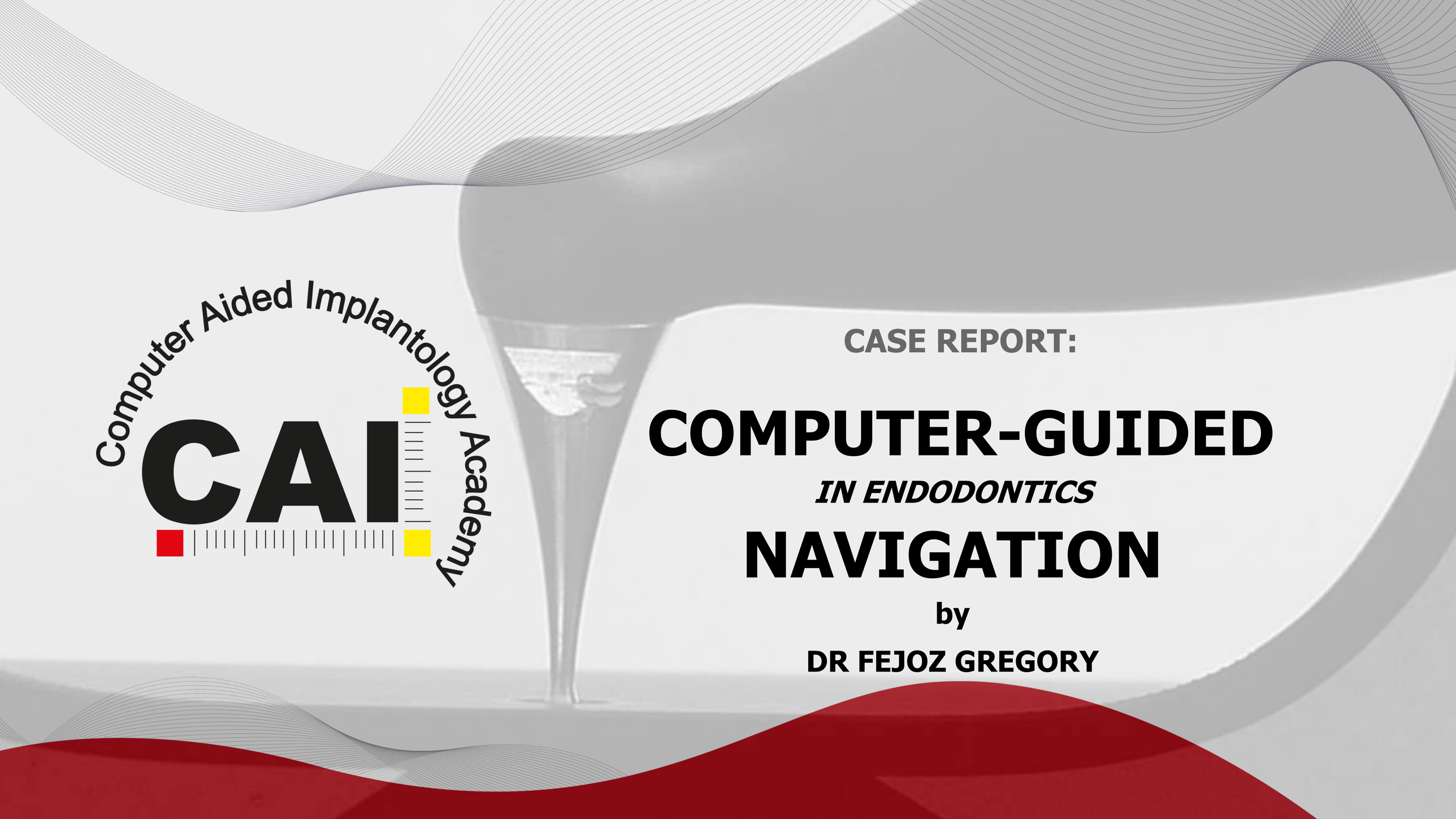


CASE REPORT:

COMPUTER-GUIDED

IN ENDODONTICS

NAVIGATION

by

DR FEJOZ GREGORY

Dr Gregory Fejoz

obtained his dental degree in 2010, at the University of Claude Bernard of Lyon 1, FRANCE.

