2 MR. ARGENTI: Objection. Form.

3 THE WITNESS: I'm not saying that
4 it can only be used in that. I'm saying that
5 I used the entire disclosure. But I am saying
6 that I understand that Invisalign is not
7 disclosing a remote assessment or treatment,
8 and I'm saying that a POSA, however, would be
9 motivated to use, you know, the disclosures
10 provided by Invisalign to reach the
11 conclusions that I have in the combination.

12 BY MS. PARKS:

13 Q Is it fair to say we've gone
14 through a number of portions of Invisalign
15 today that you don't know or understand how
16 a -- the particulars of how an orthodontist
17 would perform the instructions in Invisalign?

18 MR. ARGENTI: Objection. Form.

19 THE WITNESS: It's fair to say
20 that I'm not a dentist, and I cannot provide
21 neither an opinion or a description of
22 operations or treatments performed by a
23 dentist.

24 BY MS. PARKS:

25 Q So the detailed disclosures in

1 Invisalign that are discussions of the
2 operations or treatments performed by an
3 orthodontist, you did not have a full
4 understanding of them when you reviewed
5 Invisalign; correct?

6 MR. ARGENTI: Objection. Form.

7 THE WITNESS: I don't understand
8 what you mean by "full understanding." I
9 would interpret them as somebody with general
10 knowledge, you know, a POSA, and some
11 background in my, you know, dealing with
12 dental treatment in projects. I could have
13 some interpretation of that but, as I said,
14 not as a dentist. I cannot exactly know what
15 those treatments are and how they are
16 performed in the dentist's office.

17 BY MS. PARKS:

18 Q Okay. Let's back up in Invisalign
19 to the page with the lower case numeral "iii,"
20 which is the fourth page in the PDF.

21 Okay. And on the left-hand
22 column, do you see the section entitled
23 "Submit High-Quality Records"?

24 A Yes.

25 Q And do you see below that it says:

1 "The #1 reason for poor Aligner fit is an
2 incomplete or distorted impression"?

3 A I see that.

4 Q That refers to the initial
5 modeling of a patient's teeth before giving
6 the patient any aligners; correct?

7 A Again, you said "initial." I
8 mean, I don't know. The word "initial" is not
9 appearing there, but my understanding is that
10 that's the impression that is used for
11 manufacturing the aligner for a given step.

12 Q And the photographs discussed in
13 this section of Invisalign are likewise used
14 for manufacturing the aligner; correct?

15 A Which photograph are we talking
16 about here in this page?

17 Q Uh-huh. So, for example, right
18 under "Submit High-Quality Records," there's a
19 parenthetical that says, "particularly PVS
20 Impressions and photos"?

21 A I see that.

22 Q And Bullet B, it also discusses
23 photo-taking.

24 A I assume that's --

25 Q Now that --

1 A I'm sorry.

2 Q Now that -- yeah, now that you've
3 had a chance to look at that, these
4 photographs discussed here are for purposes of
5 manufacturing the aligner; correct?

6 A That's what -- my understanding
7 also, yes.

8 Q And these photographs would be
9 taken by the orthodontist themselves or
10 another professional in their clinic; correct?

11 A I don't know. It doesn't say it,
12 but I assume that might be the case.

13 Q Does Invisalign disclose any
14 patient-created photographs?

15 A Again, as I said, in my
16 combination, I do not rely on the fact that
17 Invisalign is disclosing any remote
18 orthodontic services. I am relying on other
19 references on that.

20 Here, I'm relying on the fact that
21 Invisalign is disclosing additional
22 information in terms of, you know, accurate
23 quantification of how do we know it fits and
24 how do we know it's seating properly and what
25 are the, you know, cases and examples. And

1 also with images, that they demonstrate that.

2 I am not -- I am not relying on Invisalign on
3 anything to do with remote services.

4 Well, I take that back --

5 Q Okay. I'll ask my question again.

6 A I take that back.

7 Q All right.

8 A I don't mean anything to do, but
9 I'm saying that Invisalign is not disclosing
10 remote services, orthodontic services.

11 Q Does Invisalign disclose any
12 patient-created photographs?

13 A No, because Invisalign is not
14 dealing with, as I said, remote services.

15 Q And Invisalign here on this page
16 we're looking at, page numeral iii, discloses
17 that high-quality photographs are taken by
18 orthodontists or other dental professionals;
19 correct?

20 A That's what it says, yes.

21 Q Okay. Now I would like to move to
22 page 6.

23 A To -- I'm sorry. What page?

24 Q Page 6.

25 A Page 6 of Invisalign?

1 Q Yes.

2 A Yes.

3 Q Okay. And do you see at the top
4 of page 6 in the gray box it says: "The
5 Aligners don't fit at all"?

6 A Where does it say that? "Aligner
7 don't fit at all"? Is it on -- oh, I'm sorry.
8 I'm looking at page 7. Sorry.

9 Yes. I see that.

10 Q And there's an Image A on page 6
11 that shows an example of an aligner that does
12 not fit properly; correct?

13 A Yes.

14 Q And would you agree that the gap
15 between the aligner and the teeth shown in
16 Image A on page 6 is significantly less than
17 the gap between the aligner and the teeth in
18 the Image A on page 1?

19 A You're asking me to provide,
20 again, a dentist's opinion. I mean, by
21 looking at it -- just looking at it like that,
22 well, I don't know that. I don't know the
23 answer to that question.

24 But if I had to do such assessment
25 as an image processing/computer vision person,

1 I would calibrate and I would convert
2 basically -- let's forget about the word
3 "calibrate." I would convert those pixel
4 measurements to the correct scale in the
5 metric measurements, in millimeters, and then
6 I could tell definitively yes or no.

7 But I do not know if this picture,
8 compared with the other figure that you
9 mentioned, you know, that I have put in my
10 declaration -- I cannot just visually compare
11 them and say, yes, this one is -- the distance
12 is bigger; or, no, it's less than. I don't
13 know. I mean, you want me to make an
14 assessment based on just visual comparison. I
15 cannot do that.

16 Q Can you tell from this Image A on
17 page 6 whether the gap between the aligner and
18 teeth is more or less than 1 millimeter?

19 A Again, I cannot tell by just
20 looking at it, but I could write a program
21 that could tell me how many millimeters that
22 distance is by using a reference.

23 Q What kind of reference would you
24 have to use to write that program?

25 A Well, it would be a length

1 reference when the image is taken. It could
2 be that -- you know, a 3D model of the teeth,
3 the patient's teeth, as Salah is disclosing.
4 It could be markers as Salah is disclosing.
5 It could be a number of different things.

6 (Stenographer requests
7 clarification.)

8 BY MS. PARKS:

9 Q Does Invisalign tell an
10 orthodontist how to measure whether a gap is
11 within or over 1 millimeter?

12 A Again, how an orthodontist makes
13 that measurement is out of the scope of my
14 expertise, out of, I'm going to say, my pay
15 grade. But how orthodontists make those
16 measurements, I don't know. But I know how
17 much is 1 millimeter. I mean, I think every
18 POSA would know what is meant by 1 millimeter.
19 You know, it's a known physical unit of
20 distance.

21 Q Okay. And in Image A on page 6,
22 the aligner and the teeth are similar shades;
23 right?

24 A I don't understand what you mean
25 by "similar shades." What do you mean by they

1 are similar shades?

2 Q The aligner and the teeth are both
3 white to translucent in color; correct?

4 MR. ARGENTI: Objection. Form.

5 THE WITNESS: Actually, as an
6 image processing and computer vision person, I
7 would say no, incorrect. I can easily
8 distinguish between aligner and teeth.

9 But . . .

10 BY MS. PARKS:

11 Q And my question wasn't whether you
12 can distinguish it. It's whether they are
13 both white to translucent in color.

14 MR. ARGENTI: Objection. Form.

15 THE WITNESS: Again, you are --
16 you're asking me to provide a subjective
17 analysis of shade and color from this single
18 image. I would say no. On the first --
19 looking at it, no, I don't see that, but no.
20 I mean, teeth visibly look different than the
21 aligner in terms of the color and shade.

22 BY MS. PARKS:

23 Q What color and shade would you
24 call the aligner?

25 A Well, I mean, they look different

1 because, you know, this is, again, a -- as a,
2 you know, general opinion, you know, I'm not
3 providing dentist's opinion in terms of color
4 and shade. I understand that in dentistry
5 that is referred to, but, you know, from image
6 processing point of view, you know, the teeth
7 look white with some reflections, and aligner
8 edges can easily be distinguished.

9 They are more like -- look like
10 they're transparent. Those are general
11 descriptions of an image that I'm providing,
12 not a dentist's definition of shade or color.

13 Q In this Figure A on page 6, can
14 you distinguish the bottom edge of the
15 aligner, like, the part that's closer to the
16 gums?

17 A I can see those edges, yes.

18 Q And does the tooth that sticks out
19 below the aligner look different than the
20 tooth that is covered by the aligner?

21 A That's a subjective, you know,
22 question because -- I don't know. I mean --
23 but, you know, in both cases, I know that's
24 the tooth by looking at it as, you know, a
25 POSA. I'm not saying as a dentist. I can

1 say, "Okay. I can see" -- it's a general
2 knowledge. I can see that part is teeth, and
3 the part that is under the aligner also is the
4 tooth and teeth.

5 And I can distinguish the edges on
6 both sides of the aligner and edges on both
7 sides and all sides of the teeth. I can make
8 those distinctions.

9 Q But the regions look a little bit
10 different -- right? -- depending on whether
11 they're covered by the aligner or not?

12 A No. Not necessarily, no. Not to
13 me.

14 Q So it -- this -- in this Figure A
15 on page 6, you don't see any difference
16 between the portion of the tooth covered by
17 the aligner and the portion of the tooth
18 that's not?

19 MR. ARGENTI: Objection. Form.

20 THE WITNESS: What do you mean,
21 "any difference"? As I said, that -- I can
22 look at every teeth and I can see that, hey,
23 that's -- I can clearly see where the teeth
24 are and where the aligner portions are.

25 So I -- so, no, I don't see any

1 difference. I mean, from my point of view --
2 again, even from image processing/computer
3 vision point of view, I can say that's -- I
4 can -- you know, a computer vision algorithm
5 would definitely detect that as one object.

6 BY MS. PARKS:

7 Q Okay. I mean, that's not really
8 my question. My question is just whether the
9 surface -- like, not from -- at the edges but,
10 like, the surface or the texture of the
11 aligner on the tooth looks different than the
12 surface of the bare tooth.

13 A No, I don't see any difference.
14 From my point of view, the tooth looks like
15 tooth, and then -- I mean, I don't know if you
16 are saying that there's glare there or
17 reflections. I don't know what -- is it from
18 the tooth or is it from the aligner? I'm
19 not -- I'm not going to speculate on that, if
20 that's what you're referring to.

21 From my point of view, no.
22 Visually, looking at it, I'd say that it looks
23 similar, you know. I can't say -- I mean, the
24 way I recognize, because they are similar,
25 that that's why, you know, that's the tooth,

1 you know, and the portions that -- defined by
2 the edges of the aligner, those are also
3 easily distinguishable. I don't see any
4 differences there.

5 Q To my eye --

6 (Simultaneous speaking.)

7 BY MS. PARKS:

8 Q -- the portion -- sorry. I don't
9 want to cut you off.

10 A I'm sorry. I mean, unless you
11 clearly can point out exactly to it, I don't
12 see any differences. I mean, I'm looking at
13 individual teeth. And you're saying that the
14 portion of the teeth that are not covered by
15 the aligner look different at the portions
16 that are covered by the aligner.

17 Different in what sense? I mean,
18 I don't understand. What should I be looking
19 at? If I -- if you are telling me about
20 shading and the color, I would say no. I
21 mean, as a general knowledge and a POSA, I
22 mean, I've also seen pictures of teeth without
23 aligner.

24 It doesn't look any more
25 different. The tooth is easily recognizable

1 in terms of its shade and color, whether it's
2 covered by the aligner or not.

3 Q Well, to my eye, the portion of
4 the tooth that has the aligner over it in the
5 image, there's more glare. Whether it's from
6 the aligner or the tooth, there's just more
7 glare in that portion of the image, and then
8 as compared to the portion of the tooth that
9 sticks out below the aligner.

10 Is your perception of that the
11 same?

12 A No. I don't know what is the --
13 is there more glare? I disagree with that.
14 There are reflections at the bottom also.

15 Is it -- could it be because the
16 top portion -- because we are looking at -- it
17 looks like we are looking at the bottom jaw.
18 Would that be inverted -- is it the direction
19 of light? There's so much involved in taking
20 that image, you know: the direction of light,
21 how many light sources were involved. You
22 know, I don't want to get into computer vision
23 or computer graphics description, what -- why
24 we see objects the way we see them or even,
25 you know, by perception.

1 But I don't want to get into that.

2 But my analysis, just visually looking at it,
3 is that I don't know where the sources of
4 light were. I don't know where the camera was
5 positioned and oriented, you know.

6 So in that single image, you're
7 claiming that there are more glares on the
8 portion that is covered. No, even that, I
9 don't buy that. I mean, I can even see glare
10 on the gums even in one of the teeth from the
11 left.

12 So what does that mean? Is
13 there -- does that mean that the aligner is
14 there? But I can see that there is no
15 aligner. There is no -- what is the cause of
16 glare is -- you know, cause of glare is a
17 reflective fact that is caused by the
18 orientation of light and the normal to the
19 surface. It has -- and it has to do with the
20 material also. I don't -- again, I don't want
21 to get into --

22 Q Sorry. Not to cut you off, but
23 I'm not asking about the cause of glare. I'm
24 just asking about the portions of this image
25 that have glare.

