



LOMA LINDA UNIVERSITY
School of Dentistry

Advanced Education Program in Implant Dentistry, Loma Linda University,
School of Dentistry, Loma Linda, California, USA

"A Novel Method to Remove the Apex of Retained Root Shield" : A Case Report

Lim Kangyeong, DDS; Hung-Chi Liao DDS, MSD; Kan Joseph, DDS, MS; Aladdin Al-Ardah, DDS, MS;
Charles Goodacre, DDS, MSD; Jaime Lozada, DDS

Introduction

It is challenging for clinicians to keep the apical portion of labial bone intact when in root shield preparation due to the proximity between root and labial bone. However, if the apical portion of root kept in the socket, it may cause complications such as sensitivity and tenderness upon palpation. The purpose of this article is to illustrate how to remove apical portion and palatal fragment of the root without damaging the labial bone.



Materials & Methods

Socket shield technique (SST) with immediate implant placement and provisionalization (IIPP) was performed on a horizontally fractured right lateral incisor (#7) at gingival level without root canal treatment.

- Step 1. A #15 Nickel-Titanium endodontic hand file was used to negotiate the apex. A stainless #20 file was used to enlarge the root canal at 2-3mm away from the apex.
- Step 2. The root canal was enlarged up to #100. While filing, The hand file was pulled toward buccal and ledge was intentionally created. The ledge is extended all the way to the surface of the root, the root was intentionally perforated.
- Step 3. The perforation was checked with apex locator. With a long diamond bur, the root was separated in mesio-distal direction. The palatal root piece was luxated with tooth elevator and removed using tooth forceps.
- Step 4. PA was captured to confirm that apical portion of root was completely removed. The labial root shield was reduced labially until 1.5mm and reduced coronally to the level of the alveolar labial bone crest. The most coronal 1 mm of the shield was reduced with a large round bur. The implant was inserted 0.5mm below the shield.

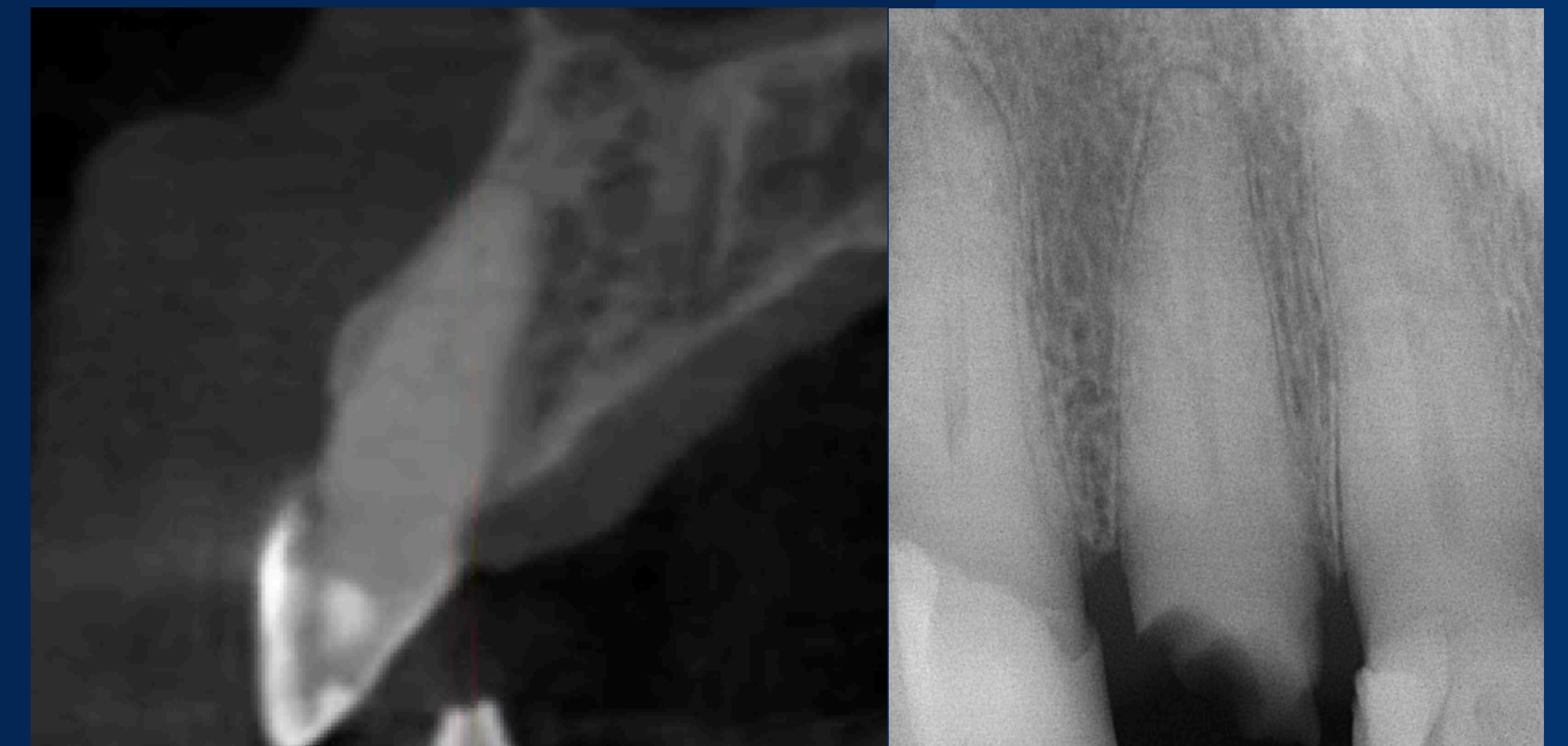
Figure1. ➤ Pre-op Intraoral front view, Cone Beam CT cross sectional view, Peri-apical radiograph



