

Maintaining Implant Health for Long Term Success

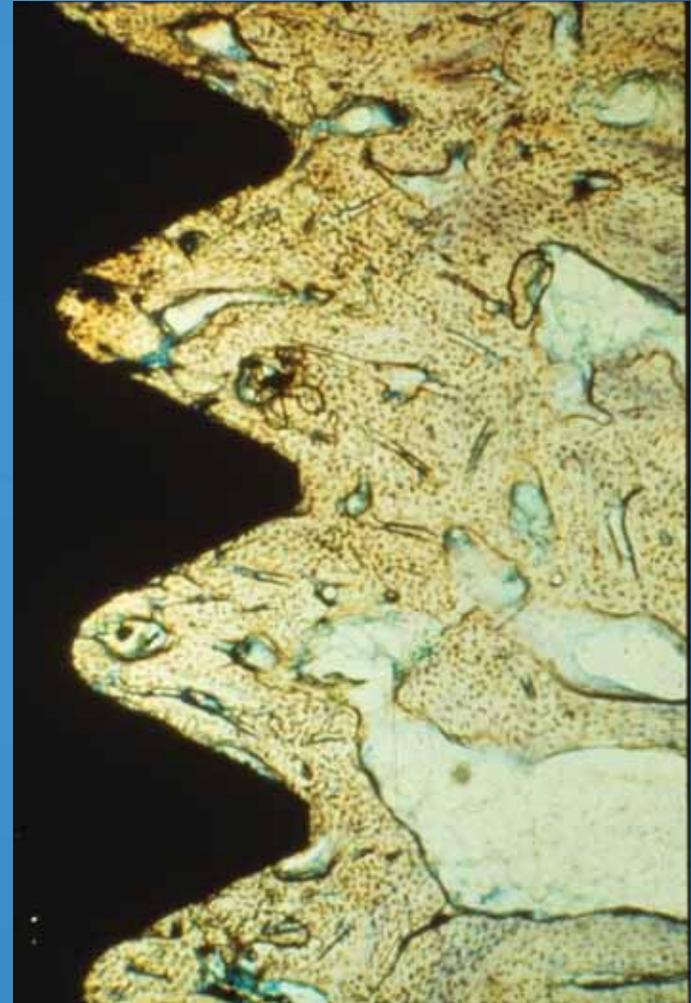
Thomas Eshraghi D.M.D
Diplomate American Board of Periodontology



Periodontal Associates
Dr. Thomas Eshraghi and Dr. Bradley McAllister

Osseointegration

Fully documented
technique for tooth
replacement..... Perhaps
the biggest advancement
in the last 40 years of
dentistry



General Indications for Dental Implants

- Fully edentulous patients (especially mandibular)
- Partially edentulous patients (especially unilateral free-end)
- Single tooth loss (especially with unrestored adjacent teeth)



Specific Implant Indications

- Uncorrected diastema cases
- Gag reflex
- Long span bridges
- Free-end partials
- Periodontally compromised abutments
- Hopeless perio or endo involved teeth
- Orthodontic anchorage



