FULL DIGITAL PROTOCOL

CLINICAL CASE REPORT

Abstract

This report presents the complex rehabilitation of a 42-year-old female patient, completed entirely under a **full digital protocol**, from diagnosis and planning to the final restorations. The treatment pathway combined fixed bimaxillary orthodontics, digital aesthetic and functional analysis (including 4D mandibular dynamics), complete oral sanitation with endodontic and restorative procedures, and minimally invasive prosthetic rehabilitation using feldspathic veneers and CAD/CAM-fabricated all-ceramic restorations.

The clinical workflow was continuously supported by advanced digital tools: standardized DSLR documentation, microscope photography using a mirrorless camera, **intraoral scanning**, **Digital Smile Design (DSD) using the SmileCloud platform**, **digital wax-up in Exocad** with integrated functional values (condylar inclination and mandibular trajectories from **Modjaw**), and both initial and final **4D functional analysis (MJ Initial / MJ Final)**.

This integration allowed the creation of a **tailor-made digital design**, precisely adapted to the patient’s real mandibular movements, providing significantly increased predictability during the clinical transfer through the mock-up test drive. The final result demonstrates a stable occlusion, natural esthetics, and a harmonious morpho-functional integration confirmed at the **2.5-year follow-up**. Beyond the clinical outcome, this case exemplifies how digital dentistry can transform not only

Patient Background & Chief Complaint

A 42-year-old female patient in good general health presented with two primary concerns:

- **functional discomfort** – improper chewing, unstable occlusion, uneven force distribution;
- **unsatisfactory esthetics** – dissatisfaction with tooth shape, alignment, and smile harmony.

Her goal was clear: *“a correct function and a smile that feels like me.”*

Thus, the plan aimed to deliver a fully integrated, predictable solution in which esthetics is built on a stable functional foundation.

Initial extraoral and intraoral situation.


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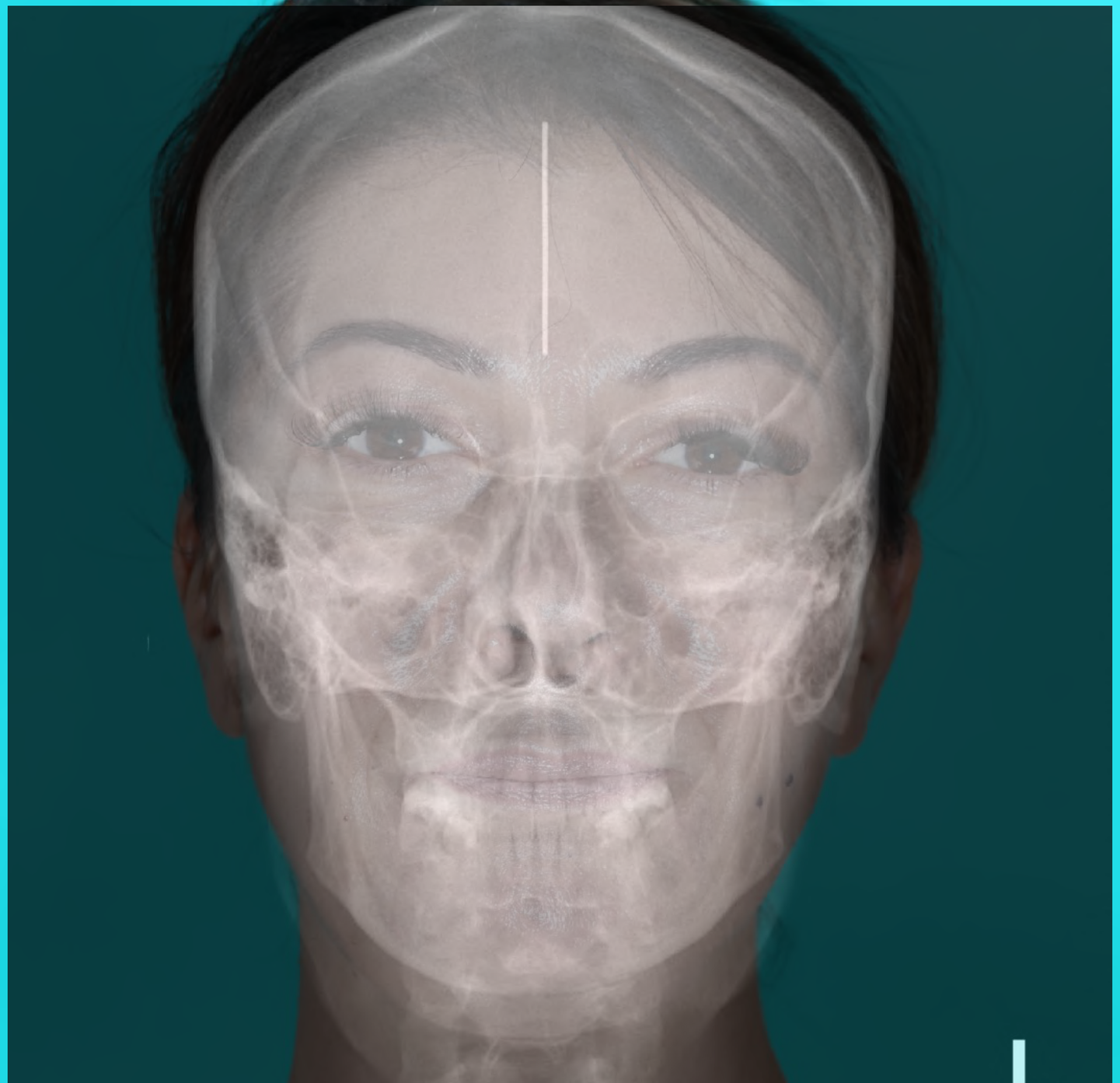

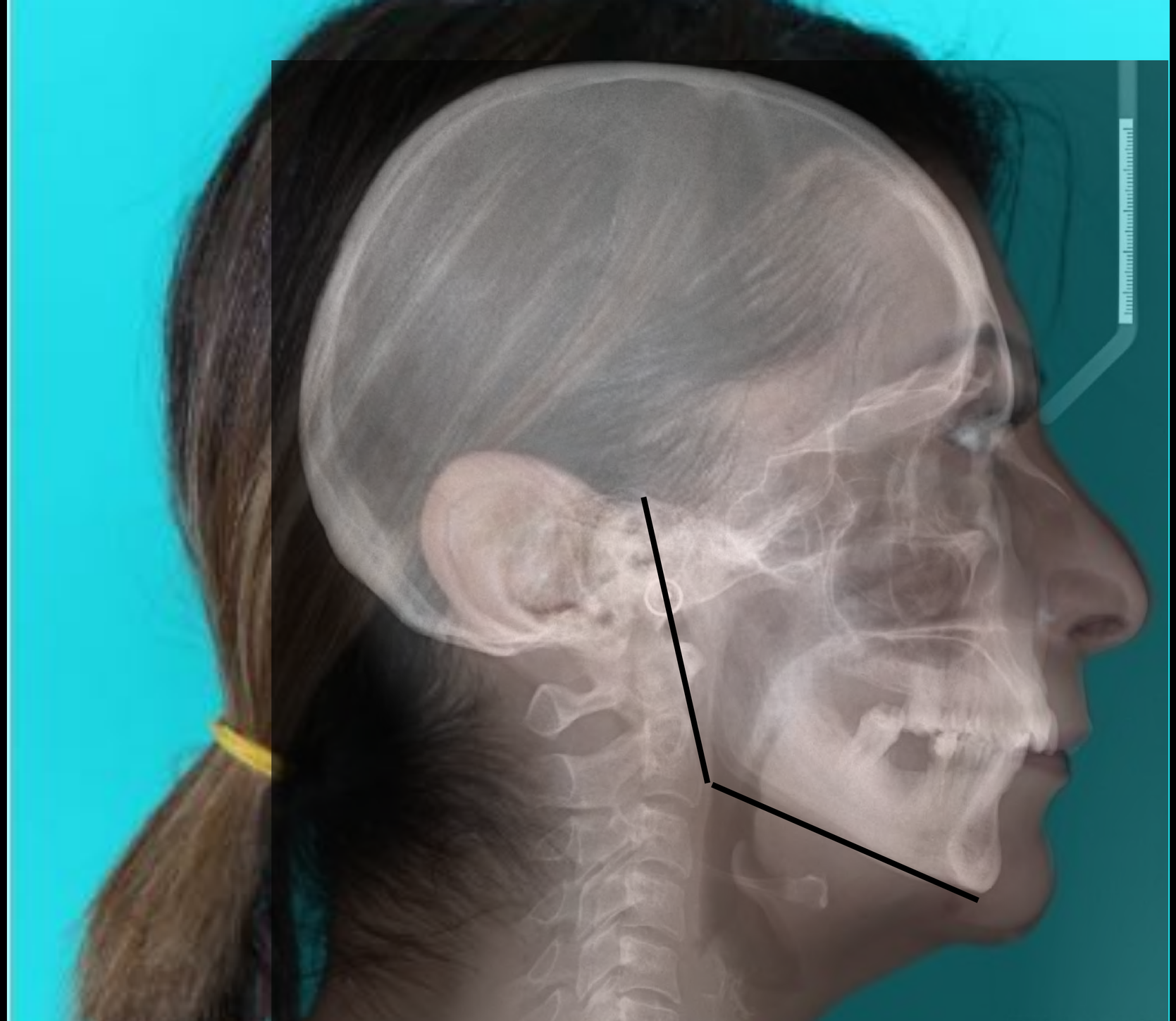


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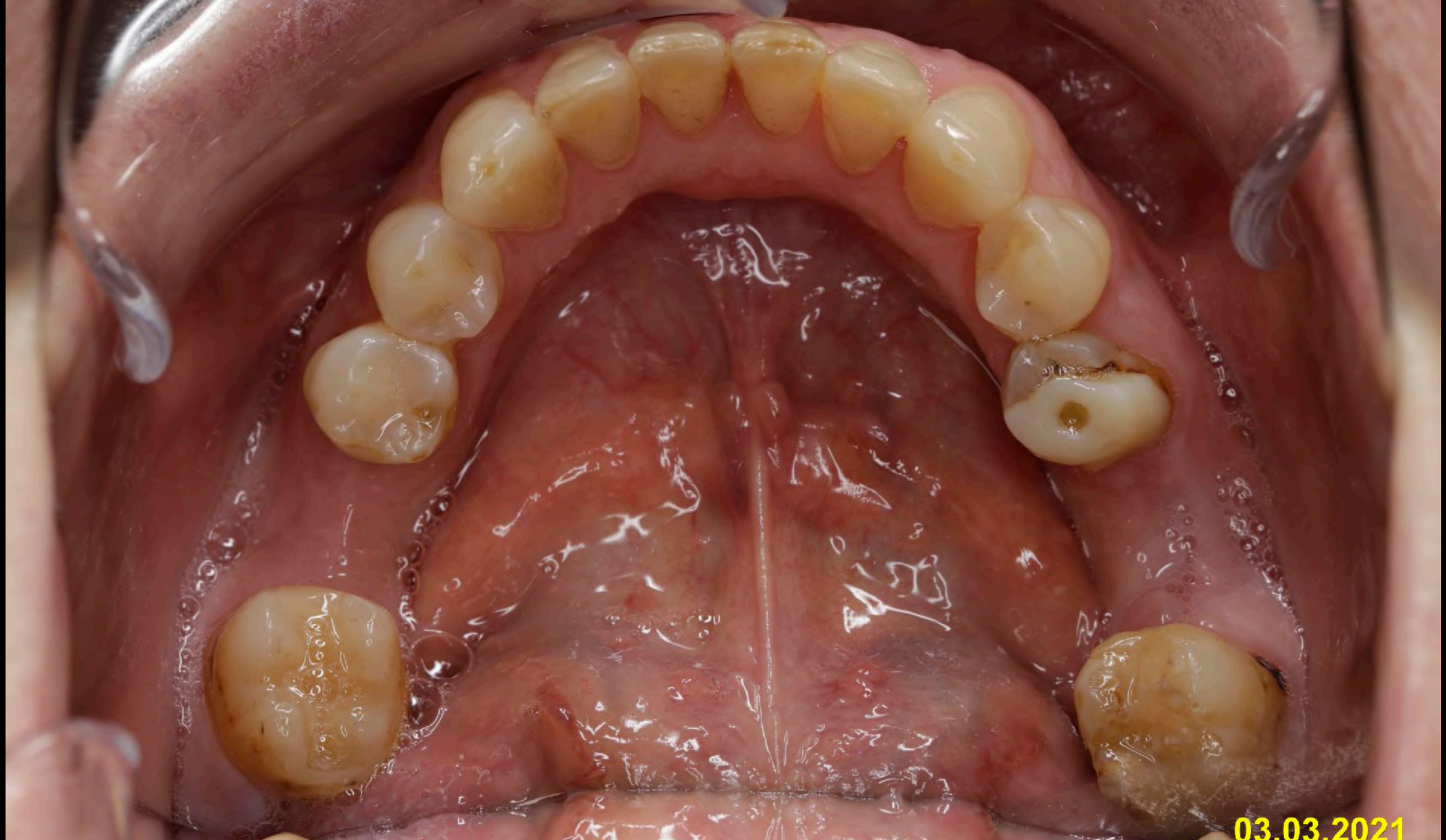
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Initial Digital Diagnostic Protocol

The initial diagnostic stage was entirely digital and included:

- standardized extra- and intraoral photography (DSLR);
- microscope-level documentation using a mirrorless camera;
- **intraoral scans** of both arches;
- digital radiography;
- **Modjaw 4D functional analysis (MJ Initial)** to evaluate mandibular trajectories, guidance patterns, and dynamic occlusal contacts.

Findings included:

- the need for **orthodontic alignment** and bimaxillary arch coordination → fixed **metallic bimaxillary appliance** indicated;
- aged and infiltrated restorations in **quadrants 1 and 2**, requiring **direct restorative therapy**;
- the need for **endodontic therapy** on teeth **3.5 and 4.5** prior to prosthetic rehabilitation;
- functional–esthetic discrepancies between current dentofacial parameters and the desired smile.

Treatment Objectives and Digital Plan

The therapeutic objectives included:

- bimaxillary alignment using a **fixed metallic orthodontic appliance**;
- achieving an integrated **aesthetic and functional diagnosis**, based on the aesthetic sheet, functional sheet, and Modjaw data;
- complete **oral sanitation**: correct endodontic treatment of 35 and 45 + restorative therapy in quadrants 1 and 2;
- a personalized digital design through **DSD in SmileCloud** and **digital wax-up in Exocad**, incorporating **Modjaw functional parameters** (condylar inclination + real mandibular trajectories);
- validation of the digital plan through a **mock-up "test drive"**;
- **minimally invasive preparations guided by the mock-up**;
- definitive restorations:
  - **maxilla:** feldspathic veneers on refractory dies;
  - **mandible:** pressed ceramic **Emax veneers** + **zirconia-based ceramic crowns on implants in molar regions**;
- stable occlusion verified **clinically and digitally** (MJ Final).

Orthodontic Phase – Fixed Metallic Bimaxillary Appliance

After the initial diagnosis, treatment began with the placement of a **fixed bimaxillary metal orthodontic appliance**, digitally planned based on scans and photographs.

Goals:

•leveling and aligning both arches,

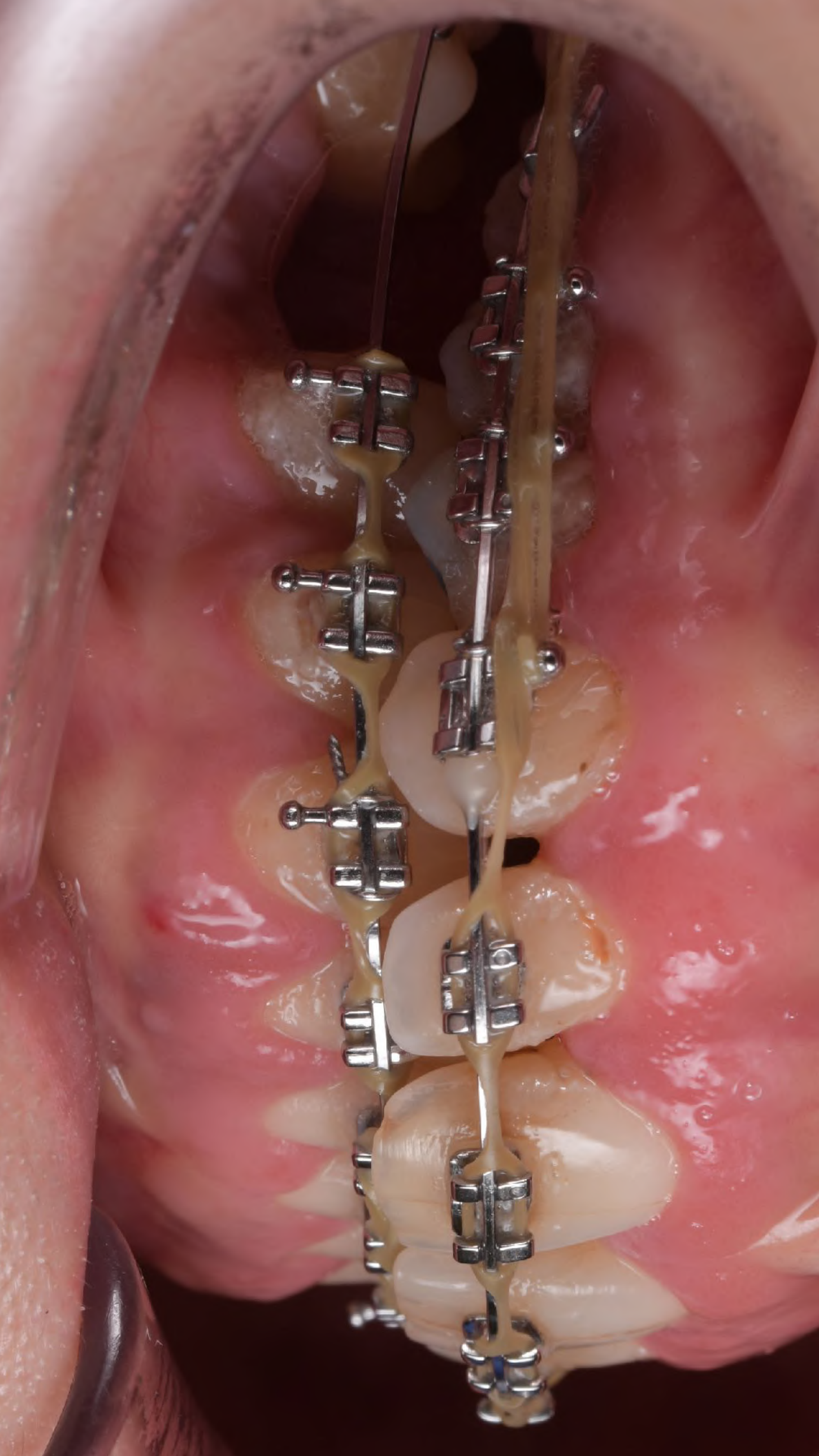
•coordinating arch forms,

•creating optimal spatial and functional conditions for the subsequent prosthetic phase.

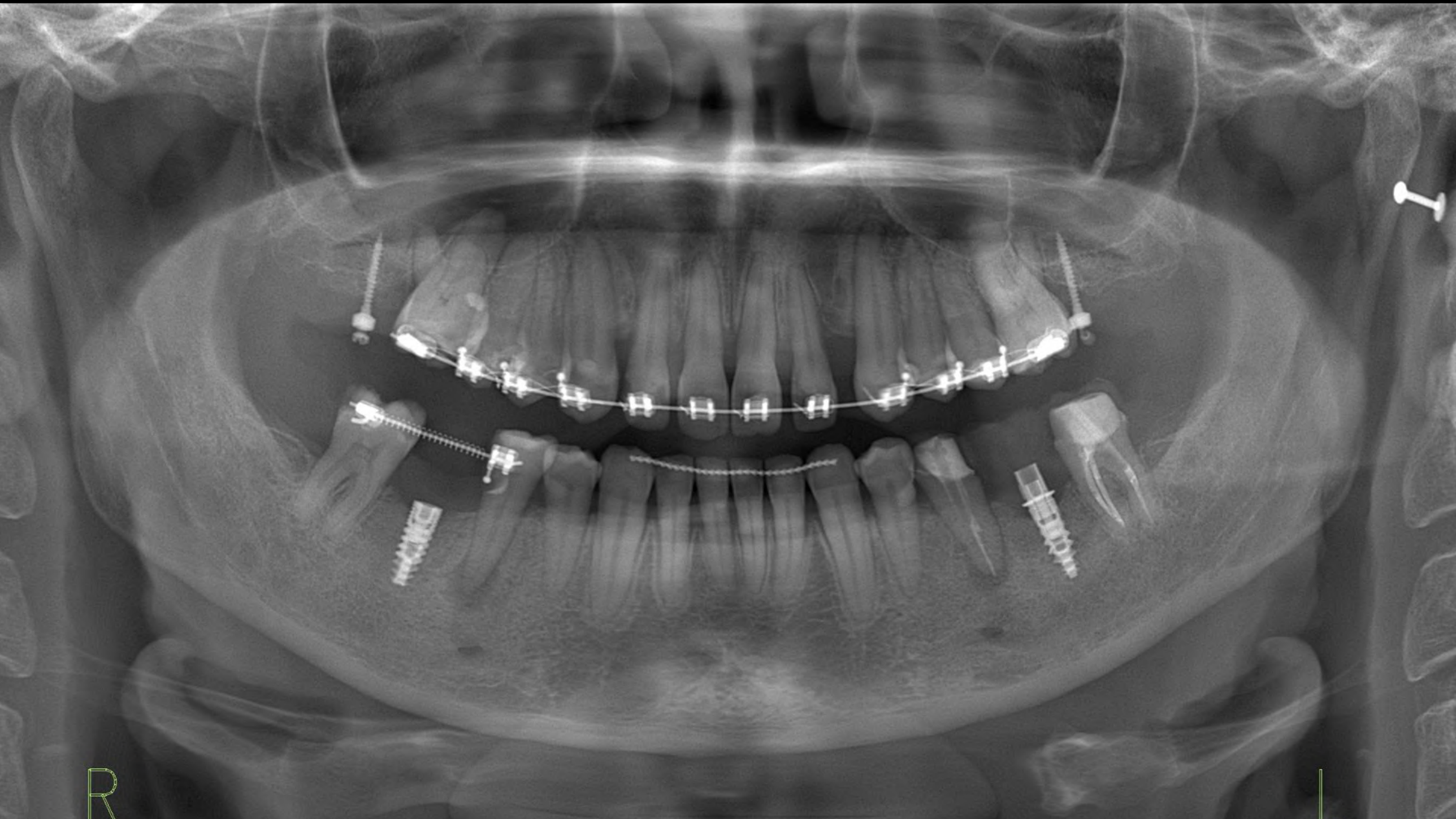
Progress was monitored visually and through periodic intraoral rescanning.

Orthodontic phase – progressive alignment of both arches using a fixed bimaxillary appliance.

Orthodontic phase – progressive alignment of both arches using a fixed bimaxillary appliance.



Orthodontic phase – progressive alignment of both arches using a fixed bimaxillary appliance.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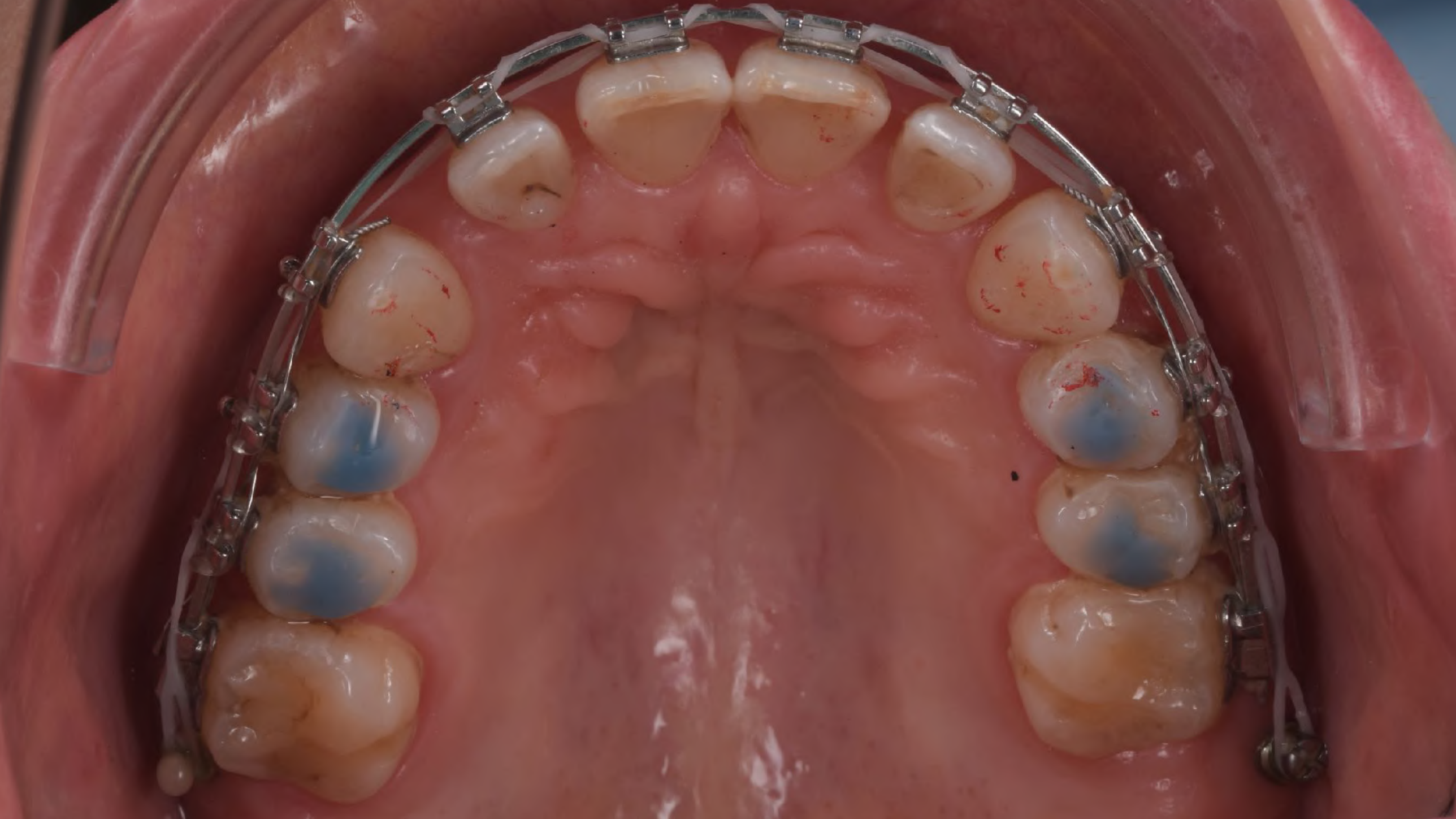


Post-orthodontic extraoral and intraoral situation.