A Initial patient presentation with failing maxillary right lateral incisor

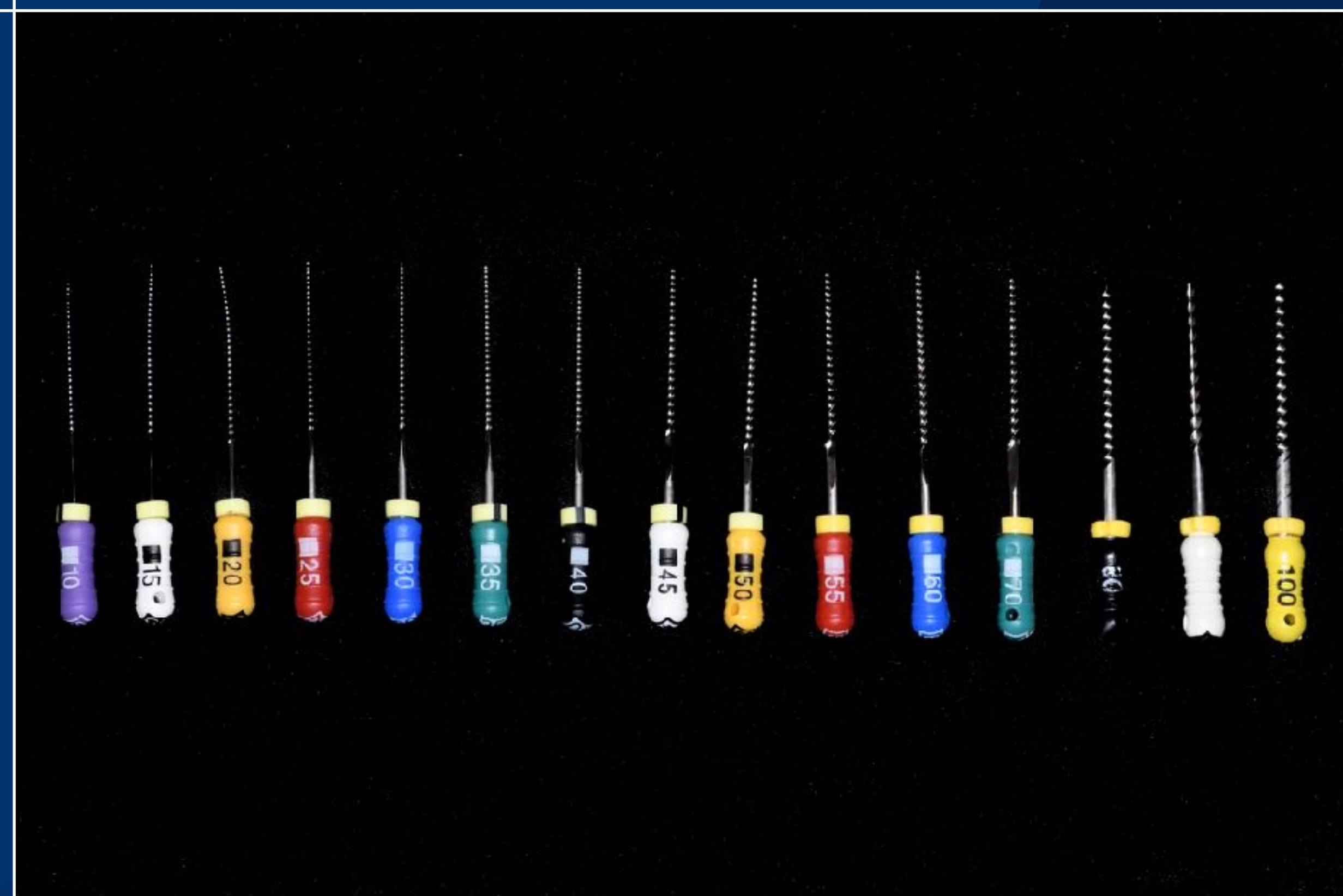


B Occlusal view with failing maxillary right lateral incisor