Immediate provisional using
natural crown & tunnel grafting



■















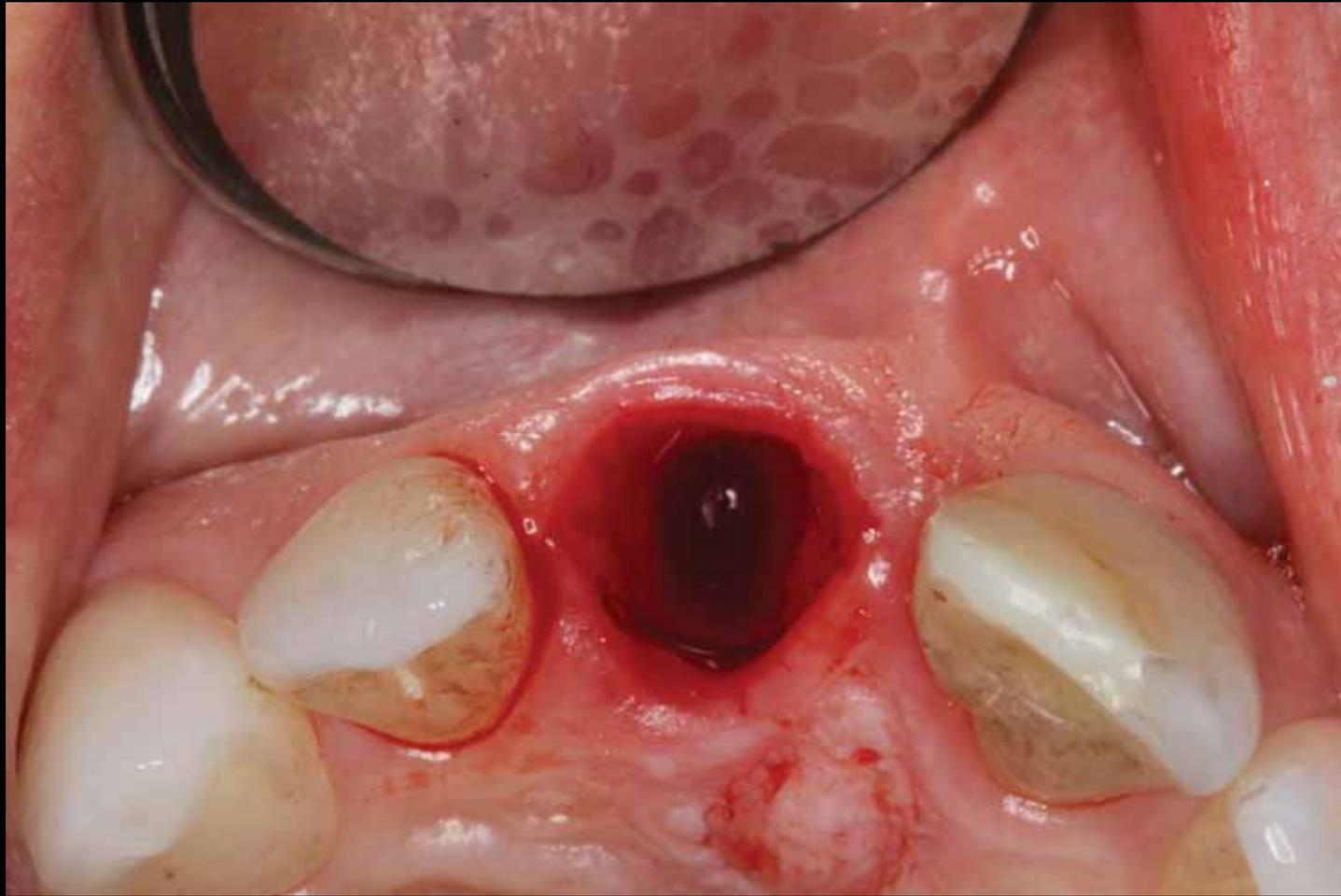


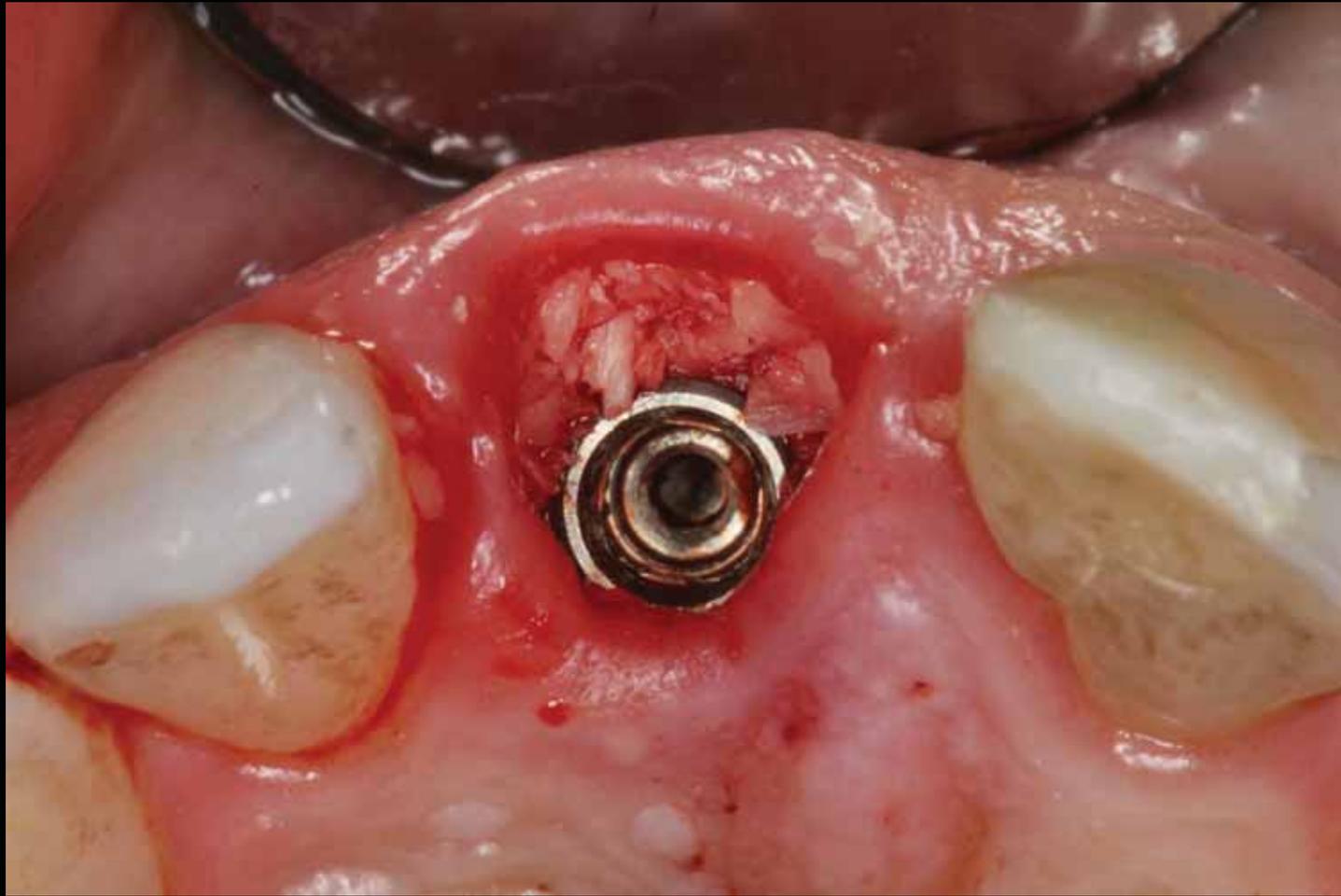




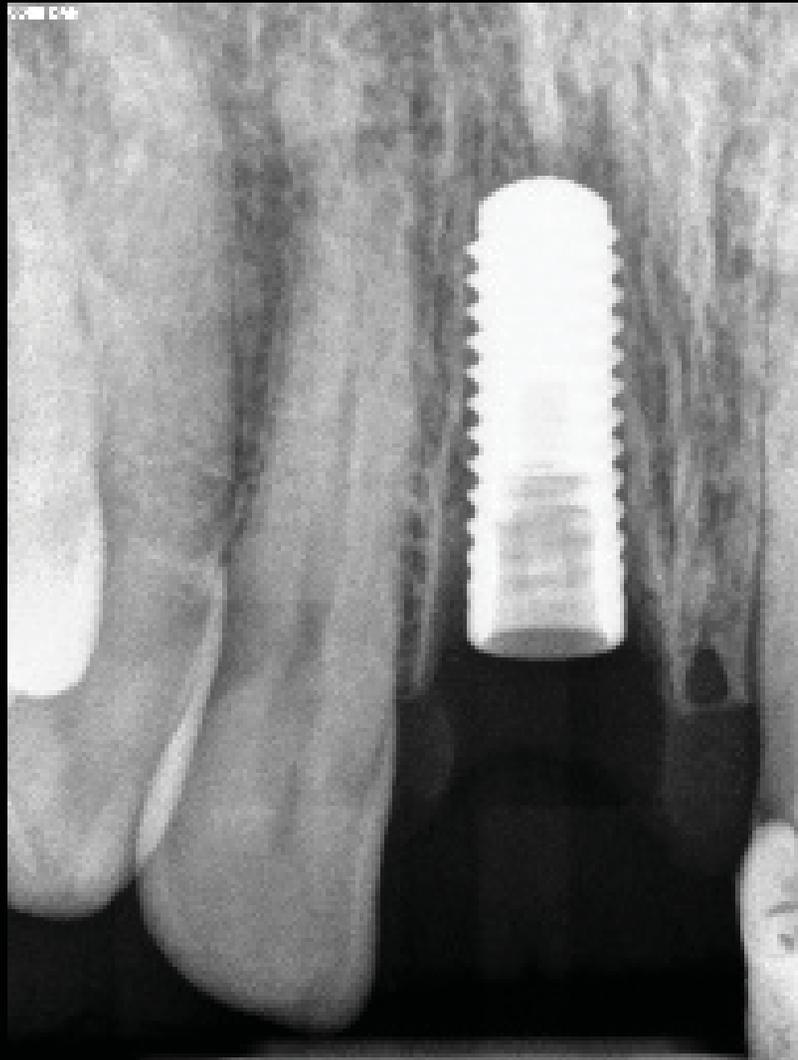