1 And it -- the glare is
2 concentrated on the portions of the image
3 showing the aligner over the tooth as compared
4 to the portions of the tooth that are not
5 covered by the aligner; correct?

6 A No. I disagree with that. I can
7 see -- as I said, second tooth from the
8 bottom, I can see glare at the bottom, and it
9 has nothing to do with the aligner. There's
10 no aligner there.

11 And I can see part of a tooth even
12 to the right and part of a tooth to the left,
13 and I'm not even sure if that part is covered
14 by the aligner. No, I don't -- I don't buy
15 that. I disagree that, you know, the part of
16 the tooth covered by the aligner necessarily
17 has more glare than other places.

18 Q Okay. We can agree to disagree on
19 that. Let's go to page 9 of Invisalign.

20 A Yes, page -- page 9, you said; is
21 that right?

22 Q Uh-huh, correct.

23 A Yes.

24 Q At the very top of page 9, it
25 says: "Managing Aligner fit and seating."

1 Do you see that?

2 A Yes.

3 Q What is the difference between
4 aligner fit and aligner seating?

5 A I mean, again, if you want to give
6 me an opinion on difference between those
7 terms from dentist's point of view, I don't
8 know how the dentist would call aligner fit or
9 aligner seating, but I can give you a general
10 description of that, which means that, you
11 know -- fitting meanings that how it fits on
12 the -- you know, the teeth altogether, and
13 seating means where it touches the teeth in
14 which places and how closely it touches the
15 teeth.

16 That's my general interpretation
17 of that, you know, how close it is. So, for
18 instance, again, as an example, the figure I
19 put in my declaration, it is talking about
20 that you can see it says that seating is
21 not -- is 1 millimeter away from -- more than
22 1 millimeter away from the teeth.

23 And fitting means a general term
24 of how it fits over the teeth. So, again,
25 that's my -- you know, it's a general, you

1 know, plain and ordinary meaning of the terms
2 I'm using, not a dentist's meaning of the
3 terms.

4 Q Okay. And that's the meaning you
5 are applying when you use those terms
6 throughout your declaration?

7 A Yes. I'm -- basically, I'm
8 applying the idea that how it fits, it means
9 that overall fitting of the aligner and
10 seating means, you know, how far away just in
11 terms of the quantification of distances
12 and -- but I think in some ways, these two
13 terms are related and maybe even
14 interchangeable.

15 You know, if it's not seating
16 properly, of course, it's not fitting properly
17 and vice versa. If it's not fitting properly,
18 I'm assuming that, at least in a certain
19 number of points, it's not seating properly in
20 the teeth.

21 Q Is it your understanding that
22 orthodontists use "aligner fit" and "aligner
23 seating" interchangeably?

24 A Maybe. I'm not an orthodontist to
25 know that. As I said, I provided.

1 Q In your -- sorry.

2 A I provide a plain and ordinary
3 meaning of those terms. I interpret those
4 terms in terms of plain and ordinary meaning
5 of them in English.

6 Q In your declaration, do you use
7 "aligner fit" and "aligner seating"
8 interchangeably?

9 A I might have in some places, but,
10 as I said, from the way -- the way I interpret
11 this, "seating" means that how closely the
12 surfaces are to each other. I'm talking about
13 surface of the teeth and the aligner.

14 So if it's seating properly on the
15 teeth, that means that, according to aligner,
16 the distance is less than -- less than
17 1 millimeter at all the places, or many
18 places, between the teeth and aligner. And if
19 that is true, then the aligner fits -- my
20 assumption is that that means that aligner
21 fits if it's less than 1 millimeter.
22 Otherwise, it doesn't fit properly.

23 Q Is it -- if I understood you
24 correctly, did you just say that Invisalign
25 teaches that the -- to be seated well, the

1 aligner must be within 1 millimeter at every
2 point?

3 A Not necessarily at every point.
4 I'm saying that every point that they're
5 performing the measurements. It means that --
6 it could be multiple points where measurements
7 are performed, not every point of the aligner
8 and the tooth, corresponding point of the
9 tooth.

10 But every point they perform the
11 measurement, if it's seating properly, then
12 those measurements, or at least a subset of
13 those measurements, should be under
14 1 millimeter in order to say that, yeah, the
15 aligner is seating properly and, therefore, it
16 fits for that step of the treatment.

17 Q Okay. Also on this same page, in
18 the second box down from the top, do you see
19 it refers to "suboptimal photos were submitted
20 that didn't allow technician to compare
21 clinical position at gingiva with the virtual
22 gingiva"?

23 A Yes, I see that.

24 Q These suboptimal photos it's
25 referring to, those would be the photos taken

1 by the orthodontist or staff for purposes of
2 manufacturing the aligners; right?

3 A That's my understanding.

4 Q Do you know what "gingiva" refers
5 to?

6 A Well, as a general knowledge, yes.
7 To the gums. But, again, I don't offer a
8 dentist's description of gingiva.

9 Q Do you know what "free gingival
10 margin" refers to?

11 A On the same text that you just
12 read?

13 Q Yes. I mean, this particularly
14 appears in the subheading on the page overall.

15 A Can you -- I'm sorry. I don't see
16 where it is.

17 Q Sure. So if you look at the top
18 of the page, there's, like, a heading,
19 Number 1, and then there's a gray box
20 underneath that. And it says: "Short
21 Aligners definitions." And then it refers to
22 "FGM," or "free gingival margin."

23 A I have no idea what that is.

24 Q So fair to say, if you don't know
25 what free gingival margin is, you didn't

1 consider that as part of forming your opinions
2 in this case?

3 A As I said, I used the entire
4 reference, but I never assumed that I have a
5 dentist's knowledge of any of those terms.
6 And as I explained that in my combination, I
7 didn't even use the fact that this is
8 disclosing, you know -- in fact, this is
9 disclosing an in-office treatment. I -- you
10 have my combination in my declaration.

11 No, I did not assume that I know
12 what FGM means in my -- neither in my
13 declaration or in my combinations --
14 combination.

15 Q Okay. We can put Invisalign
16 aside, and let's look at Exhibit 1008, which
17 is the Salah reference. Let me just introduce
18 that on the platform.

19 And just to be clear, this is the
20 translation, not the French version.

21 Okay. Dr. Foroosh, you have --

22 A Can you tell me again which
23 exhibit you want me to take out?

24 Q 1008.

25 A Okay. 1008.

1 Yes, I have that with me.

2 Q Okay. And this is the English
3 translation of the Salah reference that you
4 rely on for both the '248 and '945 patents;
5 right?

6 A That's correct.

7 Q Were you familiar with this Salah
8 reference before your work in this case?

9 A No.

10 Q Do you remember one way or another
11 whether any of your searches uncovered the
12 Salah reference?

13 A Well, to be perfectly honest, I
14 came across this very easily. I don't
15 remember -- I don't remember where this -- how
16 I did my search and -- but I remember that I
17 came across this easily. Besides, it's
18 referenced in the -- in the '248 patent.

19 Q So did you identify this reference
20 from the specification of the '248 patent or
21 from your searches?

22 A I don't recall.

23 Q In Salah, the method involves
24 first creating a three-dimensional digital
25 reference model; right?

1 A Yes.

2 Q And then what Salah teaches is
3 that you take an updated two-dimensional image
4 and compare it to that 3D model; right?

5 A That's correct.

6 Q And the purpose of that technique
7 is that it lets an orthodontist monitor the
8 movement of patients' teeth over time; right?

9 A That is correct, yes.

10 Q Okay. Let's take a look at
11 Figure 11 in Salah, which is at the back of
12 the document. Let me know when you have it.

13 A What page is that? I'm sorry.

14 Q So if you go to the images, which
15 are at the very end of the document, it's on
16 page 6 of 7 of these images?

17 A And what figure you wanted me to
18 refer to?

19 Q Figure 11.

20 A Figure 11.

21 Yes, I have that.

22 Q What is shown in Figure 11?

23 A I see a picture of the teeth, and
24 the text is saying some also orthodontic
25 appliances.

1 Q So you -- when you say
2 "orthodontic appliance," are you referring to
3 the wire on the top portion of the teeth or,
4 like, the top teeth?

5 A Yeah, I think that's what Salah is
6 referring to.

7 Q Do you know more specifically the
8 name of this orthodontic appliance?

9 A No.

10 Q Do you know the purpose of this
11 orthodontic appliance?

12 A I know the purpose of orthodontic
13 treatment. So I can only make an assumption
14 that orthodontic appliances are used for
15 moving the teeth. I don't know the purpose of
16 this specific orthodontic appliance that is
17 shown in this particular figure.

18 Q Does Salah use the phrase
19 "orthodontic appliance" anywhere?

20 A I believe he did, yes, orthodontic
21 appliances, specifically when referring to
22 this figure. But I don't recall the page
23 number or text or paragraph.

24 Q Would you mind looking for a few
25 minutes and letting me know if you can find

1 it?

2 A It would take a long time. I
3 don't -- I mean, unfortunately, on a hard
4 copy, I cannot do Control F to find quickly.
5 So I would say I can try, but it doesn't mean
6 that I can find the exact place where it would
7 be.

8 Q Okay. Well, maybe we can skip
9 that.

10 Your understanding that that wire
11 appearing on the top teeth is called an
12 orthodontic appliance, that exclusively comes
13 from -- that's from Salah?

14 MR. ARGENTI: Objection. Form.

15 THE WITNESS: Exclusively coming
16 from Salah, I mean, I don't know what you mean
17 by that. But I know that Salah is disclosing
18 that they are teaching about using certain
19 methods based on images for orthodontic
20 treatment. So, therefore, yeah, I mean, that
21 Salah is disclosing orthodontic treatment.

22 BY MS. PARKS:

23 Q Okay. Well, I do have an
24 electronic version of the document. So why
25 don't we take a look at the places where Salah

1 uses the word "appliance" together. So the
2 first is on page 1 at line 21.

3 A Yes.

4 Q That reference to an appliance
5 does not refer to that image in Figure 11;
6 correct?

7 A That's true, but it's referring to
8 orthodontic appliances.

9 Q Okay. But does that passage in
10 Salah inform you that the correct terminology
11 for the device in Figure 11 is an orthodontic
12 appliance?

13 A That paragraph, no, it doesn't
14 refer to that particular figure.

15 Q Okay. And then let's go to page 8
16 at line 27.

17 A Yes.

18 Q Here, it uses the word
19 "appliance," not the phrase "orthodontic
20 appliance." But does -- is this what informed
21 you that the device in Figure 11 should be
22 called an orthodontic appliance?

23 A No, it's not referring to that
24 figure. It's just talking about appliances,
25 or appliance.

1 Q Okay. So the next reference is on
2 page 9 --

3 A Yes.

4 Q -- line 10.

5 A Yes.

6 Q So here, it does use the phrase
7 "orthodontic appliance." Is this reference in
8 Salah on page 9 what informed you that the
9 device in Figure 11 should be called an
10 orthodontic appliance?

11 A No, it's not referring to that
12 figure.

13 Q Okay. So I will represent to you
14 that those are the only three instances of the
15 word "appliance" in the Salah reference.

16 So if it wasn't any of those
17 references that told you the device in
18 Figure 11 is an orthodontic appliance, how did
19 you come up with the phrase "orthodontic
20 appliance"?

21 A Can you also search for reference
22 on that figure to see what it says Salah says
23 there?

24 Q Certainly.

25 So the first reference to

1 Figure 11 is on page 19, line 18.

2 A Yes.

3 Q It does not reference the device
4 at all; correct?

5 A Yeah, it's talking about what we
6 call in computer vision to needle maps. It's
7 showing the reference map, as he refers to it,
8 prepared to show reflection information.

9 Q Okay. The next reference to
10 Figure 11 is on page 64, starting at line 7.

11 A Yes. "Reference map superimposed
12 on the" --

13 Q And I believe --

14 A Yes. I'm sorry.

15 Q Yeah, I'm sorry.

16 I think that it discusses
17 Figure 11 all the way through page 66 or so.
18 So why don't you read that to yourself and let
19 me know --

20 A Okay.

21 Q -- if it refers to the appliance
22 here -- or the device here.

23 A (Reviewing document.)

24 Yes, I finished reading the pages
25 starting from 64 to 66.

1 Q And does Salah reference the
2 device shown in Figure 11 in anything you just
3 read?

4 A No, it doesn't.

5 Q Okay. So what -- what was your
6 basis for calling the device in Figure 11 an
7 orthodontic appliance?

8 A I might have used my general
9 knowledge, how orthodontic devices look on
10 teeth.

11 Q Do you have an understanding one
12 way or another of whether an orthodontist
13 would call it an orthodontic appliance?

14 A No. I have no idea.

15 Q Would you agree in Figure 11 that
16 the -- the wire on the device is darker than
17 the teeth?

18 A Let me go back to Figure 11.

19 Q Sure.

20 A Yes, it does look darker than
21 teeth.

22 Q And the embodiment shown in
23 Figure 11 of Salah, that relates to an
24 embodiment in which the authors were not
25 determining the contour; correct?

1 A Actually, no. Salah is talking
2 about the image analysis using various
3 different algorithms that could determine the
4 contours as discriminant information.

5 Q Okay. Well, you just read
6 everything in Salah discussing Figure 11. So
7 can you point me to where Salah says that
8 Figure 11 -- or that the image analysis shown
9 in Figure 11 was determining contour?