After 9 years of general practice in Haute-Savoie, not far from Geneva (SWITZERLAND), he specialized in endodontics, following the training of Dr MACHTOU and colleagues at the SOP in Paris.

His current interests include developing an endolight approach by using vital pulp therapy treatments for adults and develops the use of dynamic guided navigation in endodontics.

COMPUTER GUIDED ENDODONTICS ADVANTAGES COMPARED TO FREE HAND

1. PRECISION

Dynamically navigated accesses are associated with higher optimal precision (drill path centered) to locate calcified canals in comparison with the freehand technique (75% vs 45%)[1]

The DNS group was significantly more precise, showing smaller mean values in the angulation (4.8°) and in the maximum distance from the ideal position (0.34 mm)[2]

2. TISSUE PRESERVATION

Dynamically navigated accesses resulted in significantly less mean substance loss in comparison with the freehand technique (27.2 vs 40.7 mm3)[2]

Substance loss was significantly lower with dynamically navigated accesses than freehand technique (10.5 mm3 vs 29.7 mm3)[4]

COMPUTER GUIDED ENDODONTICS ADVANTAGES COMPARED TO FREE HAND

3. TIME REDUCTION

Dynamically navigated accesses were prepared significantly faster than freehand preparations (2.2 vs 7.06 minutes)[2]

Slow-speed burs through a static- guided approach in simulated calcified canals required on an average 11 minutes compared with an average drilling time of 58 seconds.[3]

REPRODUCTIBILITY

All operators located a total of 156 canals, obtaining an overall success of 93% without a difference between operator experience.[5]

Differences in substance loss between an more experienced operator (10.3 mm3) and a novice (10.6 mm3) were not significant.[4]