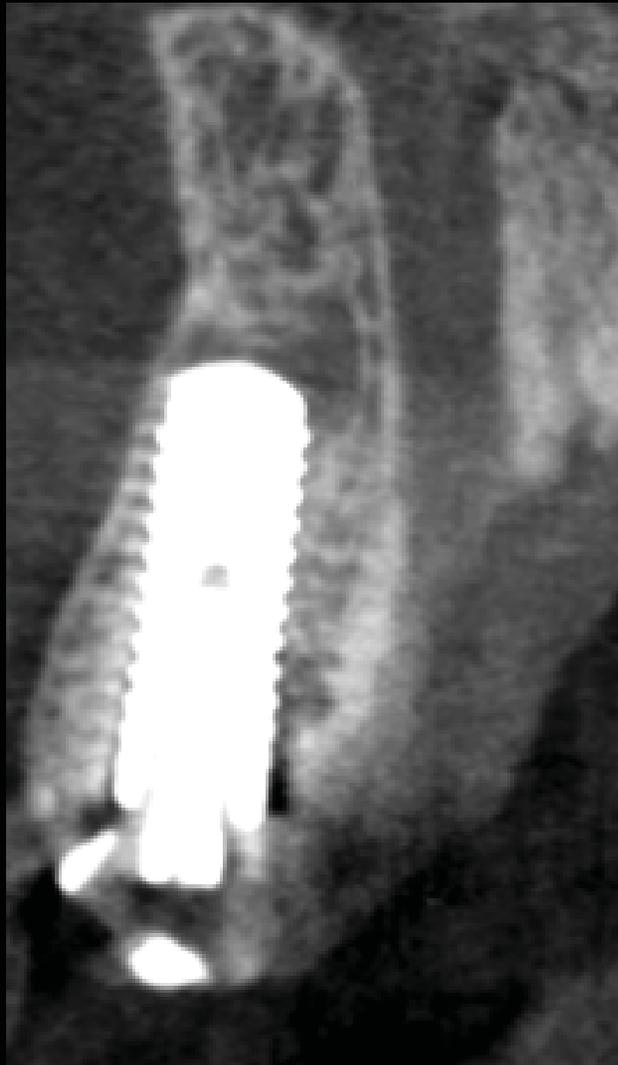
Immediate with custom
healing abutment

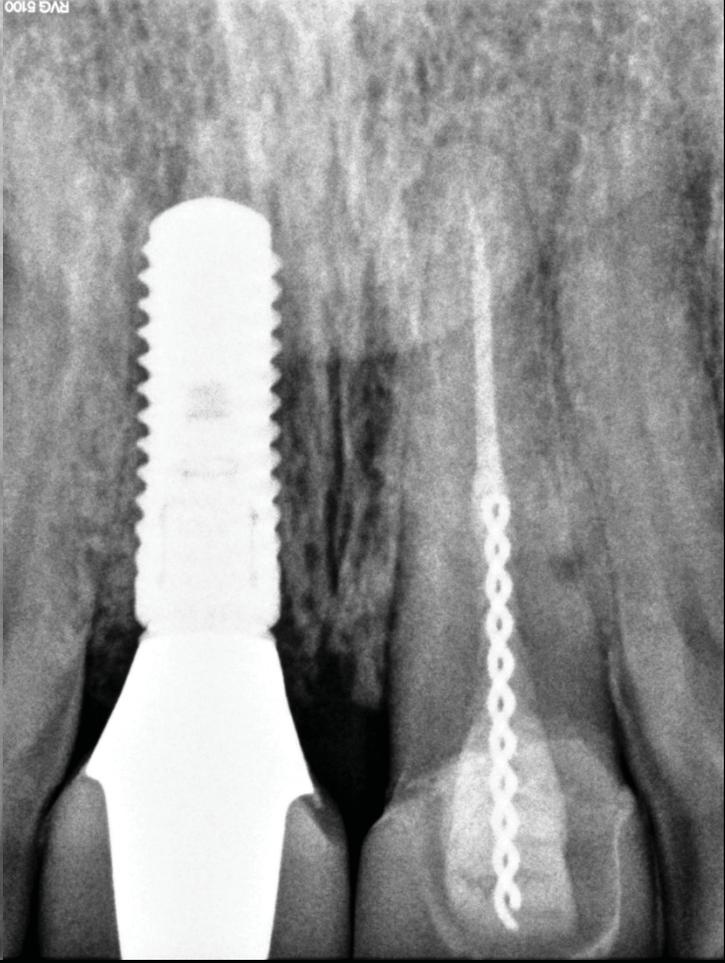
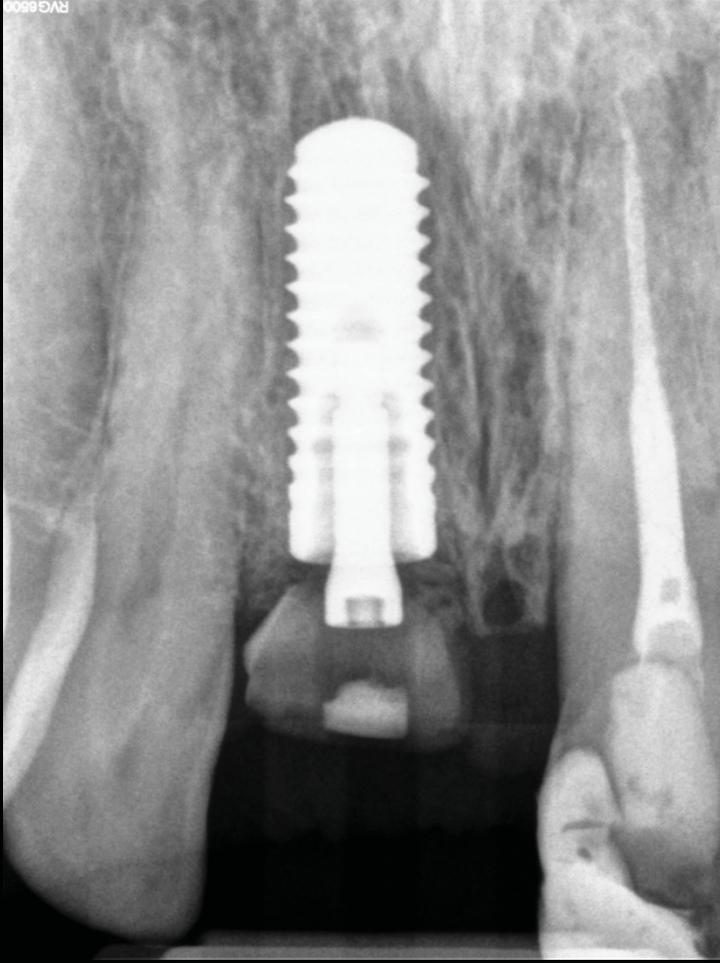