10 A Yeah. In that -- in that section,
11 it was talking about, you know, when mapping.
12 That section is specifically talking about
13 mapping the images that are taken, how they
14 mapped to the 3D model.

15 So they are saying that we are
16 using these -- what I call the needle maps in
17 order to perform that, and the length of those
18 is used as a measure of, you know, how good
19 that, you know, alignment is.

20 And -- but other places he
21 discloses clearly a set of algorithms that are
22 dealing with edge detection and contour
23 detection, and he's saying that those
24 discriminant information are used for
25 performing the analysis of the images.

1 Q Do the -- what do the needles in
2 the needle map of Figure 11 represent?

3 A They're representing the normal to
4 the surface, if you want to -- me to give you
5 image processing computer vision as, you know,
6 expert so -- a POSA of what those are. Those
7 are normal to the surface that define the
8 shape of the surface, or the 3D of the
9 surface, 3D model of the surface.

10 Q And according to Salah, in
11 Figure 11, they're based on the reflection
12 information from the image; correct?

13 A That is correct. But, again, it
14 is clear to me that -- if you look at those as
15 a POSA in computer vision, it is clear to me
16 that they are not looking for any other parts
17 of the teeth -- I mean, any other parts of the
18 jaw, rather -- I correct myself -- any other
19 parts of the jaw for determination of those
20 shape and 3D information.

21 If you look at it, it's only
22 restricted to teeth and maybe what I call
23 appliances in teeth. So that's because
24 it's -- obviously they have segmented out
25 certain portions of the jaw. And that

1 segmentation described in other places, they
2 say that in order to extract discriminant
3 information, we use edge detection methods
4 like various different algorithms that are
5 provided for segmentation methods, various
6 different ones that they have provided.

7 Q The discriminant information used
8 in connection with the example describing
9 Figure 11 is reflection information; correct?

10 A Well, as I said, no, that's not
11 how I see that. As I said, as someone
12 experienced in image processing computer
13 vision, as you can see, that the discriminant
14 information associated with Figure 11 that
15 they are illustrating on Figure 11, they're
16 showing that they restrict it to teeth only.

17 So as a POSA, I would know that
18 that means that they have done some
19 segmentation in the image.

20 Do you see those needle maps
21 anywhere else but on teeth or maybe appliances
22 on the teeth? I don't. So my conclusion is
23 that segmentation has happened also in this
24 process. And Salah, of course, is disclosing
25 that.

1 Q Does Salah say anywhere that there
2 was segmentation done on Figure 11 before
3 applying the needle map?

4 A No, but Salah discloses that
5 contour detection is used for finding
6 discriminant information. So -- and because
7 they say that Figure 11 is showing
8 discriminant information used to compare with
9 the 3D model.

10 So if they're disclosing that
11 extraction of discriminant information is
12 using contour detection, there it is. You
13 know, it must have been used here. So Salah
14 is disclosing that in the text.

15 Q Okay. But would you agree that
16 the discriminant information used in Figure 11
17 is reflection information and not the contour?

18 A No. I disagree with that. I
19 think contour information has been used to
20 actually limit those -- that particular
21 discriminant information -- which they call it
22 reflection information -- to restrict that to
23 teeth.

24 Q So looking at page 64 of Salah on
25 lines 7 and 8, it says that: "Figure 11 shows

1 a reference map superimposed on the acquired
2 image, relating to reflection information
3 (discriminant information)."

4 A Yes.

5 Q So here, Salah is saying that the
6 reflection information is the discriminant
7 information in this example; correct?

8 A That's one of the discriminant
9 informations, yes, but Salah also discloses
10 there discriminant information is using
11 contour detection or edge detection
12 algorithms, and so nothing there says that
13 it's not -- edge detection is not used there.

14 In fact, based on the image, as
15 a -- as somebody working in the area of image
16 processing and computer vision, it's clear to
17 me that segmentation has happened, and that's
18 why -- the particular discriminant information
19 that they are trying to illustrate in
20 Figure 11 must have been using a piece a POSA
21 would have understood that have been using,
22 you know, a contour detection algorithm.

23 That's why that discriminant
24 information, which is the reflection
25 information, is restricted to teeth only.

1 Q Also on page 64 at line 18, it
2 says that: "The acquired map shows these
3 areas, which constitute the discriminant
4 information to be tested."

5 So here, the discriminant
6 information to be tested in this example is
7 the reflection information; correct?

8 A It might be. Other places, it
9 says discriminant information or the contours.
10 Maybe they are testing both here, testing
11 contours and -- as well as reflection
12 information.

13 Q For purposes of this example in
14 Salah, does it ever say that the discriminant
15 information is anything but a reflection
16 information?

17 A Throughout Salah, the places it
18 says "discriminant information" can -- is
19 obtained by applying edge detection or contour
20 detection algorithms, and I can -- as a image
21 processing person, I can visibly see that in
22 Figure 11, that is true.

23 As I said, the reflection maps are
24 restricted to the teeth. That means that they
25 have used the contours of the teeth to

1 restrict that.

2 Q In this example of Salah, are they
3 using the contours of the teeth to compare
4 between the 3D model and the updated image?

5 A Yes. If they are restricting
6 their reflection map to only places that need
7 to be compared to the 3D model, the answer is
8 yes, obviously.

9 They have been using the contours
10 to make sure that you're comparing teeth, not
11 the gums or tongue or any other parts of
12 the -- parts of the jaw.

13 Q Does Salah teach extracting
14 contour image or contour information from this
15 image in Figure 11?

16 A As I said, that Salah discloses
17 that discriminant information is extracted, as
18 you refer to it, from images using techniques
19 based on contour detection or methods based on
20 contour detection, edge detection, and he
21 discloses many of those techniques and
22 algorithms.

23 Q On pages 64 to 66, does Salah
24 disclose extracting contour information from
25 the image in Figure 11?

1 A Well, he --

2 MR. ARGENTI: Objection.

3 THE WITNESS: I'm sorry.

4 He discloses discriminant
5 information, and he also discloses that
6 discriminant information is obtained by
7 applying contour detection and edge detection.
8 So he discloses on those pages, in plain and
9 ordinary understanding of the English
10 language, that discriminant information is
11 extracted in that image.

12 And because he is disclosing that
13 contour detection algorithms are used for
14 that, well, the answer is yes. So Salah is
15 disclosing that.

16 BY MS. PARKS:

17 Q So in your view, Salah is
18 disclosing applying the contour detection and
19 the edge detection before extracting the
20 discriminant information?

21 A I'm not going to speculate on
22 before or after. It could be one single
23 algorithm is doing that, you know, as part of
24 the same method but is part of the process,
25 yes, that the contours of teeth are extracted

1 and restricting reflection information clearly
2 on that figure that we are discussing to teeth
3 only and possibly appliances on teeth.

4 Q Okay. So as a result of the
5 contour and edge detection that you're
6 describing, the discriminant information
7 relating to reflection information in
8 Figure 11 is restricted to the teeth; correct?

9 A That's the way I see in the
10 images. That discriminant information of
11 reflection is restricted to teeth and
12 appliances in teeth, and that indicates to a
13 POSA that a segmentation has taken place. In
14 other words, when Salah is disclosing a
15 teaching that used contour detection algorithm
16 to perform that segmentation, it clearly says
17 that the discriminant -- extraction of
18 discriminant information described on pages
19 sixty- -- was it 62 to 64 or 64 to 66 that we
20 were discussing, are using those contour
21 detection and edge detection.

22 Q Okay. So does Salah teach
23 measuring the distance between the device in
24 Figure 11 and the teeth?

25 A No, it doesn't.

1 Q And does Salah teach any contour
2 or edge detection to segment the wire from the
3 teeth?

4 A Salah definitely discloses using
5 contour and edge detection methods for
6 analysis of images and extraction of
7 discriminant information.

8 Q But in Figure 11, for example, the
9 needle map appears on both the device and on
10 the teeth; correct?

11 A Yes.

12 Q So there's no semantic
13 segmentation between the device and the teeth,
14 at least in Figure 11; correct?

15 A I don't know about that. They
16 might have. I don't know what you mean here
17 again by "semantic segmentation." Maybe we're
18 going to get to that later.

19 But they might have segmented out
20 also the appliance and -- I mean, this figure,
21 from my point of view, is for the purpose of
22 illustration of how the mapping is done by
23 Salah from updated image to the 3D model, and
24 they're just using this figure to describe
25 that.

1 But throughout the Salah
2 disclosure, they say clearly that they use
3 edge detection and contour detection in order
4 to extract the discriminant information.

5 Q So you can't tell one way or the
6 other from Figure 11 whether they used edge
7 detection or contour detection to segment the
8 wire and the teeth; correct?

9 A To segment the wire, they might
10 have done it. And I don't know. But it says
11 that discriminant information was extracted in
12 the paragraphs corresponding to that image,
13 and it also discloses that discriminant
14 information is basically extracted using the
15 contour detection and edge detection.

16 They might have done it. I don't
17 know, but they might have extracted the
18 appliance edges.

19 Q Okay. And just to be clear, on
20 pages 64 to 66, Salah does not say explicitly
21 that there was contour detection and edge
22 detection performed; correct?

23 A As I said, I disagree with that.
24 Salah says that they are extracting
25 discriminant information and it also discloses

1 that that discriminant information includes
2 using extraction of contours and edges and
3 discloses -- Salah discloses many methods and
4 algorithms to perform that.

5 The very fact that says in those
6 paragraphs from 64 to 66 that discriminant
7 information is extracted, to me it means it's
8 teaching to a POSA that those algorithms are
9 used here.

10 Q Where on pages 64 to 66 does Salah
11 say that the discriminant information referred
12 to in that example is contour or edge
13 information?

14 A Well, I mean, I'm not relying just
15 on pages 64 to 66 to say that Salah discloses
16 that discriminant information is extracted by
17 contour detection, but I'm relying on the
18 entire document. I mean, I think you're
19 carving out a very small section of it to say
20 where does it say it there. I'm not just
21 relying on that.

22 But Salah clearly says in those
23 pages, from 64 to 66, that discriminant
24 information is extracted. And, also, it
25 discloses that discriminant information is

1 extracted using contour detection and edge
2 detection.

3 So I think a POSA would conclude
4 that, therefore, edge detection and contour
5 detection is used in an extraction of this
6 discriminant information here too.

7 And, as I said, beyond that, I
8 look at Figure 11. As an image processing
9 computer vision person, I can see that it's
10 segmented out -- in other words, contour
11 detection is used -- and that those reference
12 maps are created only for the teeth.

13 Q So nowhere on pages 64 to 66 does
14 Salah refer to contour detection or edge
15 detection; correct?

16 A That's incorrect, in my opinion.
17 I'm just repeating myself. It refers to --

18 Q Please point me -- I don't want
19 to --

20 (Simultaneous speaking.)

21 MR. ARGENTI: Objection. Form.

22 Let him -- let him answer the
23 question.

24 MS. PARKS: He's answered the
25 question for minutes, but he's not answering

1 my question, which is --

2 MR. ARGENTI: I think that --

3 MS. PARKS: -- where on pages 64
4 to 66 does it say contour detection or edge
5 detection?

6 Please answer that question.

7 MR. ARGENTI: I think that
8 demonstrates the problem with this line of
9 questioning, Counsel. He has answered the
10 question multiple times. But if you're going
11 to ask the question, let him answer the
12 question.

13 BY MS. PARKS:

14 Q Go ahead.

15 A So as I was saying, no, I disagree
16 with that. Salah is disclosing on pages 64 to
17 66 that discriminant information is extracted.
18 And, also, it teaches that discriminant
19 information is extracted by using contour
20 detection and edge detection algorithms.
21 Therefore, the very appearance of the
22 discriminant information is extracted there,
23 it says to the POSA that contour detection,
24 edge detection algorithms are used for
25 extraction of discriminant information.

1 Q Where on pages 64 to 66 does Salah
2 teach that discriminant information is
3 extracted by using contour detection and edge
4 detection algorithms?

5 MR. ARGENTI: Objection. Form.

6 THE WITNESS: I think I answered
7 that question in the sense that I said that
8 Salah is teaching that discriminant
9 information is extracted using edge detection
10 and contour detection algorithms, and he gives
11 many examples of those methods and algorithms.

12 Here on pages 64 and 66, it says
13 that discriminant information is extracted.
14 So, of course, I think a POSA would understand
15 that if discriminant information is extracted
16 and if Salah says that in order to extract
17 discriminant information use contour and edge
18 detection, it implies that edge detection and
19 contour detection is used for extracting that
20 discriminant information.

21 BY MS. PARKS:

22 Q What portion of pages 64 to 66 are
23 you referring to when you say it says that
24 discriminant information is extracted?

25 A Well, for instance, on -- I don't

1 know. It's -- let's say I just read, you
2 know, multiple instances of discriminant
3 information, which you can easily do by
4 Control F. Let's say, for instance, line --
5 line 18, it says: "The acquired map shows
6 these areas, which constitute the discriminant
7 information to be tested."

8 That means that if it's
9 discriminant information is being tested, it
10 means that it's been first -- it has been
11 extracted. And as I said, so Salah teaches
12 that in order to distract -- I'm sorry. To
13 extract discriminant information, you use edge
14 detection and contour detection methods, and
15 gives a whole list of them.