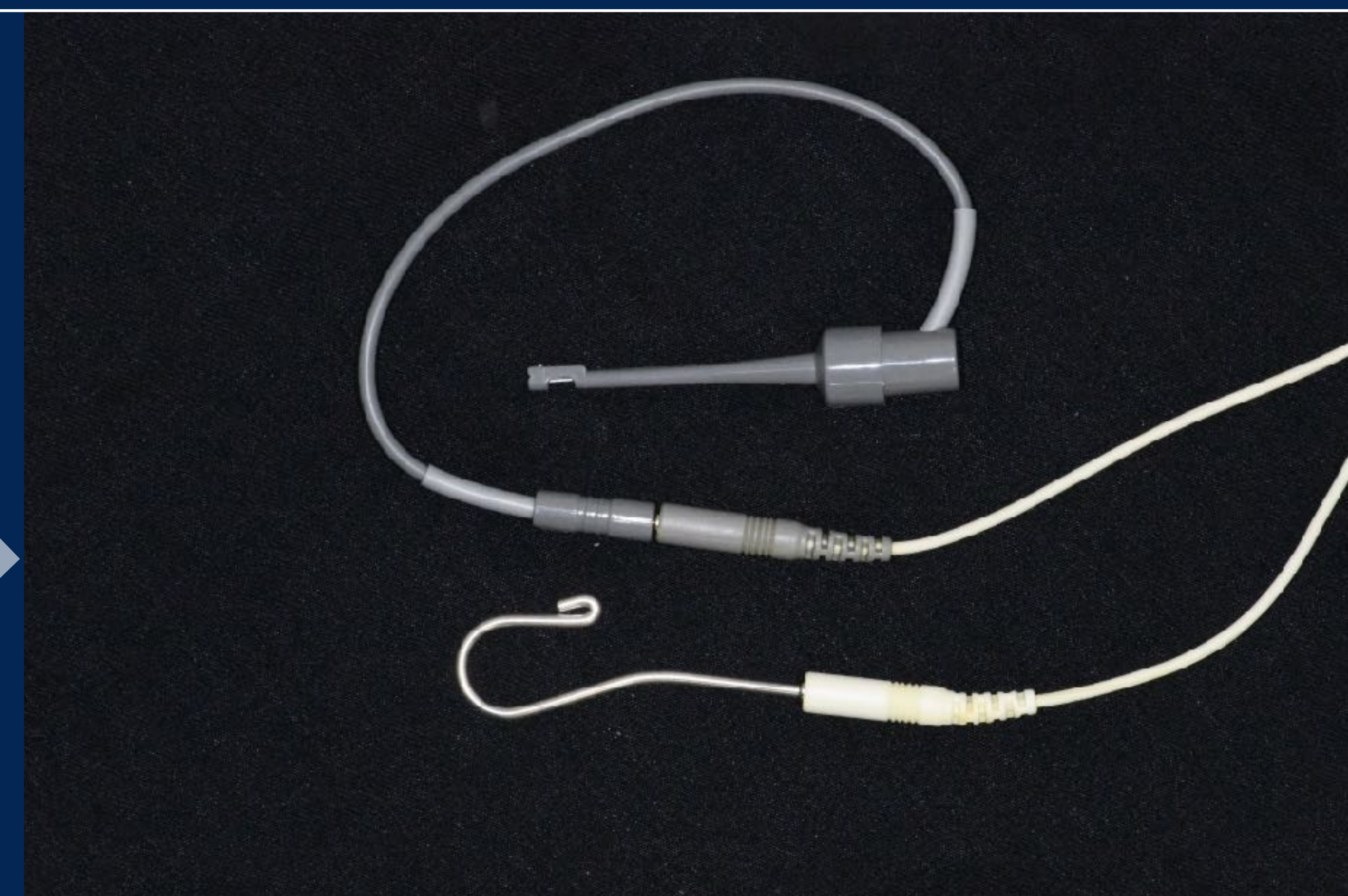


C Peri-apical radiograph and Cone Beam CT of maxillary right lateral incisor

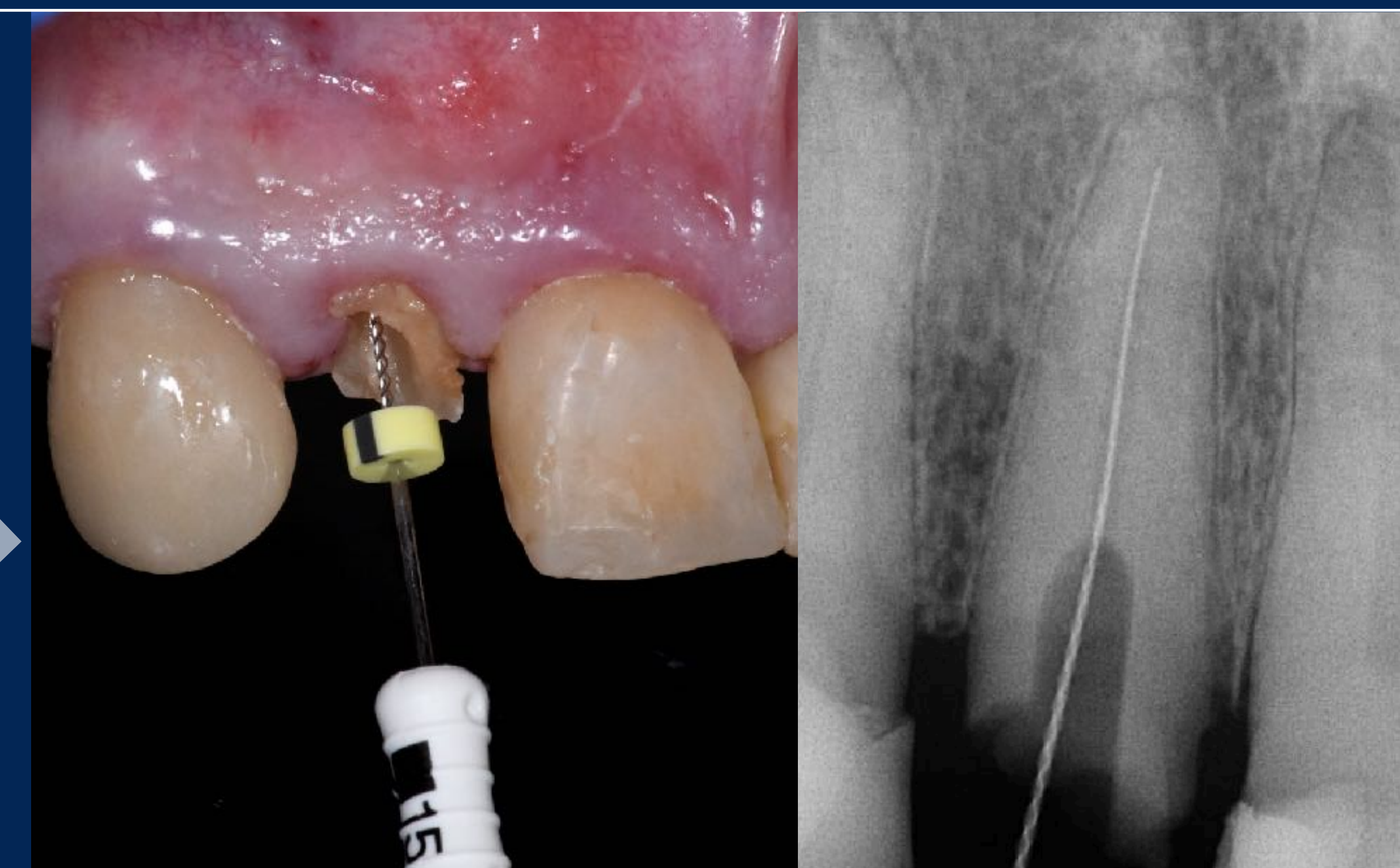
Figure2. ➤ Root separation and removal of palatal fragment