Aesthetic and functional analysis; DSD in SmileCloud and digital wax-up in Exocad with Modjaw integration.

Digital Aesthetic & Functional Analysis – SmileCloud + Functional Sheet + Modjaw 4D

Following orthodontic alignment, a comprehensive **aesthetic and functional digital analysis** was performed, consisting of:

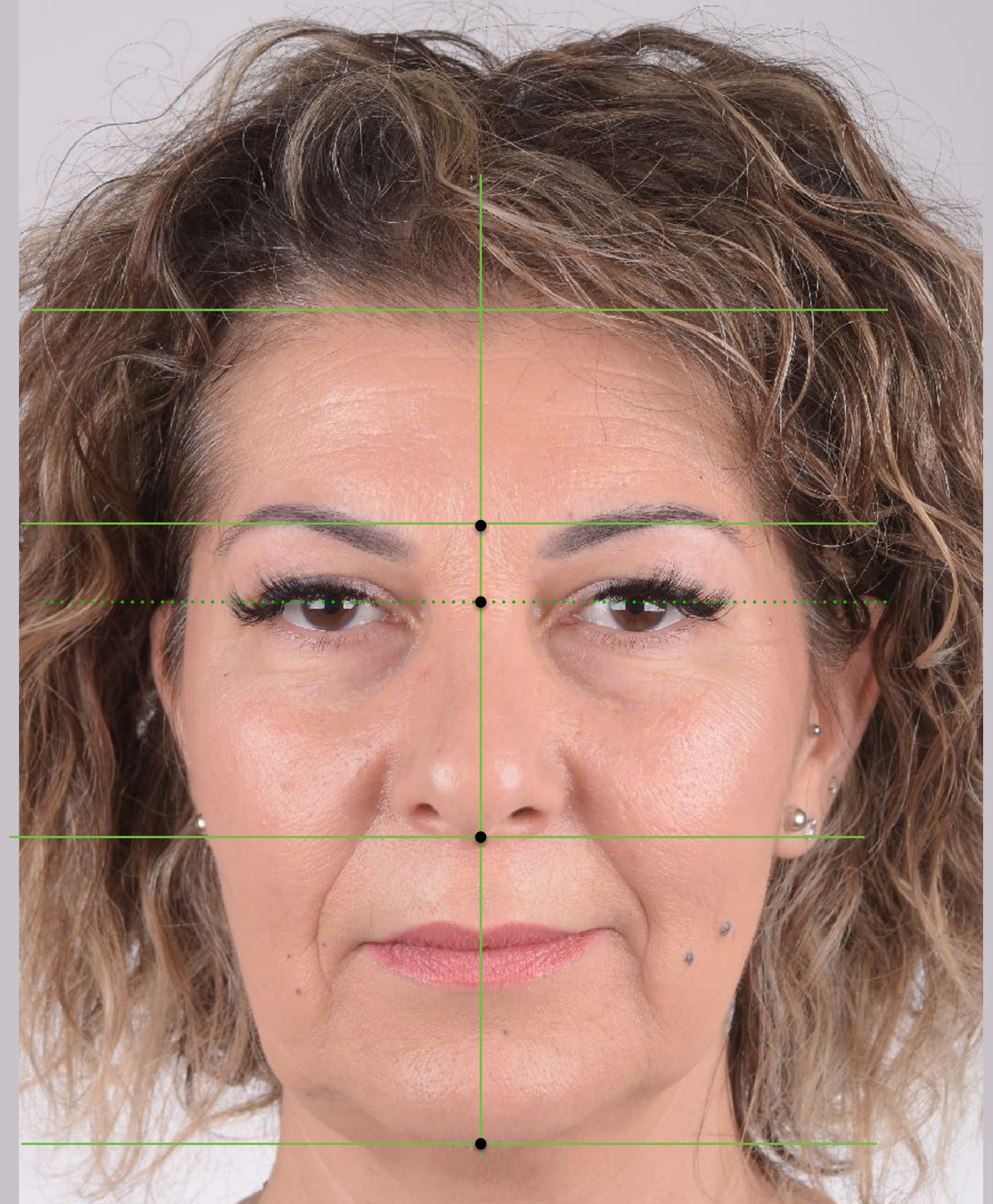
- **Aesthetic Sheet** – evaluation of smile dynamics, lip line, tooth display, facial proportions;
- **Functional Sheet** – clinical assessment of mandibular movements and potential interferences;
- **Modjaw 4D analysis** – recording real mandibular motion (MI, protrusion, laterotrusion) and condylar pathways.

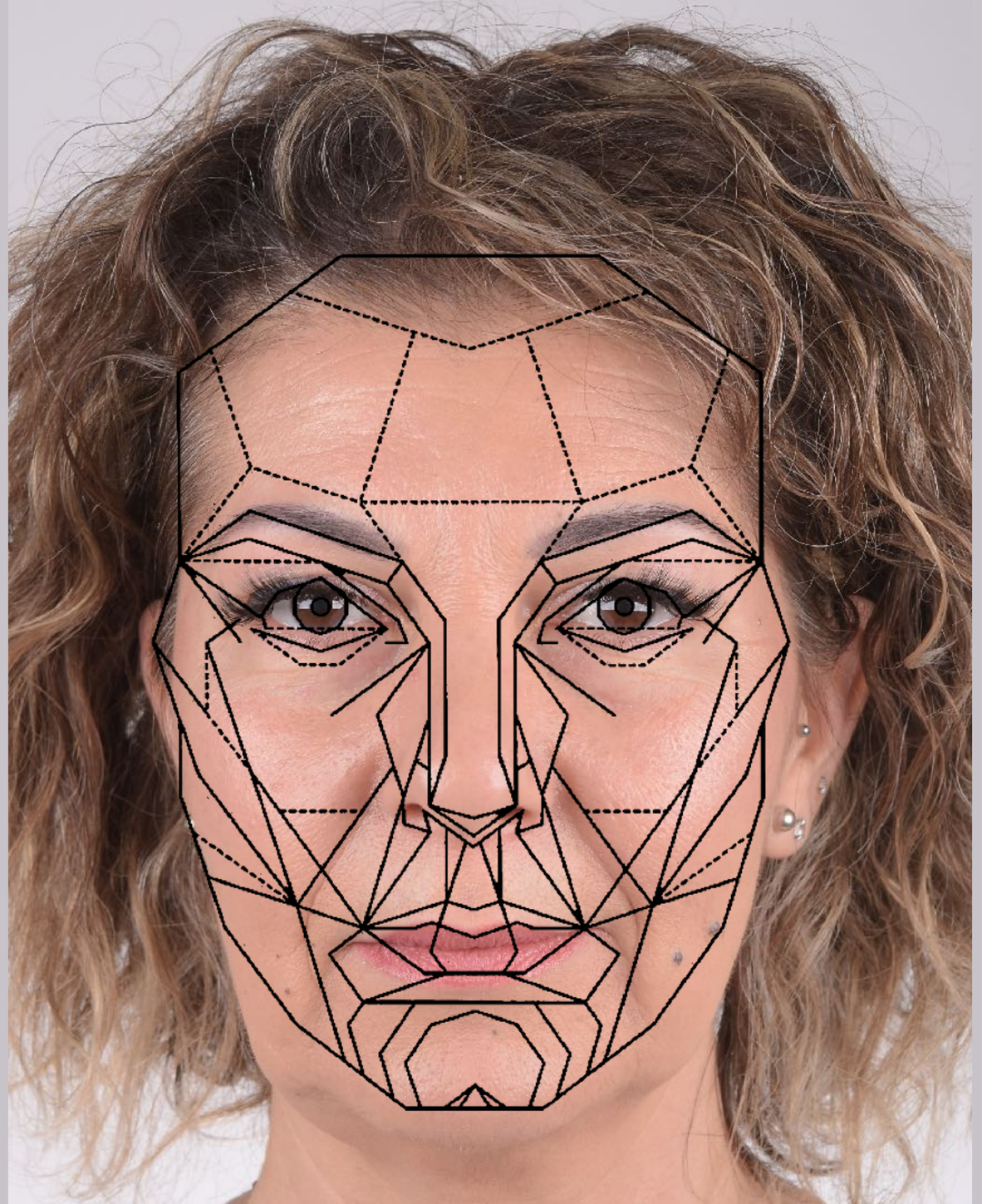
Based on these datasets:

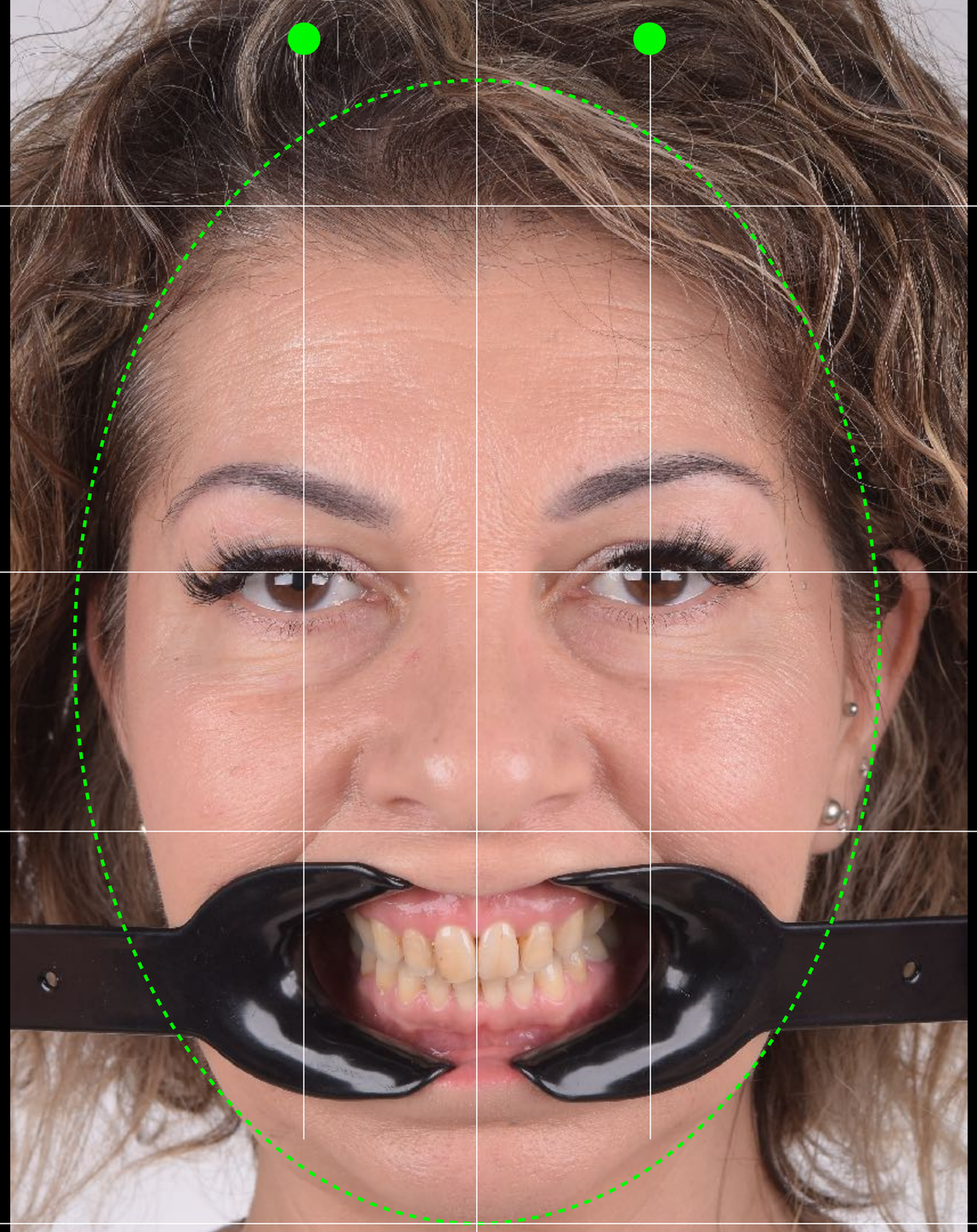
- **Digital Smile Design (DSD)** was created using **SmileCloud**;
- The laboratory produced a **digital wax-up in Exocad**, into which the **Modjaw functional values were imported** (condylar inclination + patient-specific movement paths).

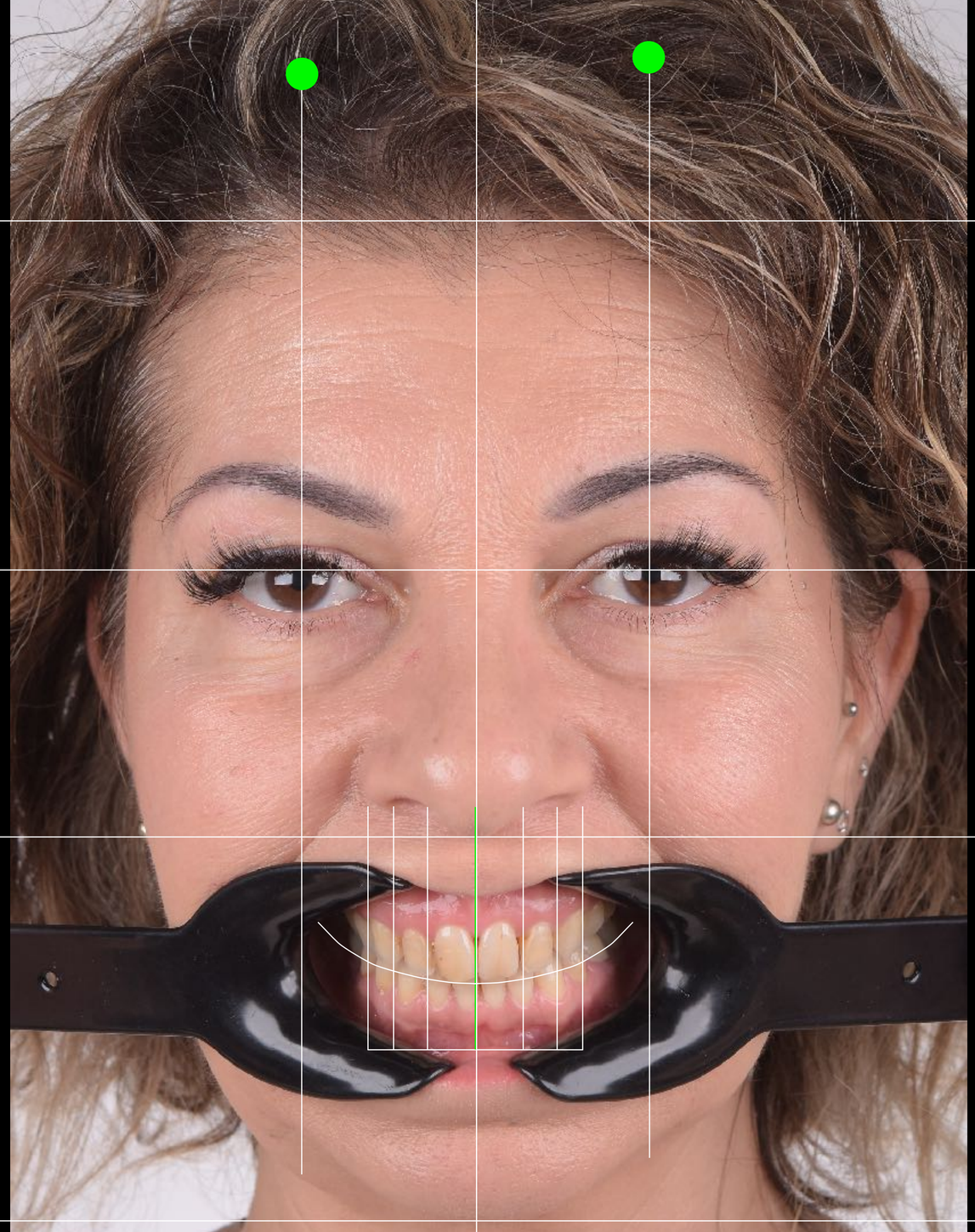
This resulted in a **customized, functionally synchronized digital design**, perfectly adapted to how the patient actually moves her mandible.

This step dramatically increased predictability during the **mock-up test drive**.