16 Here, it says that, you know, that
17 discriminant information is extracted because
18 it says we are testing it. So, therefore,
19 based on Salah's disclosure and teaching, edge
20 detection and contour detection algorithms are
21 used for extraction of that discriminant
22 information.

23 Q But the discriminant information
24 to be tested is the reflection information;
25 correct? There's no testing of the edges or

1 the contours; right?

2 A I disagree with that also because
3 as, you know, I pointed out on Figure 11 that
4 you were talking about, clearly edge detection
5 is restricting reflection information to the
6 teeth, which means that if you are testing
7 that, we are testing both, you know, whether
8 it's just -- I mean, whether it is reflection
9 and edge detection, we are testing both. It's
10 part of the same process.

11 Discriminant information is
12 extracted using edge detection and contour
13 detection. So if you are testing it,
14 therefore, we are testing also the edge
15 detection and contour detection algorithms
16 also.

17 Q Does Salah anywhere disclose
18 measuring the distance between a device and
19 teeth?

20 A I don't recall that, but I am not
21 relying on Salah on that information. As I
22 said, Invisalign clearly discloses that. And
23 in my combination, I am using Invisalign's
24 disclosure of measuring the separation between
25 the tooth edges and aligner edges in my

1 combination.

2 Q And Salah does not teach measuring
3 distances between objects in a single image;
4 correct?

5 A No. Salah -- as I said, Salah is
6 not disclosing distance measurements, no.

7 Q And Salah does not teach taking
8 any pictures with a clear aligner in a
9 patient's mouth; correct?

10 A That is correct. I want to -- I
11 want to go back to your area of question. I
12 said that Salah is not teaching distance
13 measurements. I want to -- I want to correct
14 myself because the very fact that we are
15 mapping the updated image to a 3D model and to
16 see what movements occurred and what, you
17 know, changes have taken place through the
18 treatment, that implies measuring some
19 distance.

20 I'm offering my opinion as an
21 image processing computer vision person there.
22 That requires measuring a distance. If you're
23 comparing an updated image with a 3D model,
24 there is a distance measurement involved to
25 see what moved, what did not move.

1 Q But in that case, you're measuring
2 the distance between images captured in two
3 different instances; correct?

4 A No, not really. You are
5 measuring -- you're mapping the image captured
6 to the 3D model and then measuring the
7 distance. The 3D model is your reference
8 model, and use that as a measure of the
9 progress of the treatment.

10 Q Does Salah teach capturing a
11 single image and then measuring the distance
12 between two objects in that image?

13 A Salah is disclosing that, at
14 different times of treatment, an image is
15 captured -- it could be multiple images -- and
16 sent to the -- to the orthodontist. And that
17 image or those images are compared to a
18 reference model. And based on that, you
19 determine, you know, what changes or movements
20 have taken place. And, as I said, that
21 basically implies that they are measuring some
22 distance.

23 Q Does Salah include any pictures of
24 a clear aligner anywhere?

25 A No. I think I mentioned this

1 earlier. Salah does not talk about clear
2 aligner, but -- but it talks about orthodontic
3 appliances.

4 Q Okay. But does Salah include any
5 images of a clear aligner?

6 A No. Salah is not including any
7 images of clear aligner. Again, I go back to
8 my earlier answer. I mean, the answer to your
9 previous question. However, it discloses
10 that, you know, orthodontic appliances are
11 worn by -- by the patient.

12 Q Salah also does not describe
13 assessing the fit of a clear aligner, then;
14 right?

15 A I don't totally agree with that,
16 the fact that Salah is mapping that to a
17 reference model. You know, it's measuring
18 some distance. But overall, you're right.

19 I mean, he's not talking about
20 clear aligner, and he's not talking about
21 measuring the distance between a clear aligner
22 and the tooth -- and the teeth.

23 Q And Salah -- but Salah doesn't
24 teach any way of assessing whether the aligner
25 fits well on teeth; right?

1 A Salah is not talking about clear
2 aligners; so obviously could not talk about
3 how it fits -- how a clear aligner fits or
4 seating on the teeth.

5 Q And, for the same reason, Salah
6 doesn't teach assessing the shape of a clear
7 aligner?

8 A Again, Salah is not talking about
9 clear aligners, although he's talking about
10 orthodontic appliances. So -- and I'm not
11 relaying on Salah for my combination on clear
12 aligners.

13 Both Kim and Invisalign references
14 clearly disclose that, and they both talk
15 about either whether the aligner is normal and
16 corresponds to the current treatment, as Kim
17 refers to it, or Invisalign.

18 Additional information in terms of
19 quantification, he describes that you could
20 measure the distances between the two edges,
21 and it gives actual threshold value of
22 1 millimeter to be used as whether identifying
23 if it's a good fit or it's -- whether it's
24 seating properly or not.

25 Q And, according to Salah, you will

1 get higher quality contour information if
2 you're analyzing an image with high contrast;
3 right?

4 A Can you refer to the place where
5 he says that?

6 Q Sure. So let's look at page 60,
7 line 17.

8 A Did you say page 16?

9 Q Six zero. 60.

10 A Six zero. I'm sorry. Line?

11 Q I'm starting at line 17.

12 A Line 17.

13 Q If you could just read the whole
14 paragraph, 17 to 24.

15 A Sure. It says: "In step C1, the
16 quality of the initial discriminant
17 information is assessed. In the case of a
18 contour, for example, contrast analysis
19 provides more or less reliable information: an
20 area of high contrast can be assimilated to an
21 area corresponding to a contour with a high
22 probability, and the quality of the points in
23 this area will therefore be high. On the
24 other hand, a low-contrast area, such as a
25 blurred zone, can be assimilated to an area

1 corresponding to a contour with a low
2 probability, and the quality of the points in
3 this area will be low. In this example" -- it
4 says that -- "the probability of a point in
5 the acquired image belonging to the contour
6 can be chosen as an indicator of the 'quality'
7 of the discriminant information."

8 Q So here, Salah is saying that
9 higher quality is correlated to higher
10 contrast; correct?

11 A That's what Salah is disclosing,
12 yes. So -- but I'd like to qualify that is
13 putting it in terms of the probabilities also.
14 We say that there's a higher probability if
15 you see higher contrast and lower probability
16 if you see lower contrast.

17 Q It's your opinion that Salah
18 identifies deep learning as a method for
19 defining contours in an image; right?

20 A That is my opinion, it's one of
21 the methods that Salah is disclosing.

22 Q You would agree that there are
23 different types of deep learning devices;
24 right?

25 A Of course.

1 Q And not all deep learning contours
2 are semantic contours; right?

3 A I mean, it depends on your
4 definition of semantics. Yes, you know,
5 contours in the older techniques of edge
6 detection would be black and white. Like
7 Canny edge detection is an example that is
8 given. But more recently disclosed and
9 references available that I have referred to
10 one of them in my combination or disclosing
11 category is specific contours, where
12 additional labeling or attribute can be
13 assigned to those edges.

14 So those edges are not zero and
15 one only. There are -- they have -- you know,
16 the values are not necessarily zero and one.

17 MR. ARGENTI: Counsel, it's close
18 to an hour and a half since the last break.

19 MS. PARKS: Yeah, I'm almost done
20 with Salah. So, like, I only have a few more
21 questions, if you don't mind.

22 As long as it's okay with you,
23 Dr. Foroosh --

24 THE WITNESS: That's fine with me.

25 MS. PARKS: -- if you're okay

1 going.

2 BY MS. PARKS:

3 Q Okay. Would you agree that Salah
4 doesn't tell you the single name -- or a
5 single name of a particular deep learning
6 device?

7 A Yes, but he is disclosing deep
8 learning. I mean, one other thing -- you keep
9 saying this learning device. That's a
10 somewhat unusual term. I would just refer to
11 it as "deep learning," but that's fine with
12 me, you know.

13 Yeah, Salah is disclosing that
14 deep learning is one option that can be used
15 for the extracting discriminant information,
16 which includes contours and edges, and doesn't
17 give a very specific deep learning method
18 associated with that.

19 Q And to use a deep learning method,
20 a person of skill would have needed to first
21 select a particular method; right?

22 A I would say that I believe that by
23 July 2017, which is the priority date, a POSA
24 would have been familiar with a whole group of
25 such deep learning methods that were

1 published. I chose one of those, which
2 happens to be Maninis.

3 Q And that's what a person of skill
4 would have to do. After looking at Salah and
5 seeing it discloses deep learning, they'd have
6 to then pick what type of deep learning to
7 use; right?

8 A So, yes, for implementation
9 purposes, yes, a particular deep learning
10 method should be used.

11 MS. PARKS: Okay. Great. Let's
12 take that break now.

13 (Break taken from 11:53 a.m. to
14 12:02 p.m.)

15 BY MS. PARKS:

16 Q Okay. So now I'd like to spend
17 some time talking about your report for the
18 '248 patent. So can you pull that up for me.

19 A You are talking about my
20 declaration?

21 Q Yes. I'm sorry. Old habits.
22 Your declaration for the '248 patent.

23 A Yes. So that's Exhibit 1002; is
24 that correct?

25 Q Correct. Although, there are -- I

1 guess there's two Exhibit 1002s. So make sure
2 it's the one that refers to the '248 patent on
3 the cover page.

4 A Yes, on the Exhibit 1002 for the
5 '248 patent.

6 Q Yes.

7 Okay. On page 93, did you apply
8 this signature?

9 A Yes.

10 Q Are you aware of any errors in
11 this declaration?

12 A Not that I'm aware of, no.

13 Q What is the relevant field for the
14 '248 patent?

15 A Well, my take that the text of the
16 '248 patent, I think I clearly say it there in
17 Item 1. It says: "The present invention
18 relates to the field of dental arch image
19 analysis."

20 That's what the patent discloses.

21 Q Okay. So when you refer to the
22 relevant field of the patent in your report,
23 that's the field of art you're referring to?

24 A Yes.

25 Q Okay. Did you consult with anyone

1 else in forming the opinions set forth in this
2 declaration?

3 A No.

4 Q Apart from counsel, of course.

5 A Sure. Of course. No.

6 Q And just to confirm, have you
7 spoken with any other experts retained by
8 Align or otherwise in preparing your opinions
9 in this declaration?

10 A Have I consulted, you said, any
11 experts from Align? No, I haven't.

12 Q Okay. And did you consult with
13 any other experts not from Align in preparing
14 the opinions in this declaration?

15 A No.

16 Q And so you didn't consult with any
17 person having a background in dentistry or
18 orthodontics to prepare your opinions; right?

19 A That is correct. I did not.

20 Q And is the same true for your
21 declaration about the '945 patent?

22 A That is correct.

23 Q Okay. So let's turn to
24 paragraph 51 in your '248 patent declaration.

25 A Paragraph --

1 Q Oh, wait. I might have the
2 wrong --

3 A -- 51, yes.

4 Q I might have directed you to the
5 wrong place.

6 Okay. So sorry. I meant to
7 direct you to paragraph 61, not paragraph 51,
8 in your declaration. If you could turn to
9 that, please.

10 A Okay. I'm there.

11 Q Okay. And here, you -- you state
12 that a person of ordinary skill would have at
13 least two years of work in computer vision,
14 image analysis, medical imaging, or related
15 areas.

16 When you refer to medical imaging
17 in that sentence, are you referring to
18 professional-grade medical images?

19 A No. I'm referring --

20 MR. ARGENTI: Objection to form.

21 THE WITNESS: Yeah, I'm referring
22 to -- I'm sorry -- referring to medical
23 imaging as in image analysis, medical image
24 analysis, or medical image acquisition.

25 ///

1 BY MS. PARKS:

2 Q Okay. But that would be the
3 analysis or acquisition of professional-grade
4 medical images?

5 MR. ARGENTI: Objection. Form.

6 THE WITNESS: Well, I don't
7 understand your definition of
8 "professional-grade imaging."

9 What I mean by that is that the
10 person would have been working in the area of
11 medical image analysis or medical image
12 acquisition, and that's basically someone with
13 also image processing, computer vision
14 background. They just specialize in and
15 working on those application areas.

16 BY MS. PARKS:

17 Q Okay. All right. So why don't we
18 go to page 36 of your declaration.

19 So here, with respect to the
20 '248 patent, it's your opinion that each of
21 the asserted -- or each of the challenged
22 claims are obvious over the combination of
23 Kim, Invisalign, Salah, and Maninis; right?

24 A That's correct.

25 Q And how did you choose this

1 particular combination of ground references?

2 MR. ARGENTI: Objection. Form.

3 And, again, I'll caution the
4 witness not to disclose communications with
5 counsel during preparation of your
6 declaration.

7 THE WITNESS: Again, this dates
8 back to a year ago. I don't recall every
9 details. But, as I said earlier, some search
10 and working together with counsel, we -- I
11 mean, I used these four references in my
12 combination.

13 BY MS. PARKS:

14 Q And in paragraph 69, for your
15 analysis of the combination of these
16 references, you start with Kim, and then you
17 modify it with the other references; right?

18 A Do you want me to read that
19 paragraph?

20 Q No. I'm just asking -- or just
21 confirming that in your declaration you start
22 with Kim --

23 A Yes.

24 Q -- for purposes of your analysis;
25 right?

1 A Yes.

2 Q And so you're -- as you go on in
3 this section, you're modifying Kim using the
4 other references; right?

5 A Well, I'm not sure whether you
6 call it modifying Kim. I rely on additional
7 references in combination. So, I mean --

8 Q And it's your opinion -- sorry.

9 A I'm sorry.

10 What I mean, that by modifying
11 Kim, I mean, it's not a one-way thing. I
12 think it's a combination. So it's not that
13 one is modifying the other one.