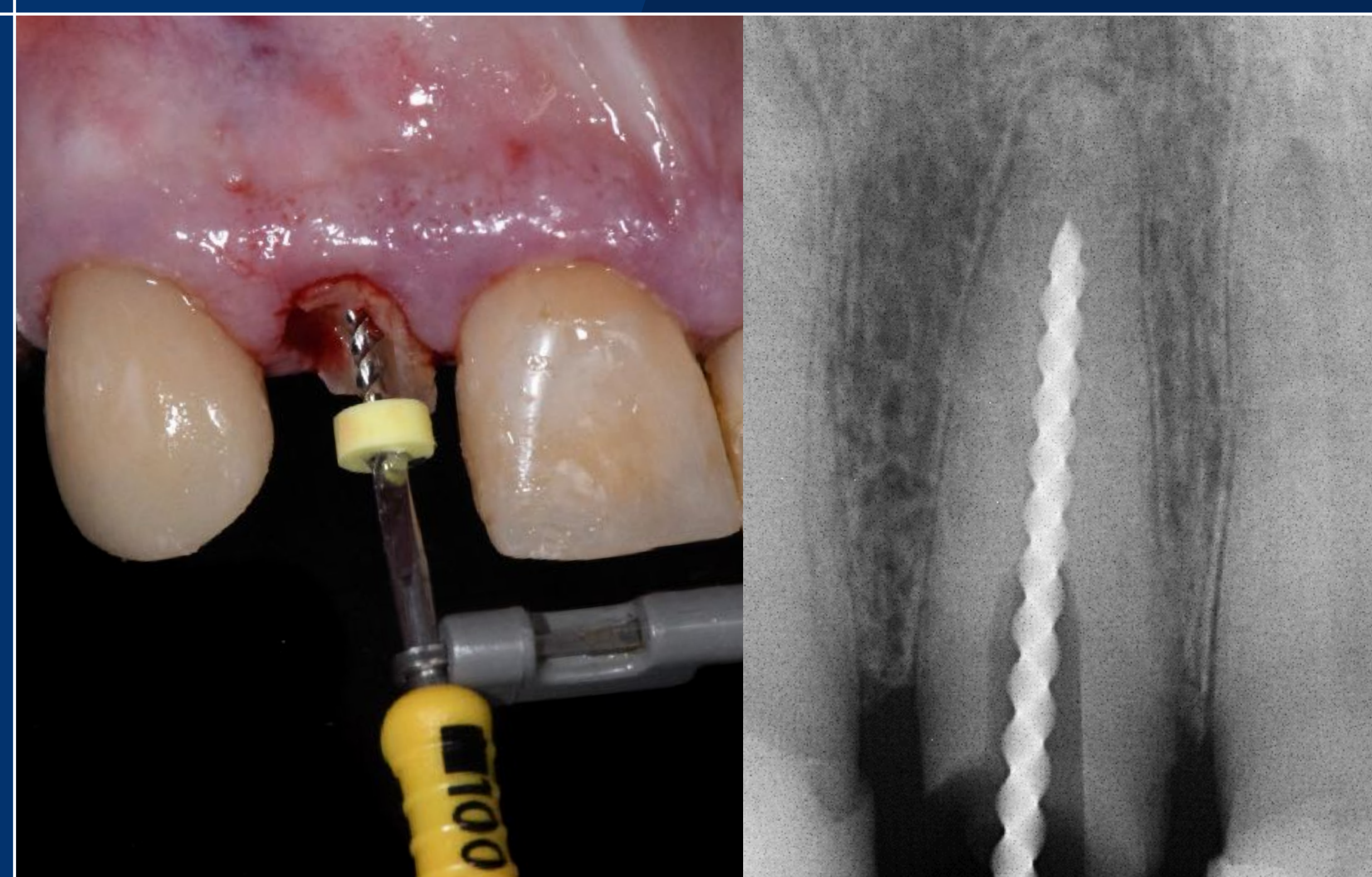
A Endodontic hand files
(K-file #10-#100)