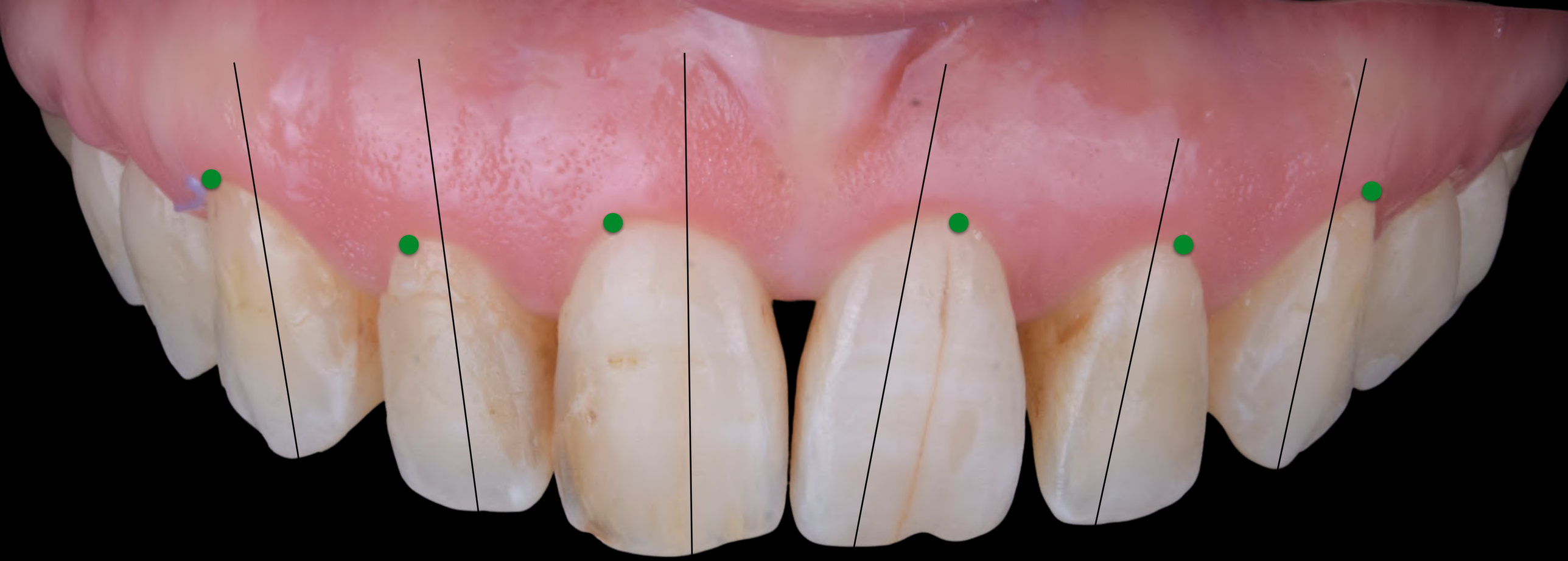


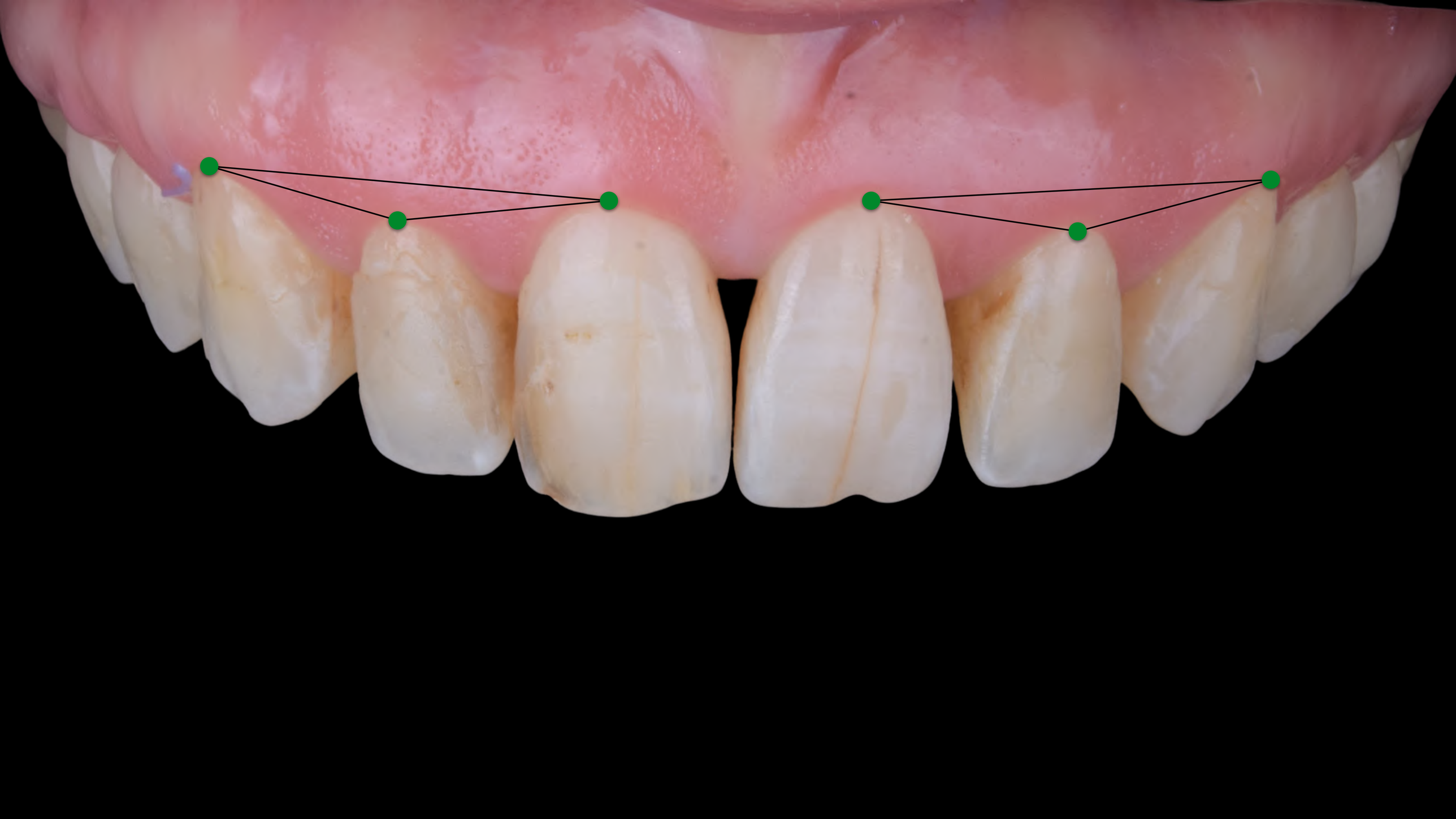


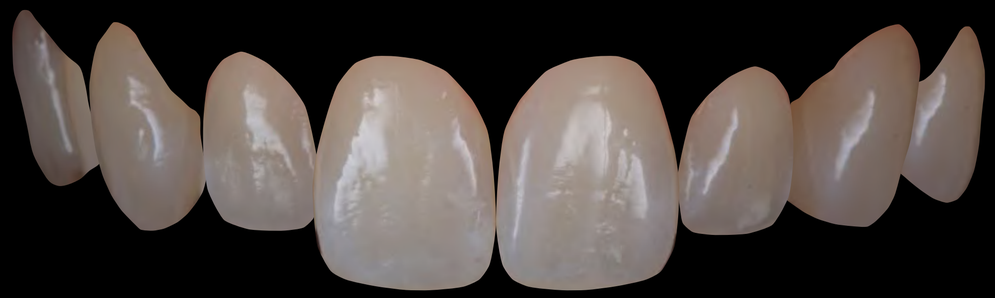


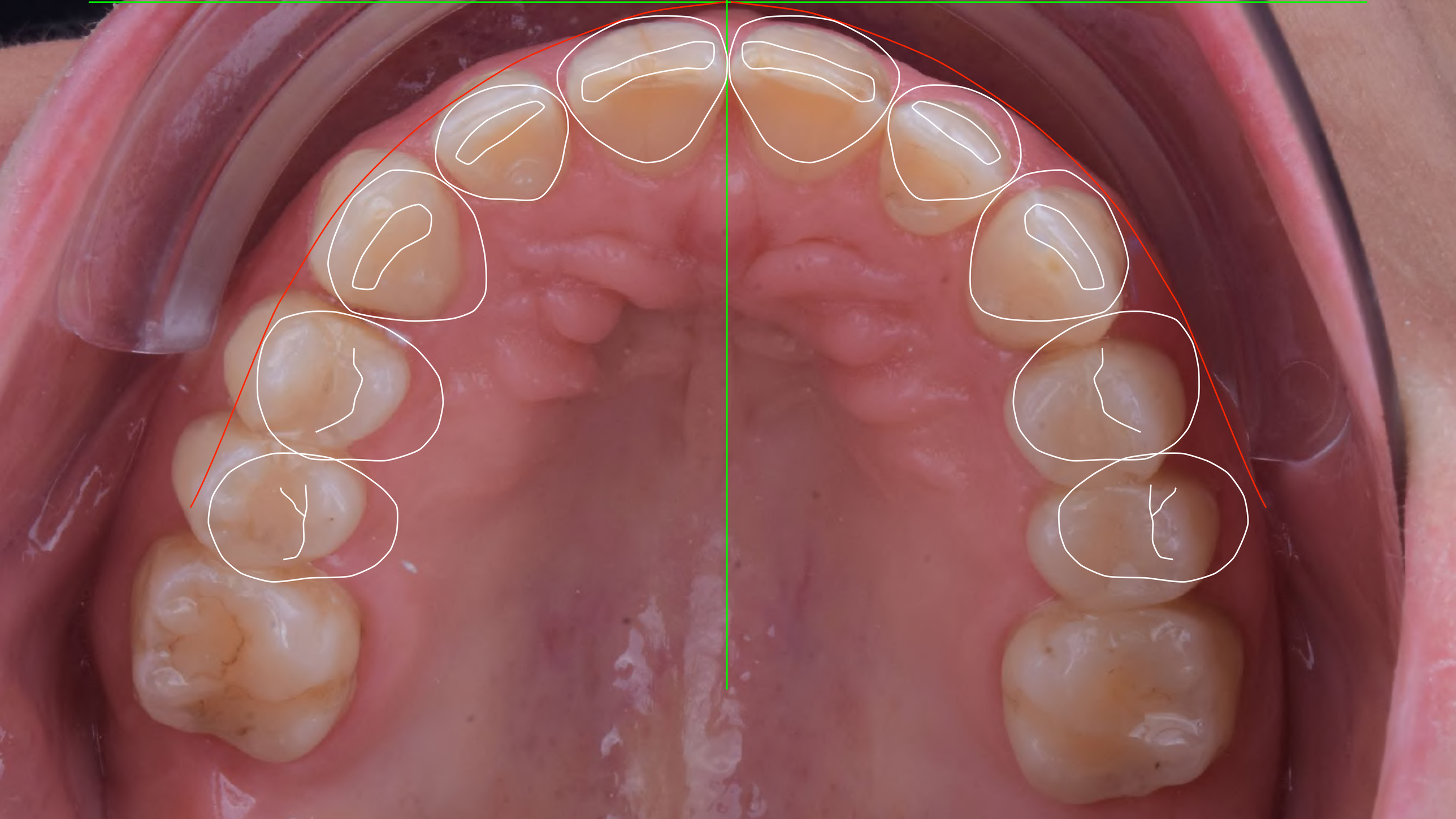



70%
71%

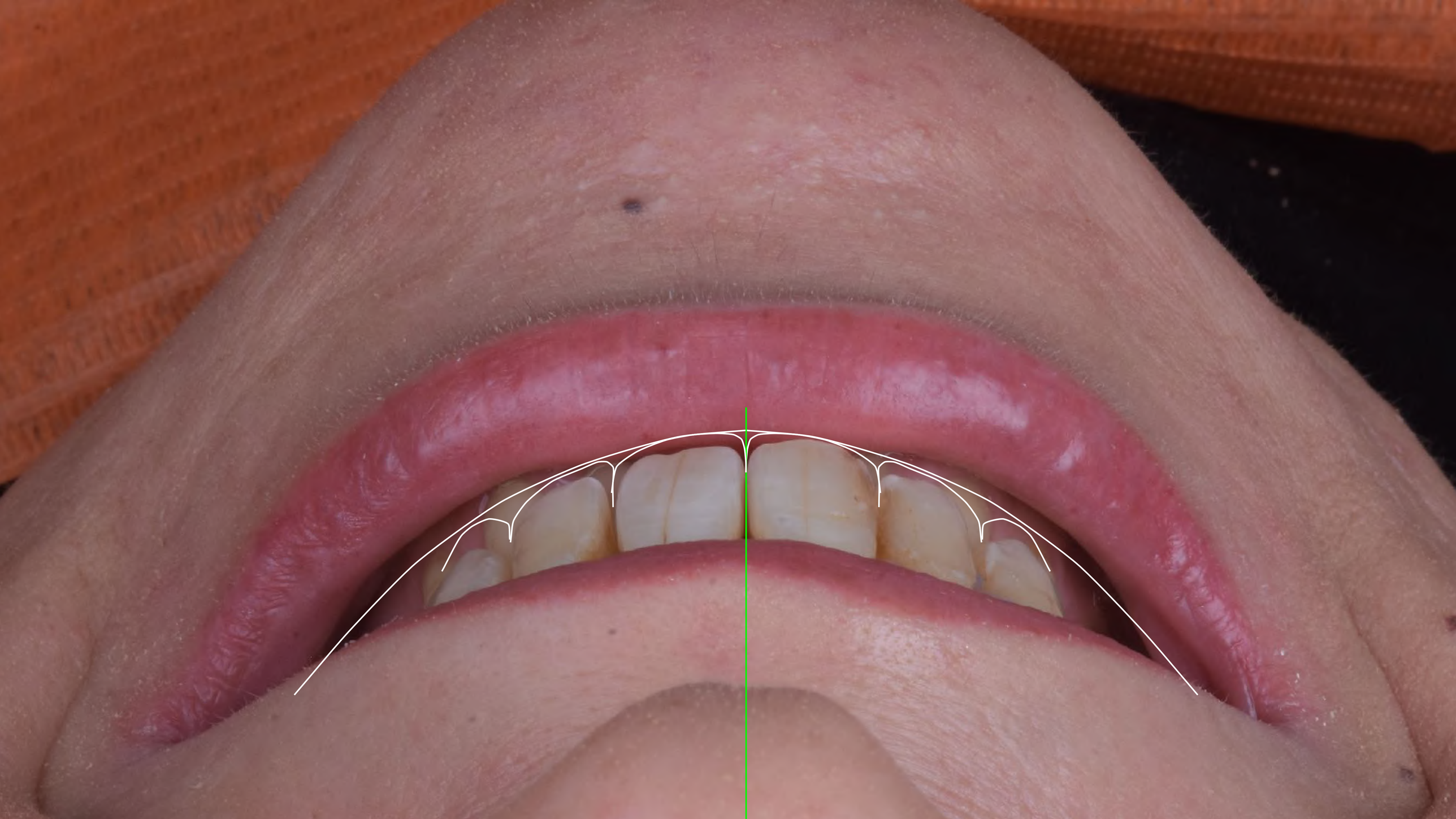









2,5 MM



Functional sheet and aesthetic sheet.

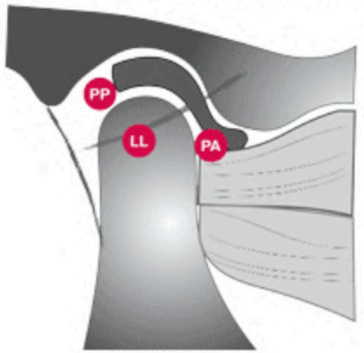
Evaluare functionala

ANALIZA ATM

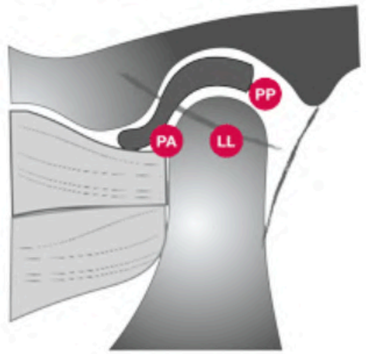
In antecedente pacientul prezinta:

- [ ] Dureri in ATM
- [ ] Zgomote in ATM
- [ ] Bruxism
- [ ] Blocaje mandibulare
- [x] Dureri de cap/gat
- [ ] Tulburari ORL
- [ ] Onicofagie
- [ ] Traumatisme Craniene Alte

	Condil DR				**ASCULTATIE**	Condil STG				
	LD	LS	P	D	I	I	D	P	LS	LD
CRACMENTE	☐	☐	☐	☑	☐	☐	☑	☐	☐	☐
CREPITATII	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐



DR	**PALPARE**	**STG**
	PA-POL ANT	
0,5	**PP-POL**	0,5
	POST	
	LL-LIG. LAT.	



0 - Absenta Durerii
1 - Durere Moderata
2 - Durere intensa

Concluzii

CONDIL DREPT

(D)cracmente in deschidere

DR

Durere POL POSTERIOR - 0,5

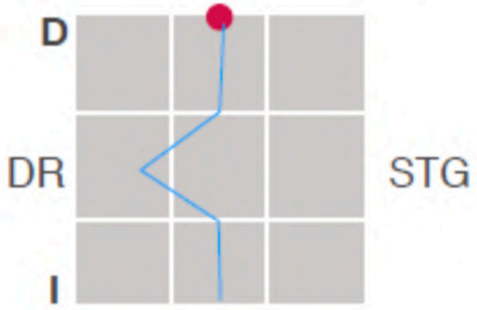
CONDIL STANG

(D)cracmente in deschidere

STG

Durere POL POSTERIOR - 0,5

DINAMICA MANDIBULARA



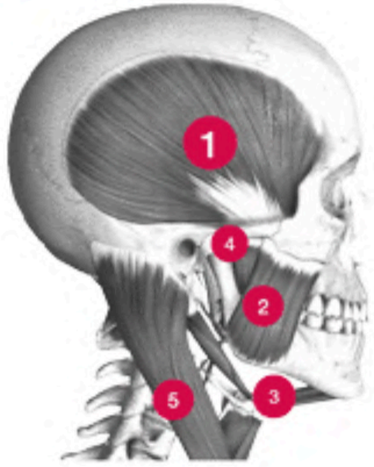
			Durere
Deschidere max	55	mm	☐
Lat DR	15	mm	☐
Lat STG	13	mm	☐

Load testing ☐

Stabilization test ☐ A ☐ M

Determinarea RC ◉ Usor ○ Inter ○ Greu

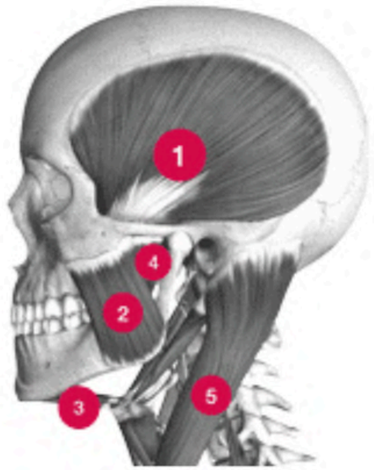
ANALIZA MUSCULARA



DR

Durerea muschiului pterigoidianului lateral drept - 0,5

DR	PALPARE	STG
	1. TEMPORAL	
	2. MASETER	
	3. DIGASTRIC	
0,5	**4. PTERIG. LAT**	0,5
	5. SCM	



STG

Durerea muschiului pterigoidianului lateral stang - 0,5

0 - Absenta Durerii
1 - Durere Moderata
2 - Durere intensa

EVALUARE PARODONTALA GENERALA

INFLAMATIE GINGIVALA ☐ RETRACTII PARODONTALE ☑ PUNGI PARODONTALE ☐ BIOTIPUL GINGIVAL Fin ◉ Gros ○

OCLUZIA STATICA SI DINAMICA

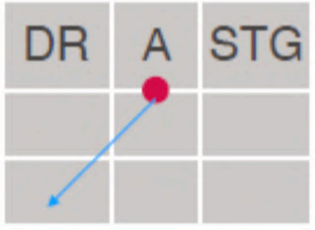
☐ INTERFERENTE ☐ CONT. PREM.

ABSENTE DENTARE

8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
✔	✔	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	✔	✔
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
✔	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	✔

UZURI DENTARE

8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
☐	☐	☐	☐	☐	✔	✔	✔	✔	✔	✔	☐	☐	☐	☐	☐



CONT RC

8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
													7		

CONTACTE IN STATIC

8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
		7, 6	5	4	3	2	41	31	2	3	4	5	6, 7		

PROPULSIE

8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
						3	41	31	2, 3						

LATEROTRUZIE DR

8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
					3										

LATEROTRUZIE STG

8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
							41		2						

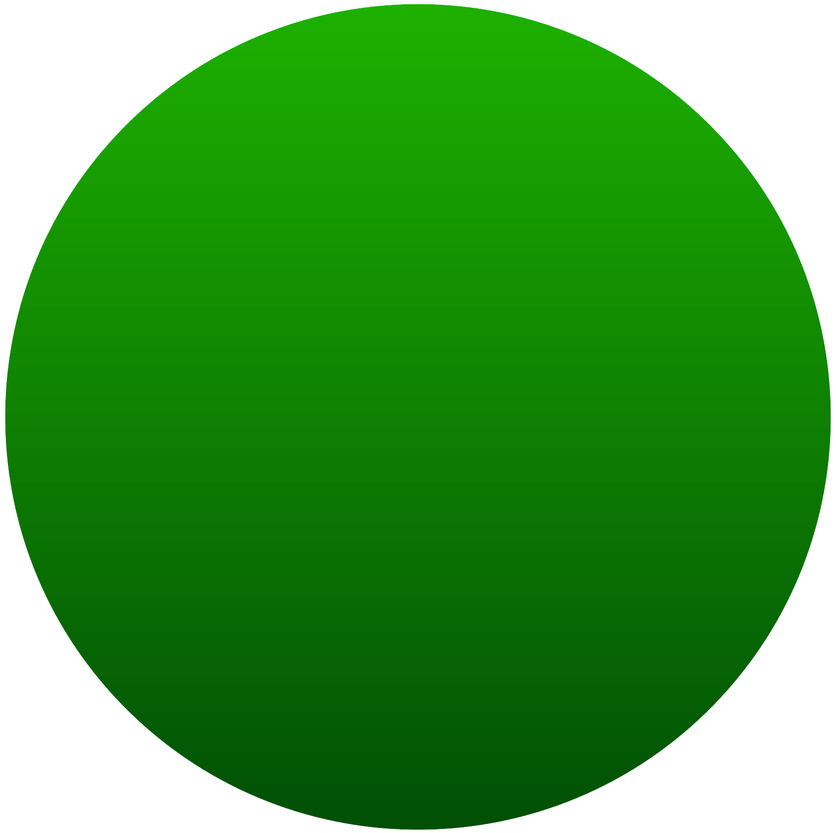
	M dr	C dr	C stg	M stg	OJ	OB
IM	I	I	I	I	2mm	1/3
RC	I	I	I	I		

Concluzii

PAT. INTRARTICULARA ☐ PAT. MUSCULO-OCLUZALA ☐ POSTURAL ☐ Stabil ◉ Instabil ○

Concluzii

Pacient stabil

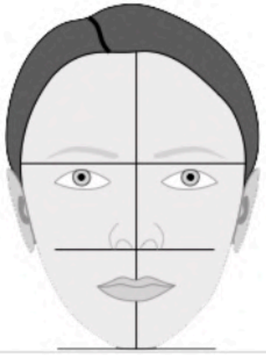


Evaluare estetica

Nume pacient:

Doctor:

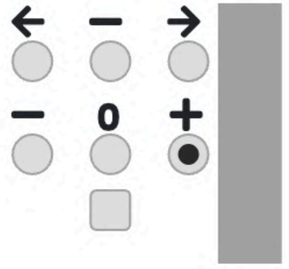
FACE



ASIMETRIE MANDIBULARĂ

ETAJ INFERIOR

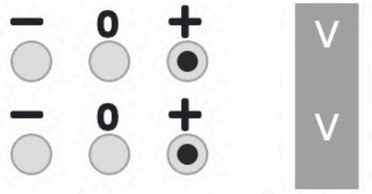
INCOMPETENȚĂ LABIALĂ



SMILE

EXPUNEREA **IS** ÎN REPAUS

EXPUNEREA **II** ÎN REPAUS



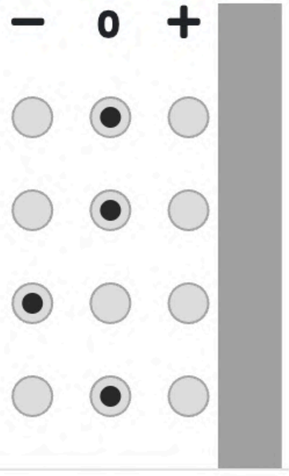
TRUE VERTICAL

BS (+1)

BI (0)

M (-3)

DIVERGENȚĂ FACIALĂ

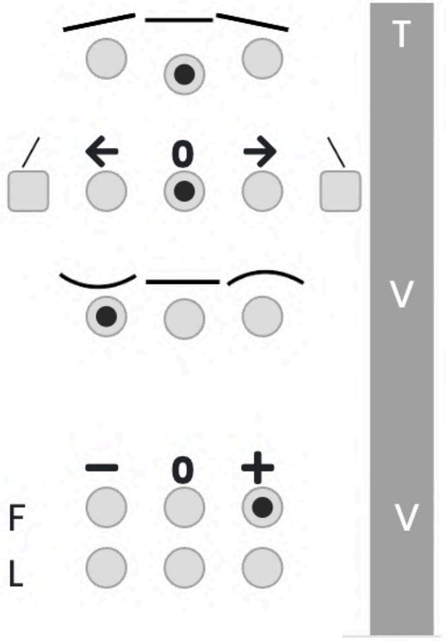


PLAN MAX. VS LBP

LM**IS** VS LM A FETEI

CURBURA MARGINII INCIZALE

EXPUNERE GINGIVALĂ



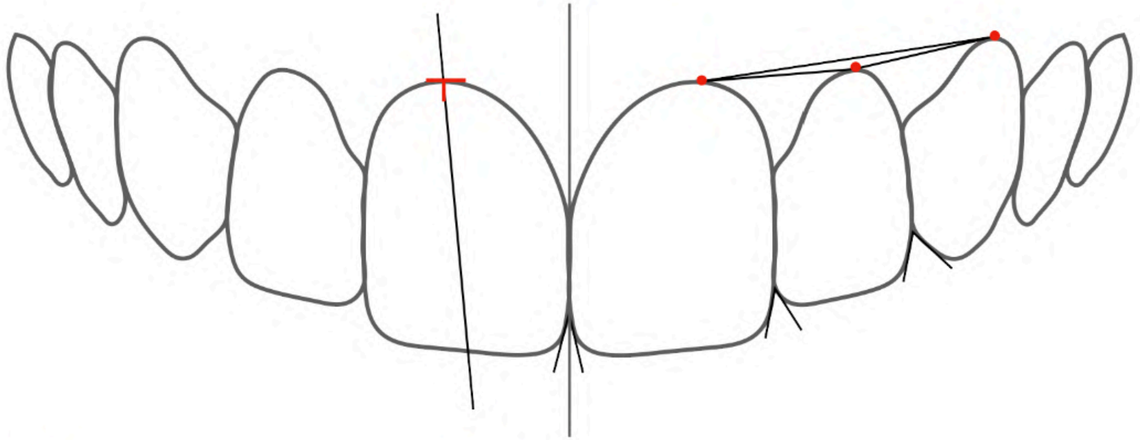
TLP

	−	0	+	
IS	○	●	○	S
II	●	○	○	

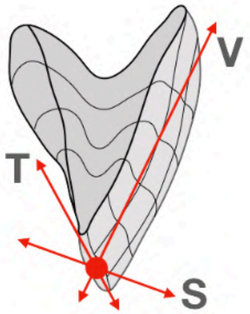
	−	0	+		−	0	+
MAXILAR V	○	●	○	S	○	○	●
MANDIBULAR V	●	○	○	S	○	●	○

CORIDOR BUCAL ●

TEETH



CORIDOR BUCAL ○



H 411	H 408
L 291	L 291
P 70.80 %	P 71.32 %

	✓	✗
Zenituri	●	○
Axe	●	○
Contacte	●	○
Ambrazuri	●	○
Colete	●	○
Papile	●	○

Concluzii

Face

Etaj inferior marit

Incompetenta labiala prezenta

Etaj inferior marit

Mentonul este in spatele liniei true vertical

Smile

EXPUNEREA marita a INCISIVILOR SUPERIORI in repaus. Peste 4 mm

EXPUNEREA marita a INCISIVILOR INFERIORI in repaus. Sunt vizibili

Linia mediana a incisivilor centrali superiori este spre deviata pacientului

Curbura marginii incizale este convexa

Expunerea gingivala in zona frontala in zambet este in exces - Gummy smile.