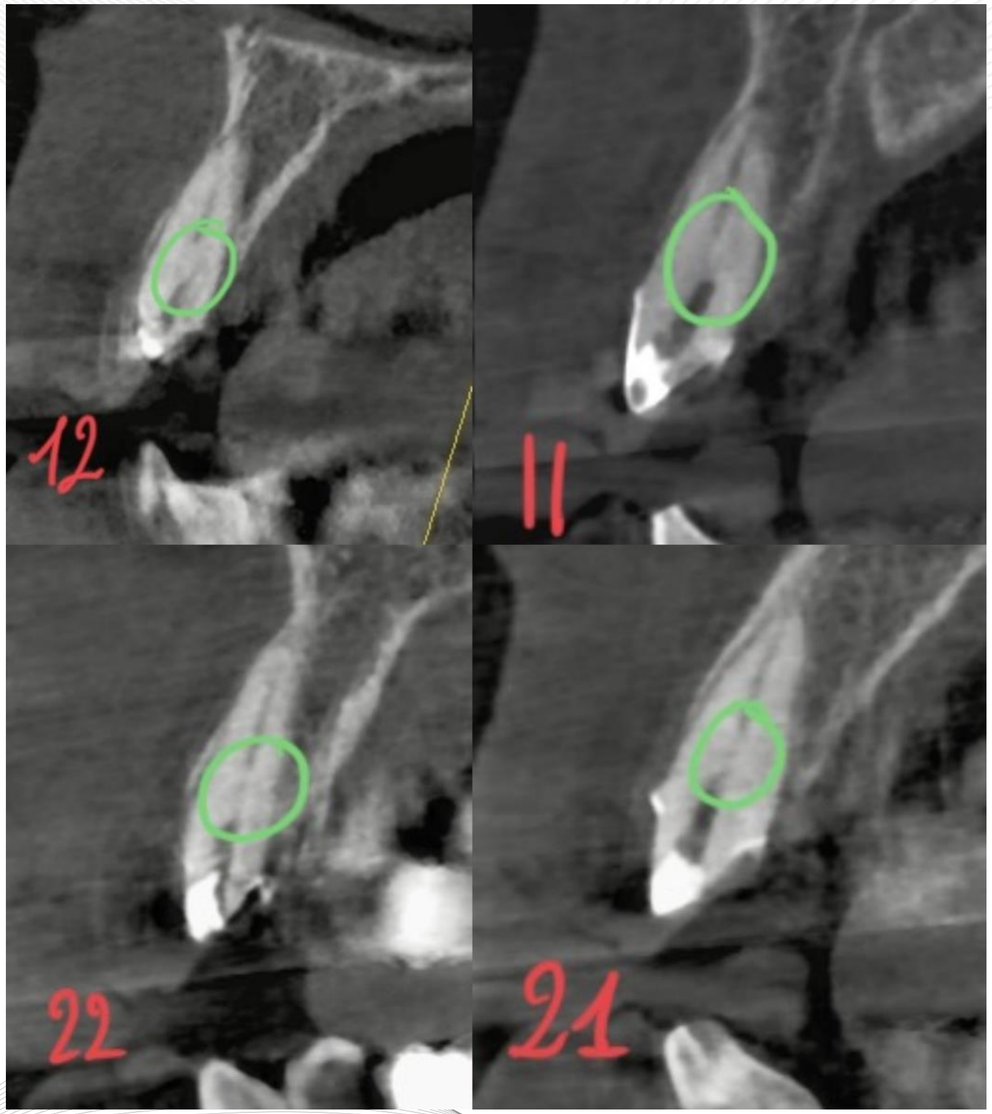
CLINICAL CASE

56 yo female patient, with no systemic condition is referred for performing the root canal treatment of the 4 superior incisives.

The practitioner didn't find the accesses and RCTs need to be done regarding the anterior prosthetic rehabilitation in progress.

The choice of computer guided navigation over a static guided approach is based on the possibility of modifying the axis in real-time, the facility of the workflow (only a CBCT needed) and the use of all kind of burs, not just endodontic guided drills.