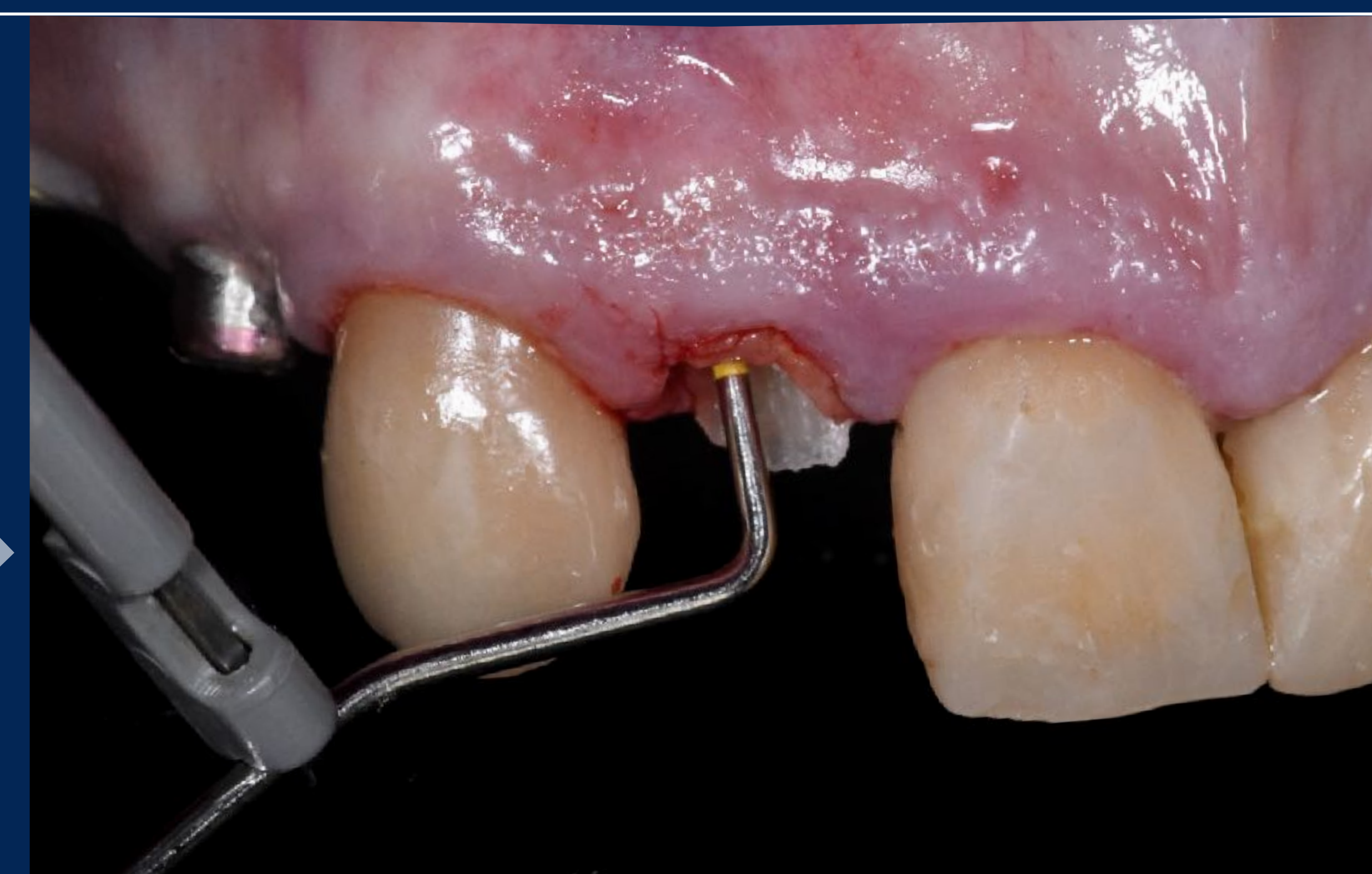
B Root apex locator



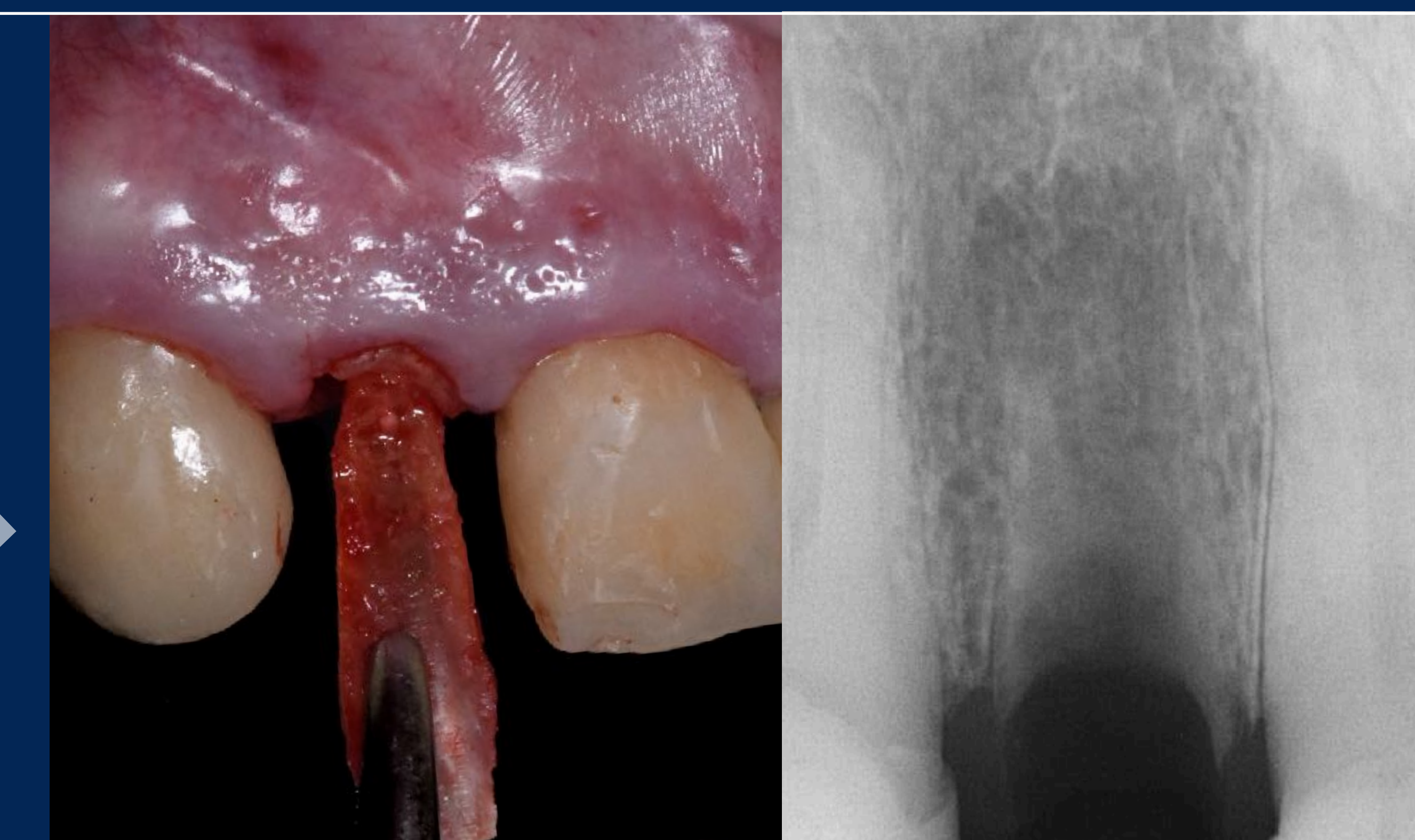
C Root apex negotiation using #15
Nickel-Titanium endodontic file (Step1.)



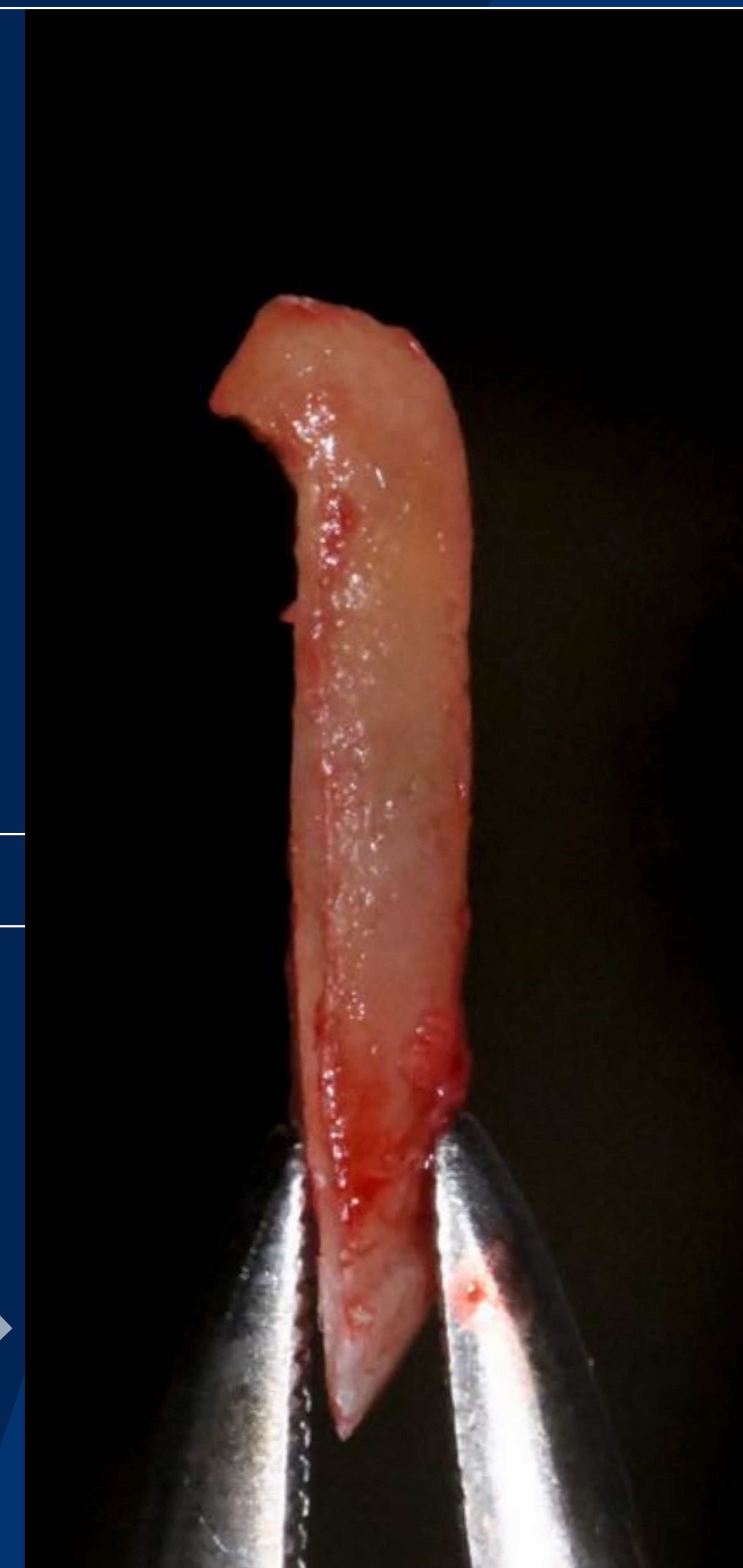
D Intentional ledge creation using #100
stainless steel endodontic file (Step 2.)