Teeth

CORIDOR BUCAL - micsorat

ZENITURI - corespunzatoare

AXE - corespunzatoare

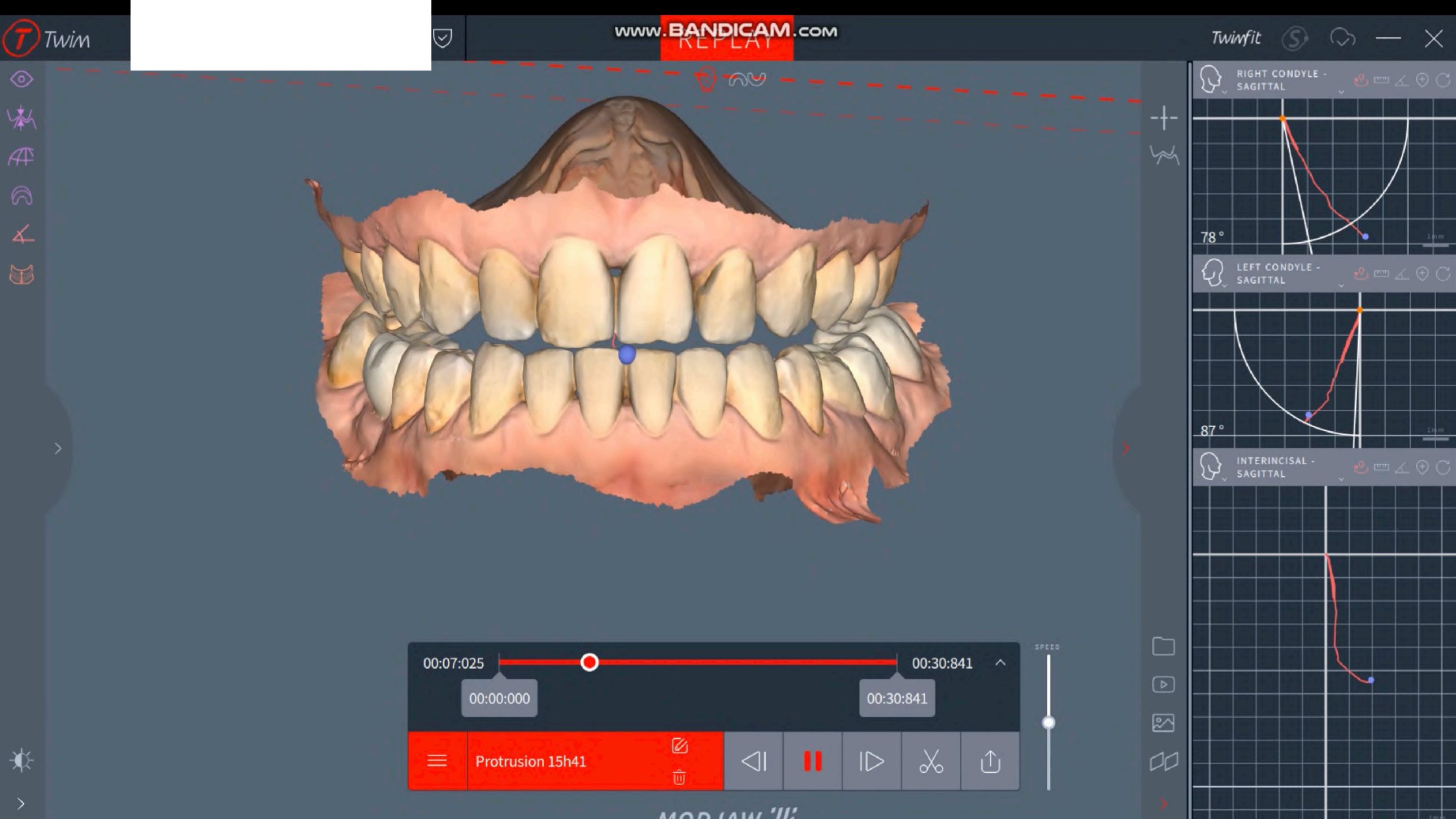
CONTACTE - corespunzatoare

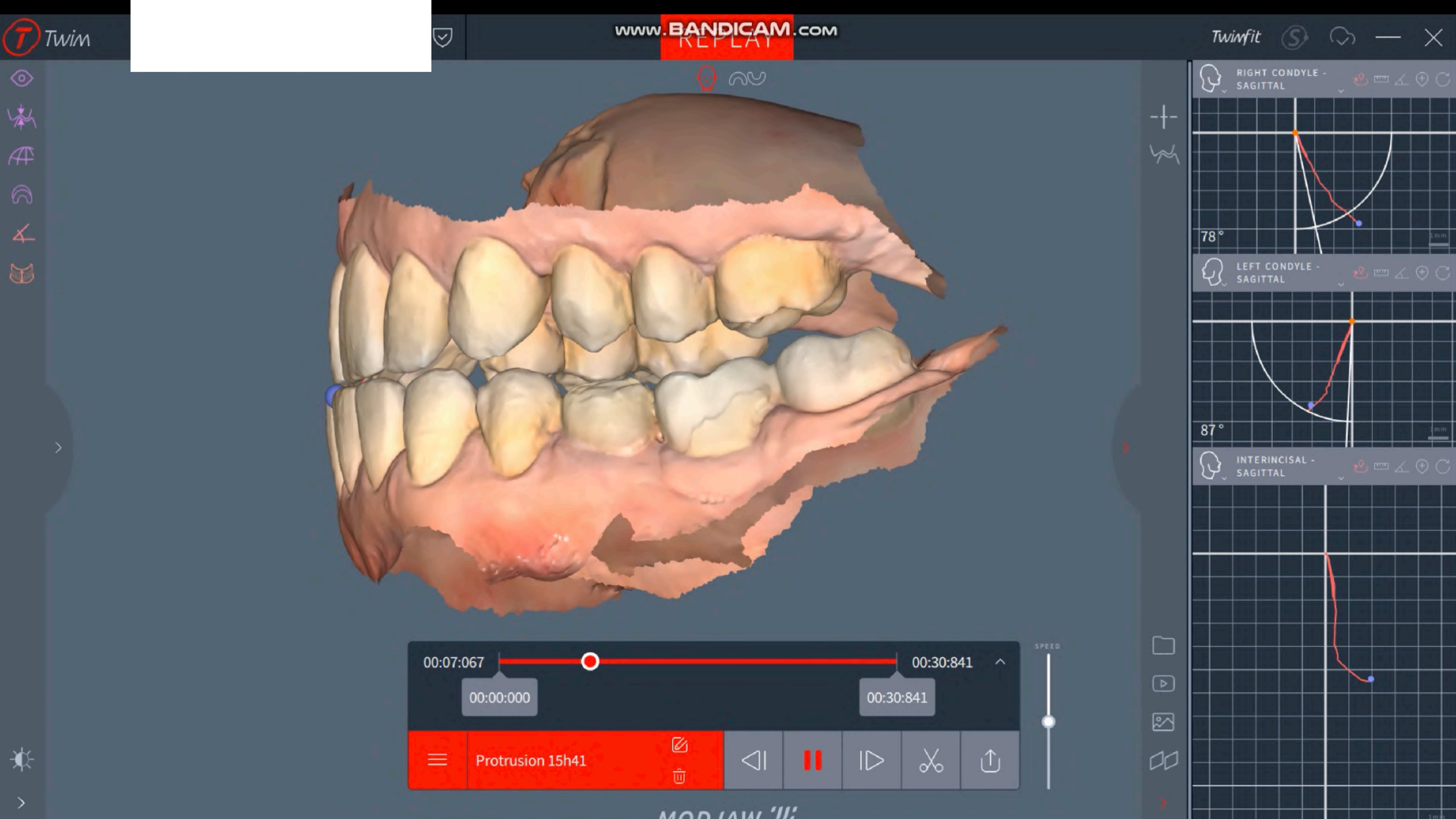
ABRAZURI - corespunzatoare

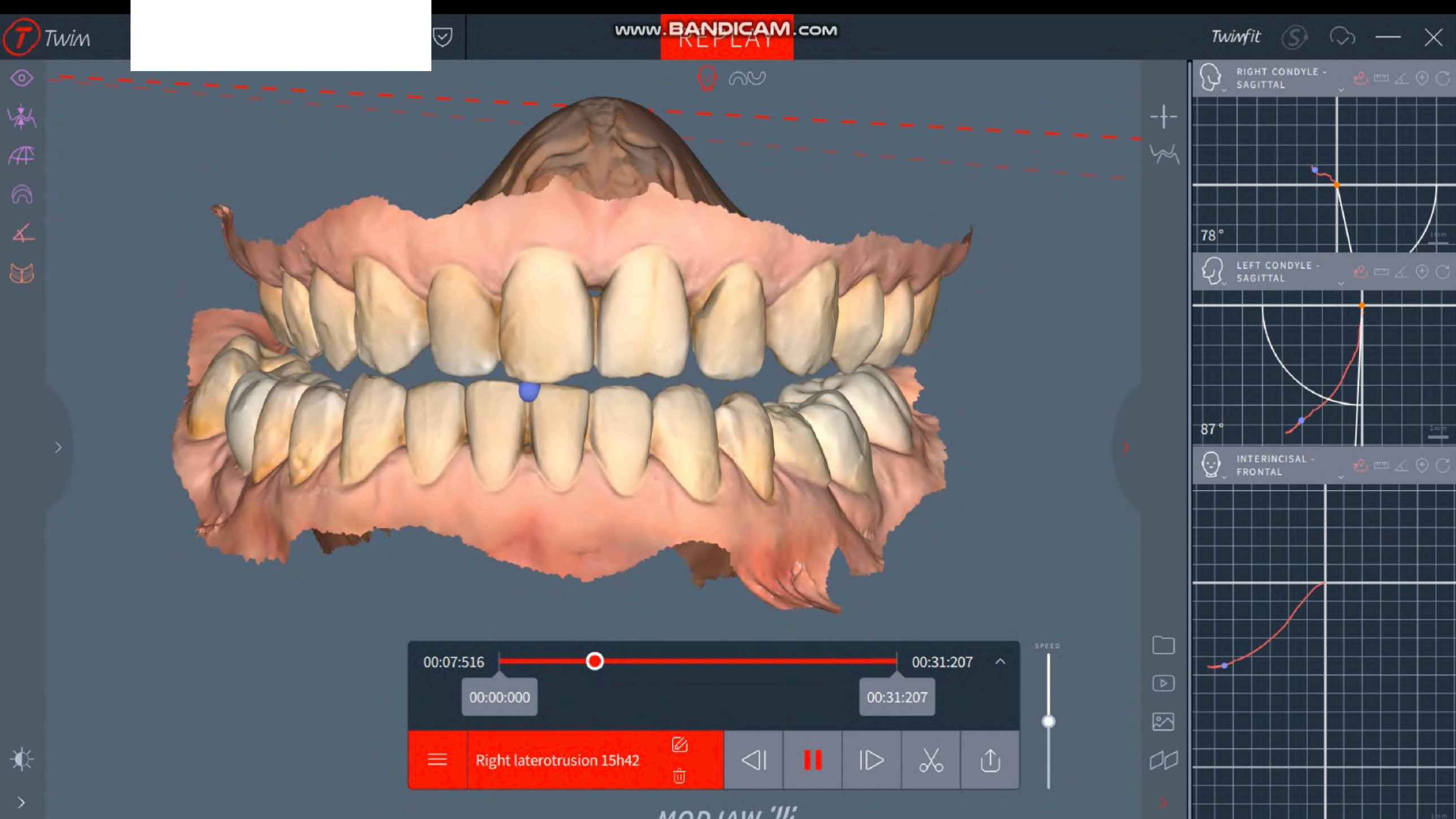
COLETE - corect plasate

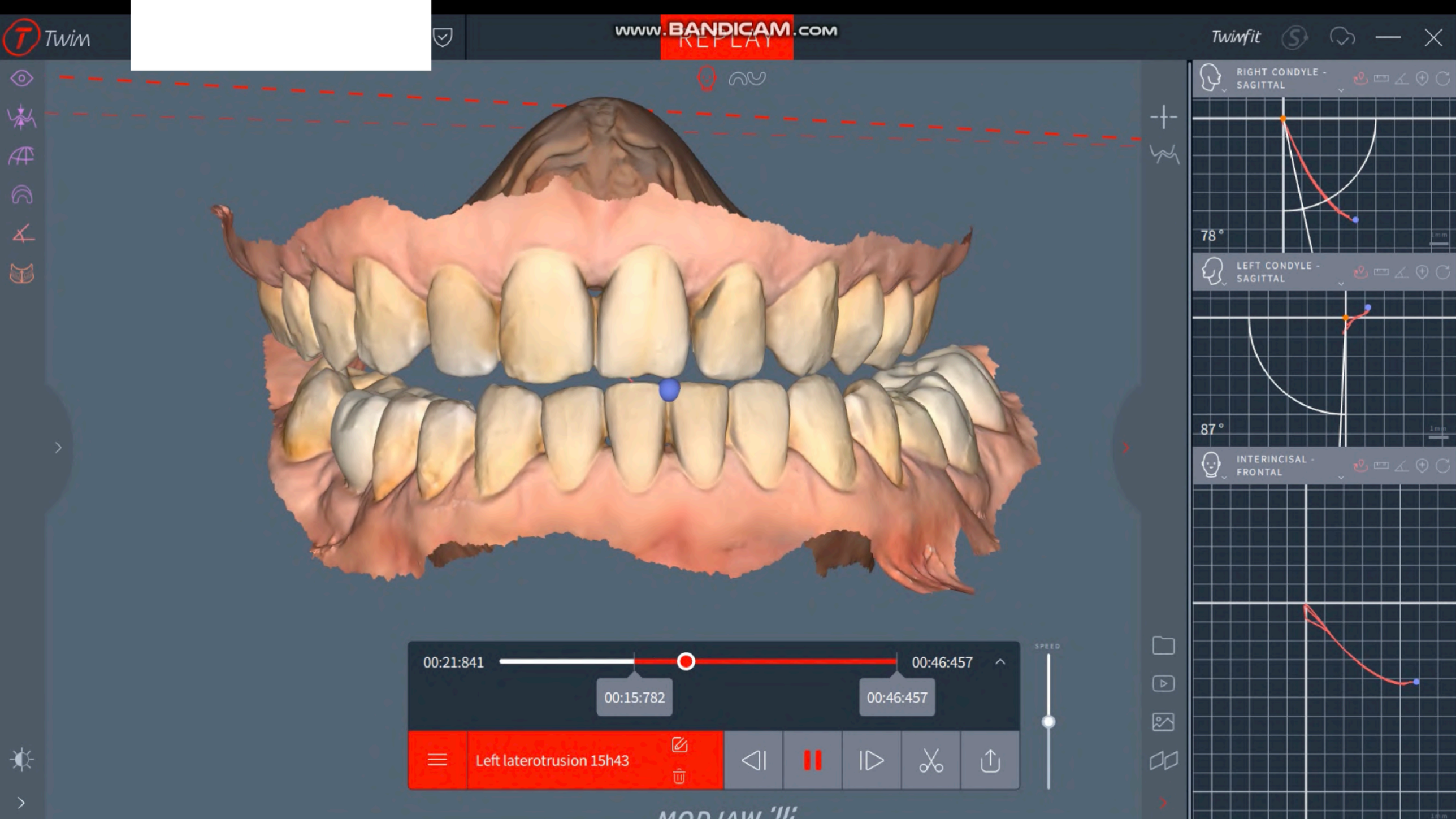
Marime si forma - corespunzatoare

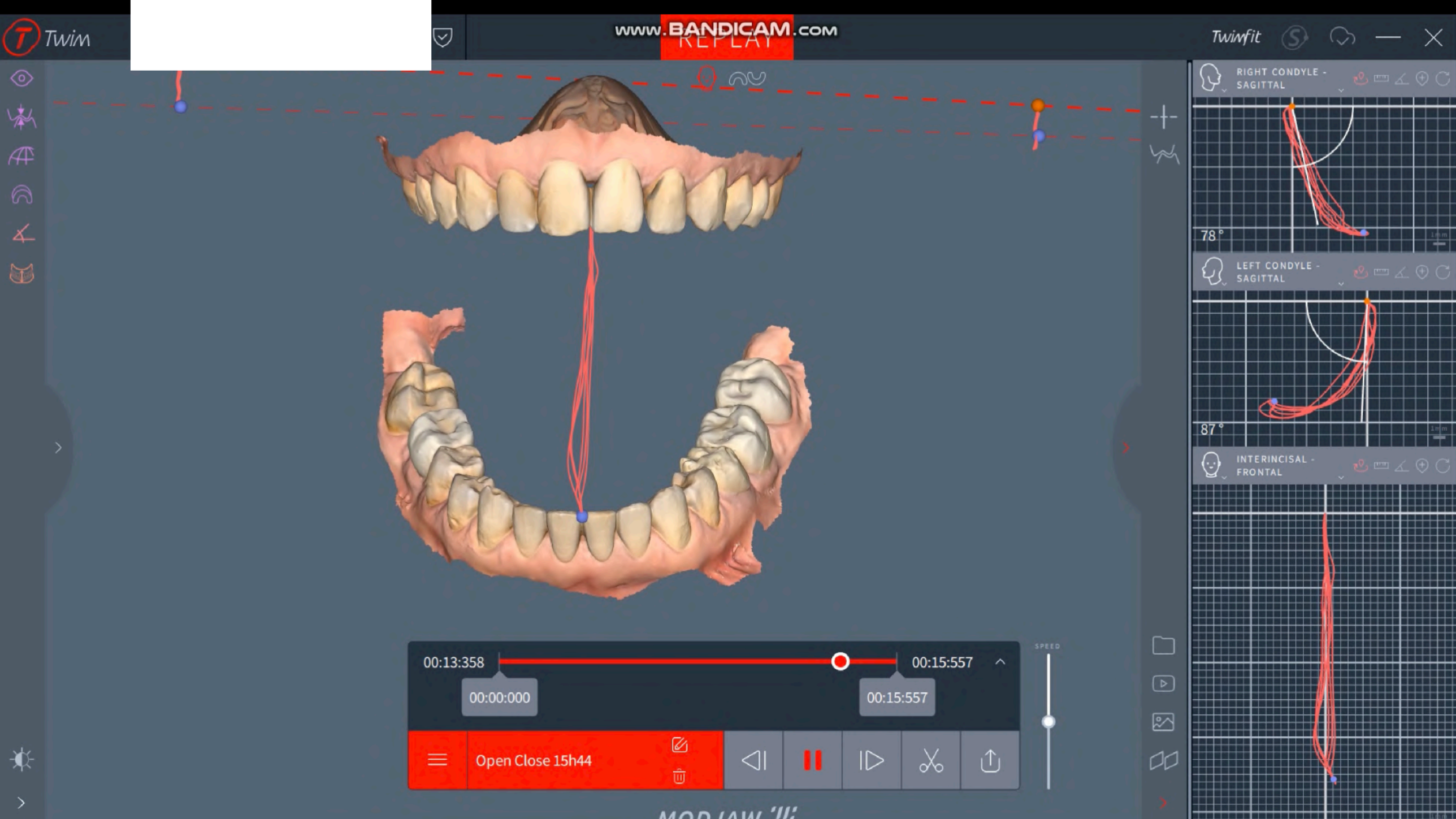
Initial Modjaw analysis.

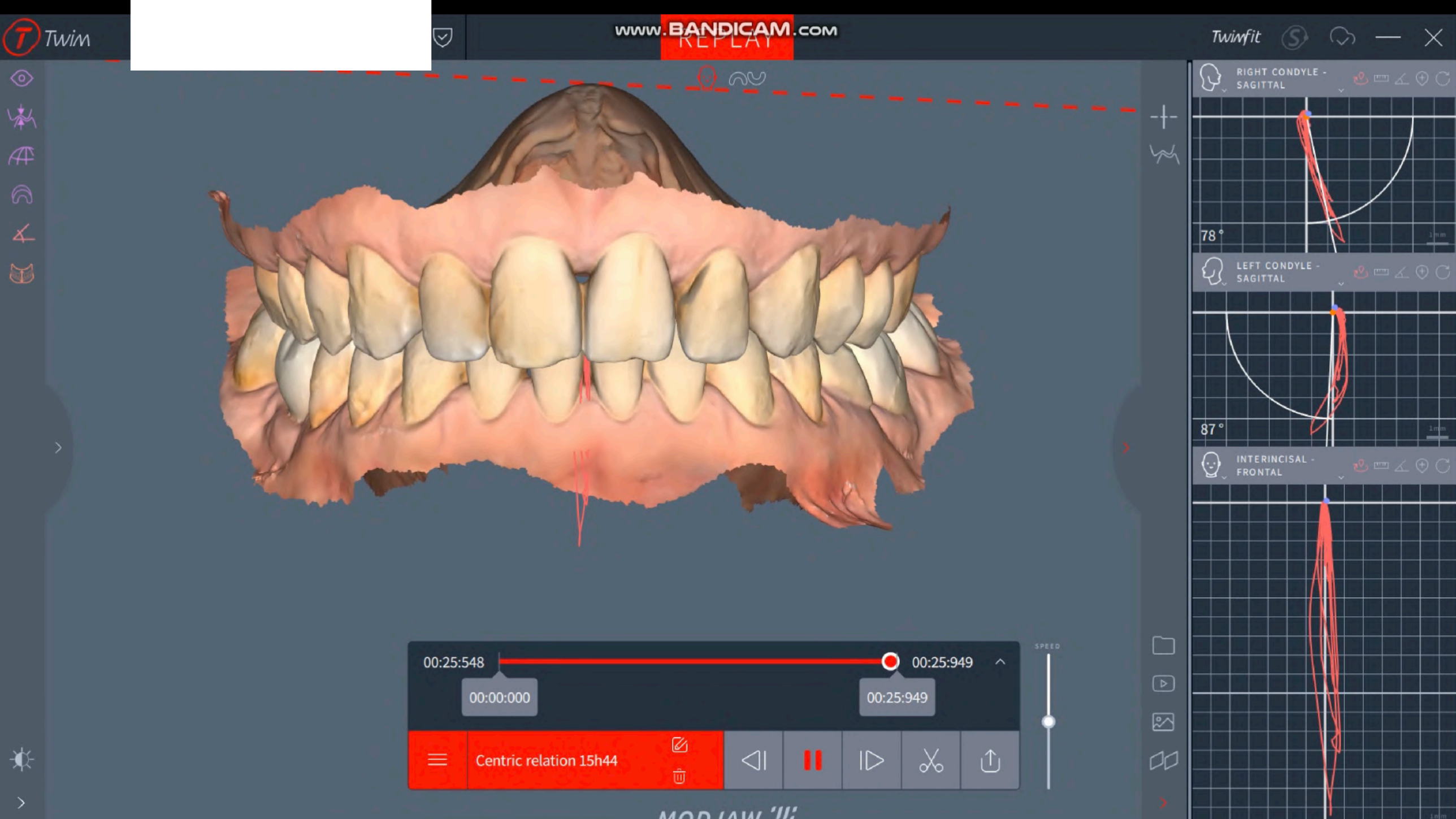

Twim
www.BANDICAM.com
REPLAY
Twinfit
RIGHT CONDYLE - SAGITTAL
78 °
LEFT CONDYLE - SAGITTAL
87 °
INTERINCISAL - SAGITTAL
00:07:025
00:30:841
00:00:000
00:30:841
SPEED
Protrusion 15h41

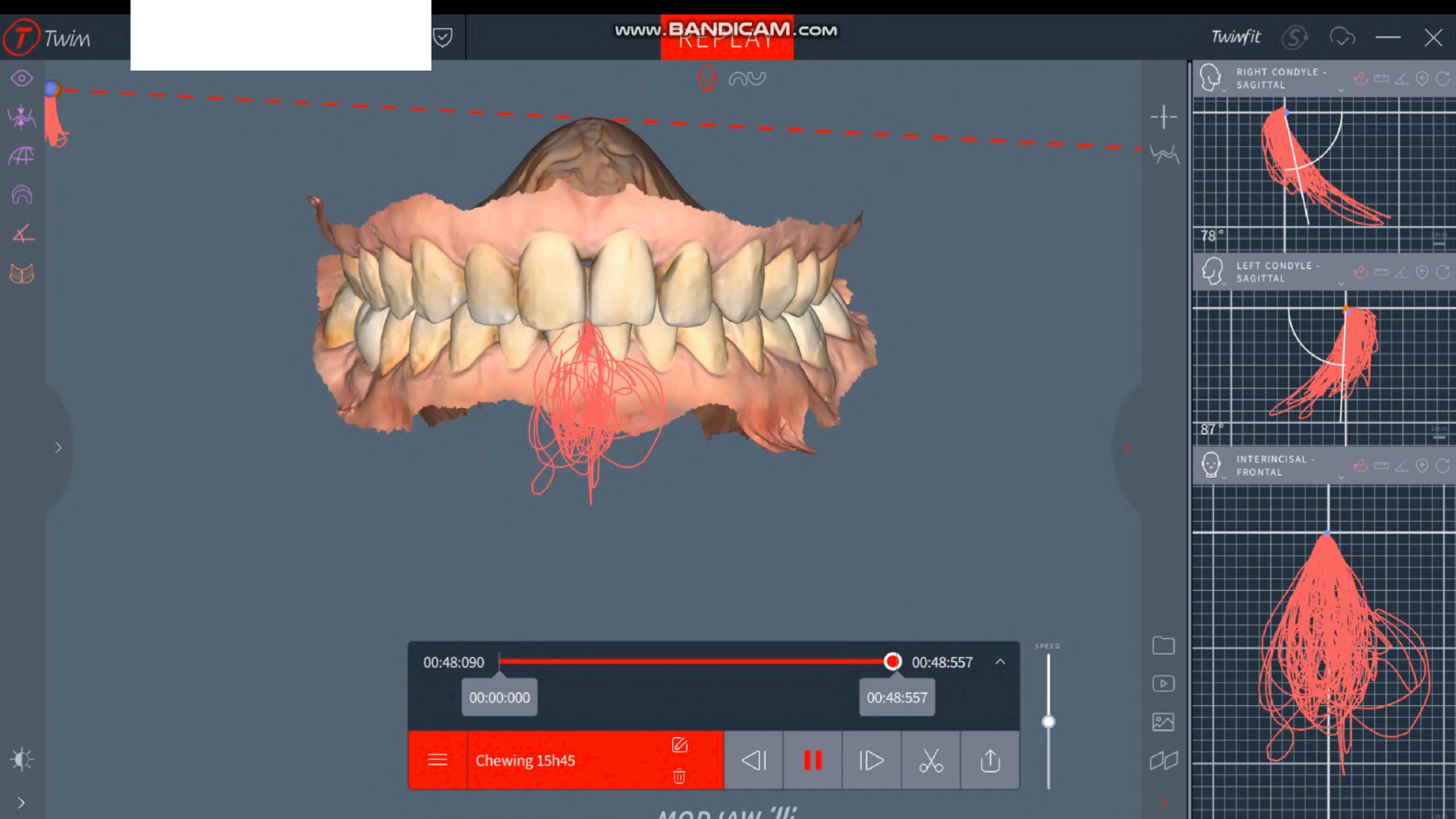





Twim
www.BANDICAM.com
REPLAY
Twinfit
RIGHT CONDYLE - SAGITTAL
78 °
LEFT CONDYLE - SAGITTAL
87 °
INTERINCISAL - FRONTAL
00:21:841
00:46:457
00:15:782
00:46:457
SPEED
Left laterotrusion 15h43


Twim
www.BANDICAM.com
REPLAY
Twinfit
RIGHT CONDYLE - SAGITTAL
78°
LEFT CONDYLE - SAGITTAL
87°
INTERINCISAL - FRONTAL
00:13:358
00:15:557
00:00:000
00:15:557
SPEED
Open Close 15h44





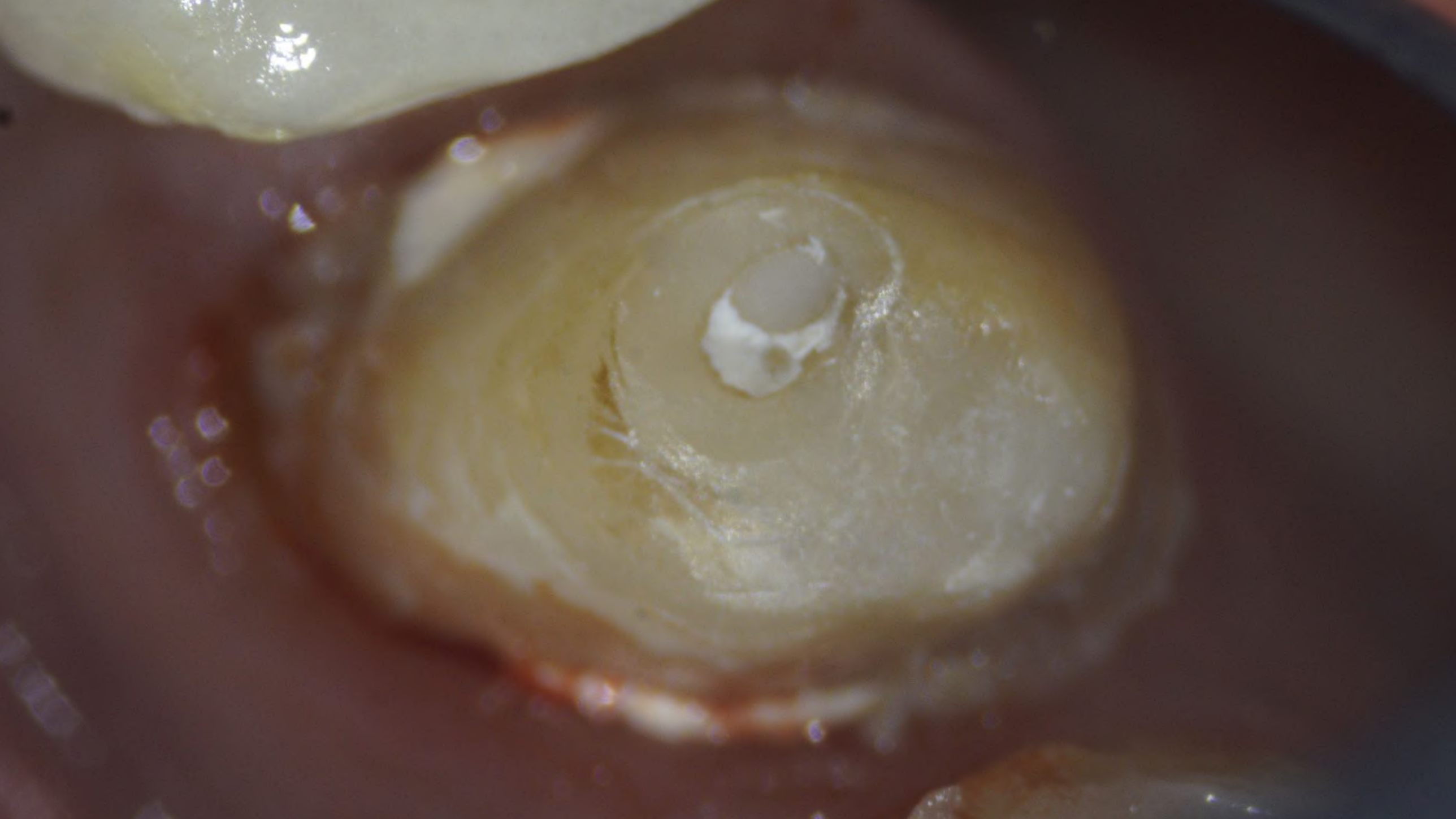
Oral sanitation – endodontic treatments of 35 and 45 + restorative therapy in quadrants 1 and 2.