PULP CANAL COMPLICATIONS



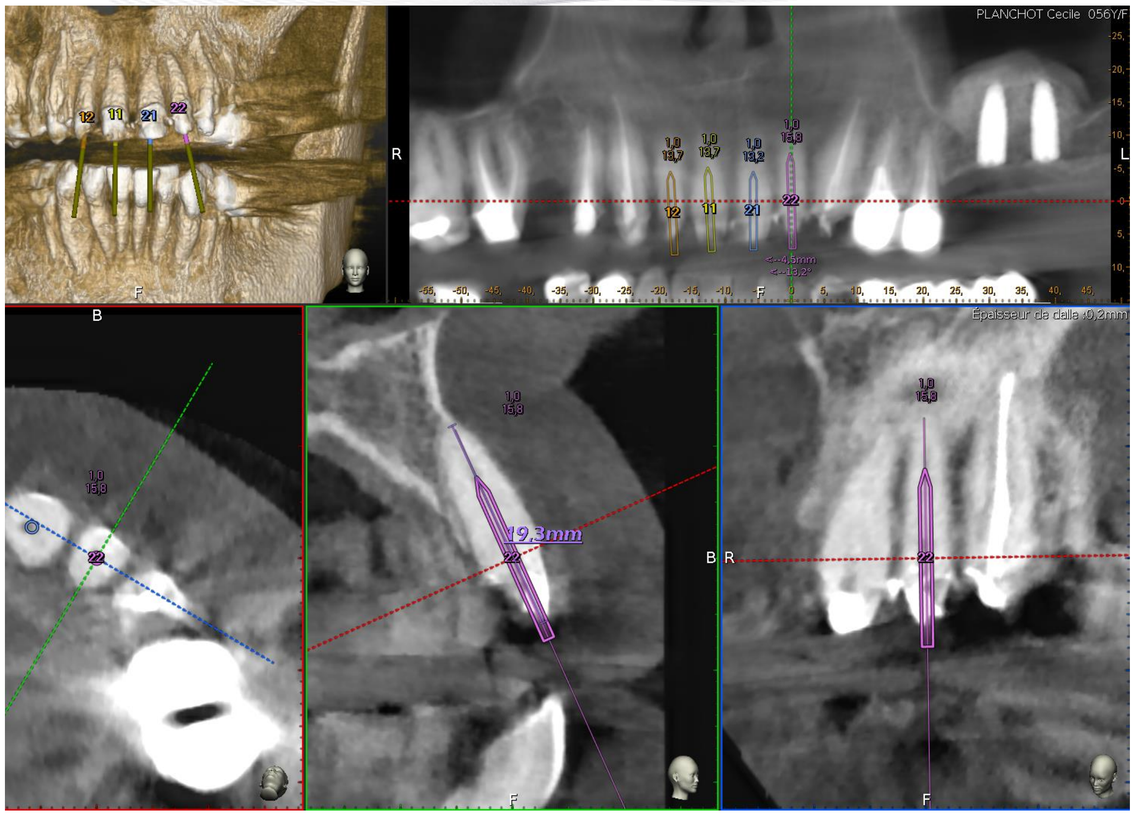
S1

Initial CBCT

12-11 : 1-2-1 root canal typology

21-22 : narrowed root canal

PULP CANAL COMPLICATIONS

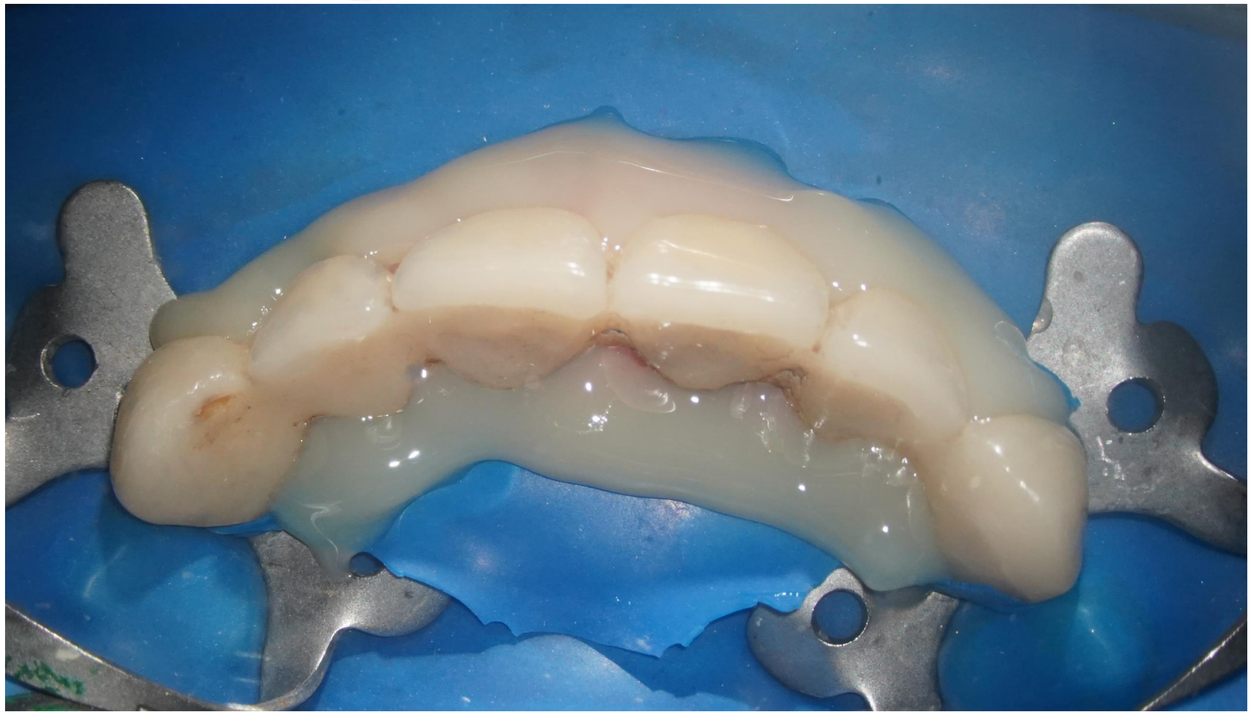


S2

Planification

4 virtual axis are planified with the minimal size (1mm) and the root length are mesured for information (temporary crowns don't allow us to measure precisely)

PULP CANAL COMPLICATIONS

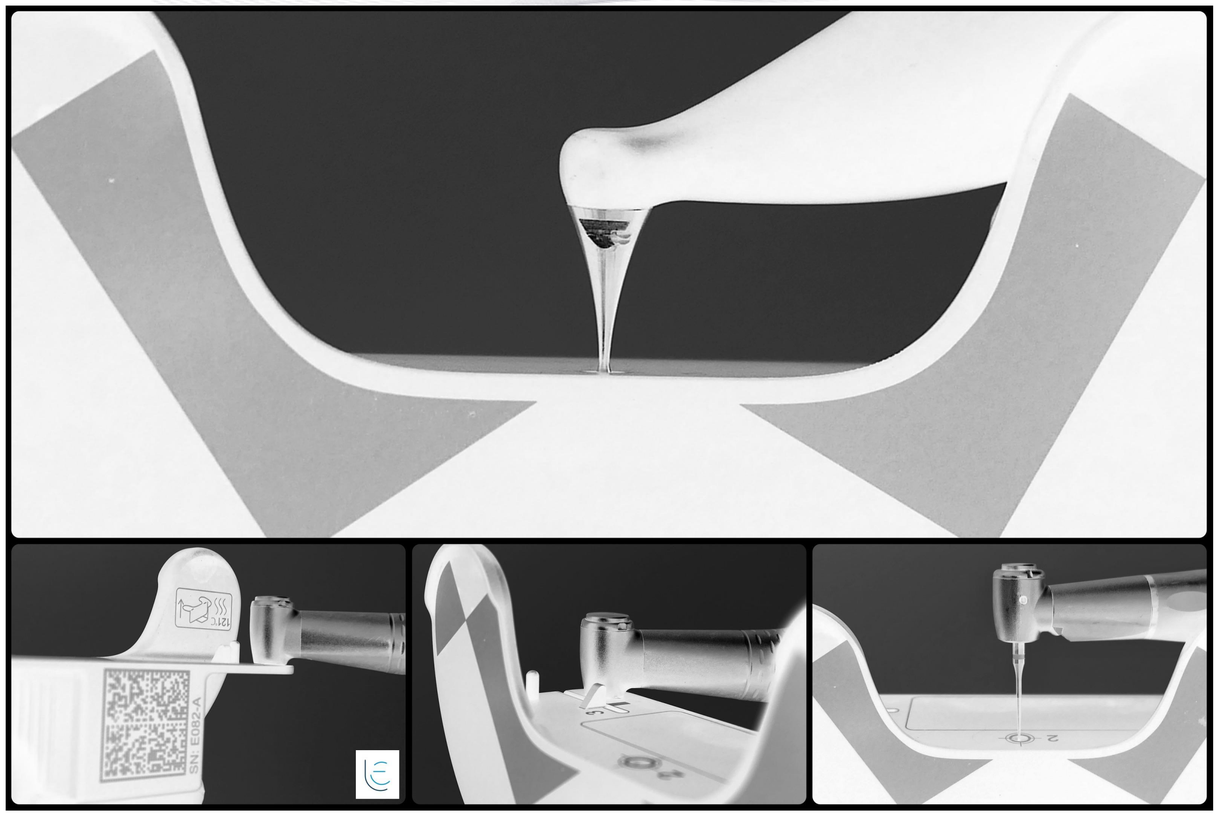


S3

Rubber Dam Isolation

Temporary crowns are sealed with a self-curing composite material (Structur 3, Voco)