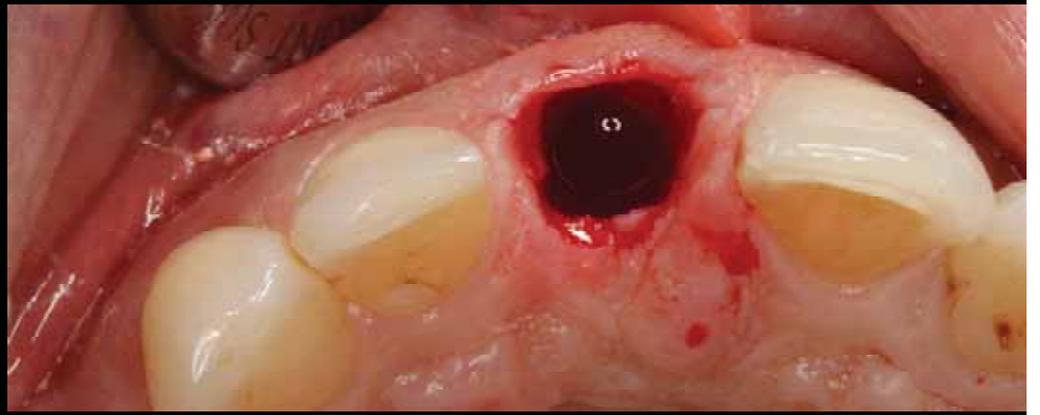


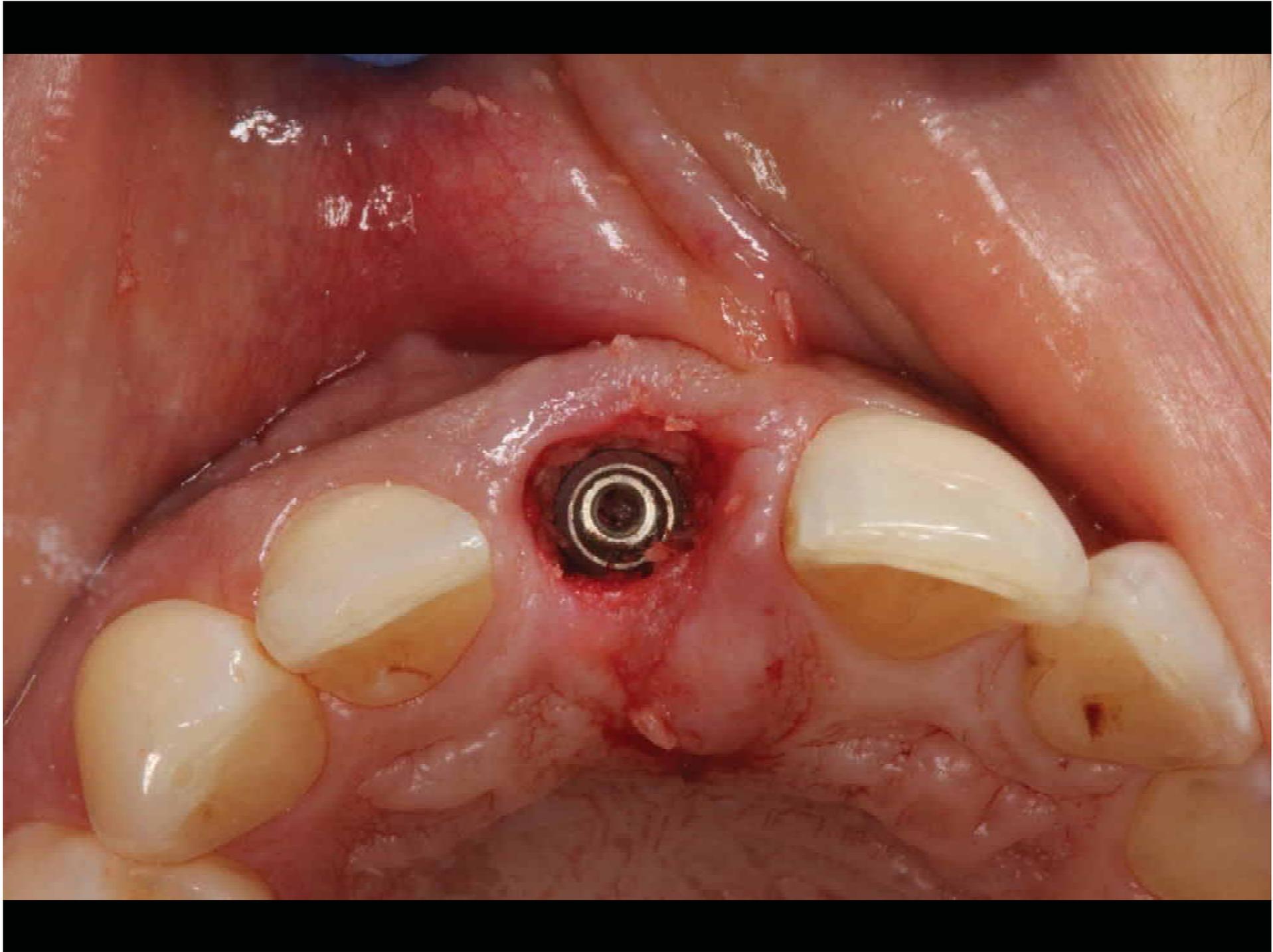




Immediate with
provisionalization











Historical perspective

- *Implant survival:*

- a) often equated with implant success.
- b) defined as the implant remaining in the jaw