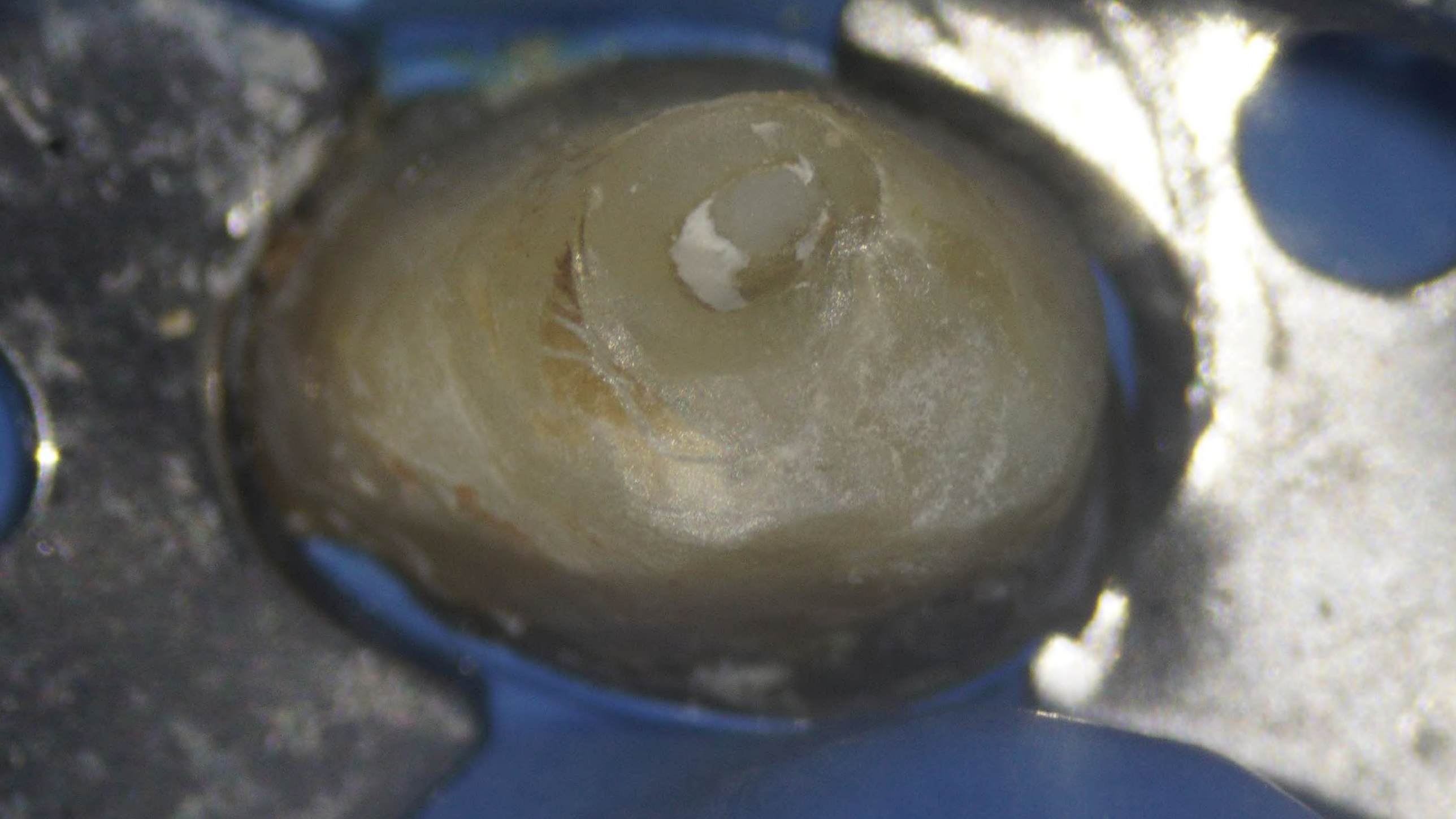
After confirming the esthetic and functional digital plan, **sanitation** was completed:

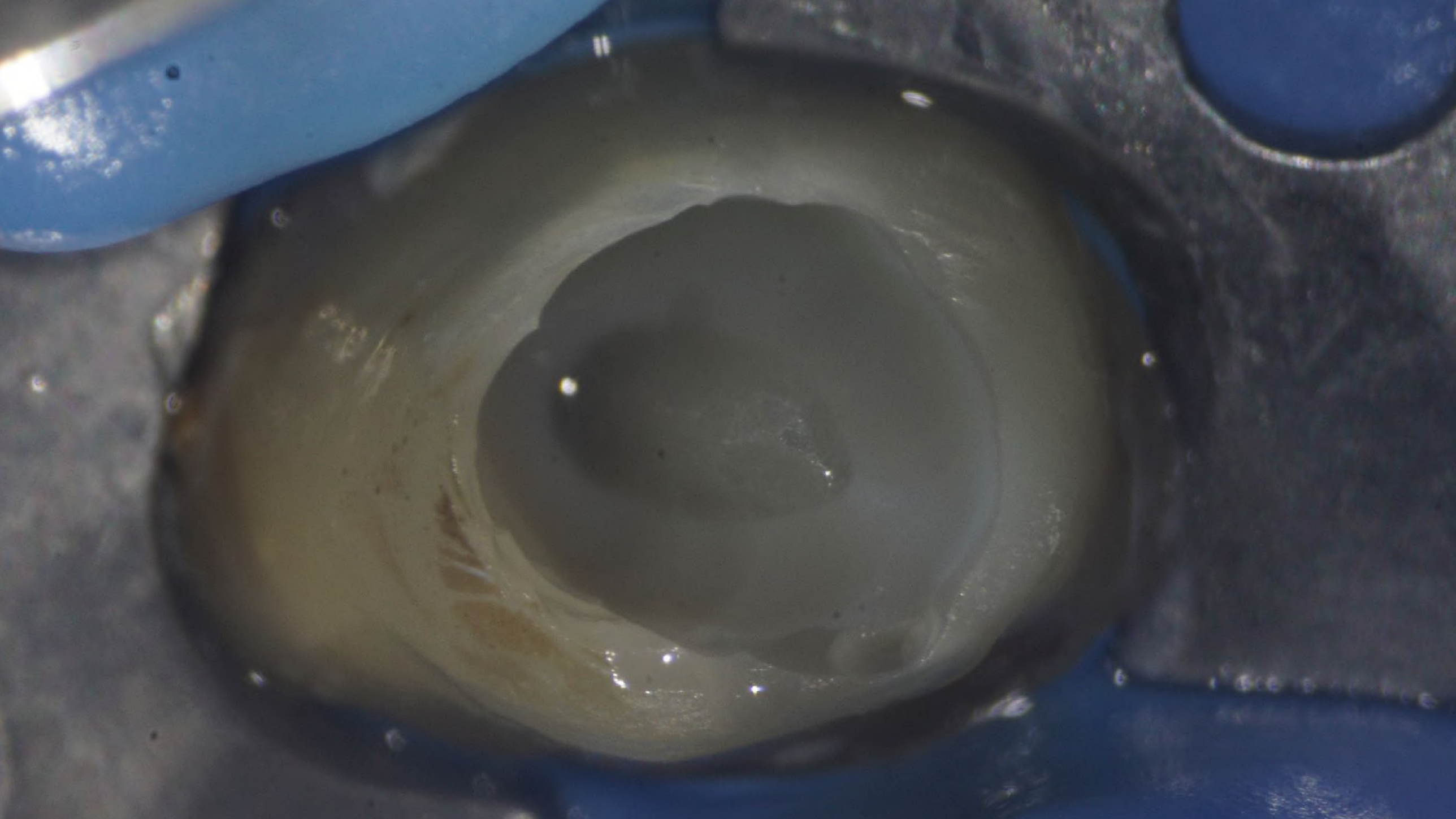
- quadrants **1 and 2**: removal of old restorations and caries, isolation under rubber dam, and adhesive direct composite restorations;
- **endodontic treatment** of teeth **3.5 and 4.5**, performed under the microscope with full digital and radiographic documentation (pre-, intra-, and postoperative).

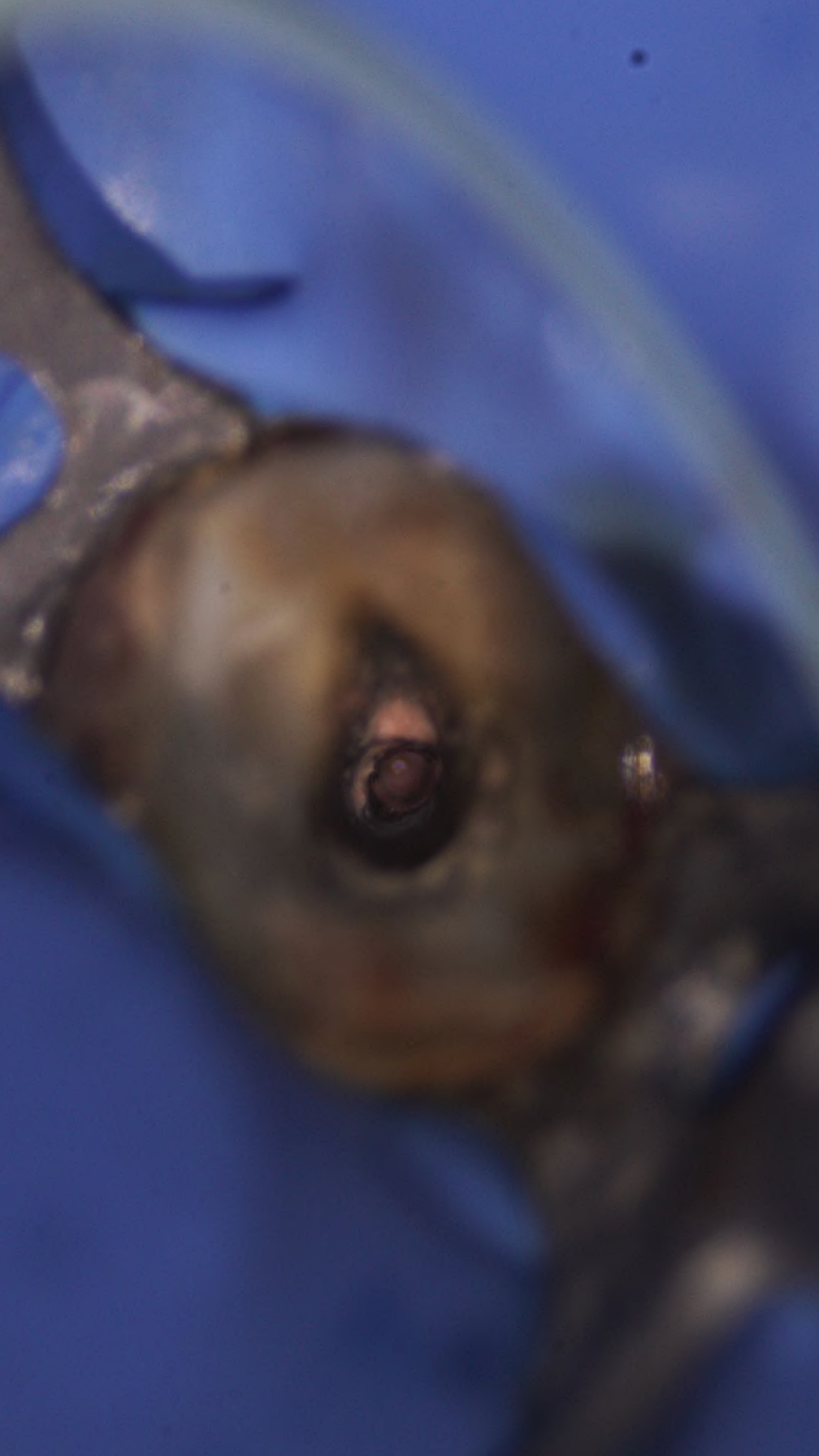
This ensured a biologically stable foundation for the prosthetic phase.

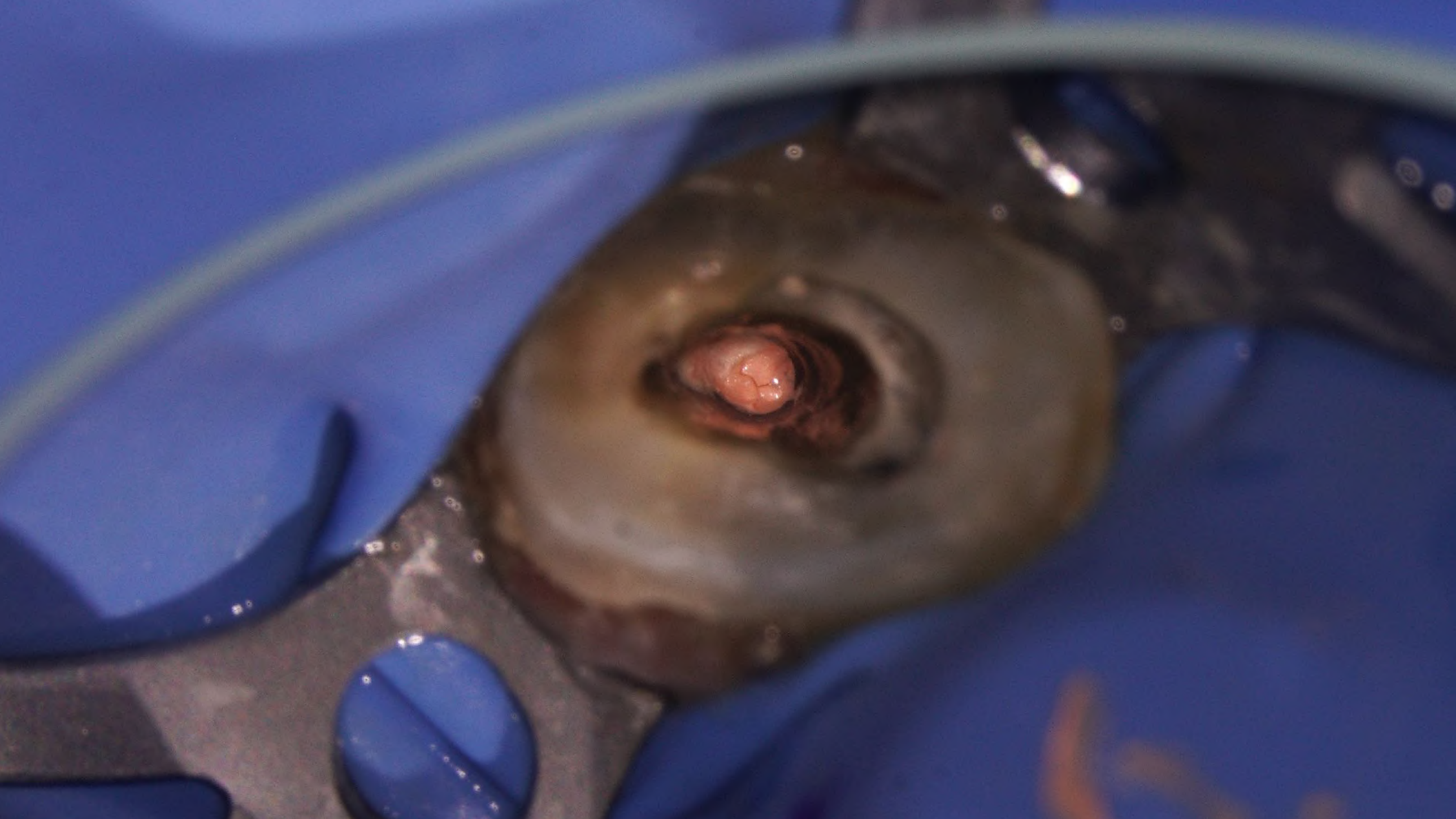
Endodontic treatment of tooth 35.