14 Q But it's your opinion that a
15 person of skill in the art would have been
16 motivated to pick and choose aspects of Kim
17 and combine them with aspects of the other
18 references; right?

19 MR. ARGENTI: Objection. Form.

20 THE WITNESS: I'm not sure whether
21 I would call it aspects of it. I think a
22 person of ordinary skill in the art would be
23 motivated to combine them. And those
24 motivations are provided by those references,
25 and that combination would have made the

1 disputed claims obvious.

2 BY MS. PARKS:

3 Q Okay. I'd like to go to
4 paragraph 71, which is on page 38.

5 A Yes.

6 Q In the first sentence, you write
7 that: "Invisalign corroborates Kim's
8 teachings regarding imaging an aligner in a
9 service position on teeth."

10 So it's your view that the
11 motivation to combine Kim and Invisalign is
12 that they both describe an aligner in the
13 service position on patient teeth; correct?

14 A That's one motivation, yes. I
15 might have pointed to other motivations. Yes.
16 I mean, the fact that they're both disclosing
17 that is a motivation to combine those two
18 references.

19 Q Okay. So about halfway down that
20 paragraph, there's a sentence that starts "The
21 first criterion," and it refers to "Invisalign
22 specifying that if an aligner is well seated,
23 there will be a distance of less than
24 1 millimeter."

25 What do you mean by "well seated"

1 in this sentence?

2 A Well, I mean the plain and
3 ordinary meaning of the term but also what
4 Invisalign is disclosing. That's what
5 Invisalign is saying, is that if it's well
6 fitted, then the distance between the edges
7 would be less than 1 millimeter and gives that
8 as a method of quantification of fitting an
9 aligner.

10 Q So when you're using "well seated"
11 here, you mean that the aligner is within
12 1 millimeter of the teeth?

13 A Based on the disclosure of
14 aligner, yes. I used that. I'm saying that a
15 POSA would have known to use that as a
16 threshold to say whether it fits properly or
17 not.

18 Q And is it your view that
19 Invisalign teaches that the only metric for
20 whether an aligner is well seated or not is
21 whether there's a distance of 1 millimeter or
22 less between the aligner and the teeth?

23 A It's one that is disclosed there,
24 and I think a POSA would have been motivated
25 to use that as a quantification tool for

1 measuring in images whether the aligner is
2 fitting properly or not.

3 Q And in the next sentence, you
4 refer to a poorly seated aligner. Does that
5 mean the same thing as a poorly fitting
6 aligner in this context?

7 A Again, as I said, aligner -- I'm
8 sorry. Invisalign reference is disclosing
9 that that threshold defines whether it's
10 fitting well or poorly fitting based on the --
11 this distance measurement, and that's what I
12 mean by that.

13 Q So is it your view that the
14 1 millimeter threshold of Invisalign relates
15 to both whether the aligner is fitting well
16 and whether it's seating well?

17 A He discloses that that's one way
18 of measuring or quantifying whether the
19 aligner fits well or not.

20 Q Is there a difference between a
21 poorly seated aligner and an unseated aligner?

22 A I don't know. This gets into, you
23 know, dentist description, I think. I'm not a
24 dentist. I cannot say if there is a dental
25 difference or orthodontic difference between

1 the two. No. I mean, I cannot say the
2 difference.

3 Q Can an aligner be seated on teeth
4 without fitting correctly?

5 MR. ARGENTI: Objection to form.

6 THE WITNESS: Well, again, as I
7 said, I'm just saying what Invisalign is
8 disclosing here. Invisalign is disclosing
9 that one way of measuring whether an aligner
10 is, you know, poorly seated or properly or
11 well seating is -- can be measured by or
12 quantified by measuring the distance between
13 the -- the edges of the teeth to edges of the
14 aligner.

15 BY MS. PARKS:

16 Q Yeah. I guess what I'm trying to
17 figure out is if there's any significance to
18 your choice of saying "poorly seated" in this
19 sentence as opposed to "poorly fitted."

20 A Well, the only significance is
21 that it depends -- it says whether that
22 distance is below the threshold or above the
23 threshold. So if the distance is bigger than
24 1 millimeter based on aligner's disclosure,
25 it's poorly seated. If it's below

1 1 millimeter, that distance, it's well seated.

2 Q No, but is there a difference --
3 like, in this sentence, you chose to say
4 "poorly seated" instead of "poorly fitted."
5 If we were to substitute the word "poorly
6 fitted" in this sentence, would it have a
7 different meaning?

8 A I mean, this discussion came --
9 this question came up I think a little bit
10 earlier, and I said that my understanding of
11 these two terms is the plain and ordinary
12 meaning of these terms. I'm interpreting in
13 terms of the plain and ordinary meaning of
14 these terms in English.

15 So if an appliance fits well, then
16 I'm assuming that it's seating -- you know,
17 well seating on every section of the -- I
18 mean, that the aligner is seating well on the
19 corresponding teeth -- tooth. I'm sorry.

20 Q Before your work on this case, had
21 you ever heard the phrase a "well seated" or
22 "poorly seated" aligner?

23 MR. ARGENTI: Objection. Form.

24 THE WITNESS: No, but as I said, I
25 saw on -- I mean, I read it in the Invisalign

1 disclosure. I might have heard -- take that
2 back. I said no. I might have heard in an
3 orthodontist's office as a patient, but, you
4 know, again, that's a general knowledge.

5 But I also, you know, read the
6 Invisalign and interpreted the terms that --
7 or the disclosures that he's making in terms
8 of plain and ordinary meaning of those terms.

9 BY MS. PARKS:

10 Q Okay. And then in that same
11 paragraph, a few words earlier you say, "This
12 type of separation is depicted in a digital
13 photograph."

14 How do you know that the
15 photograph in Invisalign is a digital
16 photograph?

17 A Well, so you are making -- you
18 want to make a distinction between digital as
19 opposed to using an old-fashioned film and
20 develop that? Is that what you are referring
21 to? Because, you know -- yes.

22 I mean, I just assume that in
23 modern days, even in dentist office I've been,
24 they are using SLR cameras. Those are all
25 digital. And the cell phones we use are all

1 digital.

2 And I made the assumption that
3 today we are -- at the priority date. I'm
4 sorry. Not today.

5 The priority date in 2017, by far,
6 digital cameras were the dominating cameras --
7 type of cameras in the market, and maybe
8 specialized photographs -- people working in
9 photography would use films for -- because of
10 many reasons: the quality, etc., or artistic
11 point of view. I have no idea.

12 But, yes, I assume that these are
13 digital photographs because that -- that would
14 have been the trend before -- way before,
15 even -- the priority date of the -- of the
16 '248 patent.

17 Q I'm sorry. In that answer did --
18 was that a DSLR camera that you referred to?

19 A I'm sorry. Can you repeat the
20 question? No. I was referring to SLR type of
21 cameras that, you know, dentists use in
22 offices as opposed to, let's say, camera on
23 our cell phones. I've seen that they're all
24 digital cameras.

25 Of course, the actual image

1 itself -- also, all the images -- I mean,
2 they're all digital because they are in a
3 digital document. Whether they were
4 originally digital or not -- and maybe they
5 were digitized.

6 I mean, Invisalign does not make a
7 disclosure of that, that this was analog
8 cameras and then they digitized it and put it
9 in this document or saying the manufacturer
10 needs to digitize it. So I assume that as it
11 is common practice and was common practice by
12 the priority date, everybody was using digital
13 cameras.

14 And, again, as I said, by the very
15 fact that cell phones are digital also, I'm
16 considering all images we are dealing with are
17 digital, yes.

18 Q In that same sentence, you start
19 by saying "This type of separation." In your
20 opinion, is separation different than
21 distance?

22 A We are getting into probably
23 the -- again, semantics of words here.
24 "Separation" means how far one object is from
25 another one, and distance is a measure of that

1 maybe, what is -- probably it could be used
2 interchangeably.

3 I mean, I would use them
4 interchangeably, that -- the distance. But,
5 however, maybe sometimes when I refer to
6 distance I mean specific number, I would say,
7 you know, so many millimeters or -- but that
8 could also apply to the word "separation."

9 If two things are separate, it
10 means that they are not in contact or touching
11 each other. So that would imply that there's
12 some distance between them. So maybe that's
13 one way of describing it.

14 May I qualify further? I even
15 used, I think, the word "gap" in my
16 declaration. So if two objects are distant or
17 separated. So the -- I assume that there's a
18 gap between them, and that's what I mean by
19 that.

20 Q Okay. At the bottom of page 38,
21 the last sentence -- I think it moves on to
22 the next page -- starts, "Describing the gap
23 in terms appropriate for computer-vision."
24 And then if you turn the page, later on in
25 that sentence you refer to "the occlusal end

1 of the teeth."

2 What does the occlusal end of the
3 teeth mean?

4 A Well, again, this is my general
5 knowledge about teeth. So the portion -- the
6 edges of teeth are not in contact with other
7 teeth or the gum.

8 Q And what's the occlusal surface of
9 the aligner?

10 A The corresponding portions that
11 are -- the corresponding edges on the aligner.

12 Q So would the occlusal surface of
13 the aligner be the interior surface of the
14 aligner that is adjacent to the teeth, or
15 would it be the outside exterior surface of
16 the aligner?

17 A Are you trying to get -- to say
18 that the aligner has some thickness that it
19 should be taken into account? Is that -- is
20 that your question?

21 Q Well, I'm just trying to
22 understand which contour you're referring to
23 here, if it's the interior contour of the
24 aligner or the exterior contour.

25 A Well, I mean, to my opinion,

1 Invisalign is, directly with those arrows,
2 pointing out to the outer edges of -- that's
3 what I see. The arrows are clearly not saying
4 that, hey, let's distinguish between interior
5 and exterior edges. It's pointing out to the
6 outside edges and says that if that -- the
7 distance of that from the corresponding edges
8 of teeth is more than 1 millimeter, then, you
9 know, that is not properly fitting.
10 Otherwise, it's properly fitting.

11 Q So when you are referring to the
12 occlusal surface of the clear aligner here,
13 you're talking about the outside edges of the
14 aligner?

15 A Yes. I mean, I think that's what
16 Invisalign is disclosing.

17 Q All right. Let's move to
18 paragraph 72.

19 A Yes.

20 Q Okay. So this is the second
21 sentence of paragraph 72. You write: "This
22 combination would be applying known methods
23 for orthodontic evaluation of aligner fit
24 based upon the appearance of the aligner worn
25 on the patient's teeth, as taught by

1 Invisalign, in order to analyze a photo or
2 video of the aligner worn by the patient, as
3 taught by Kim."

4 Just to be clear, the known
5 methods of a photo or video of the aligner
6 worn by the patient that you're referring to
7 in this sentence, those come from Kim;
8 correct?

9 A No.

10 MR. ARGENTI: Object to the form.

11 THE WITNESS: I'm referring to
12 both coming from the combination. So, in
13 fact, Invisalign also is -- you know, it's
14 referring to that. As we just discussed that.

15 Invisalign is saying that --
16 compare the distance between the edges, and
17 it's a method of quantifying that and says
18 that use 1 millimeter as a threshold.

19 So in that sentence, I'm relying
20 on both and not just Kim. It's the
21 combination that it's -- I'm referring to.

22 BY MS. PARKS:

23 Q But between -- I'm sorry.

24 Between Kim and Invisalign, only
25 Kim teaches analyzing -- or in your

1 estimation, only Kim teaches analyzing a photo
2 or video of an aligner worn by the patient;
3 right?

4 A Oh, I see. So your question is:
5 So does Invisalign teach remote assessment
6 using images? And I answered that question
7 earlier. I said no, I am not relying on a
8 disclosure like that from Invisalign. Yes.

9 So the -- the concept of remote
10 service -- orthodontic service, I'm saying
11 that a POSA would learn that from Kim, but
12 Invisalign -- combination with Invisalign
13 provides this added value, additional
14 information, that how does the dentist perform
15 those evaluations and how they are reflected
16 in images and example of images that
17 Invisalign is showing and disclosing in the
18 document. And I'm saying that a POSA would
19 have been motivated to combine these two.

20 Q Yeah, but even setting aside a
21 remote analysis, Invisalign doesn't teach any
22 analysis of a photo or video of the aligner
23 worn by the patient; right?

24 A No, that's incorrect.
25 Invisalign -- I'm mean, Invisalign is talking

1 about, you know, specifically methods of
2 quantifying how well it fits and whether it's
3 seating properly.

4 I don't -- maybe I'm
5 misunderstanding your question, but no.
6 Invisalign is talking about, you know, how do
7 we know the treatment is working or not in a
8 sense that how well the aligner fits.

9 Q But Invisalign doesn't teach doing
10 that assessment via a photo or a video; right?
11 It's done in person in Invisalign.

12 A The assessment, that's what I said
13 when I brought back to this idea of remotely.
14 Assessment by a doctor, an orthodontist, yes,
15 I said that is not true; Invisalign is not
16 disclosing that.

17 Invisalign is not talking about
18 remote assessment or providing remote
19 orthodontic services by a doctor to a patient,
20 but Invisalign is disclosing other information
21 like, you know, how do we know if an aligner
22 is fitting well or how do we know it's seating
23 well on the teeth, and how do we quantify
24 that? And I'm saying that those are -- those
25 are motivating points for a POSA to combine

1 this with the teachings of Kim.