PULP CANAL COMPLICATIONS

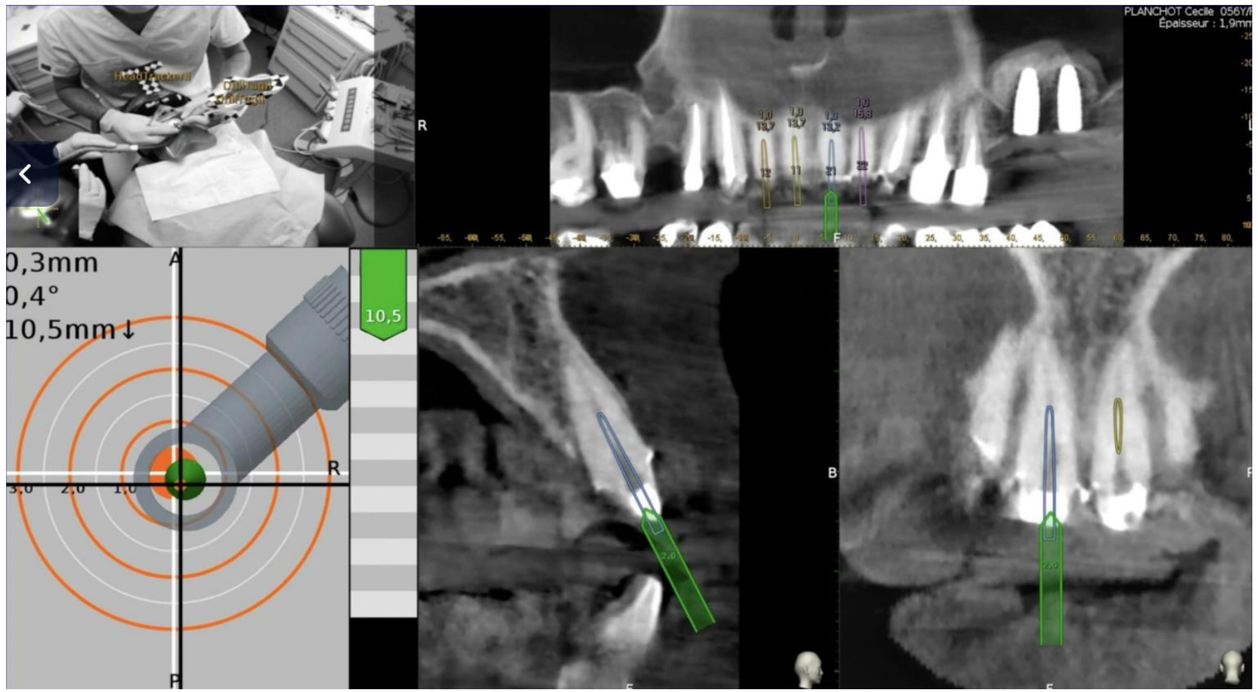


S4

Calibrations

As required by the software, calibration of the tracer, the high speed contra-angle and the endodontic bur.