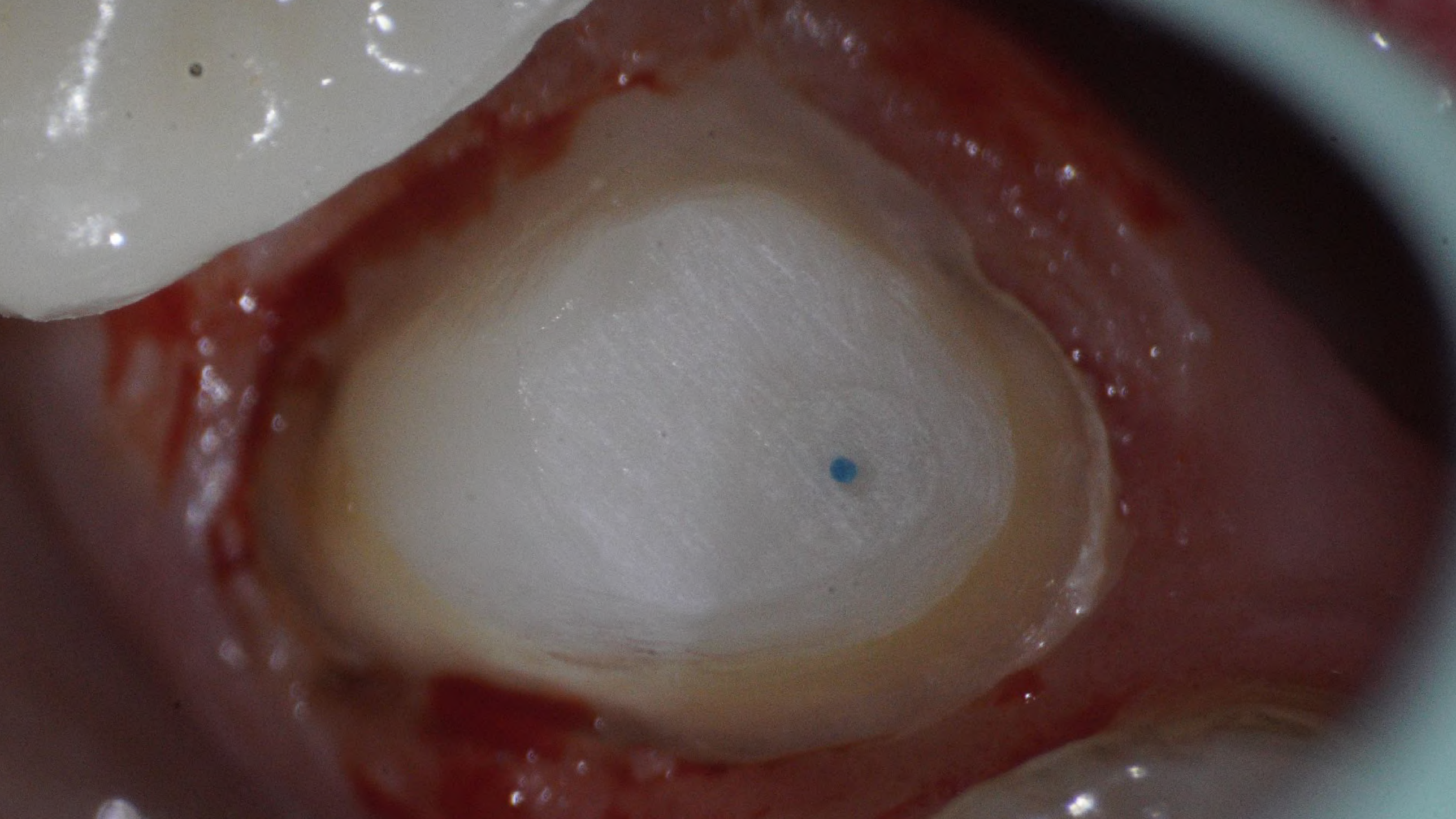




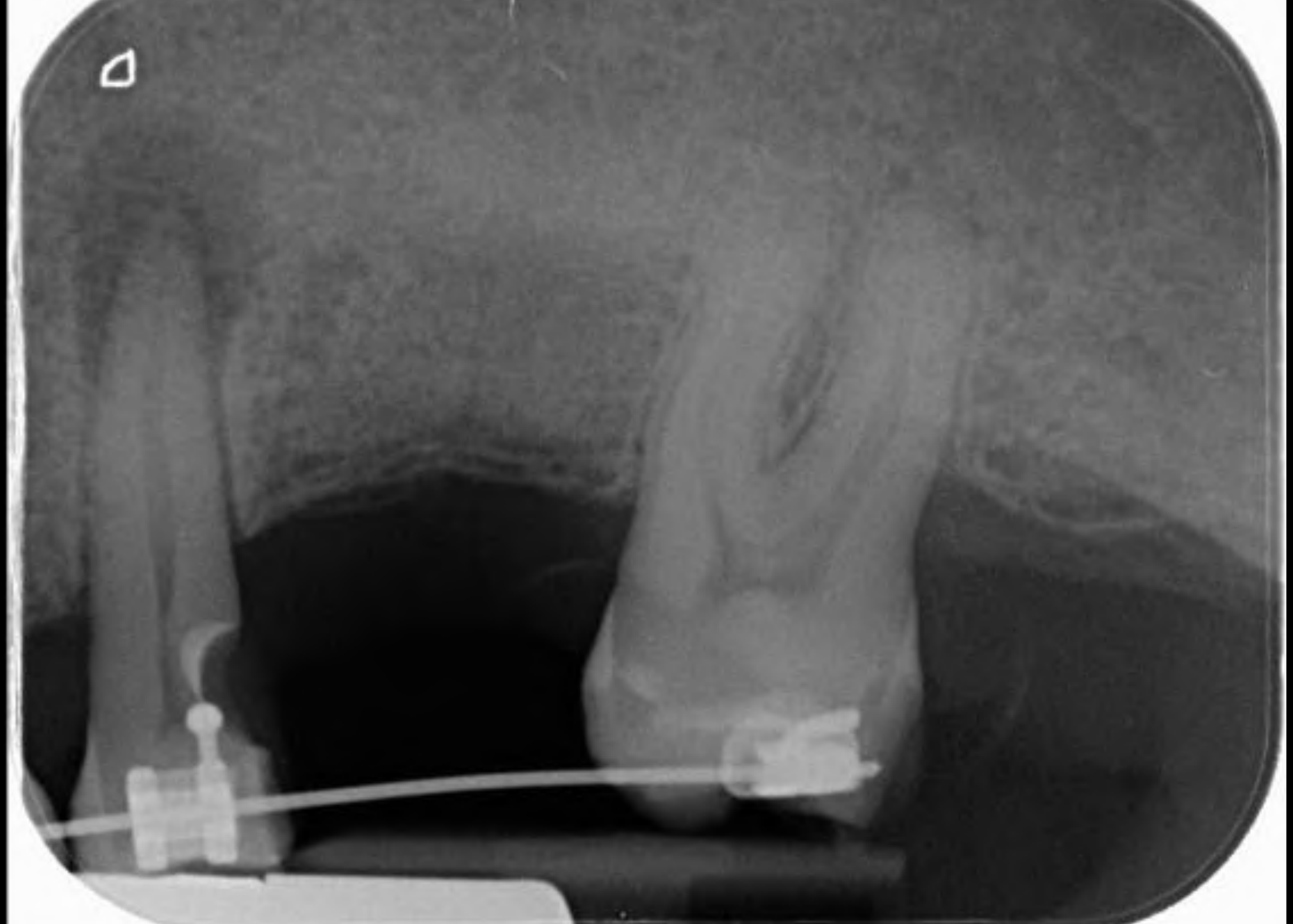


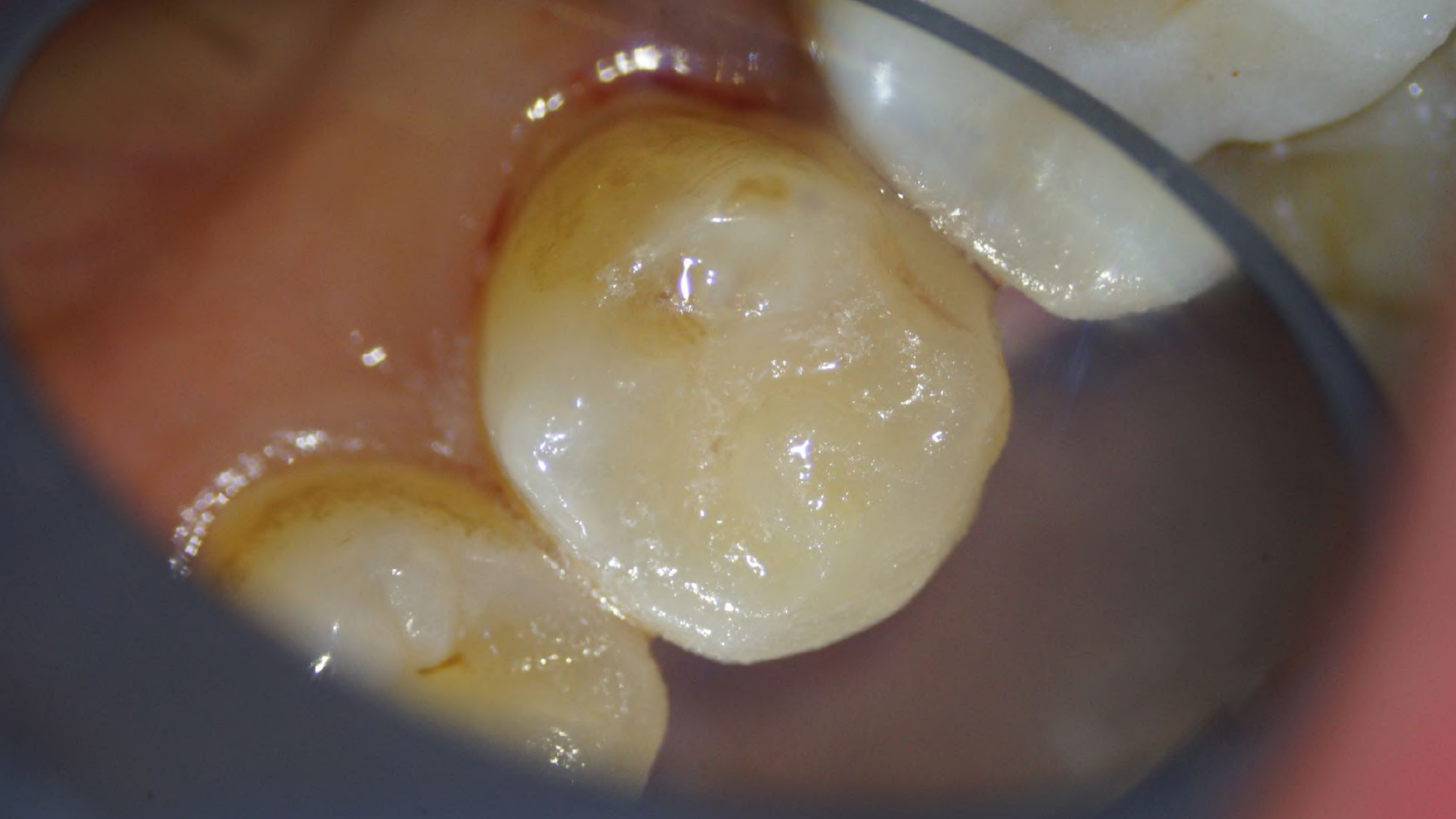


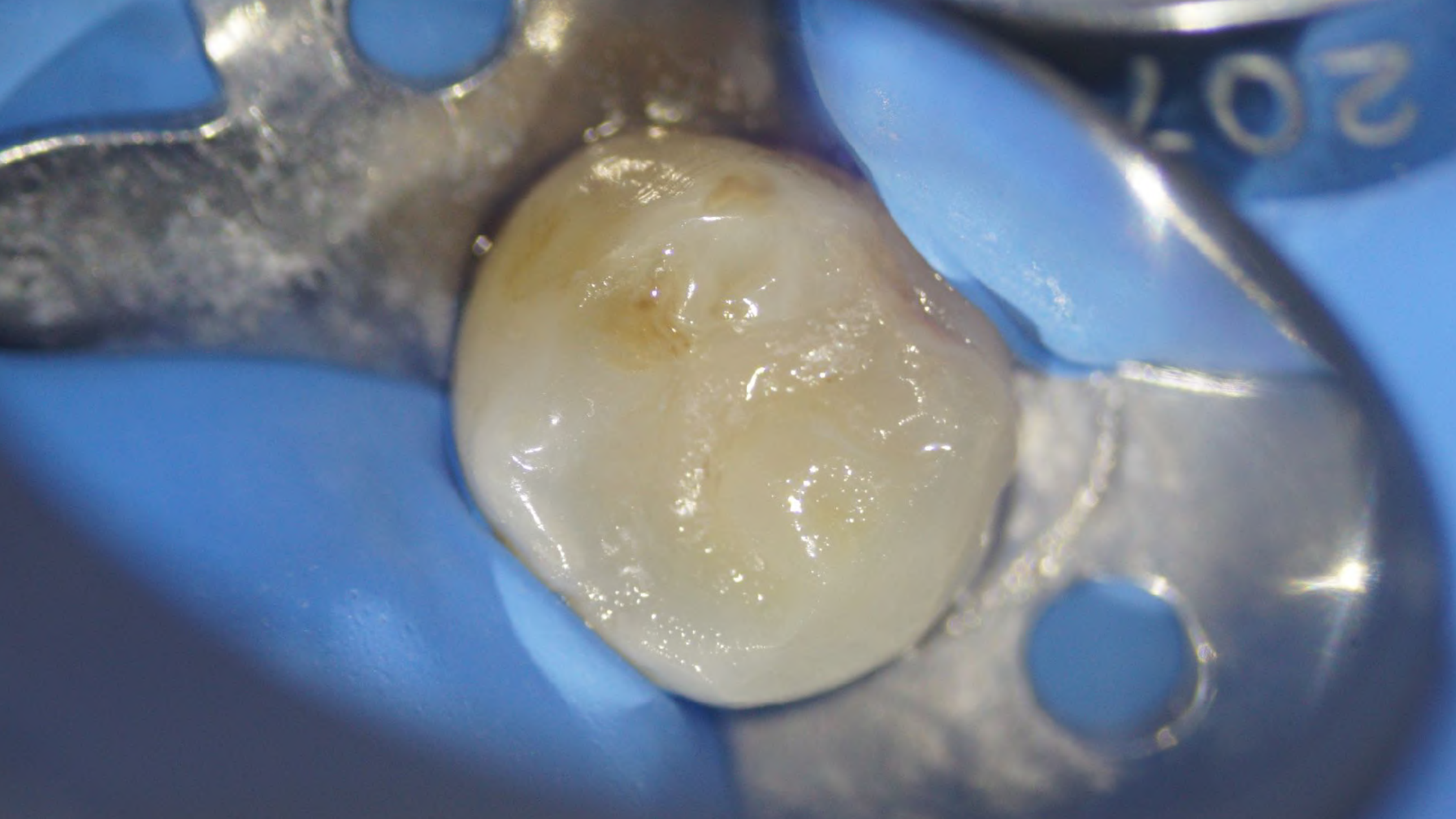


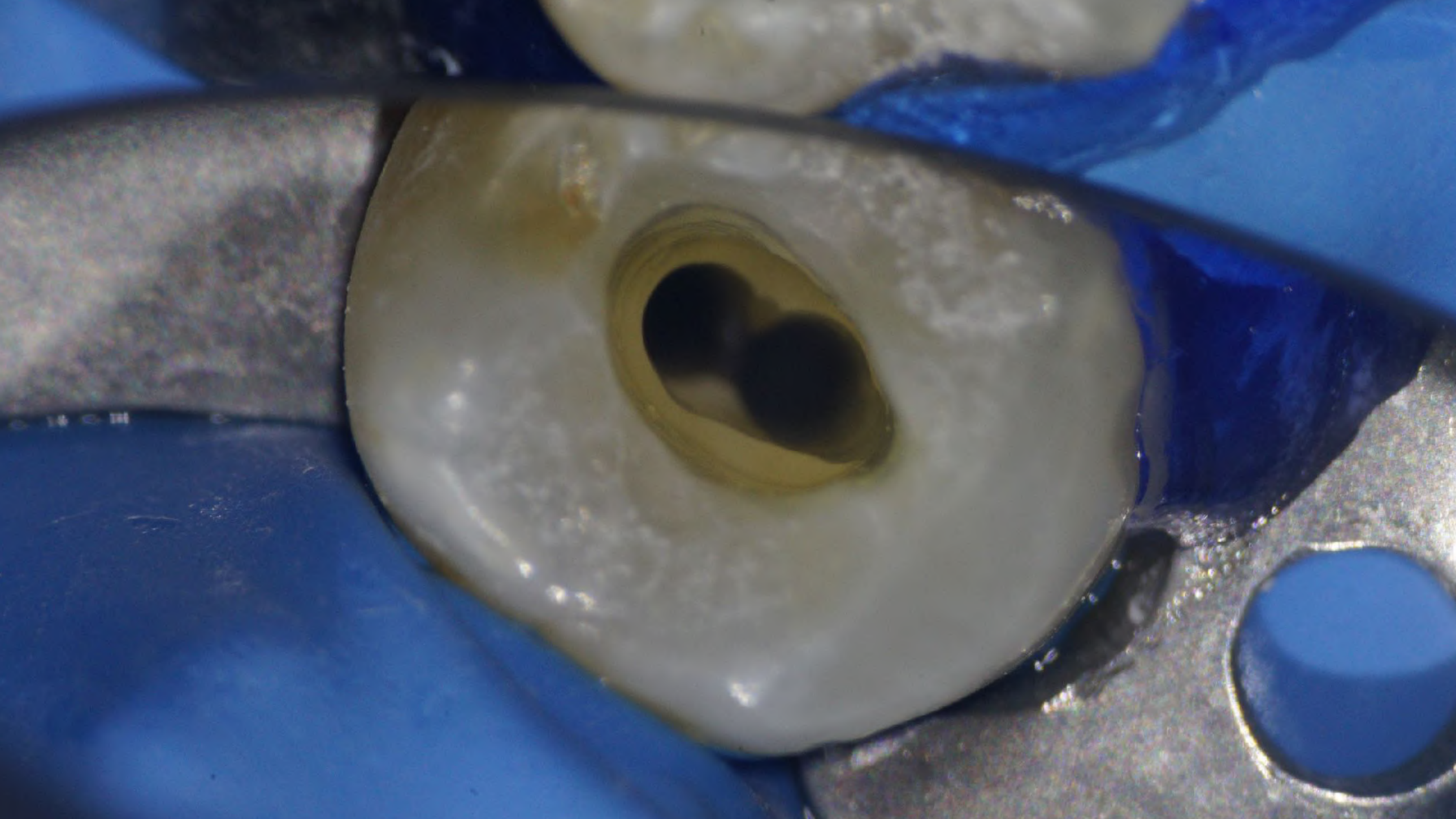


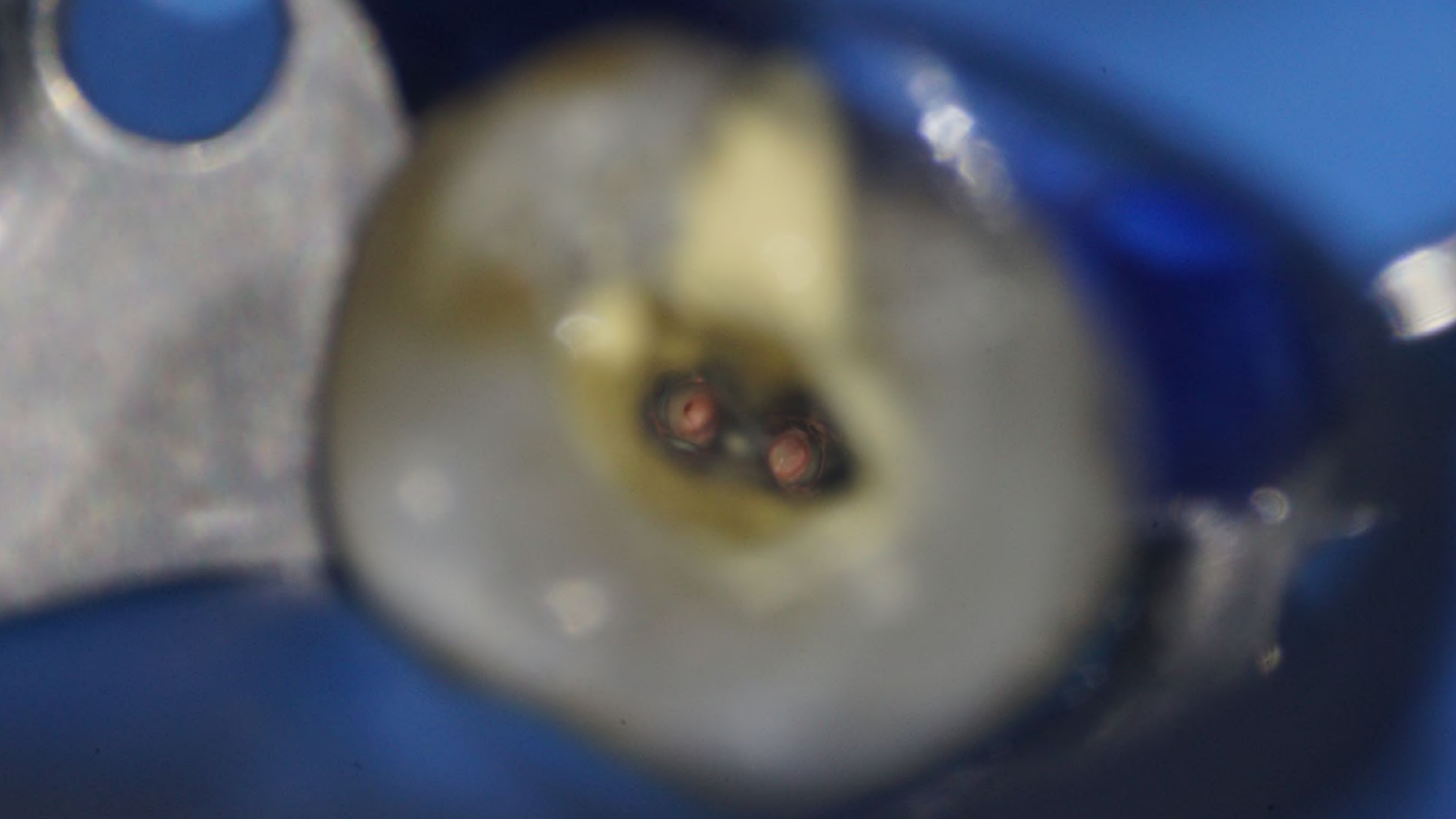
Endodontic treatment of tooth 45.

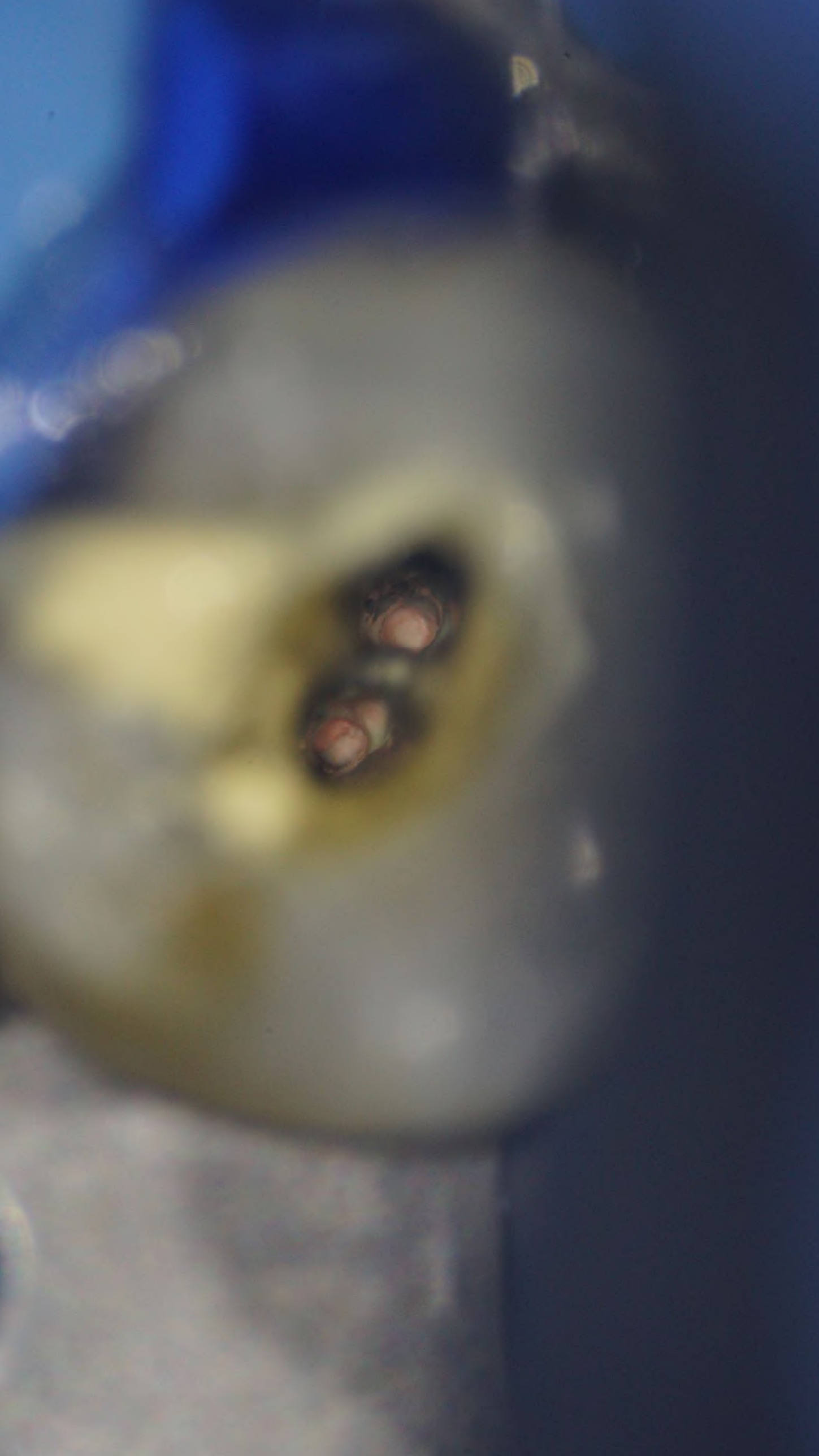


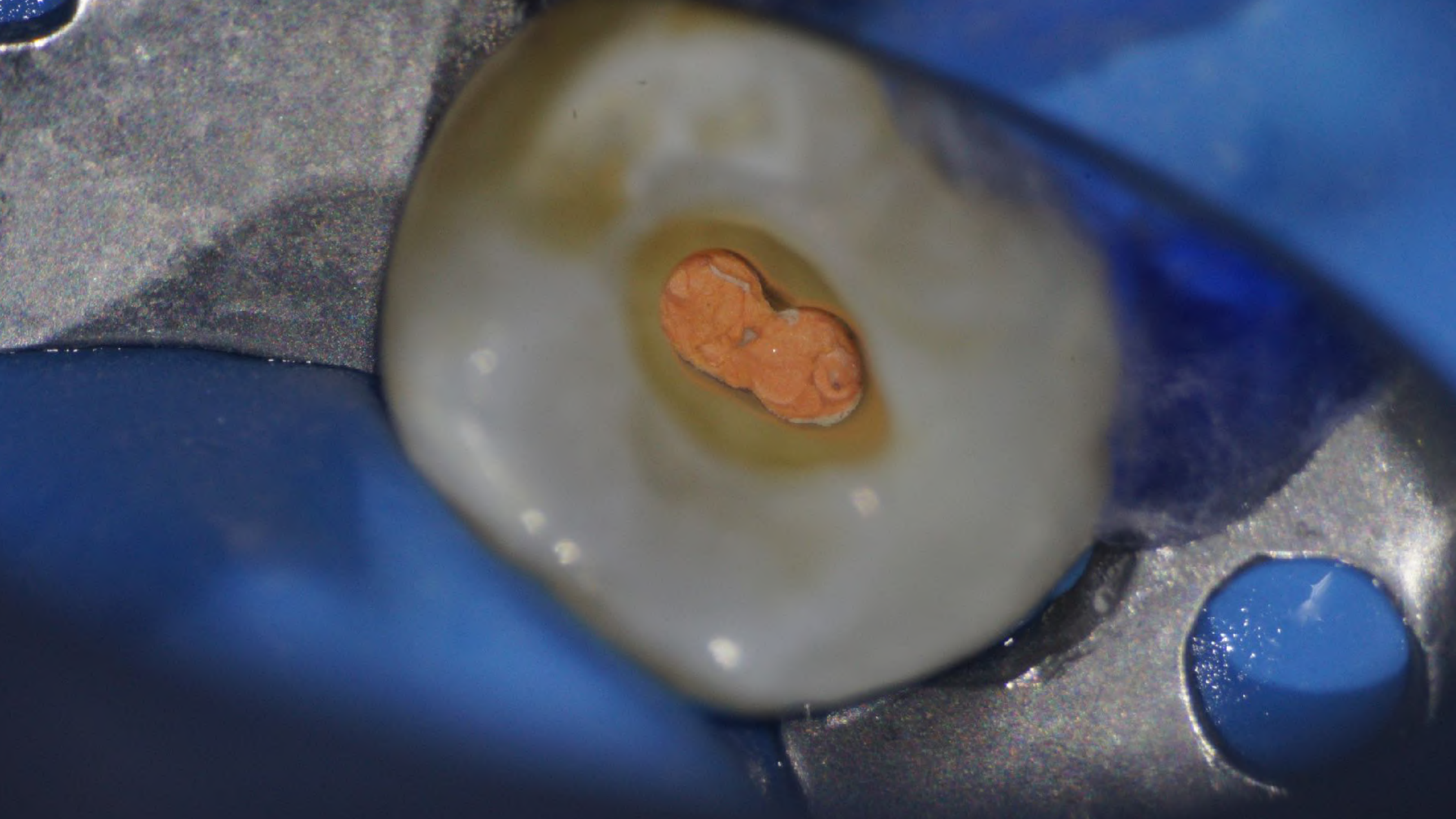


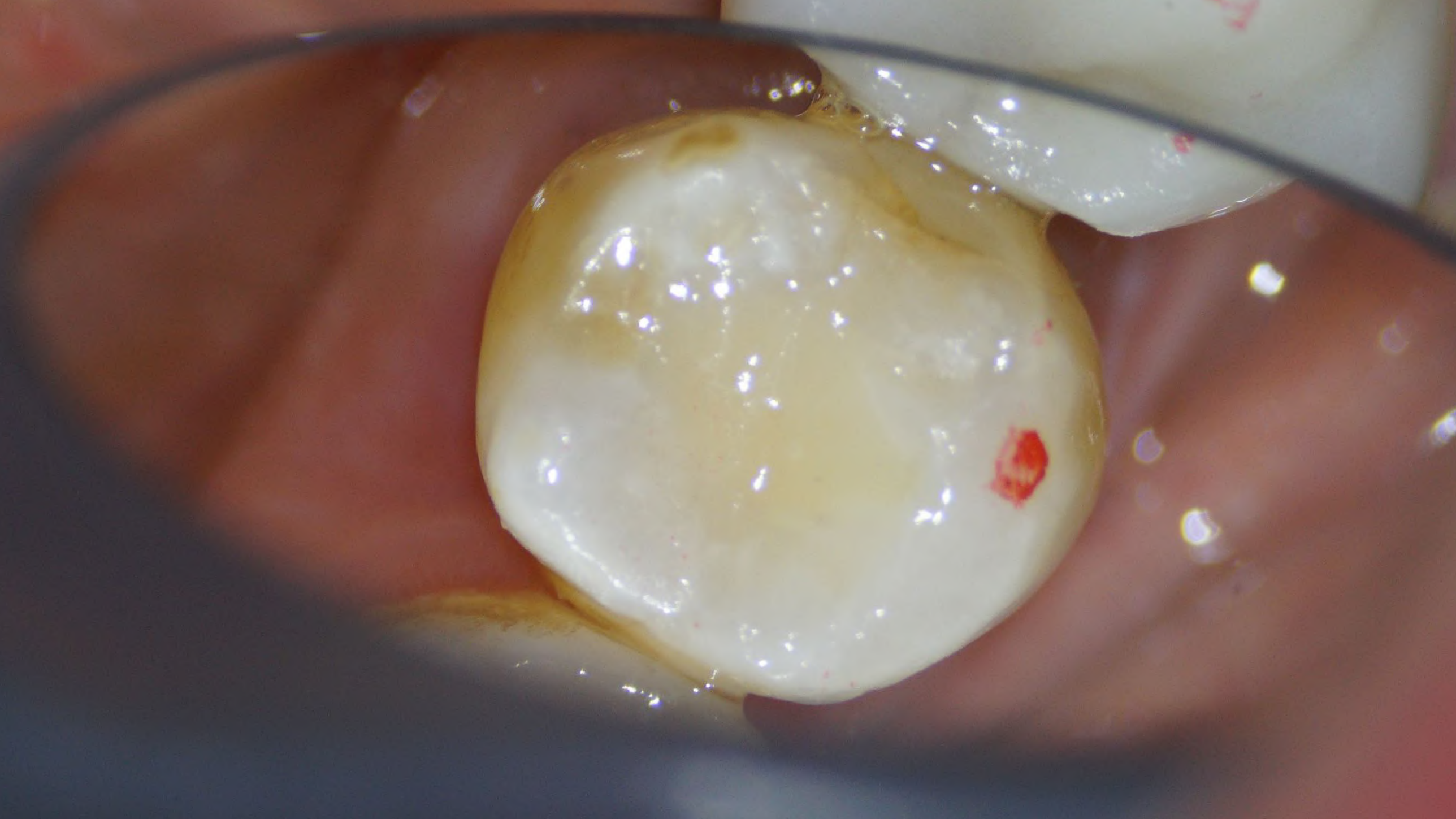












Restorative therapy – quadrant 2.

Restorative therapy – quadrant 1.


B2

DSD + mock-up test drive – aesthetic and functional validation.

A mock-up based on the digital wax-up was transferred into the oral cavity.

During the test drive:

- esthetics, phonetics, and smile dynamics were evaluated;
- functional behavior (contact distribution, guidance, movement pathways) was checked both clinically and correlated with Modjaw data;
- fine adjustments were performed and fed back into the digital workflow.

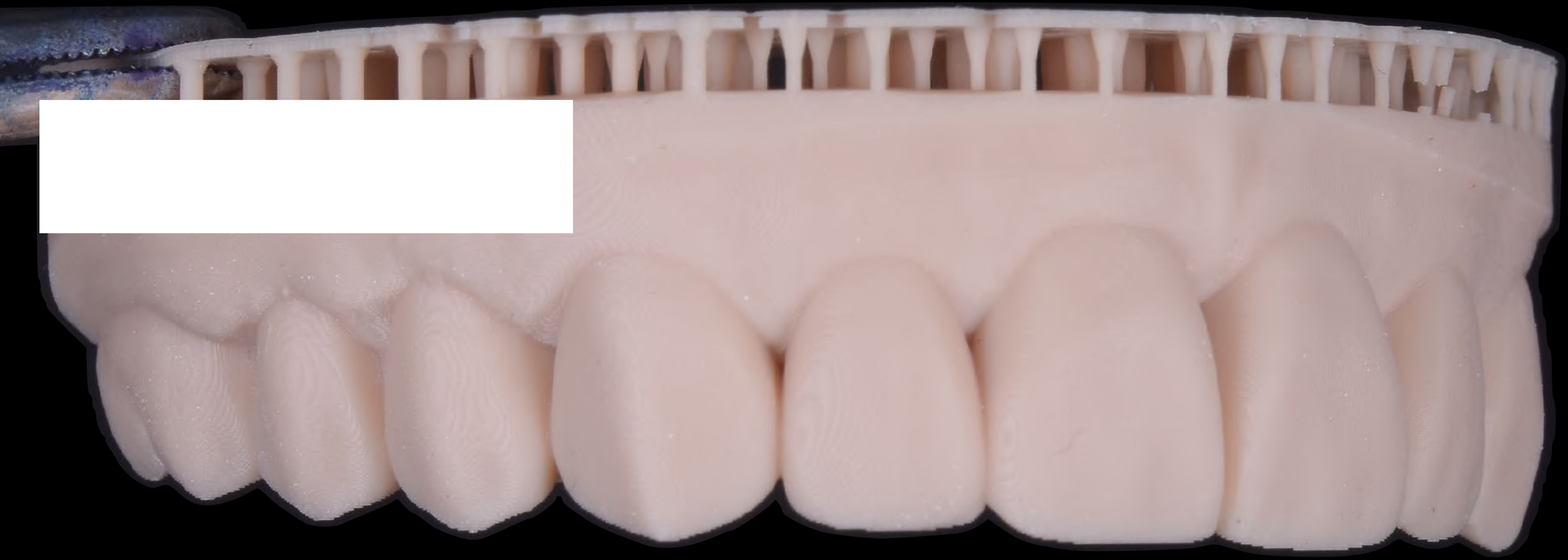
The mock-up served as a **predictive simulation**, confirming that the digital “tailor-made” design could be safely transferred into the mouth.

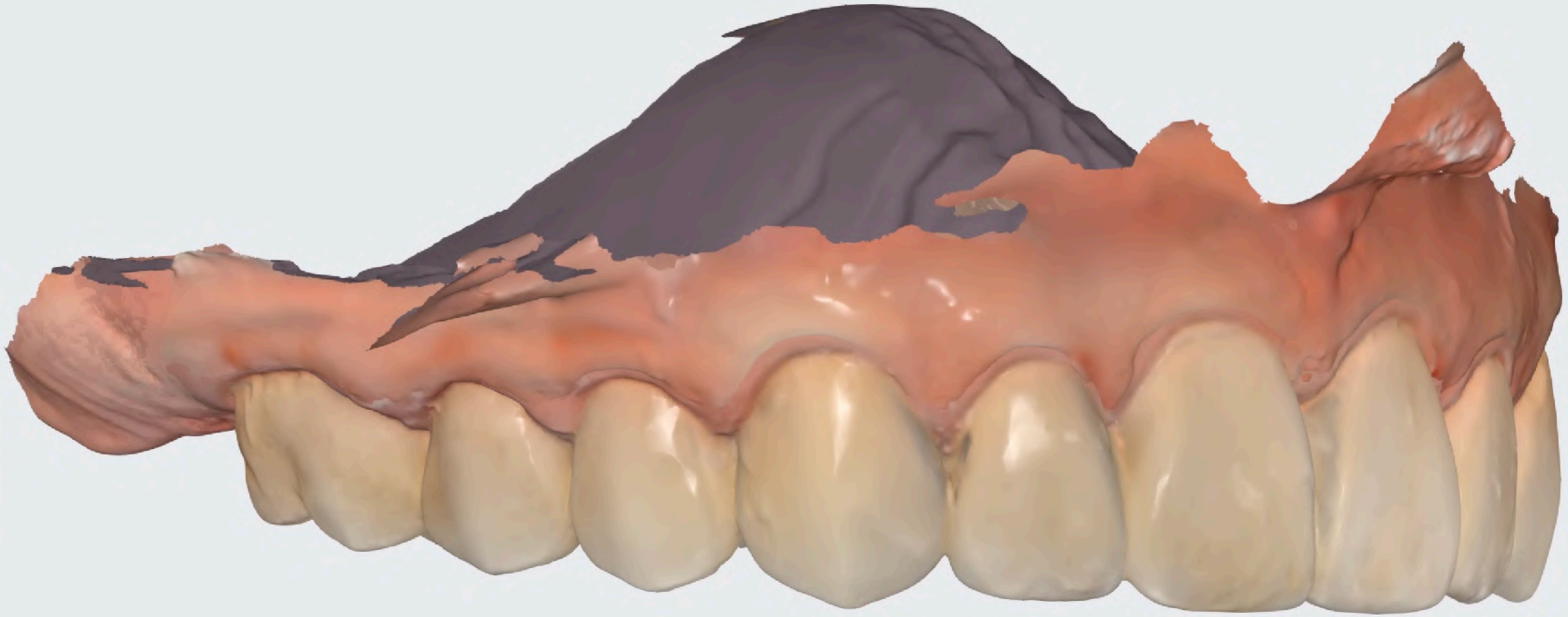
Minimally invasive preparations guided by the mock-up and final restorations.