- *Implant success:*

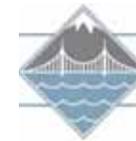
- a) implant is immobile when tested clinically
 - b) vertical bone loss - less than .2mm/yr after the 1st year
 - c) 85% after 5 yrs, 80% after 10 yrs
- Albrektsson et al. JOMI 1986



Microbiology of Peri-implant disease

- Bacteria in peri-implant disease are similar to bacteria in periodontal disease
- The microflora present prior to implantation determines the composition of the microflora on implants
- Patients who lost their teeth due to periodontitis have an increased risk of developing peri-implantitis

Mombelli, Periodont. 2000, 2002, Fransson et al. COIR 2005, Lang et al. COIR, 1993, Rorvik et al. COIR 1993



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Histopathology of Peri-implant disease

- The *peri-implant tissues appeared less able to arrest progressive, plaque associated lesions* .
- The *amount and intensity of bone loss was more rapid* at the implant than the tooth site...3.2mm vs 1.3mm.
- *The apical extension of the ICT was more widespread* and extended into the alveolar bone around implants

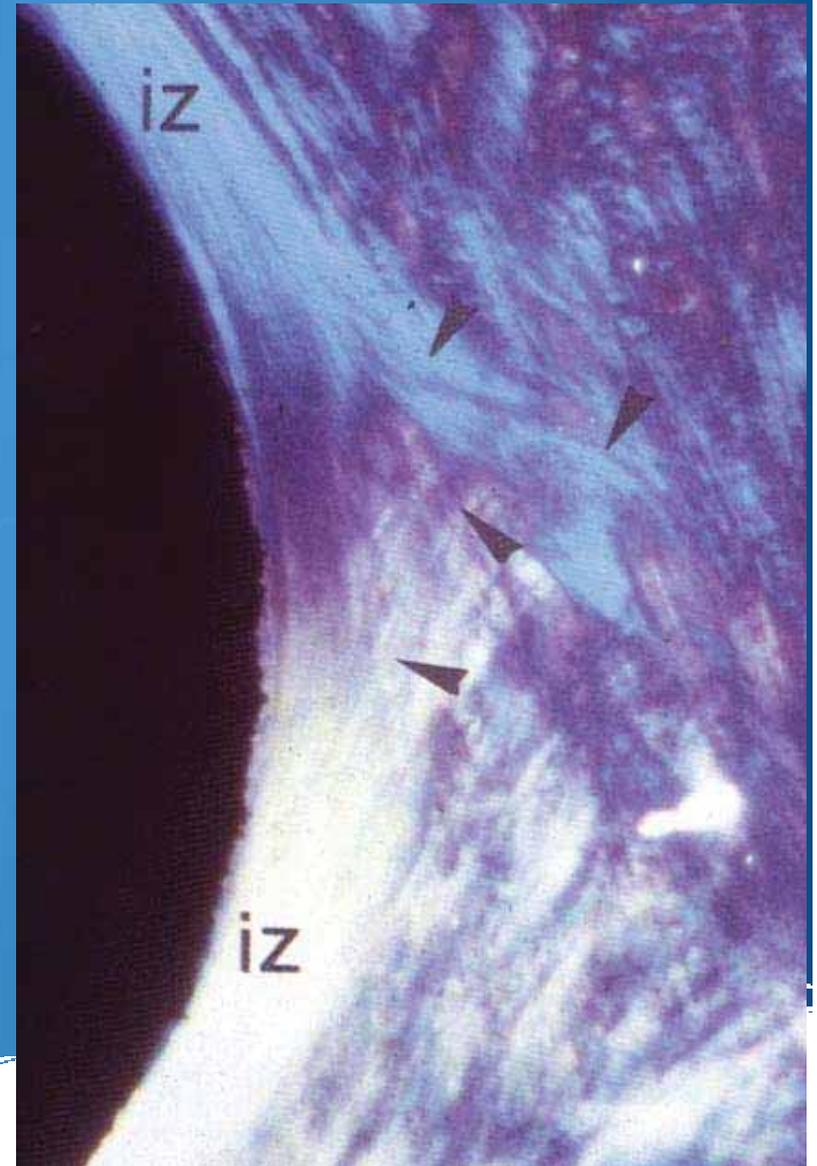
Lindhe et al. COIR 1992, Berglundh et al. COIR 2004



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Histopathology of Peri-implant disease

- a) The parallel or circular orientation of the connective tissue fibers may lead to a more rapid spread of inflammation in the peri-implant mucosa
- b) The self limiting healing process in periodontal tissues may not be present around implants



Lindhe et al. COIR, 1992, 5 dogs
Berglundh et al. JCP, 2011, human biopsy – review paper

Peri-implant mucositis vs implantitis

- Peri-implant mucositis describes an inflammatory lesion that resides in the mucosa alone. Fundamentally similar to gingivitis.
- Peri-implantitis also affects the supporting bone. Fundamentally similar to Periodontitis.

(Lindhe & Meyle 2008).



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Peri-implant mucositis vs implantitis

- It is assumed that bone loss occurring after initial remodelling is mainly due to bacterial infection.
- The key parameter for the diagnosis of peri-implant mucositis is bleeding on gentle probing (<0.25 N).
- Peri-implantitis is characterized by changes in the level of the crestal bone in conjunction with bleeding on probing with or without concomitant deepening of periimplant pockets.
- Pus is a common finding in peri-implantitis sites.



Iatrogenic factors

Peri-implantitis may be initiated and/or maintained by iatrogenic factors (e.g.



- ex



- Ina



- Ov

- Implant mal-positioning, technical complications
- Bone trauma at time of placement



Improving Outcomes

- Proper implant maintenance
- Restoration cleansability
- Restoration fit
- Residual Cement
- Keratinized tissue
- Appropriate Occlusion
- Identifying additional risk factors:
PERIODONTAL DISEASE
SMOKING
DIABETES



Dental Implant Maintenance



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Implant Maintenance

- Annual exam (probe, radiograph, occlusion check)
- Oral hygiene instructions
- Recall maintenance visits

- Restoration cleansability
- Removing cement flash
- Keratinized tissue
- Peri-implantitis
- Implant repair or removal