2 Q Okay. But Invisalign on its own
3 does not teach analyzing a photo or a video;
4 right?

5 A On its own, no. But I'm not
6 relying on Invisalign on its own for my
7 combination. I'm relying, in fact, on four
8 references on my -- in my combination.

9 Q Okay. So still in paragraph 72,
10 in the last paragraph on -- or sorry -- the
11 last sentence on page 40, do you see the
12 sentence starting "Additionally, a POSA would
13 have understood that the type of image
14 analysis suggested by Kim and Invisalign could
15 readily be applied on images or videos showing
16 a clear orthodontic aligner"?

17 A Yes, I see that.

18 Q In this sentence, when you say
19 "image analysis," you're referring to
20 computer-aided image analysis; right?

21 A No. In the case of Invisalign,
22 image analysis might have been performed by --
23 you know, as I said, it's not remote; so it is
24 in the office. Maybe pictures are taken and
25 also the doctor is using -- I'm not sure.

1 I know that Invisalign is
2 disclosing that accurate impressions and
3 images need to be transferred to the
4 manufacturer, to Align Technology.

5 So images are taken and, clearly,
6 Invisalign discloses that. And Kim, of
7 course, is disclosing that such images are
8 taken by cell phones and are transmitted to --
9 to the orthodontist for remote orthodontic
10 services.

11 So I'm not sure what you mean by
12 that question. Yes, analysis of the images
13 and videos are performed. In one case, it's
14 remotely by a doctor. In the case of Kim,
15 remotely by a doctor. The images and videos
16 provided by the patient are sent to the doctor
17 by the patient.

18 In the other case, these images or
19 videos are taken in the office, and maybe they
20 are analyzed by the doctor in the office or
21 maybe physical analysis. I'm not relying on
22 image assessment in my combination. That is
23 done by Invisalign. But whether they do it or
24 not, I don't know.

25 Q Are you aware of any instruction

1 at Invisalign that orthodontists should look
2 at images or videos for treatment?

3 A As I said, no, I'm not aware of
4 any disclosure like that; but, as I said, I'm
5 not relying on that combination. I'm relying
6 on other pieces of information that is
7 Invisalign giving me like how to quantify, you
8 know, how well the aligner is fitting.

9 Q Moving on to paragraph 73, you
10 cite to a reference by Dr. Scott Frey in this
11 paragraph.

12 Frey is not part of your proposed
13 obviousness combination; right?

14 A That is right.

15 Q Is it your opinion that Frey
16 confirms that persons of ordinary skill were
17 motivated to use images of aligners on teeth
18 for orthodontic evaluation?

19 A I'm saying that's an example of a
20 publication that was there prior to July 2017
21 that shows that people were aware of -- and by
22 "people," I mean orthodontist in this case.
23 So I was aware that this was a possibility
24 that one could do remote assessment of
25 orthodontic treatment and provide remote

1 services. I'm saying that here it is an
2 example of that.

3 But, as you said, I'm not relying
4 on that in my combination and the proof of
5 obviousness.

6 Q And you don't cite to any other
7 publications other than Frey for that point;
8 right?

9 A No, I don't. But as I said --
10 again, I'm repeating myself -- I just said
11 this is one example out there, and -- but I'm
12 not relying on this on -- in my combination.

13 Q Yeah. No, I understand. You're
14 just -- you're relying on Frey, as you say, to
15 confirm the motivation to combine Kim and
16 Invisalign; right?

17 A Well, one -- I'm just saying that
18 people were aware of this, that this was
19 possible, yes.

20 Q How did you identify the Frey
21 reference?

22 MR. ARGENTI: Objection. Form.

23 THE WITNESS: I don't recall. I
24 might have --

25 BY MS. PARKS:

1 Q Can you --

2 A -- searching online again.

3 Q Before your work on this case, had
4 you heard of the Ortho Cosmos website?

5 A Not that I recall, no.

6 Q And had you heard of Dr. Scott
7 Frey before your work on this case?

8 A No.

9 Q Does Frey disclose information
10 that isn't found in the ground references for
11 your obviousness combination?

12 A Can you repeat that question.

13 MR. ARGENTI: Objection. Form.

14 BY MS. PARKS:

15 Q Is there information in Frey that
16 is not found in the ground references for your
17 obviousness combination?

18 MR. ARGENTI: Objection. Form.

19 THE WITNESS: Again, as I said,
20 I'm not relying on Frey in any part of my
21 combination, and I'm not relying on that for
22 obviousness. So it's not involved -- Frey is
23 not involved in my combination in any way or
24 form.

25 ///

1 BY MS. PARKS:

2 Q Frey is the only reference you
3 point to that teaches remote evaluation of
4 aligner fit from patient-created images;
5 right?

6 A No. I disagree with that. Kim is
7 disclosing that.

8 Q And that would be paragraph 66 of
9 Kim?

10 A One paragraph that I'm citing,
11 yes. And I think we discussed this earlier.

12 So as I said, Kim discloses
13 that -- let me clarify. Kim discloses that
14 the remote assessment of images or videos sent
15 by the patient could be used -- by "remote
16 assessment," I mean remote assessment by the
17 orthodontist -- could be used to determine
18 whether the -- the aligner is normal or not
19 and whether it corresponds to the current
20 treatment, current step of treatment.

21 And I'm further using Invisalign
22 to say that -- okay. What does that mean?

23 It means in terms of fitting
24 and -- I mean, a POSA would have understood it
25 that way in terms of fitting and seating of a

1 aligner and how to quantify that.

2 So -- so I disagree that -- you
3 know, I didn't use Dr. Scott Frey for any one
4 of my combinations, and definitely he is not
5 the person I'm relying on on remote assessment
6 of images and videos. I'm relying on a
7 combination using the references that I have
8 provided.

9 Q Frey doesn't disclose any
10 techniques that would require anything more
11 than the tools readily available to an
12 orthodontist; right?

13 A I don't understand what you mean
14 by "tools readily available to orthodontist."
15 I'm not sure what that question means.

16 Q I can ask it more simply.
17 Does -- Frey doesn't disclose any
18 computer-implemented image analysis; right?

19 A No. He discloses that he uses
20 some services by Google and YouTube to comply
21 with HIPAA and -- again, if you go back to
22 what I was saying before, I don't think it
23 really matters because I'm not relying on this
24 in my combination, and I'm not using this for
25 obviousness. So I think it doesn't really

1 matter whether he discloses that or not.

2 Q Okay. Let's go to paragraph 74.
3 So right at the start of paragraph 74, you
4 write: "A POSA would have known how to
5 determine the width of such gaps using image
6 processing software. As I discussed briefly
7 above, the distance between depicted teeth and
8 a depicted aligner corresponds to the distance
9 from the edge of one to the edge of the
10 other."

11 So when you say "as I discussed
12 briefly above" here, are you referring to the
13 photograph that you replicate from Invisalign?

14 A Among -- among other things, but
15 also the entire disclosure of the Invisalign,
16 I'm referring to that. Not just the
17 photographs but the teachings, generally the
18 teachings of Invisalign.

19 Q Okay. And then a little bit
20 further down in that paragraph you write:
21 "Like Kim, Salah teaches application" -- I'm
22 sorry. Let me strike that.

23 A little further down you write:
24 "Like Kim, Salah teaches application of
25 computer image analysis to dental images for

1 orthodontic treatment purposes."

2 Where in Kim does it disclose
3 computer image analysis?

4 A Kim is disclosing that -- that,
5 you know, images and videos are sent to
6 orthodontists to perform the analysis of
7 whether the -- as I mentioned earlier, whether
8 the aligner is normal and it corresponds to
9 the current or the proper step of the
10 treatment.

11 So these analyses, even if we
12 assume that they are not done by a computer
13 software, it still doesn't matter because
14 Salah is teaching that, and it's part of the
15 combination.

16 So that's why I say like Kim Salah
17 teaches that, but, you know, I'm talking about
18 the analysis of the images, but Salah is
19 teaching the computer image analysis. So I
20 mean --

21 Q Okay. So --

22 A I'm sorry. May I continue? Maybe
23 it's --

24 Q Absolutely.

25 A -- misunderstood what I'm saying.

1 I'm saying that, like Kim, Salah teaches
2 application of computer -- I don't mean -- I
3 mean that Salah is teaching analysis of the
4 images, but Salah is doing it with computer,
5 you know, vision techniques or computer image
6 analysis.

7 That doesn't mean that Kim is not
8 doing that, but -- okay. Kim is not -- maybe
9 not explicitly disclosing it, but that doesn't
10 matter in my combination. I'm saying that Kim
11 is talking about it, this image analysis. So
12 is Salah, and Salah is saying that "I'm going
13 to use computer vision and image processing
14 methods to do that."

15 Q Okay. Let's just jump to
16 paragraph 78, please.

17 A Yes.

18 Q Okay. So about halfway down
19 paragraph 78, you refer to "a deep learning
20 architecture as taught by Maninis, trained on
21 images relevant to the dental imaging
22 applications of Salah, Kim, and Invisalign."

23 Do you see that?

24 A Yes.

25 Q How large a learning base would be

1 required for this training?

2 MR. ARGENTI: Objection. Form.

3 THE WITNESS: I think you want me
4 to put a number. I don't think that's the --
5 I can't do that, you know, like that. But,
6 you know, the -- Maninis is disclosing saying
7 that maybe you can have 10,000 or more images
8 and . . .

9 Okay. So that's disclosure for
10 one application. It could be less or more. I
11 mean, it -- it depends. You know, once the
12 data collected, then that question can be
13 better answered.

14 But, also, it is also known that
15 in deep learning, you do not have to start
16 from a completely random, you know,
17 configuration of a deep learning model, and
18 you can start with pretrained model. And many
19 applications -- probably in most applications,
20 you do that.

21 In fact, Maninis is disclosing
22 that. If you go to Maninis, it's saying that
23 I'm picking up from my base CNN a pretrained
24 model, and I'm going to basically adapt it for
25 this particular application that I'm looking

1 for.

2 BY MS. PARKS:

3 Q So you think the number 10,000 or
4 so from Maninis is the right benchmark, about,
5 for training a deep learning device that
6 you're discussing here?

7 MR. ARGENTI: Objection. Form.

8 THE WITNESS: No, that's not what
9 I said. I said that, yes, one number that
10 Maninis discloses, and it could be less or
11 more. It's around the same number for -- for
12 dental image analysis. I cannot put some
13 hypothetical number on that, and I haven't
14 done that in my declaration.

15 BY MS. PARKS:

16 Q And the best learning base that
17 you could use for the dental applications
18 you're discussing here would be a base of
19 historical photographs of real patients
20 wearing aligners; right?

21 A Well, did you say the best
22 learning base? Is that what you said?

23 Q Yes.

24 A So what do you mean by "best
25 learning base"?

1 Q In an ideal world, if you were
2 training the deep learning device you're
3 discussing in paragraph 78, you'd want to
4 train it on historical photographs of real
5 patients wearing aligners; right?

6 A So if you mean by that -- by the
7 word "best" you mean that the data should be
8 collected in a most realistic fashion, yes, I
9 would say that that would be the ideal
10 scenario.

11 So, basically, if you want to
12 train on data collected by the patient using
13 cell phones, then -- so we would ideally like
14 to collect it under those conditions to have
15 a, you know, good training sense.

16 Q And once you had your set of
17 images, you would have to label them with
18 attributes like tooth numbers or aligners to
19 further train the deep learning device; right?

20 A That would have been one way of
21 doing it. Not all deep learning devices -- I
22 mean -- device.

23 Not all learning methods require
24 that you have a labeled dataset for your
25 training set. In fact, there are deep

1 learning methods out there that, you know,
2 they're -- we refer to them in my field as
3 unsupervised methods that do not require
4 labels or attributes.

5 But it could be, yes. It could be
6 that you -- you know, we could use either
7 fully labeled dataset or partially labeled
8 dataset. That would be called semi-supervised
9 method, or even an unsupervised method, which
10 is no labels.

11 Q Okay. Why don't we move to your
12 declaration with respect to the '945 patent.
13 Let me just get that on the exhibit-share
14 platform. I'll do the right document this
15 time.

16 Okay. So do you have your
17 '945 patent declaration in front of you?

18 A I'm pulling it out, if you give me
19 a second.

20 That's, again, Exhibit 1002 but
21 '945 patent; is that correct?

22 Q Correct.

23 A Yes, I have that.

24 Q And on page 66, is that your
25 signature?

1 A Yes.

2 Q Are you aware of any errors in
3 this declaration?

4 A Not that I'm aware of.

5 Q And with respect to the
6 '945 patent, it's your opinion that each of
7 the challenged claims is obvious over the
8 combination of Kim, Invisalign, and Salah;
9 right?

10 A That's correct.

11 Q Okay. So if we turn to --
12 starting at paragraph 56 on page 26.

13 A Yes, paragraph --

14 Q You have a section called --

15 A Paragraph 56, you said?

16 Q Yes.

17 A Yes, I'm there.

18 Q The section that's called "The
19 combination of Kim, Invisalign, and Salah."

20 A Yes, I'm there.

21 Q Are the -- is it your opinion that
22 the motivations to combine Kim, Invisalign,
23 and Salah for purposes of the '945 patent are
24 largely the same as those for the '248 patent?

25 A Yes. I mean, in the sense that

1 largely -- I mean, I don't want to quantify
2 what does largely the same means, but yes.
3 Motivations are more or less very -- very much
4 overlapping. The only difference here is that
5 the deep learning is not in the picture. We
6 are not considering deep learning. That's why
7 I'm not relying on Maninis in my combination.