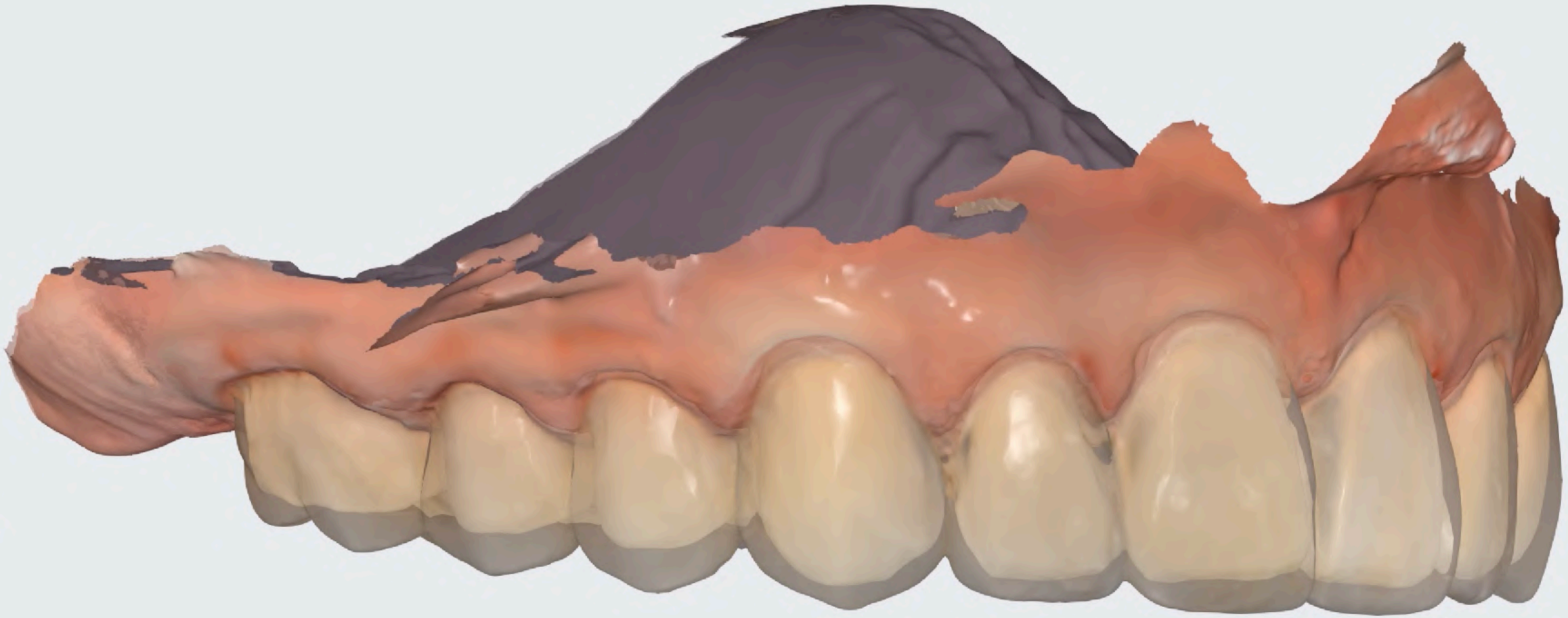
After validating the mock-up, **minimally invasive preparations** were performed, strictly guided by the pre-approved design.

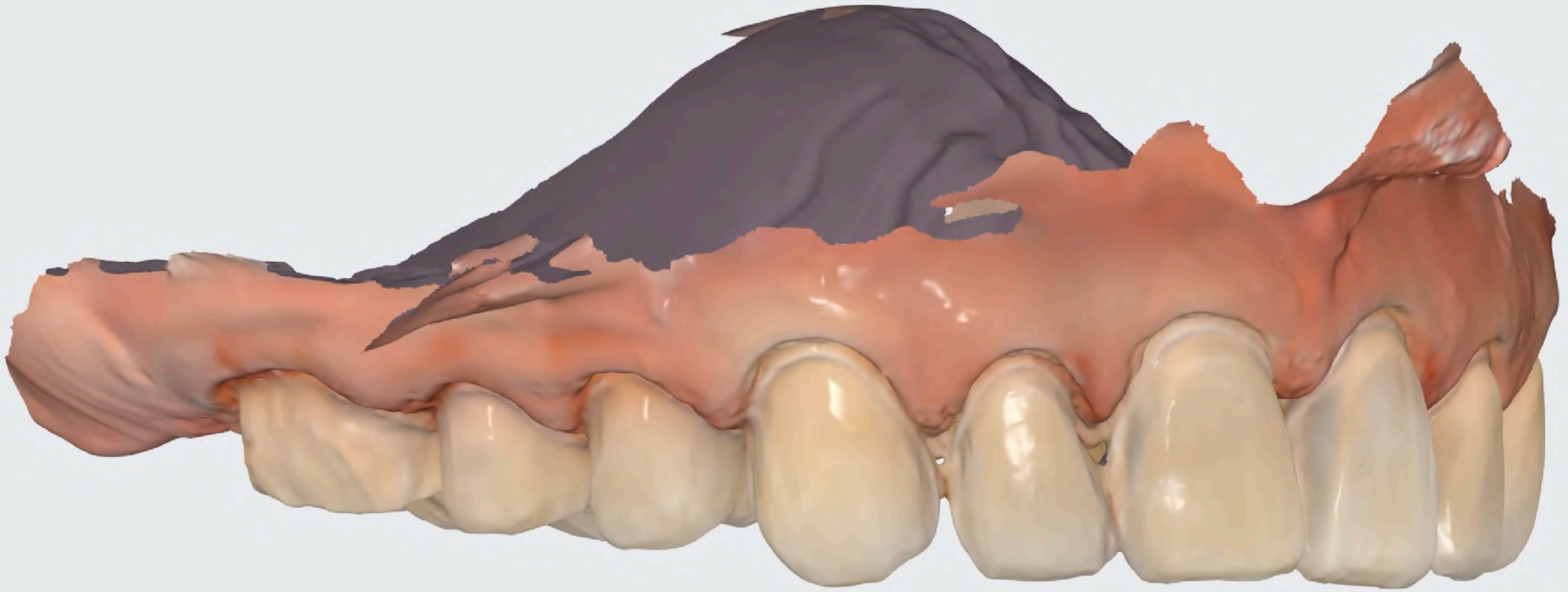
Scanner interface captures clearly show:

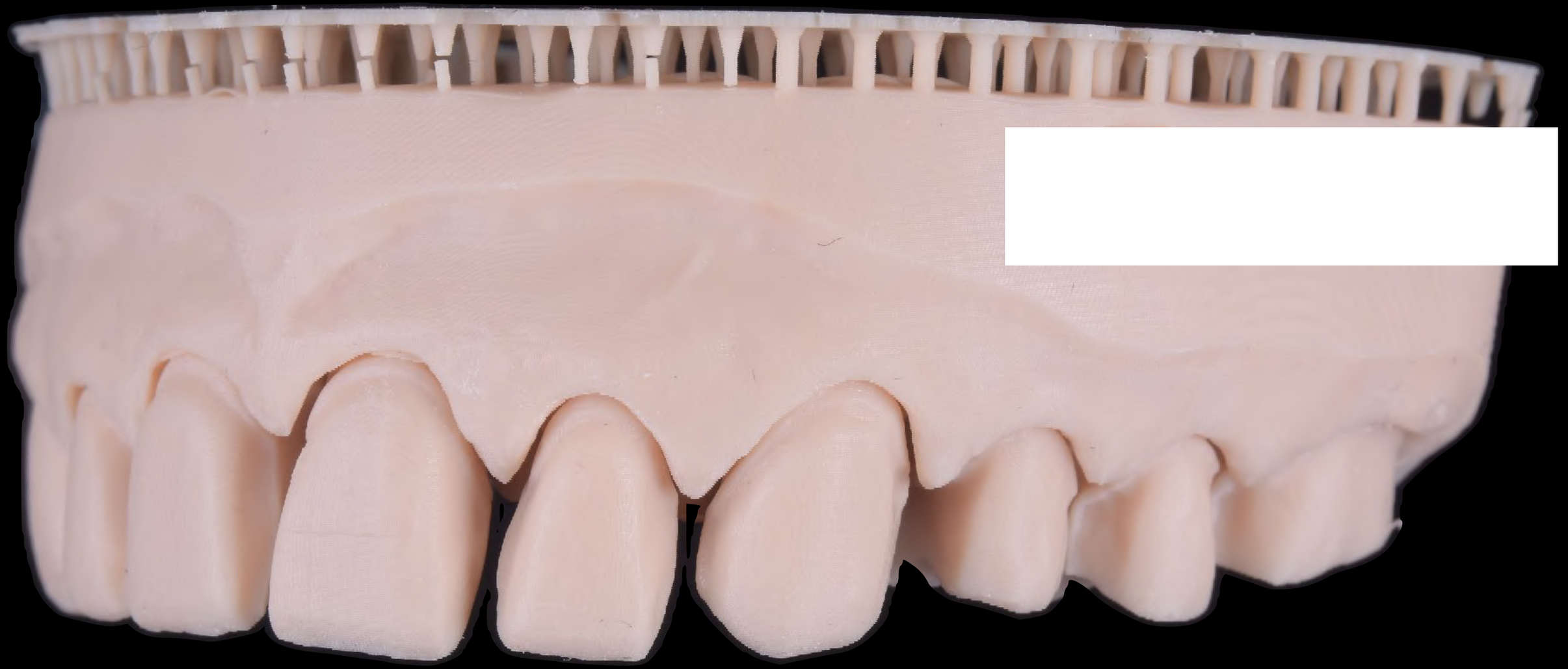
- **pre-operative situation**,
- **transparent overlays of pre-op / mock-up / preparations**, highlighting available vs. required space,
- **final preparations**, respecting enamel-preserving limits.

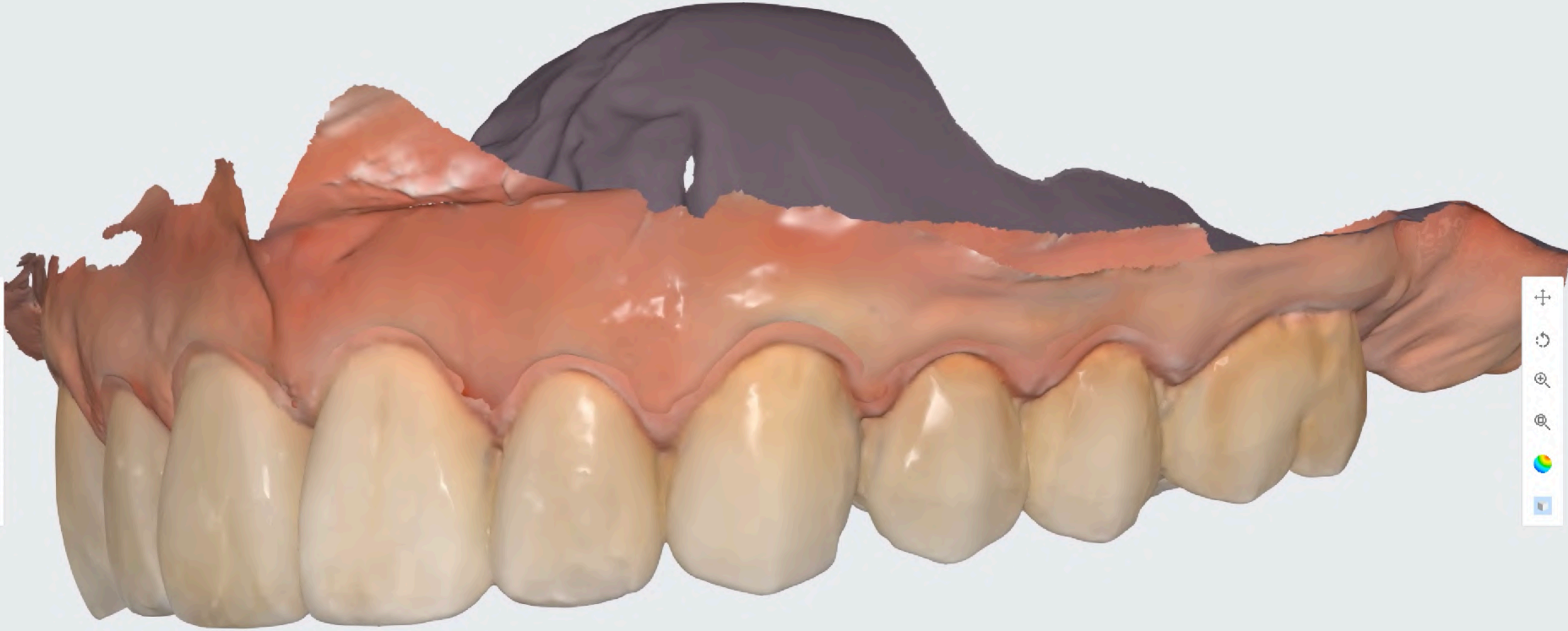


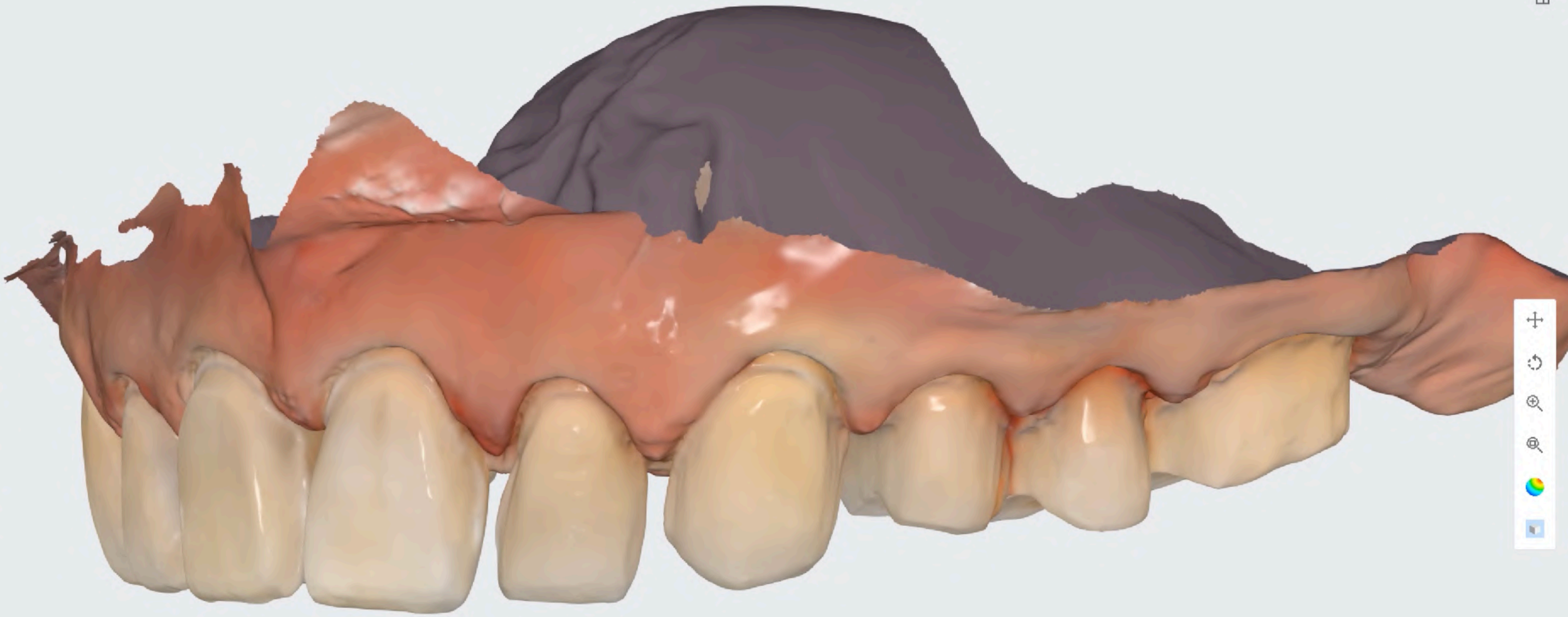













+Z


+Z

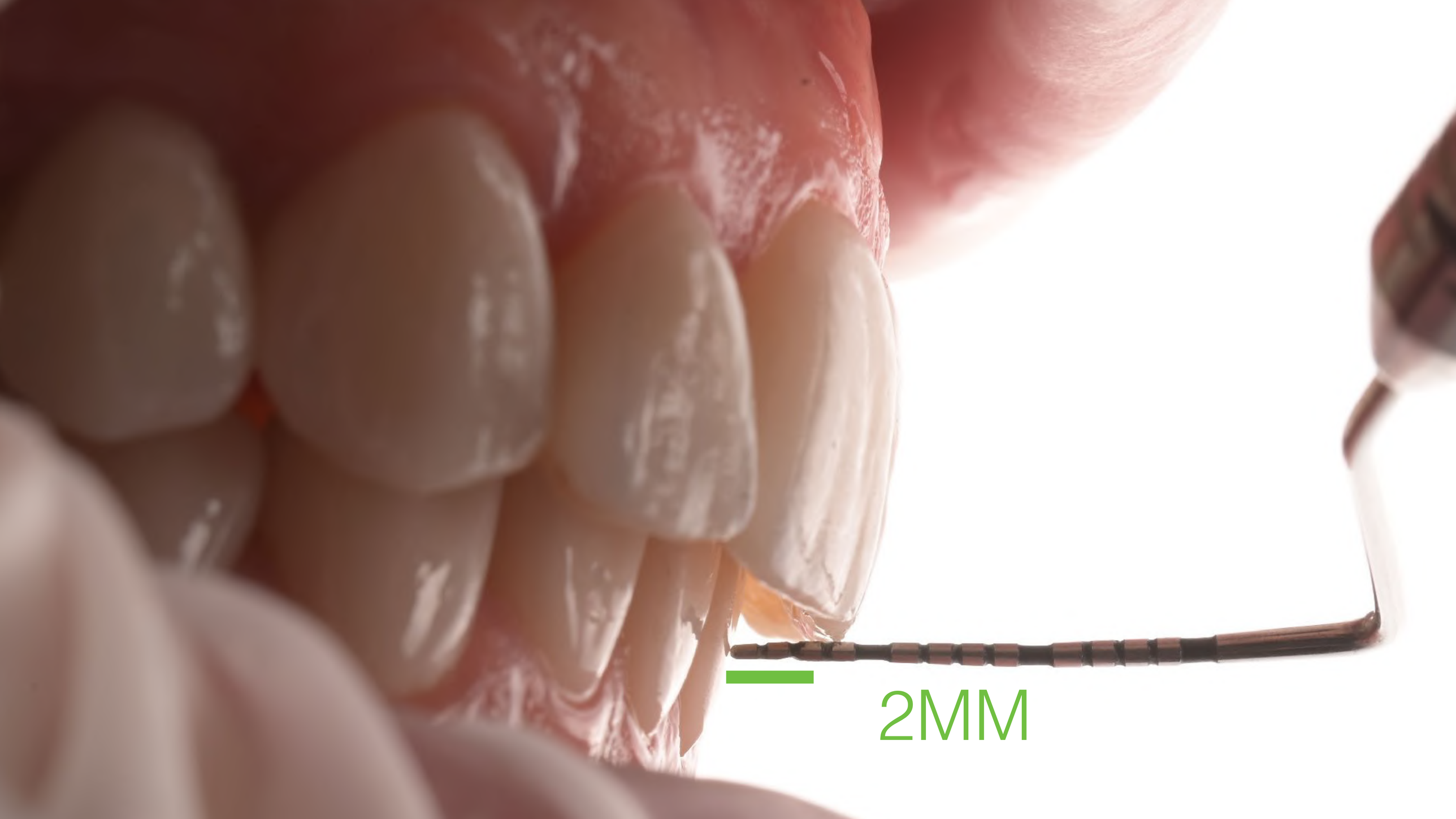

+Z

Final restorations.

Final restorations included:

- **Maxilla:** feldspathic veneers on refractory dies;
- **Mandible:** pressed ceramic **Emax veneers** anteriorly and premolar, plus **zirconia-based ceramic implant-supported crowns** molar.

Digital scans of the preparations were sent to the laboratory. Due to precise planning, clinical adjustments during try-in were minimal.


2MM

Scanning of the completed case.


+Z


+Z
+X

Modjaw Post-op

Occlusal and Functional Verification

A second **Modjaw 4D functional analysis (MJ Final)** was performed to compare with the initial functional condition.

Results confirmed:

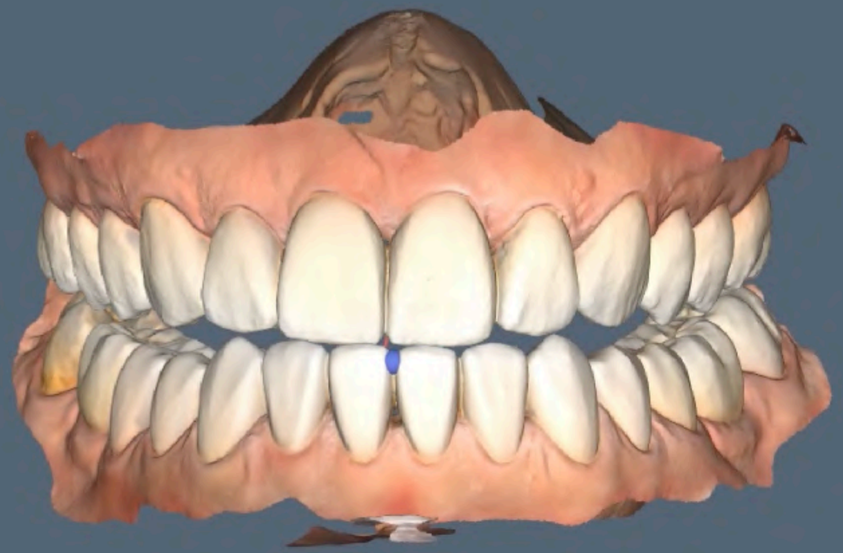
- **stable maximum intercuspation**,
- functional anterior and canine guidance,
- balanced excursive movements,
- excellent concordance between the planned digital design and actual functional behavior.

Twim

REPLAY

Twinfit

NEW MOTION



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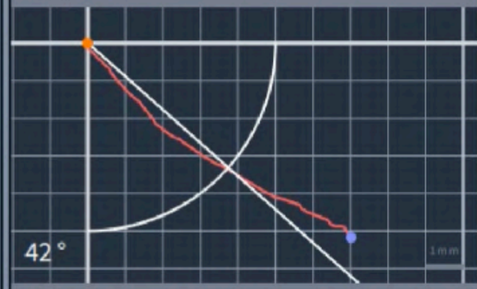

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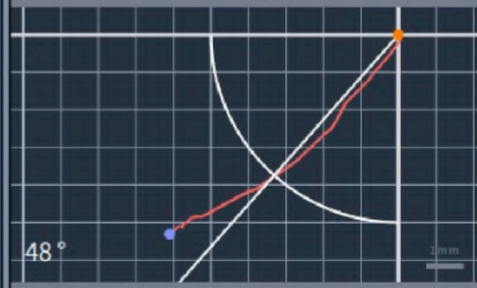

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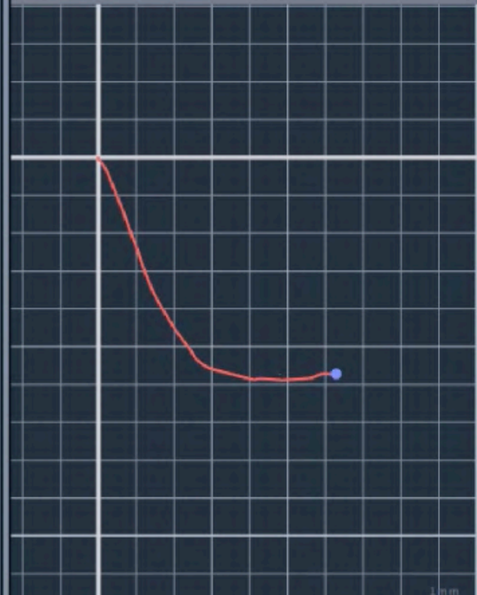

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00:28:074

00:00:000

00:28:074

SPEED

Protrusion 16h30

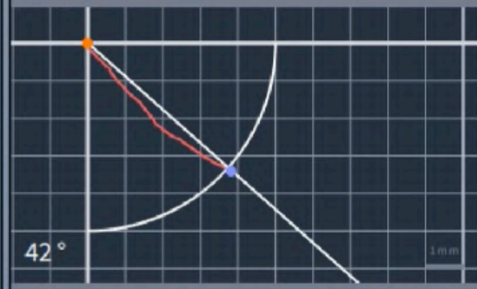
Twim

REPLAY

Twinfit

NEW MOTION

RIGHT CONDYLE - SAGITTAL



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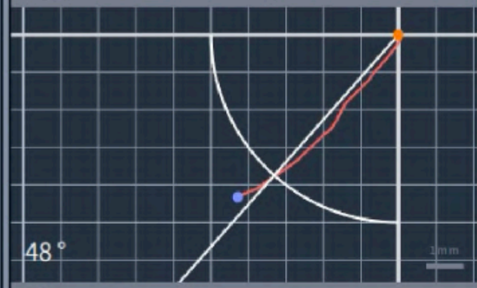