Yearly Probing, Radiograph and Occlusion Check

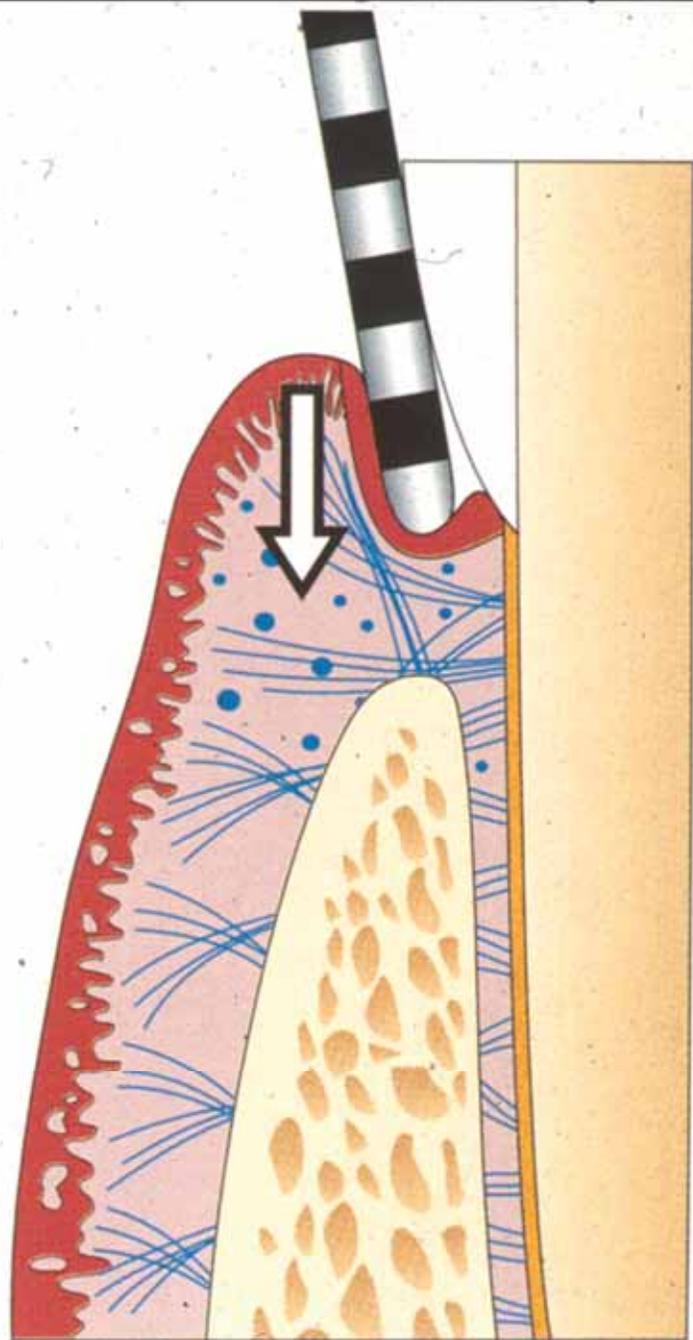
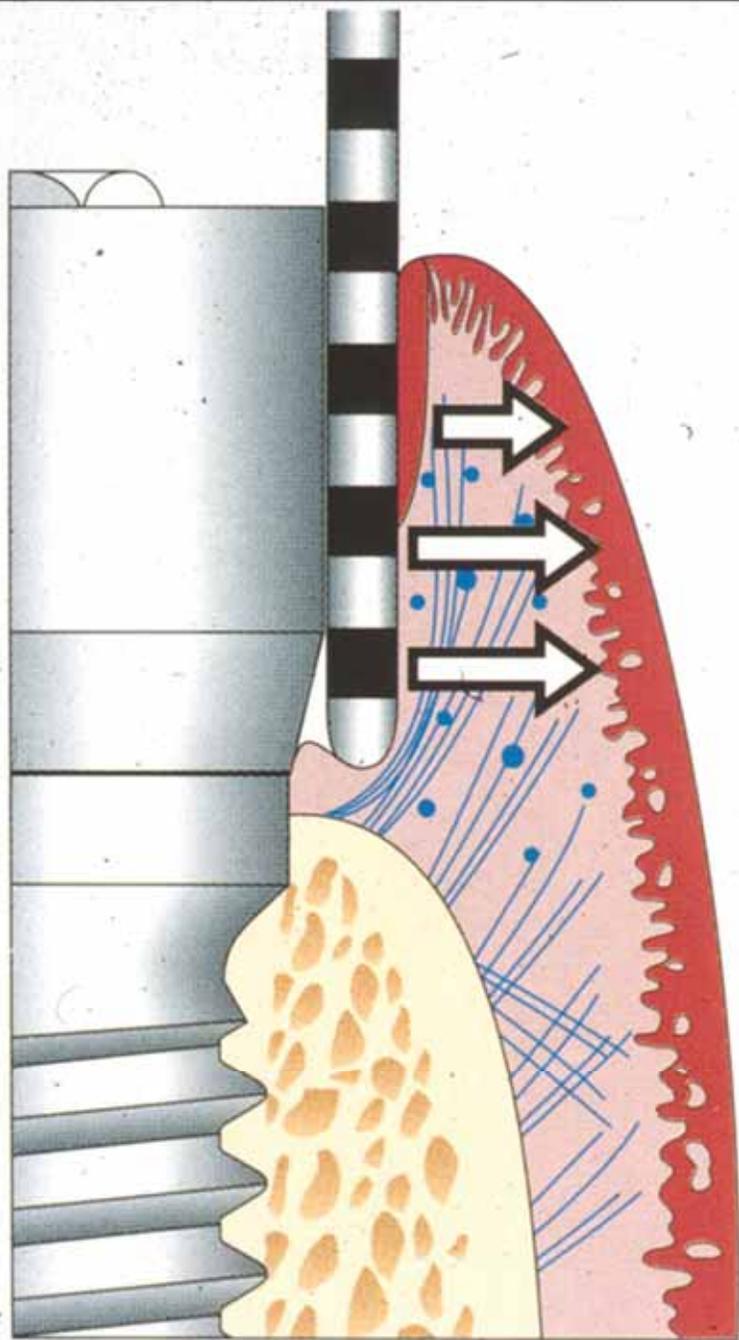
- Yearly probe to screen for bone problems.
- More important is a proper annual radiograph to evaluate marginal bone levels.
- Evaluate occlusion with foil shimstock



Why Probe Implants?

- Clinical signs of inflammation do not always appear, even with bone loss.
- Bone loss does not always show up on radiographs (buccal is masked, B/L cortical bone may hide loss and w/o subtraction radiography small changes are not detectable).
- Panoramic films often do not show bone loss.
- No literature to demonstrate any permanent damage from gentle annual probing.