8 Q And when you say that deep
9 learning is not in the picture, that -- you
10 mean it's not claimed in the claims of the
11 '945 patent?

12 A I mean I don't care whether
13 they're in the claims or not, but I'm just
14 saying that a POSA would -- could go in --
15 with this combination, and that would have
16 made, you know, the challenged claims obvious.
17 I mean, I'm just saying that that's a
18 possibility, the POSA would have chosen a
19 combination of Kim, Invisalign, and Salah and
20 saying, "Okay. I don't want to do deep
21 learning. I want to go a different route.
22 I'm going to use other disclosures of image
23 analysis, methods of Salah."

24 And that would -- there is
25 motivation for that, and there is also -- and

1 that combination would also work.

2 Q Is it -- in your opinion, are the
3 motivations to combine the references for the
4 '248 patent the same as the motivation to
5 combine the references for the '945 patent, or
6 are there other differences?

7 A Well, as I said -- I think the
8 first question you asked, I said largely the
9 same, or something similar to that.

10 I said, yeah, I think they mostly
11 overlap. The only -- the only thing is that a
12 POSA could have said, "Okay. I'm not going to
13 rely on deep learning."

14 But other than that, Salah is
15 disclosing a whole set of other algorithms for
16 extracting discriminant information, not
17 necessarily deep learning. A POSA could have
18 decided to use a combination that does not
19 include deep learning.

20 So, yes, the answer to your
21 question today to some extent is that it's the
22 same set of motivations except that a POSA
23 would have said that, "You know, I'm" --
24 "I'm" -- "You know, I'm not going to use deep
25 learning." And that's a possible choice a

1 POSA could have.

2 Q Let's jump to paragraph 62, which
3 is on page 32.

4 A 62, you said?

5 Q Yes.

6 A Yes, I'm there.

7 Q From the -- at the very end of
8 that paragraph, you say: "Salah teaches that
9 analysis of acquired images may include
10 determining contours of objects in an image,
11 including by using image processing software
12 for contour or edge detection."

13 As you're using those terms in
14 this paragraph, do contour and edge detection
15 mean different things?

16 A No. I mean, this is a -- this
17 relates to how these two terms are used. And,
18 in fact, I think in my background, I'm talking
19 about this. I'm saying that even other words
20 like "boundaries" are used.

21 And so in the literature, some
22 people make distinctions and some don't.
23 They're -- edge detection is -- and contour
24 detection, those are very old subjects in
25 image processing computer vision, and there

1 are literally thousands of papers published in
2 this area. And some people refer to those
3 terms as synonymous or interchangeable, and
4 some may not do that. I make distinctions,
5 but I think to the large -- to a large extent,
6 they're kind of referring to the same idea and
7 are interchangeable.

8 Q Okay. And then if you could go
9 back in the document to paragraph 48.

10 A Paragraph 48, you said?

11 Q Yes.

12 A Yes.

13 Q So about halfway down that
14 paragraph, you write: "Salah's analysis of
15 images can include using contour detection on
16 an acquired image to determine edges of
17 intraoral structures such as teeth and aid
18 mapping to a reference model."

19 Where -- or does Salah explicitly
20 disclose contour detection of any intraoral
21 structures other than teeth?

22 A The very fact that you're
23 segmenting teeth also means that you -- even
24 if we assume that it's only for teeth, the
25 very fact that it's disclosing teeth and

1 anything else, that means that they also
2 segmented out anything else in there too.

3 But, you know, a POSA would have
4 known, of course, that edge detection is not,
5 you know, necessarily -- it's like more recent
6 edge detection methods like deep
7 learning-based methods that just detect what
8 you want, like an object. Edge detection
9 inevitably can recover and may be used,
10 therefore, in -- for the analysis of image of
11 not just the teeth and other parts of the --
12 of other parts of the intraoral structures,
13 including appliances.

14 Q So as you're using "intraoral
15 structures" here, it can refer either to
16 biological components like teeth or some kind
17 of device that's in the mouth?

18 A It could, because edge detection
19 is going to detect everything.

20 Q Is it your understanding that an
21 orthodontist would use intraoral to refer to
22 both biological and nonbiological elements in
23 the mouth?

24 A I don't know what a dentist would
25 refer to, but obviously in combination with

1 Kim, for instance, then it would have been
2 obvious -- and Invisalign -- it would have
3 been obvious that we want to detect not only
4 the teeth, but we want to also detect the
5 aligner.

6 Q A couple of times today I've asked
7 you a question about an orthodontist, and
8 you've answered by saying "dentist."

9 Are you using "orthodontist" and
10 "dentist" interchangeably?

11 A I've been using probably today
12 interchangeably, but I understand that they
13 are -- I mean, these patents and the
14 references I'm providing for proof of
15 obviousness, they are in the orthodontic area.

16 I mean, orthodontist, from my
17 point of view, are also dentists. So that's
18 why I refer to them as dentist. So if you
19 want me, I can just restrict myself to say
20 orthodontist.

21 Q No, no. That's fine. I just was
22 curious.

23 Are you aware that Dr. John Mongan
24 also submitted declarations relating to the
25 '248 and '945 patent?

1 A I am -- I have not seen any
2 declarations. I have not read any
3 declarations regarding '248 and '945 patent
4 from Dr. Mongan.

5 Q Are you familiar with Dr. Mongan?

6 A I do not know him personally.
7 And, of course, I had a deposition for another
8 patent that you probably know, '409 patent.
9 That was the first time I came across -- after
10 the deposition came across some -- you know, I
11 got some knowledge of his background.

12 Q So after your prior deposition,
13 you learned more about Dr. Mongan's background
14 and credentials; fair?

15 A You could say so. I haven't seen
16 his CV. I have just seen some part of the
17 qualifications.

18 And beyond that, I don't know him
19 personally because I have never seen him
20 publishing in the field of image
21 processing and computer imaging, in my area,
22 let's say. So I think we have not overlapped
23 in terms of conferences or places that we
24 attend probably or those conferences. I've
25 never come across him. This was my first

1 time, and I learned about him after the
2 '409 patent deposition.

3 Q And do you have any reason to
4 dispute the part of his qualifications that
5 you reviewed?

6 A I have --

7 MR. ARGENTI: Objection to the
8 form.

9 THE WITNESS: -- neither any
10 reason to dispute or not to dispute.

11 BY MS. PARKS:

12 Q Do you have any reason to dispute
13 that he was a person of ordinary skill in the
14 art in 2017?

15 MR. ARGENTI: Objection. Form.

16 THE WITNESS: Well, I think the
17 board has accepted him as a person of ordinary
18 skill, and that's fine with me. And I don't
19 know if I'm right on that or not, but I think
20 that the board has accepted.

21 I don't know. I haven't done
22 assessment of -- as I said, I have not seen
23 Dr. Mongan's CV or go over his qualifications;
24 so I cannot make any statement regarding that.
25 So, I mean, I cannot -- either way, I cannot

1 provide any opinion on Dr. Mongan's
2 qualifications.

3 MS. PARKS: Okay. Is this a good
4 time to take our lunch break?

5 MR. ARGENTI: That sounds good.

6 THE WITNESS: Sounds good to me.

7 (Luncheon recess from 1:06 p.m. to
8 2:00 p.m.)

9 BY MS. PARKS:

10 Q So I'd like to go back to your
11 '248 patent report, if you still have that
12 around.

13 A Yes. That's my '248 declaration.

14 Q Yes, declaration.

15 Okay. So on page 47, starting at
16 paragraph 82, this is where you go through
17 each of the challenged claims of the
18 '248 patent; right?

19 Do you see that?

20 A Yes.

21 Q Okay. Great. So starting in
22 paragraph 83, you include the language from
23 the preamble of the claim, and the -- it
24 refers to the shape of an orthodontic aligner.

25 Is that shape of the orthodontic

1 aligner here, is that the shape of the aligner
2 relative to the teeth?

3 MR. ARGENTI: Objection. Form.

4 THE WITNESS: I don't know. It
5 says shape of the aligner. I read it as, you
6 know, what it says. It says what it says, the
7 shape of the aligner.

8 Relative to the teeth? I don't
9 want to interpret that.

10 BY MS. PARKS:

11 Q So do you think it means that you
12 have to determine the shape of a -- of the
13 aligner as a whole?

14 MR. ARGENTI: Objection. Form.

15 THE WITNESS: Maybe. Maybe not.
16 I don't know. It says -- it just says shape
17 of the aligner. I mean, it says what it says
18 in plain English. I don't want to interpret
19 beyond what it says.

20 BY MS. PARKS:

21 Q And in paragraph 84, when you're
22 discussing Kim and Invisalign, you're talking
23 about the portions of those references that
24 you say teach an aligner fitted onto teeth;
25 right?

1 A I'm talking about the -- of
2 course, when I refer to Kim and Invisalign, I
3 talk about the entire document, not specific
4 portions of it.

5 Q But it's your opinion that Kim and
6 Invisalign teach assessing the shape of an
7 orthodontic aligner?

8 A I -- yes. I say that, in my
9 opinion, Kim and Invisalign teach the
10 preamble.

11 Q So, for example, you say that Kim
12 teaches evaluating an aligner by looking at
13 the aligner currently worn by the patient;
14 right?

15 A Which line in paragraph 84 are you
16 referring to?

17 Q The very first sentence.

18 A Oh, I see. Yes. Yeah, I see
19 that. Yes, I do.

20 Q Yeah. So you're saying here that
21 "Kim teaches evaluating an aligner by
22 reviewing an image of the aligner currently
23 worn by the patient," which, in your view,
24 means that the aligner is physically being
25 worn by the patient at that moment; right?

1 A That is correct, and I think I
2 covered that much earlier today.

3 Q And then you say that Invisalign
4 teaches assessing the aligner because it
5 teaches assessing the fit of the aligner;
6 right?

7 A Yes. Fit of the aligner, yes.

8 Q Okay. All right. So let's go to
9 page 55, paragraph 93. Let me know when
10 you're there.

11 A I'm there.

12 Q Okay. So here you're talking
13 about Step 1(b") of Claim 1, and it refers to
14 a deep learning device; correct?

15 A Yes.

16 Q And I think we already covered
17 this, but just to be clear, a deep learning
18 device has to be trained; right?

19 A Otherwise, it cannot do the -- do
20 the task that you're expecting to do. Of
21 course, it has to be trained, yes.

22 Q So, in other words, the training
23 that you do for the deep learning device makes
24 it capable of analyzing an image and
25 recognizing patterns in it?

1 MR. ARGENTI: Objection. Form.

2 THE WITNESS: It depends what
3 you're using it for. So, I mean, deep
4 learning is used for -- you're asking a
5 general question. Deep learning is used for
6 many things. Doesn't have to be image
7 analysis. Or even can be used for many
8 applications that has nothing to do with image
9 analysis.

10 But -- and it could be a
11 pretrained model also, which means that you
12 don't need -- you do not need to perform
13 probably the training process.

14 But, generally speaking, I
15 understand what you are saying. I think I
16 understand what you are saying. Yes, the
17 model has to be trained or might be pretrained
18 to perform, in this case, image analysis.

19 BY MS. PARKS:

20 Q Yeah. So the training makes it
21 capable of the image analysis. It also makes
22 it capable of recognizing patterns in the
23 image?

24 A Again, I mean, you're putting it
25 in general terms recognizing patterns. And, I

1 mean, image analysis, probably a better way of
2 putting it, because, I mean, I don't know what
3 you mean in the context of this '248 patent.

4 You know, what do you mean
5 recognizing patent? I'm not sure.

6 But, yes, generally speaking, deep
7 learning needs to be either trained or be a
8 pretrained model to perform the task that
9 you're looking for. That task might be
10 anything. It could be recognizing a pattern,
11 but it could be many other things.

12 Q Okay. Yeah, and I'm sorry. I
13 wasn't trying to trick you. I was, you know,
14 talking about deep learning in the context of
15 the claim, which talks about image analysis.
16 But I think we got on that same page.

17 Is it your opinion that a -- or
18 from -- as I understand it, anyway, it's your
19 opinion that a person of ordinary skill in the
20 art would have been motivated to use a deep
21 learning device to determine a tooth attribute
22 as recited here in Step 1(b") of Claim 1?

23 A Yes, that is my --

24 MR. ARGENTI: Objection.

25 THE WITNESS: -- opinion.

1 Excuse me.

2 BY MS. PARKS:

3 Q Okay. Now if you could go to
4 page 67, Claim 2.

5 A Yes.

6 Q You see that in paragraph 110
7 [as read]: "Claim 2 resides 'The method as
8 claimed in Claim 1, comprising, after the
9 steps assessing the'" -- or "'assessment of
10 the suitability of the aligner as a function
11 of the value of said tooth attribute.'"

12 What is your understanding of the
13 word "suitability" as it's used here?

14 MR. ARGENTI: Objection. Form.

15 THE WITNESS: Well, I'm talking
16 about the combination here that includes --
17 excuse me. I'm losing my voice -- that
18 includes --

19 BY MS. PARKS:

20 Q It has been a long day.

21 A -- Kim and Invisalign, and
22 Invisalign says that, you know, it is one way
23 to see the suitability in terms of, for
24 instance, how it fits and the seating.

25 And Kim also refers to the aligner

1 being normal and appropriate for the -- for
2 the step of treatment. So I'm -- by
3 "suitability," I'm referring to that.