PULP CANAL COMPLICATIONS

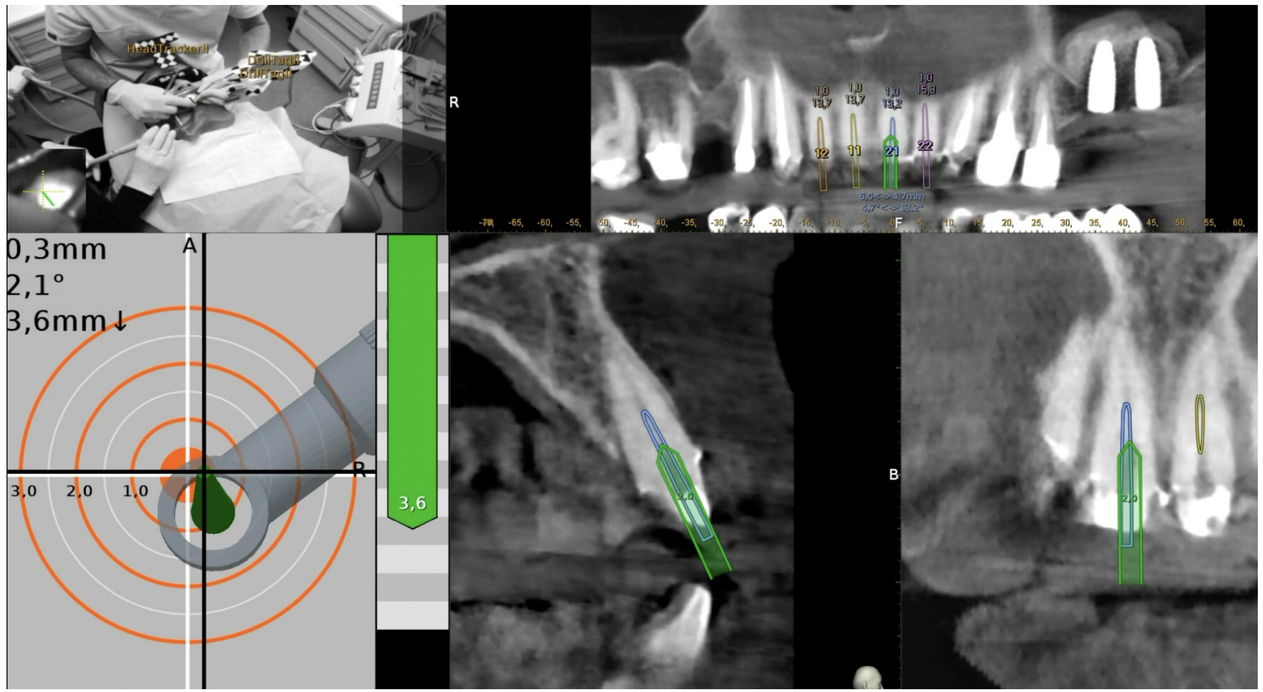


S5

Drilling Part

The first step is marking on the surface the access point for each tooth, with a high speed round diamond burr and a contra-angle holded by 2 hands, to prevent slipping during the drilling.