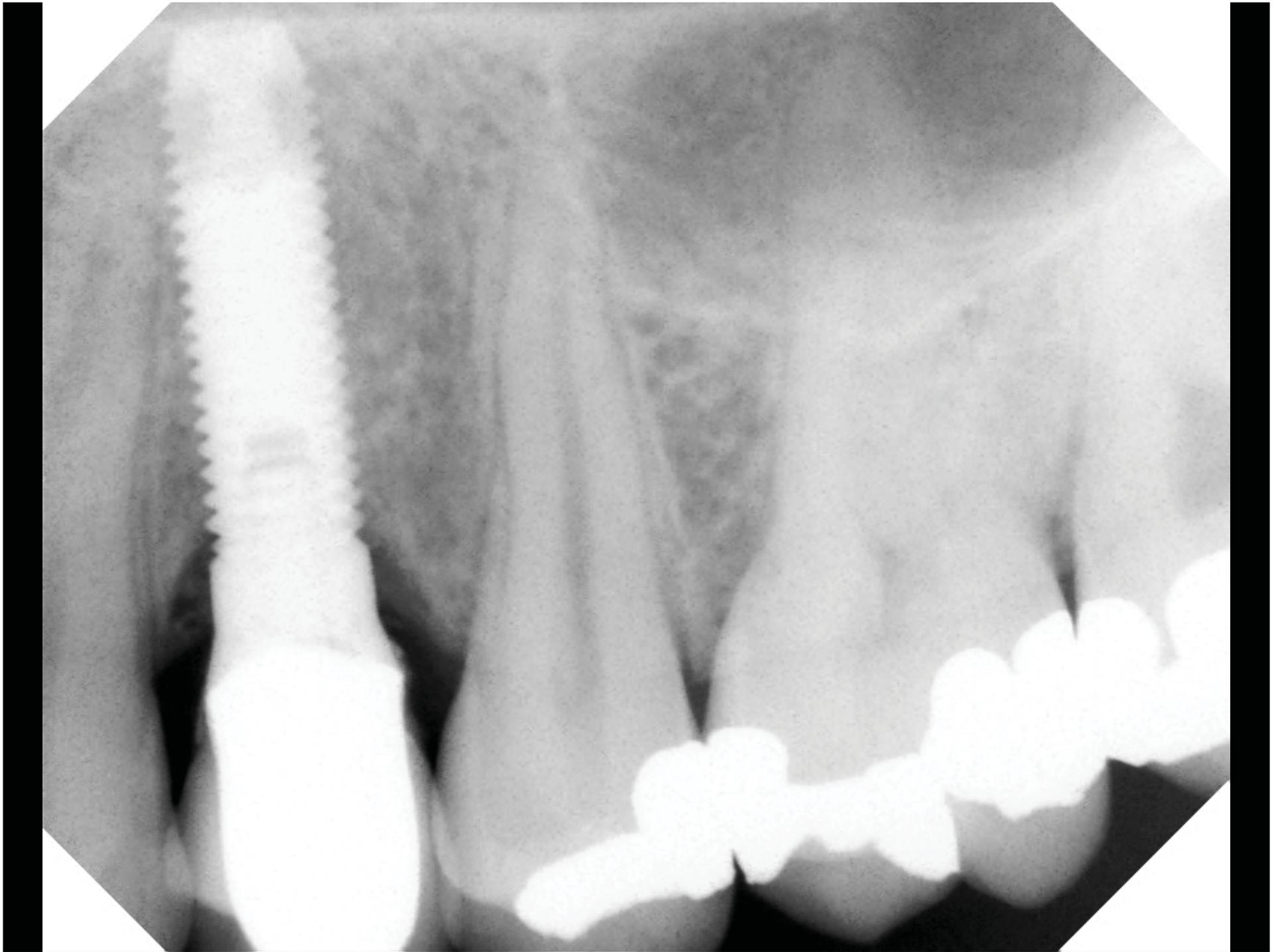




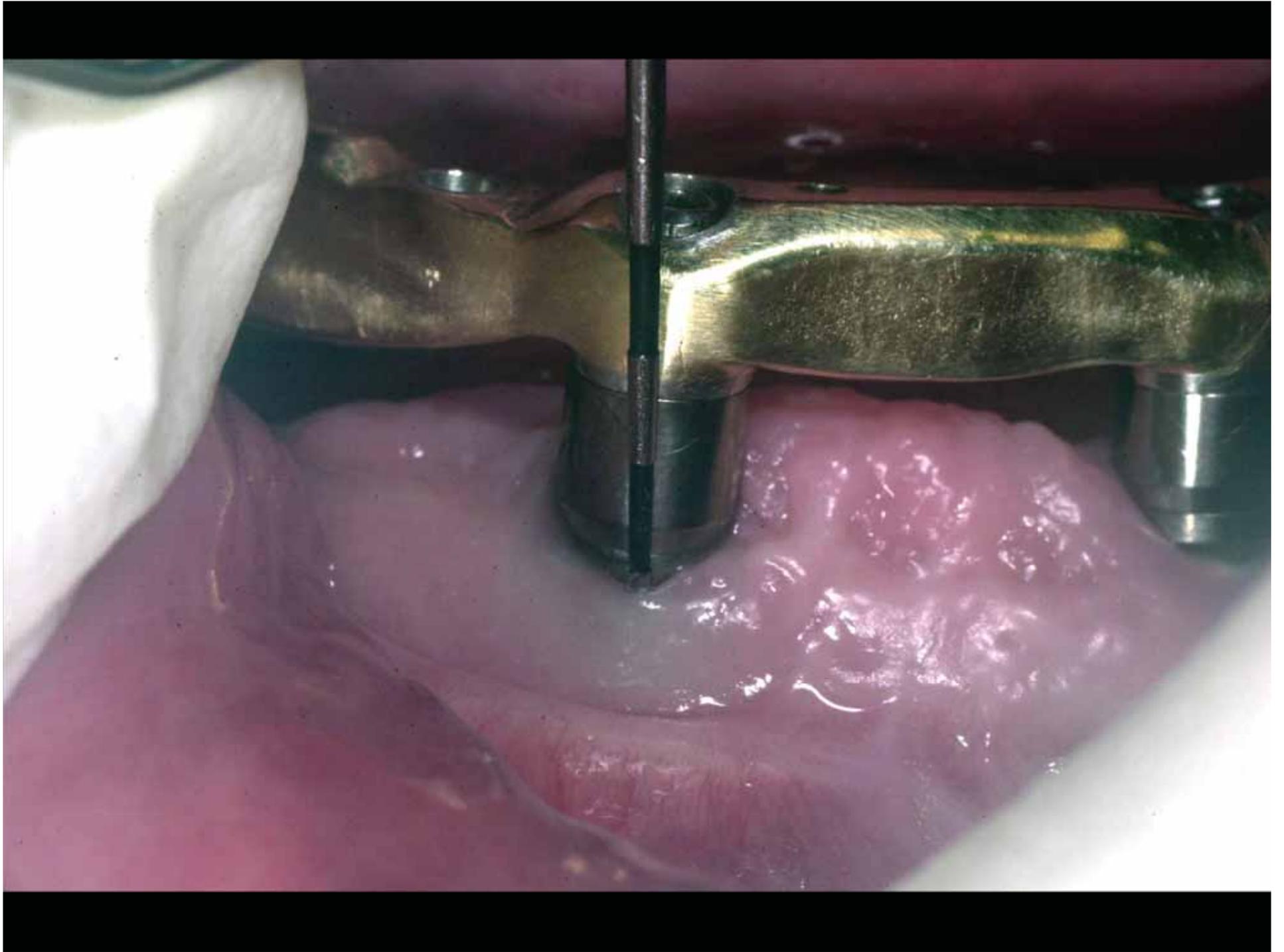
Implants often probe deeper than natural teeth