4 Q Okay. So, for example, in the
5 first sentence of paragraph 111, you say:
6 "Invisalign teaches to use a threshold to
7 assess aligner acceptability."

8 Is aligner acceptability the same
9 as suitability?

10 A Yeah. I mean, it could be. But,
11 as I said, also -- Kim also is disclosing that
12 is it the correct one that -- I mean, the
13 correct aligner that the patient is wearing?
14 So that could be part of also the word
15 "suitability."

16 But here, I'm going into more
17 specific. I'm saying that here is an example
18 where Invisalign is saying how we measure and
19 quantify that.

20 Q All right. I don't have too
21 many -- too many more questions today,
22 hopefully.

23 If you can bear with me. I'm
24 sorry that you're getting hoarse. I
25 understand. It happens to me too.

1 On the next page, on
2 page [sic] 116 -- at the very end of
3 paragraph 116, you say: ". . . since the
4 purpose of performing evaluations of aligner
5 fit is to inform the people involved in
6 patient treatment, such as the orthodontist
7 and the patient, about the results of the
8 analysis."

9 What is your basis for saying that
10 this is the purpose of performing evaluations
11 of aligner fit?

12 A Kim is disclosing there -- as he's
13 saying, that one of the purposes at least --
14 he said that a POSA would find it obvious
15 because Kim is disclosing that the terminals
16 of the patient, the orthodontic patient, and
17 the orthodontist are on a network, and they're
18 exchanging information based on, you know, the
19 information sent from the patient in terms of
20 images, videos, and feedback to the patient,
21 whether, you know, it's suitable or if the
22 aligner being worn is the correct one for the
23 current step and is it normal.

24 Q You don't cite to Kim here in
25 paragraph 116, do you?

1 A No, I don't see citing to Kim
2 here, but whether -- I don't think it makes
3 any difference. I could say also that a POSA
4 would say -- I mean, what is the purpose of
5 assessment? So, you know -- so you need to
6 give some feedback.

7 You know, if, for instance, the
8 patient is wearing the wrong aligner or the
9 aligner is not -- is not fit or normal, as Kim
10 refers to it, then obviously I assume that
11 common sense would say that a normal action to
12 take is that the doctor informed the patient
13 saying that, "Well, there is something wrong.
14 We need to take a corrective action."

15 My point of view is that this
16 would have been obvious to a POSA. If we are
17 doing an assessment, there is a reason behind
18 it, because we want to either give a feedback
19 and take a corrective action, or maybe it
20 requires manufacturing a new one or a step --
21 I don't know.

22 I mean, I'm just saying that it
23 makes sense not to just do the assessment just
24 for the sake of assessment. There's a purpose
25 for that. I think that's -- that would have

1 been obvious to a POSA.

2 But, of course, Kim also, as I
3 said, is disclosing that. That information is
4 going in both directions between patient and
5 doctor and doctor to patient.

6 Q You can put that declaration
7 aside, and we'll go back to your '945 patent
8 declaration and look at that same section. So
9 that starts on page 34. Yes.

10 A What was that page number again?

11 Q It starts on page 34, but I'm
12 actually going to direct you to page 36 first.

13 A 36. Okay. I'm there.

14 Q So in this paragraph 71 -- I'm
15 sorry. Paragraph 70 -- sorry. Sorry. Yes in
16 paragraph 70. So at the top of page 36, right
17 before paragraph 71.

18 The first sentence there, it says:
19 "Step 1(1) indicates that the aligner and
20 dentition images may be different or the same.
21 In other words, this claim element may be
22 satisfied by acquiring only a single image
23 representing both an aligner worn by a
24 patient's teeth and the patient's teeth
25 themselves." And you say that your analysis

1 set forth further down in your declaration
2 focuses only on this aspect of Claim 1.

3 So in your declaration, you do not
4 address whether a method that acquires two
5 separate images is obvious; right?

6 A I did not, because I thought, you
7 know, if I'm satisfying, it's -- you know,
8 that claim says it's either/or. It could be
9 either separate images or same image. I'm
10 saying: Okay. So my understanding is that if
11 I satisfy one, that proves the obviousness.

12 Q Okay. And then on page 42, in
13 paragraph 81, you've reproduced Figure 6b of
14 Salah.

15 Do you see that?

16 A Yes.

17 Q The contours in Figure 6b only
18 show the outlines of teeth; right?

19 A I'm not sure. There are -- other
20 edge pixels are visible there. Whether they
21 are part of -- I don't know -- edge of a tooth
22 or -- I mean, there are some other edges
23 there. So other than some of them -- again,
24 I'm not a dentist, but just, you know, as a
25 POSA or, you know, as someone with general

1 knowledge, I could say, yeah, I can see the
2 teeth are there. But there might be some
3 edges that are detected that are not -- that
4 are not necessarily belonging to teeth.

5 Q But you can't say what they are
6 belonging to; correct?

7 A Well, not just by looking at this
8 single picture, no, unless I have the original
9 image. Just by looking at the edges like
10 this, I couldn't say every edge pixel belongs
11 to a tooth.

12 Q Okay. All right. So if you go to
13 the next page, on paragraph 83 -- and it's
14 quite a long paragraph. It spans --

15 A Yes.

16 Q -- almost four pages.

17 So in this paragraph, you're
18 relying on Salah's disclosure of Canny edge
19 detection; correct?

20 A Among others maybe. You know, I'm
21 saying probably picked Canny as one example
22 because as long as -- I mean, in this patent
23 the '945, I'm saying that the POSA would say
24 -- he or she would go with the alternative of
25 known deep learning method, and Salah is

1 disclosing a whole group of those nondeep
2 learning methods.

3 But Canny is one of them. Yes, I
4 see that I mention Canny there, but it doesn't
5 have to be Canny. It could be any of the
6 methods that Salah is disclosing.

7 Q And to prepare the image that's
8 captioned "Simple Edge Detection" on the top
9 of page 46 --

10 A Yes.

11 Q -- did you use Canny edge
12 detection for that?

13 A I used Canny edge detection and
14 bilateral filtering, which both of them were
15 disclosed by -- by Salah.

16 Q Did you perform this analysis to
17 go from the original image to the simple edge
18 detection by yourself?

19 A Yes.

20 Q Did anyone help you?

21 A No. I'm an image processing
22 computer vision person. I can program and
23 reproduce this whenever I want.

24 Q I don't doubt it.

25 So in looking at the simple edge

1 detection analysis, the labels that are here
2 that say "Tooth Edge" with an arrow and
3 "Separation" with an arrow and "Aligner Edge"
4 with an arrow, you applied those labels
5 yourself; right?

6 A That's correct. I annotated for
7 adding clarity, what we see there. That's
8 right.

9 Q So, in other words, Canny edge
10 detection isn't able to tell you what was the
11 tooth and what was the aligner in this image;
12 right?

13 A Canny edge detection returns a
14 binary value. It wouldn't be able to say
15 which edge is a tooth edge or any other edge.
16 That is -- that is a correct statement.

17 Q And Canny edge detection also
18 wouldn't be able to tell you what was the
19 region of the gap or separation; right?

20 A Not the Canny edge detector
21 itself, no. It doesn't mean that additional
22 techniques a POSA would have been aware of
23 couldn't be used to do that.

24 You know, some of them could be
25 simple techniques, some of them even probably

1 disclosed by Salah. I'm just -- I just used
2 for -- as a demonstration and illustration
3 purpose. I'm not saying that this is the only
4 thing a POSA would have done.

5 Q And, in fact, the Canny edge
6 detector wouldn't be able to distinguish
7 between the arrows that are added by the
8 Invisalign reference and the photograph of the
9 teeth; right?

10 MR. ARGENTI: Objection. Form.

11 THE WITNESS: Between the arrows?
12 I mean, the Canny edge detector was applied to
13 the image on the previous page, 45. There
14 weren't -- oh, you're talking about those red
15 arrows at the bottom that Salah has
16 introduced? Actually, no.

17 As I said, not the Canny edge
18 detection, but, you know, it is possible that
19 you would add additional techniques that would
20 detect those arrows.

21 No, I -- I agree that edge
22 detection by Canny wouldn't do that, but
23 detecting those arrows, I think it's very
24 simple. I can write a code to do that.

25 ///

1 BY MS. PARKS:

2 Q Okay. Did you do anything to
3 prepare for your deposition today?

4 A Well, yeah. I read through the --
5 through my declaration and the exhibits, and I
6 had a meeting with the counsel yesterday to go
7 over topics that are were in the -- in my
8 declaration and the exhibits.

9 Q And by your counsel, you mean
10 Mr. Argenti and Mr. Medley?

11 A That is correct, yes, Mr. Argenti
12 and Mr. Medley.

13 Q Was anyone else present?

14 A No.

15 Q And was it just one meeting or
16 more than one?

17 A Just one meeting.

18 Q About how long did that meeting
19 last?

20 A Maybe about seven hours,
21 something -- something between seven to eight
22 hours.

23 Q And did you do it by Zoom, or did
24 you meet in person?

25 A Oh, by Zoom. Well --

1 Q And --

2 A Not Zoom, but another platform. I
3 believe that it was Microsoft Teams, was it?
4 I'm not sure. Yes. Yeah, one of the Align
5 platforms.

6 Q Yeah. "Zoom" is quickly becoming
7 a generic term.

8 So when you said you reviewed
9 documents to prepare, was that with your
10 counsel, or did you also review documents on
11 your own?

12 A No, I reviewed the documents on my
13 own just to remind me -- myself of, you know,
14 everything. So it's -- you know, I do a lot
15 of things in my everyday life. It's easy to
16 forget or -- some of the things that either
17 I've been including in my declaration or even
18 details in some of the, you know, exhibits
19 that I used or the references I used, a
20 combination.

21 Q Okay. And then during any of the
22 breaks that we took today, did you speak with
23 anyone about the substance of your testimony?

24 A No.

25 MS. PARKS: Okay. So I will stop

1 there, subject to any recross. Pass the
2 witness.

3 MR. ARGENTI: All right. Why
4 don't we take a short break, then, like, five
5 minutes.

6 MS. PARKS: Works for me.

7 (Break taken from 2:26 p.m. to
8 2:30 p.m.)

9 MR. ARGENTI: Back on the record.
10 No questions for me. Thank you
11 for your time, Dr. Foroosh.

12 THE WITNESS: Thank you.

13 MS. PARKS: Thank you,
14 Dr. Foroosh. I really appreciate it.

15 THE WITNESS: Thank you.

16 MR. ARGENTI: Off the record
17 again.

18 Any information you need on our
19 end?

20 CERTIFIED STENOGRAPHER: Do you
21 need a copy of the transcript?

22 MR. ARGENTI: We'll take a rough
23 and, yeah, we'll take a final too.

24 CERTIFIED STENOGRAPHER: And do
25 you need it expedited?

1 MR. ARGENTI: No. Although, I'm
2 not sure -- I won't speak for Ms. Parks.

3 MS. PARKS: Yeah, I think we did
4 order an expedited.

5 CERTIFIED STENOGRAPHER: Yes, you
6 did.

7 (Time Noted: 2:31 p.m.)

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CERTIFICATE OF OATH

STATE OF FLORIDA

COUNTY OF POLK

I, the undersigned authority, certify
that HASSAN FOROOSH, Ph.D., remotely appeared
before me via Zoom and was duly sworn.

WITNESS my hand and official seal this
2nd day of July, 2024.

Rhonda Hall-Breuwet, RDR, CRR, CSR, LCR, CCR, FPR
NCRA Realtime Systems Administrator
Notary Public - State of Florida
My Commission Expires: 9/28/27
Commission No. HH 414033

1 CERTIFICATE OF STENOGRAPHER

2 STATE OF FLORIDA:

3

4 I, RHONDA HALL-BREUWET, RDR, CRR, CSR,
5 LCR, CCR, FPR, NCRA Realtime Systems
6 Administrator, shorthand reporter, do hereby
7 certify:

8 That the witness whose deposition is
9 hereinbefore set forth was duly sworn, and
10 that such deposition is a true record of the
11 testimony given by such witness.

12 I further certify that I am not related
13 to any of the parties to this action by blood
14 or marriage, and that I am in no way
15 interested in the outcome of this matter.

16 IN WITNESS WHEREOF, I have hereunto set
17 my hand this 2nd day of July, 2024.

18

19

20

21

22 _____
23 RHONDA HALL-BREUWET, RDR, CRR, CSR, LCR, CCR, FPR,
24 NCRA Realtime Systems Administrator
25 Shorthand Reporter

25

1 ERRATA SHEET FOR THE TRANSCRIPT OF:

2 Case Name: ALIGN TECHNOLOGY, INC. V. DENTAL
MONITORING SAS

3 Dep. Date: June 28, 2024

4 Deponent: HASSAN FOROOSH, Ph.D.

5 CORRECTIONS:

6	Pg.	Ln.	Now Reads	Should Read	Reason
7	_____	_____	_____	_____	_____
8	_____	_____	_____	_____	_____
9	_____	_____	_____	_____	_____
10	_____	_____	_____	_____	_____
11	_____	_____	_____	_____	_____
12	_____	_____	_____	_____	_____
13	_____	_____	_____	_____	_____
14	_____	_____	_____	_____	_____
15	_____	_____	_____	_____	_____
16	_____	_____	_____	_____	_____

17

18

19 _____
Signature of Deponent

20 SUBSCRIBED AND SWORN BEFORE ME

21 THIS _____ DAY OF _____, 2024

22

23

24 _____
(Notary Public) MY COMMISSION EXPIRES: _____

25

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