PULP CANAL COMPLICATIONS

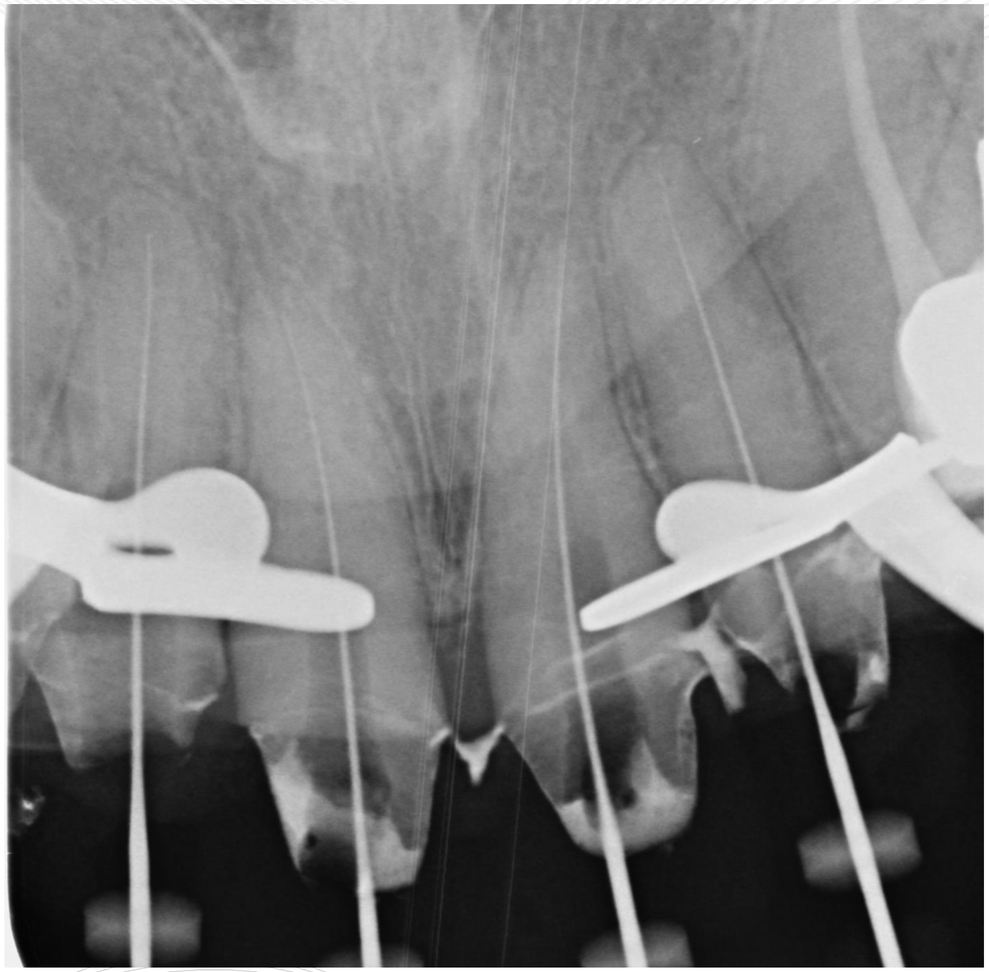


S5

Drilling Part

Coronal access is made with a high speed round diamond bur and the radicular part is done with a EndoTracer (Komet), a special endodontic bur made with a long neck (31mm or 34mm)

PULP CANAL COMPLICATIONS



S6

X-Ray Control

Verification of the permeability with a K10 file in each canal

Registration of the working length with an apex locator (EndoPilot, Komet)

PULP CANAL COMPLICATIONS

S7

Root Canal Shaping

Use of the Reflex Komet System (Endopilot + Procodile Q) with a constant irrigation of 2,5 % NAOCl

Verification with Gutta Percha cones of the apical adjustment

PULP CANAL COMPLICATIONS

S8

Root Canal Filling

Use of the Gutta-Smart (Dentsply) to perform the warm condensation vertical technique and temporary obturation with a Cavit (3M)

References

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2. Gambarini G, Massimo G, Morese A., et al Precision of Dynamic Navigation to Perform Endodontic Ultraconservative Access Cavities: A Preliminary In Vitro Analysis. J Endod. 2020;46:1286-903. Jain SD, Carrico CK, Bermanis I.
3. Dimensional Accuracy of Dynamic Navigation Technology in Locating Calcified Canals. J Endod. 2020 Jun;46(6):839-845
4. Connert T, Leontiev W, et al. Real-Time Guided Endodontics with a Miniaturized Dynamic Navigation System Versus Conventional Freehand Endodontic Access Cavity Preparation: Substance Loss and Procedure Time. J Endod. 2021;47:1951-56
5. Torres A, Boelen GJ, Lambrechts P, Pedano MS, Jacobs R. Dynamic navigation: a laboratory study on the accuracy and potential use of guided root canal treatment. Int Endod J. 2021 Sep;54(9):1659-1667