E Check perforation of the root
using periodontal probe (Step 3.)

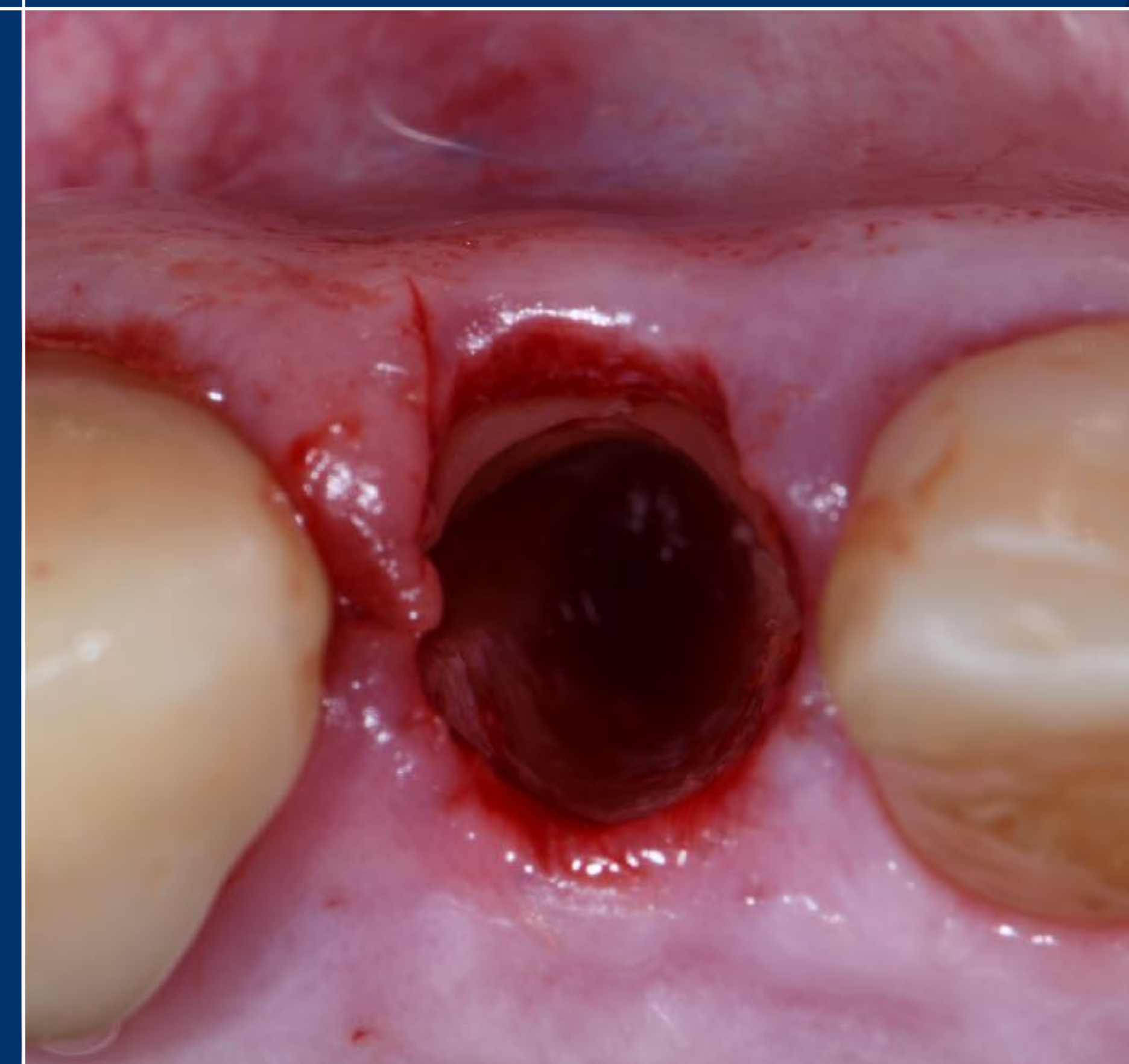


F Palatal root fragment extraction
(Step 4.)