INTERINCISAL - SAGITTAL

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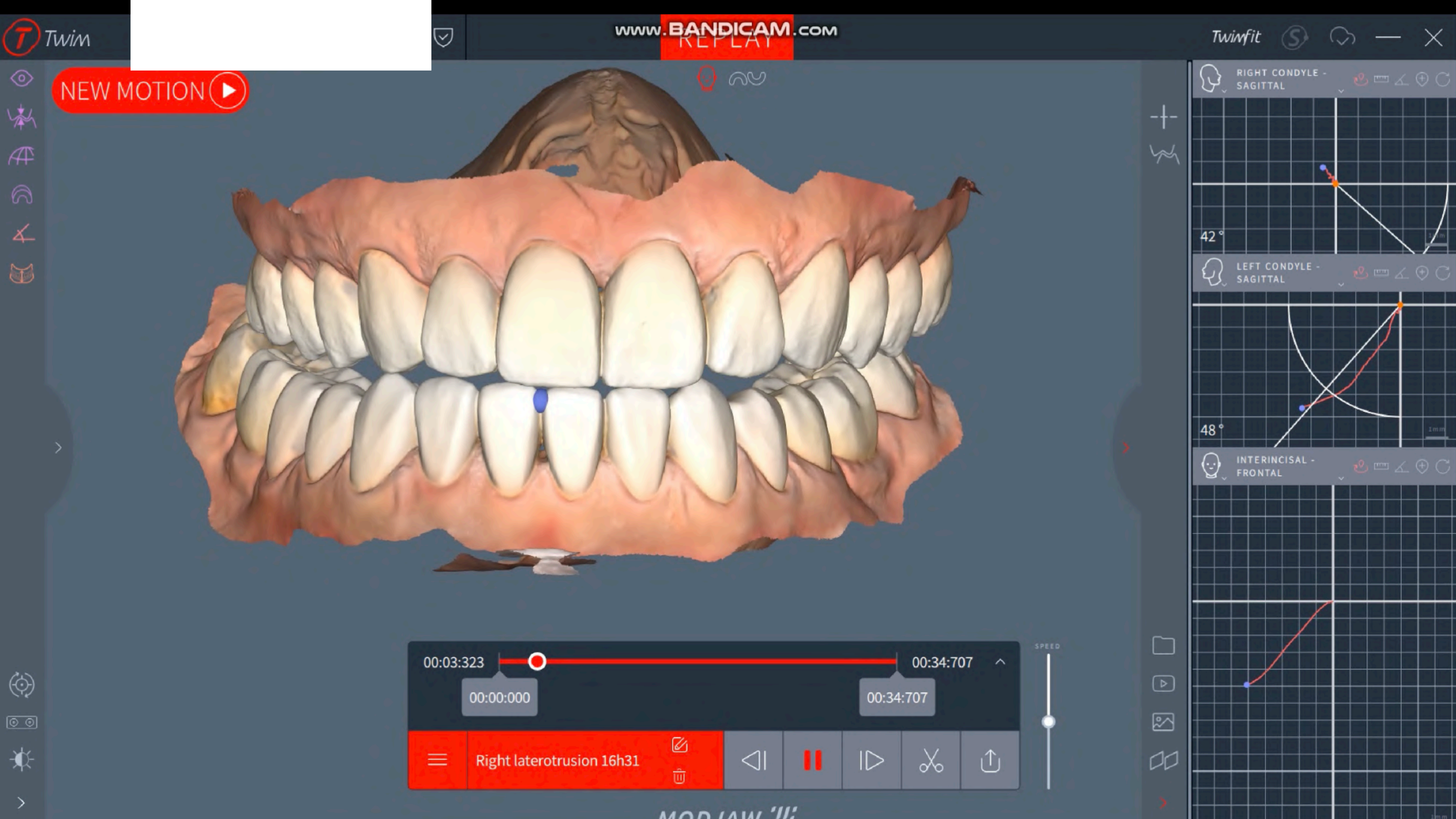
00:28:074

SPEED

Protrusion 16h30

MOD JAW


Twim
www.BANDICAM.com
REPLAY
Twinfit
NEW MOTION
RIGHT CONDYLE - SAGITTAL
42 °
LEFT CONDYLE - SAGITTAL
48 °
INTERINCISAL - FRONTAL
00:03:323
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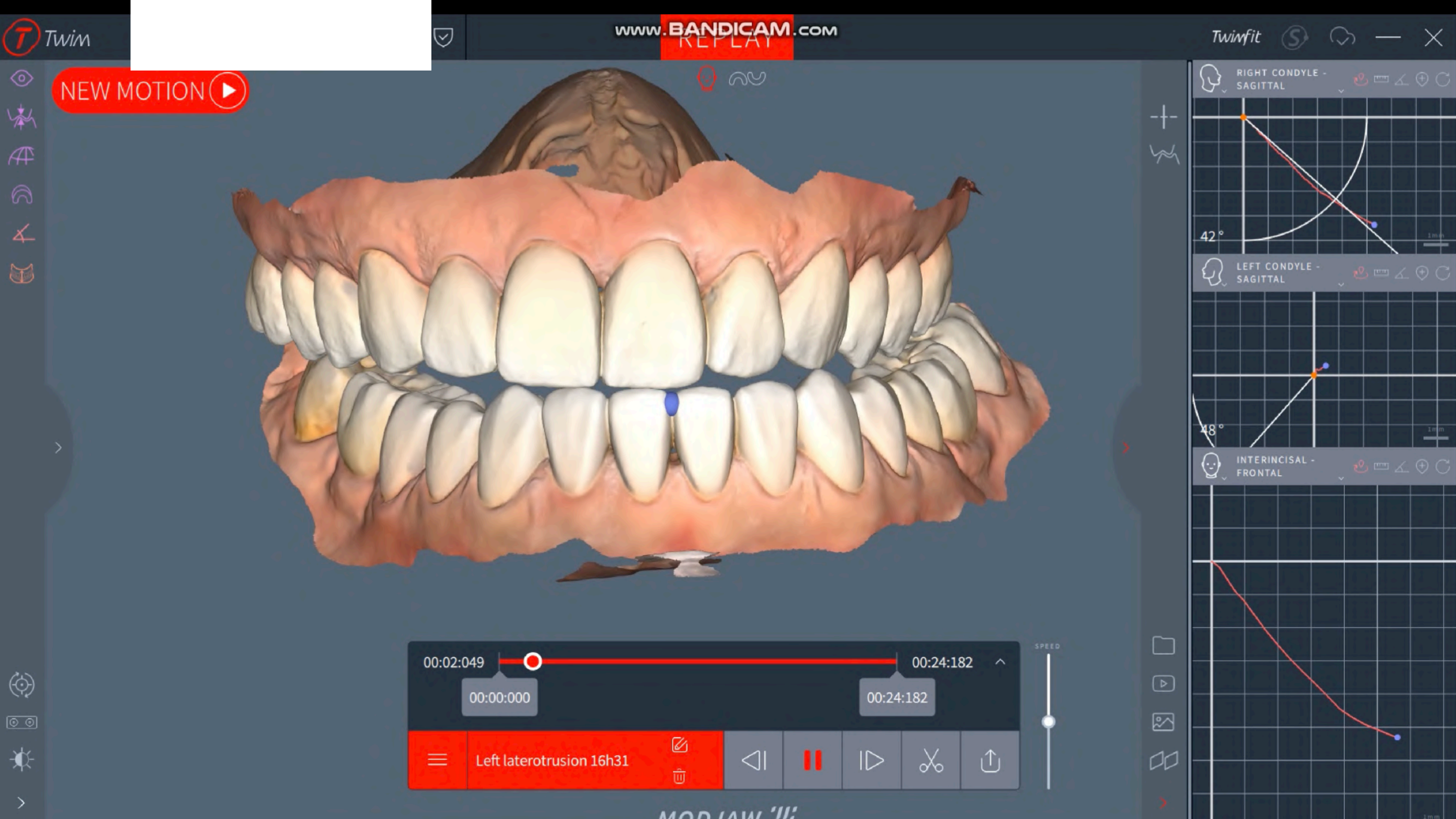
00:34:707
SPEED
Right laterotrusion 16h31


Twim
www.BANDICAM.com
REPLAY
Twinfit
NEW MOTION
RIGHT CONDYLE - SAGITTAL
42 °
LEFT CONDYLE - SAGITTAL
48 °
INTERINCISAL - FRONTAL
00:02:049
00:24:182
00:00:000
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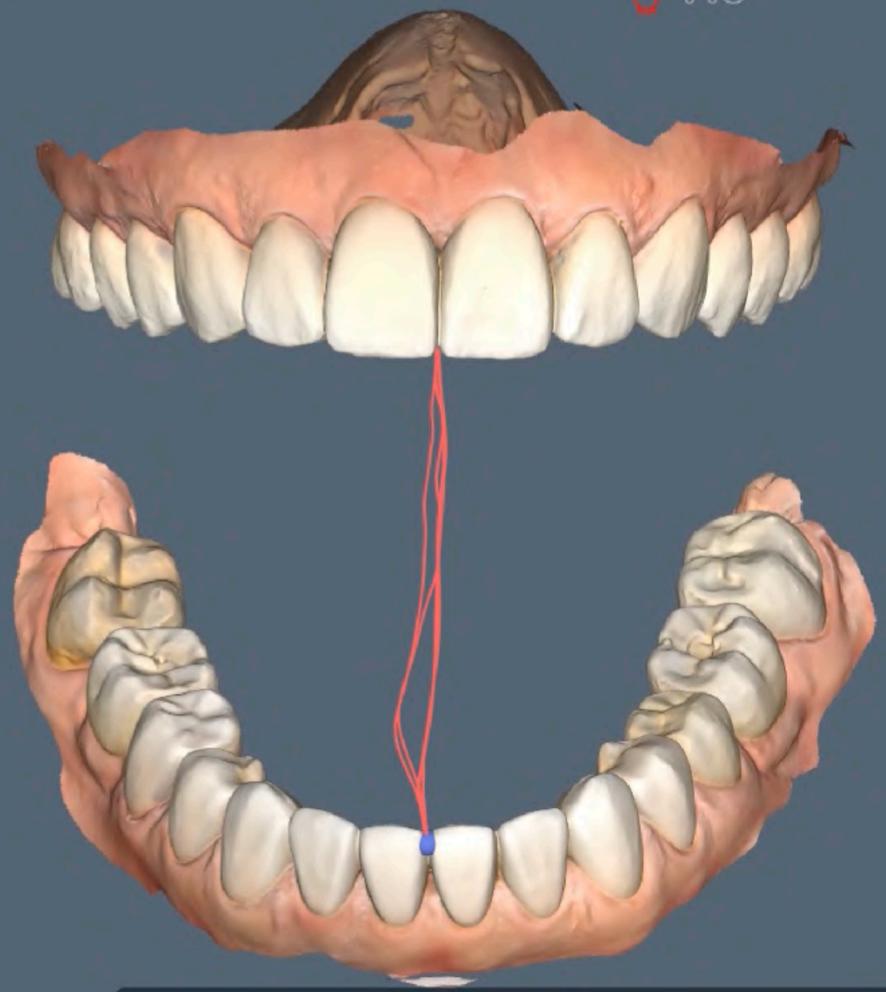
SPEED
Left laterotrusion 16h31

Twim

REPLAY

Twinfit

NEW MOTION



RIGHT CONDYLE - SAGITTAL

42 °

LEFT CONDYLE - SAGITTAL

48 °

INTERINCISAL - FRONTAL

00:10:333

00:26:324

00:00:000

00:26:324

SPEED

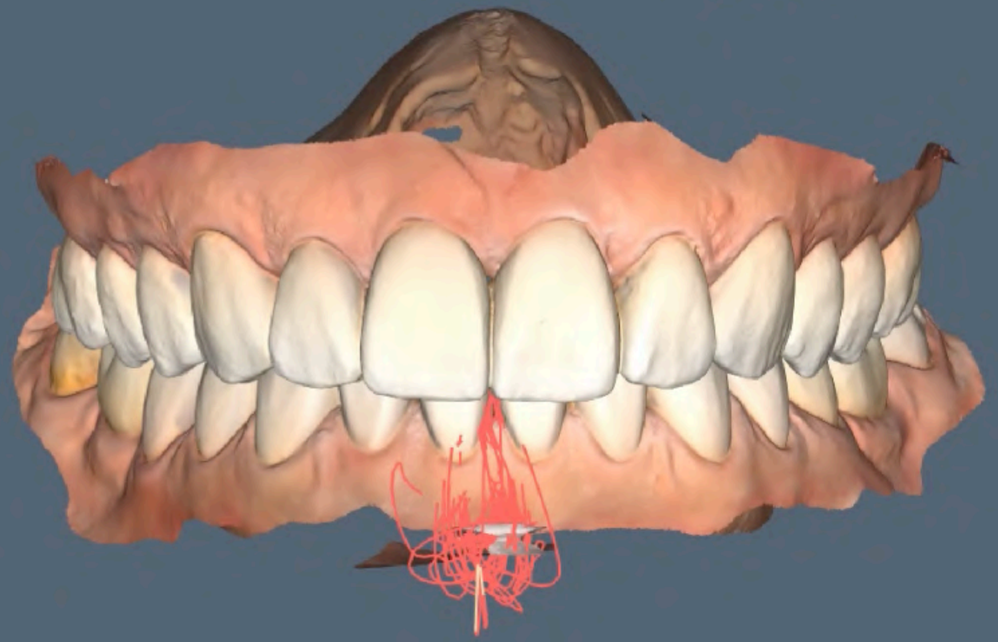
Open Close 16h32

Twim

REPLAY

Twinfit

NEW MOTION



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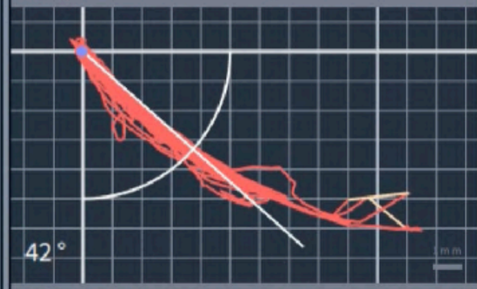

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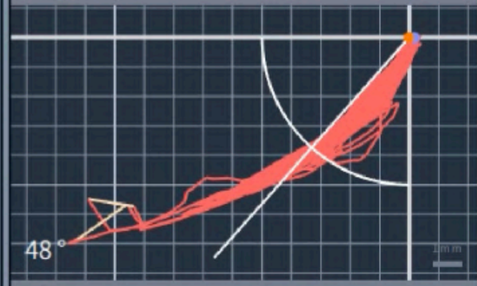
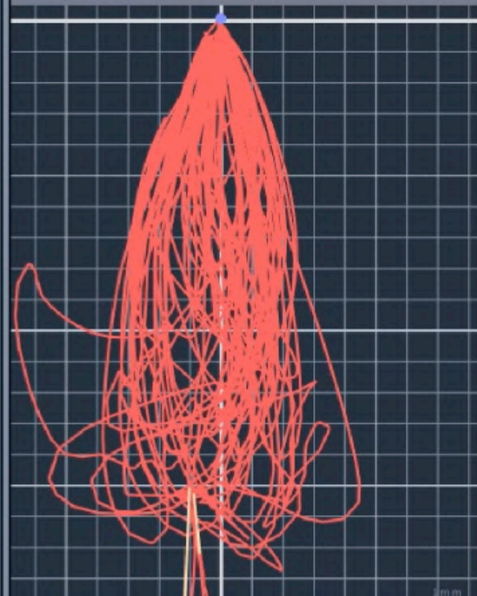


INTERINCISAL - FRONTAL



00:54:548

00:54:723

00:00:000

00:54:723

SPEED

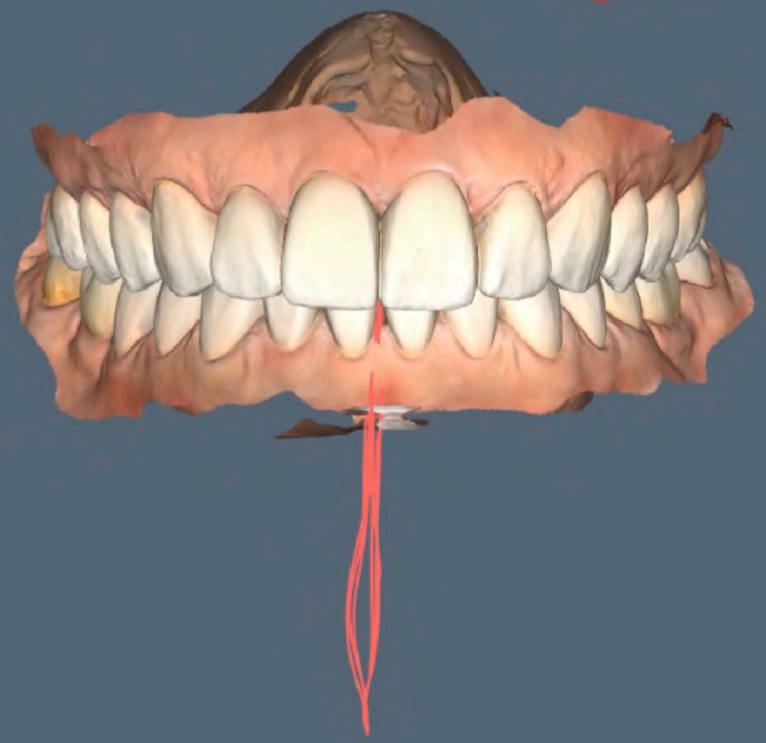
Chewing 16h33

Twim

REPLAY

Twinfit

NEW MOTION



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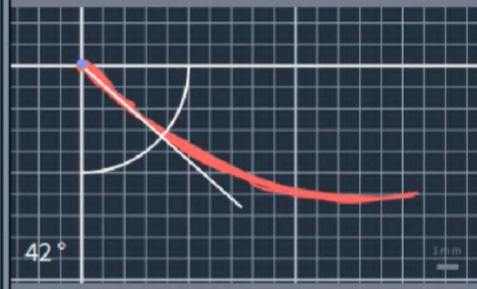
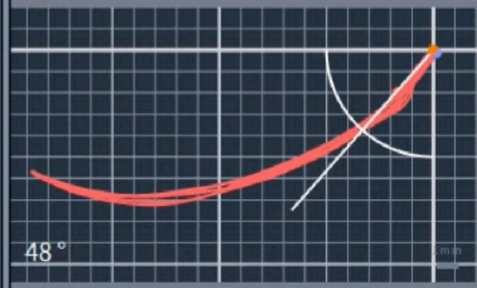


LEFT CONDYLE - SAGITTAL



INTERINCISAL - FRONTAL

00:28:033

00:33:390

00:00:000

00:33:390

SPEED

Centric relation 16h34

Results & 2.5-Year Follow-Up

The final outcome shows:

•harmonious, natural esthetics,

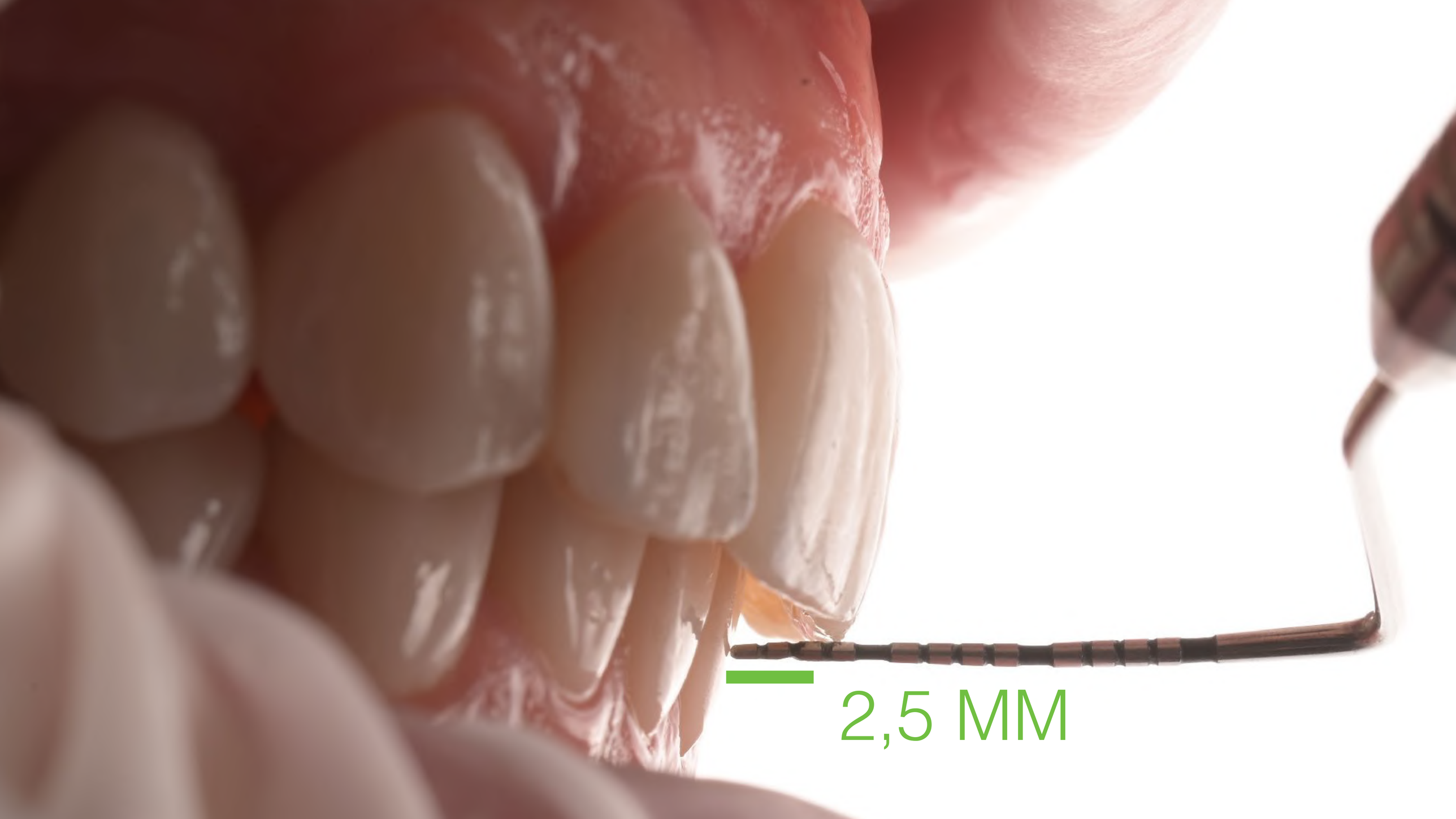
•stable occlusion,

•healthy soft-tissue response,

•excellent long-term integration of all-ceramic restorations.

At **2.5 years**, restorations remain intact, occlusion is stable, and the patient reports high satisfaction and confidence. Minor occlusal refinements were performed conservatively.

From the patient’s perspective, this was not only an aesthetic transformation but a **functional and emotional one**—chewing comfort restored, confidence regained, and a smile she now embraces naturally and proudly.


2,5 MM

Clinical conclusions and the value of the digital protocol.

This case demonstrates how a **complete digital workflow**—where diagnosis, function, and esthetics are aligned—can transform a complex rehabilitation into a predictable, controlled process.

The synergy between:

- **SmileCloud** (DSD),
- **Exocad** (CAD wax-up with Modjaw integration),
- **Modjaw** (real-movement dynamics),
- high-quality photography and intraoral scanning

enabled a **tailor-made digital design** perfectly adapted to the patient's mandibular dynamics and validated through the mock-up test drive.

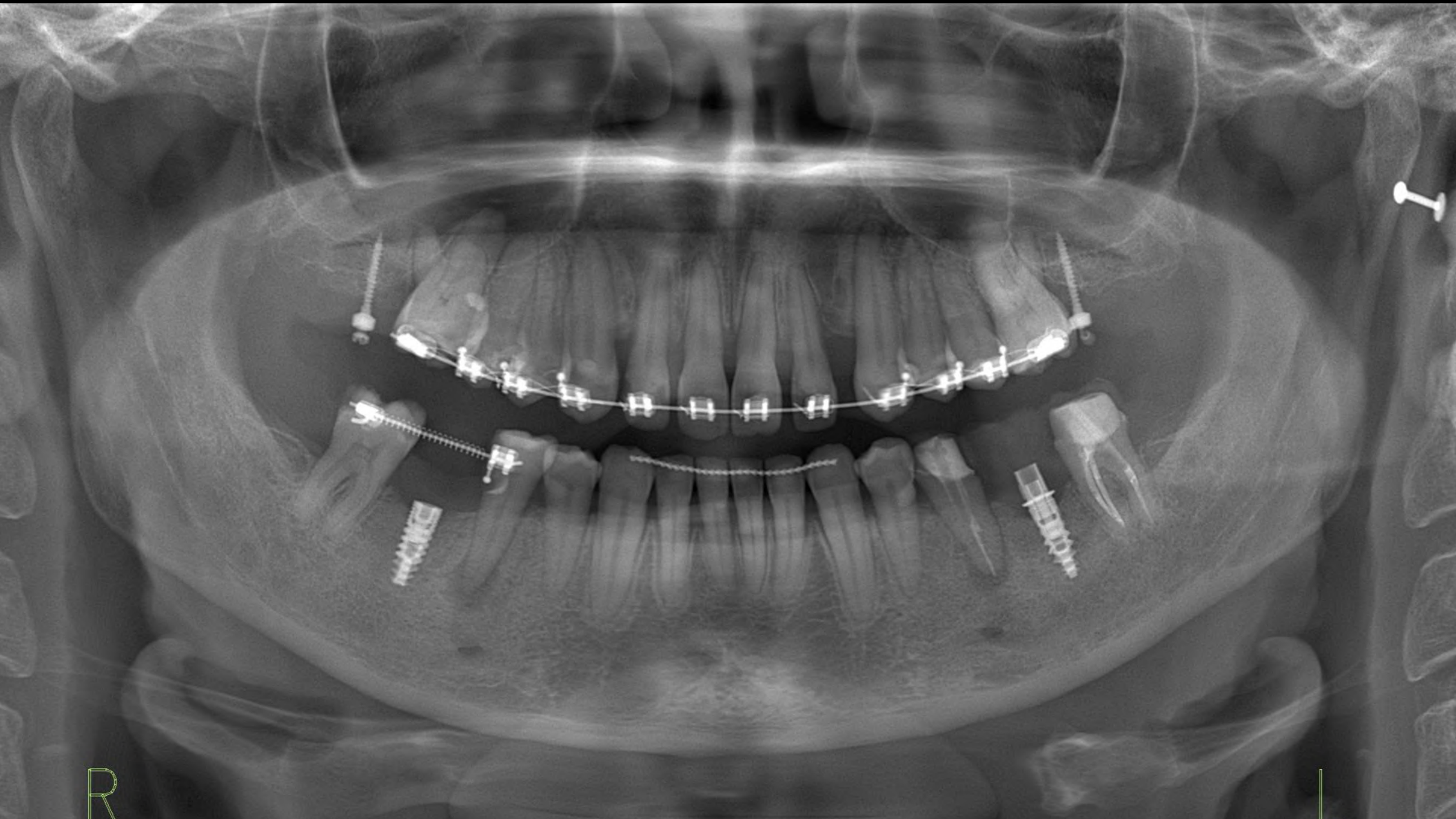
Clear benefits:

- minimized intraoral adjustments,
- transparent communication between clinician, laboratory, and patient,
- functional and esthetic validation prior to definitive restorations,
- confirmed long-term stability at 2.5 years.

Beyond technology, this case speaks about **trust, collaboration, and gratitude**—gratitude for the digital tools that refine decision-making, for the interdisciplinary teamwork, and especially for the patient who embraced the journey with patience and courage.

The final outcome is more than a new smile.
It is a **new quality of life**, with stable function, confident chewing, and the joy of smiling without hesitation.

Case Summary.


R
L


MEDIDENT
F.M. MEDI

Thank you for your attention!