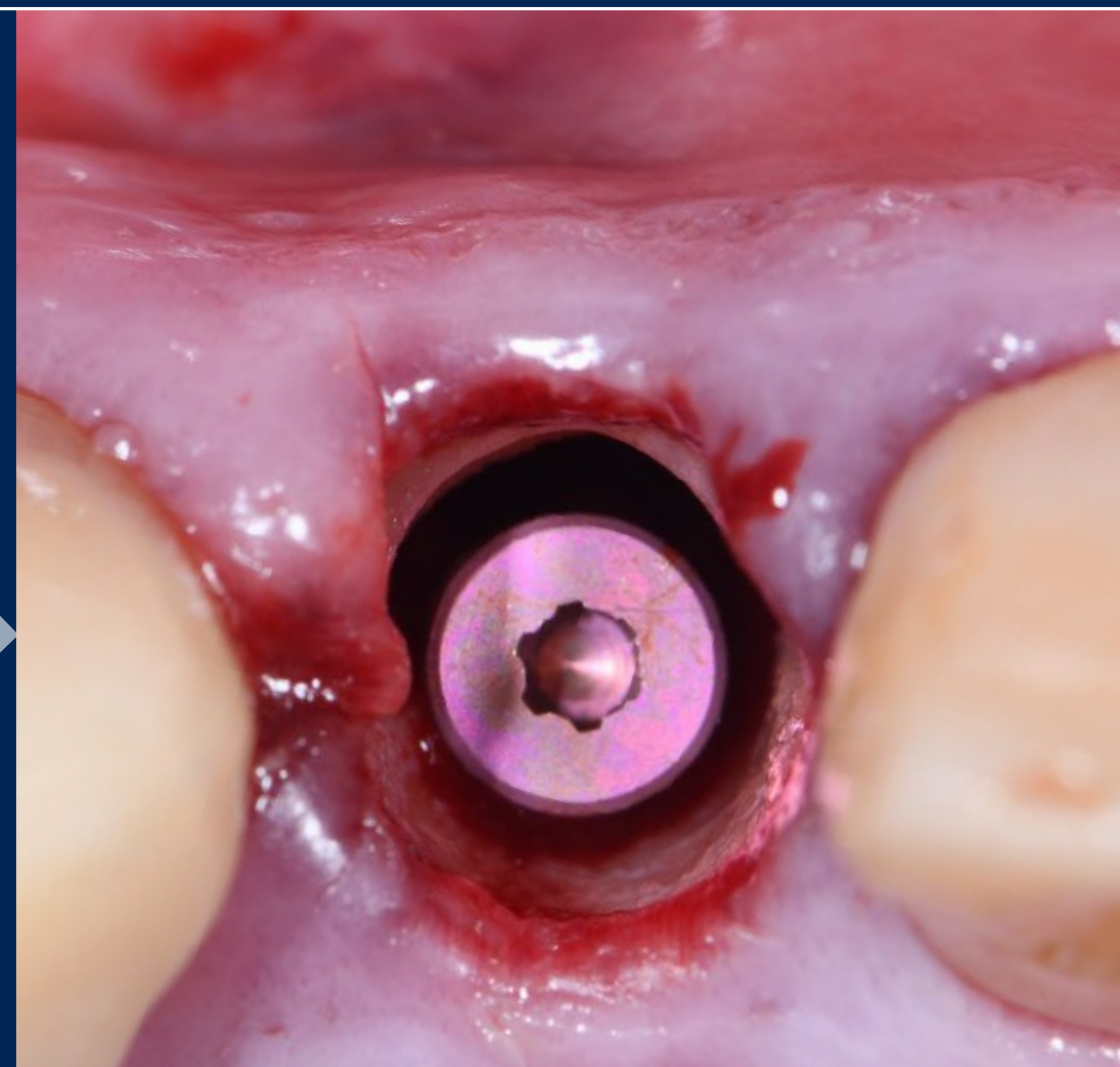


G Extracted palatal
fragment with root apex

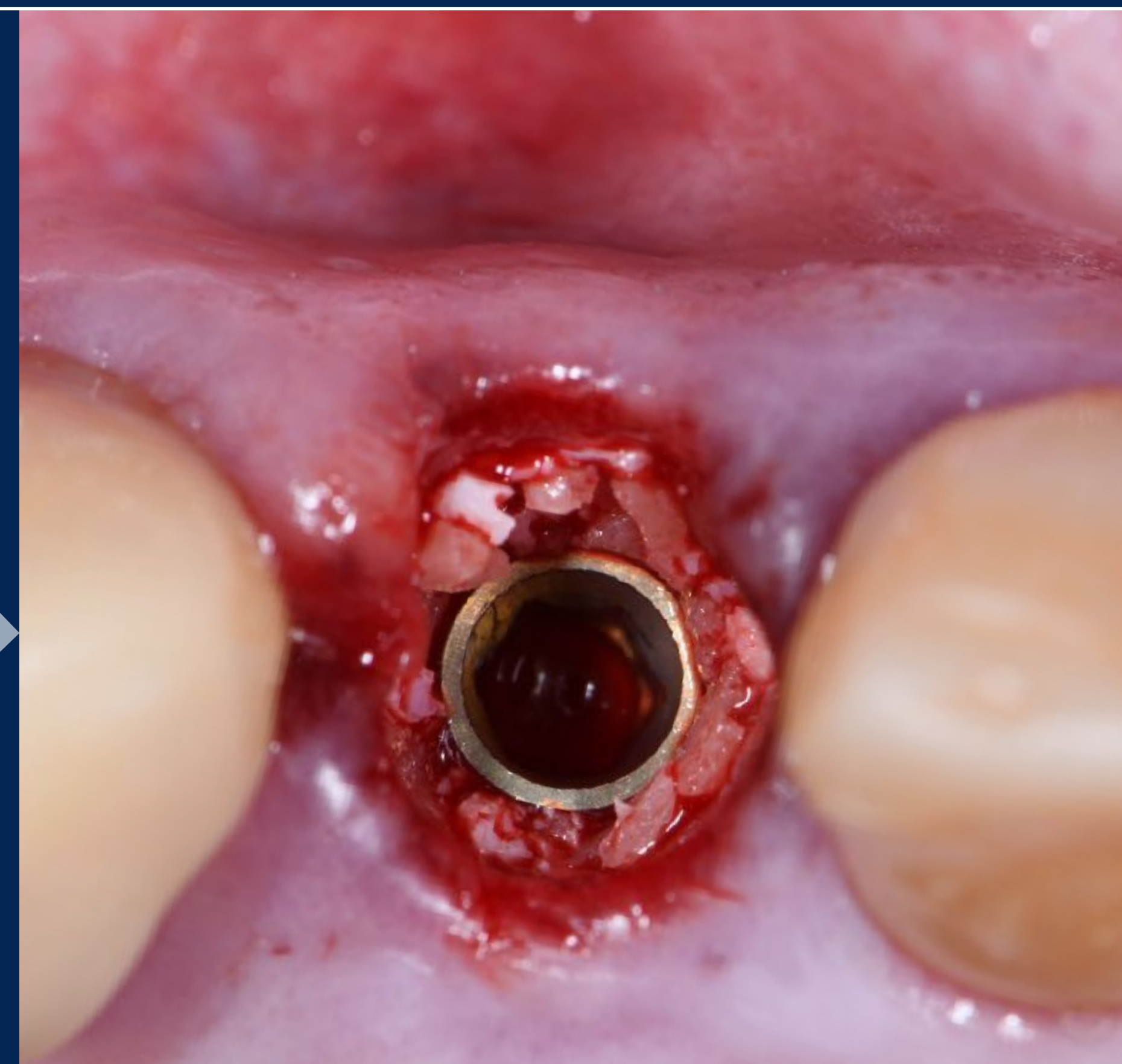
Figure3. Root shield preparation, Implant placement, Bone graft, Post-op and follow-up intraoral photos



A After root shield preparation(Step 4.)



B Implant placement



C Bone graft
(Allograft and Xenograft)



D Post-op front view



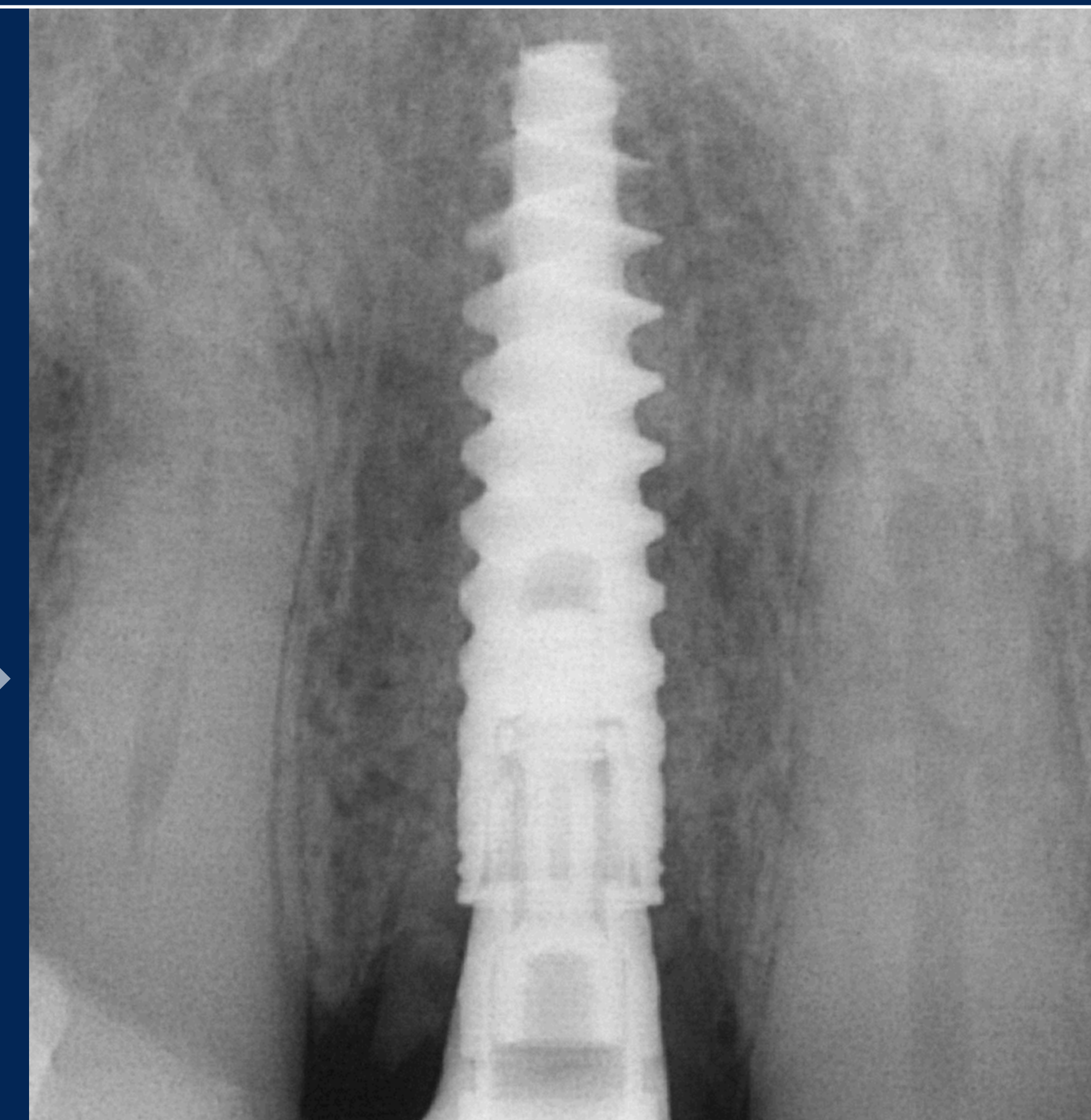
E Post-op occlusal view



F 3 months follow-up
front view



G 3 months follow-up
occlusal view



H Peri-apical radiograph



I Post-op cone beam CT
cross sectional view

Results

Removal of apical portion of the root and palatal fragment of the root without damaging the labial bone was successfully performed. Patient was asymptomatic after the socket shield surgery and did not report any further sensitivity or discomfort up to 4 months.

Conclusion

Although this method is technique sensitive, it can avoid complication related to soft tissue and labial bone resorption during the surgery and post restoration.

References

1. Hürzeler, Markus B et al. "The socket-shield technique: a proof-of-principle report." Journal of Clinical Periodontology vol. 37,9 (2010): 855-62. doi:10.1111/ j.1600-051X.2010.01595.x
2. Kan, Joseph Y K et al. "Classification of sagittal root position in relation to the anterior maxillary osseous housing for immediate implant placement: a cone beam computed tomography study." The International Journal of Oral & Maxillofacial Implants vol. 26,4 (2011): 873-6.
3. Staehler, Philip et al. "The socket-shield technique: a step-by-step protocol after 12 years of experience." The International Journal of Esthetic Dentistry vol. 15,3 (2020): 288-305.