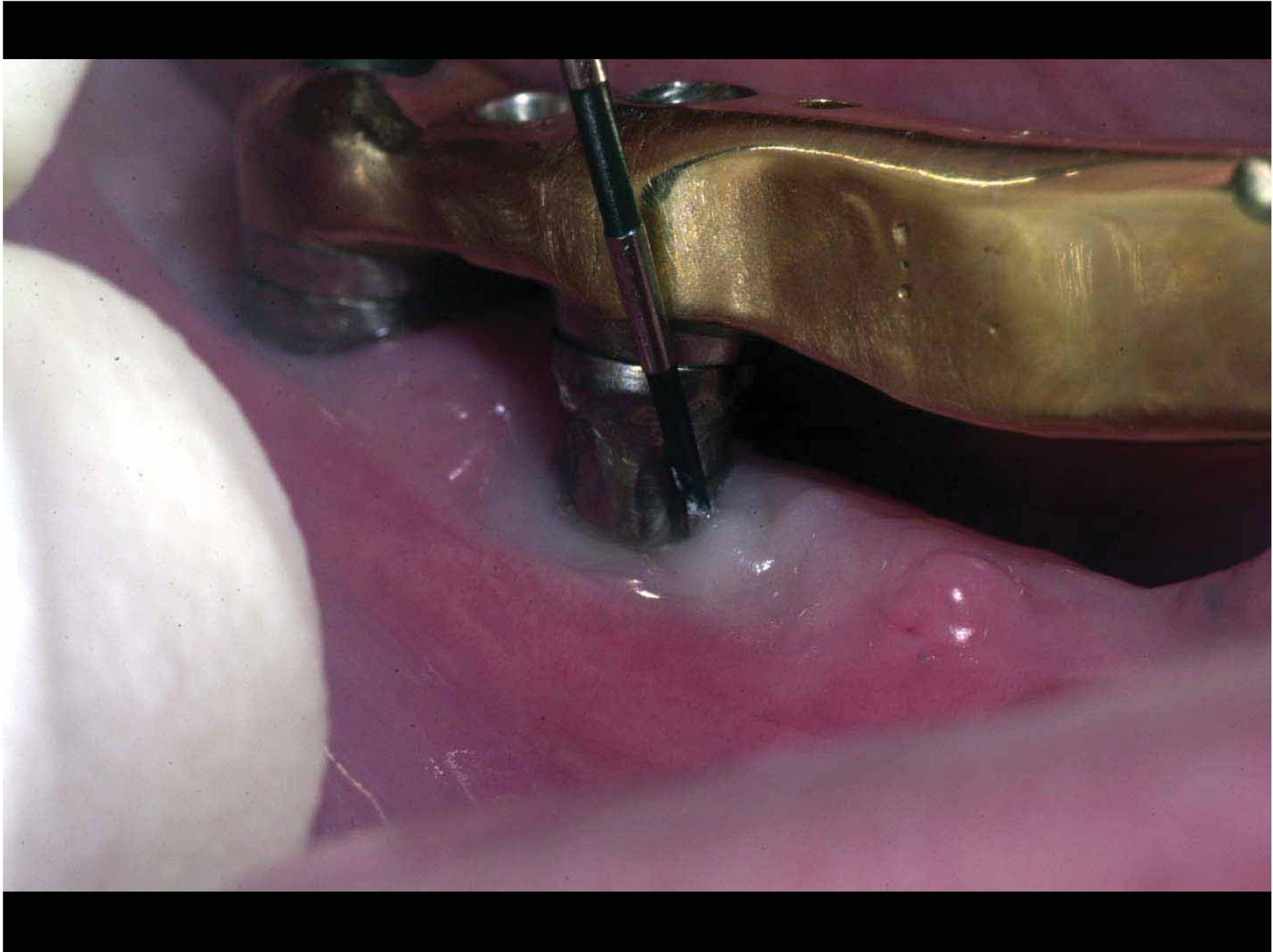
- Interproximal on flat top implants
- Thick palatal tissue
- Lack of resistance











Plastic vs. Metal Probes



Implant Dent. 2012 Aug;21(4):311-6.

Probing and scaling instrumentation on implant abutment surfaces: an in vitro study.

Fakhravar B¹, Khocht A, Jefferies SR, Suzuki JB.

PURPOSE:

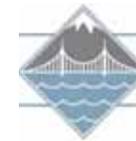
To investigate surface roughness on the apical collar of implant abutments caused by probing and scaling instruments.

MATERIALS AND METHODS:

Fourteen transmucosal abutments (BioHorizons, Atlanta, GA) and 4 instruments: UNC-15 metal probe, Periowise plastic probe, McCall SM 17/18 metal scaler, and universal plastic scaler were used to conduct the study. Four abutments were used for nontreated measures, and 10 abutments were treated with the 4 indicated instruments. Surface roughness was assessed with a contact profilometer.

CONCLUSIONS:

Probing around implant abutments with a metal probe seems to have no effect on abutment surfaces. In contrast, instrumentation with scalers (metal and plastic) and plastic probe may cause surface roughness.



What do you do when you cannot probe around implants?

It is all the more critical to analyze horizontal bone levels and signs of inflammation.

Consider yearly removal and polishing of intaglio surfaces.

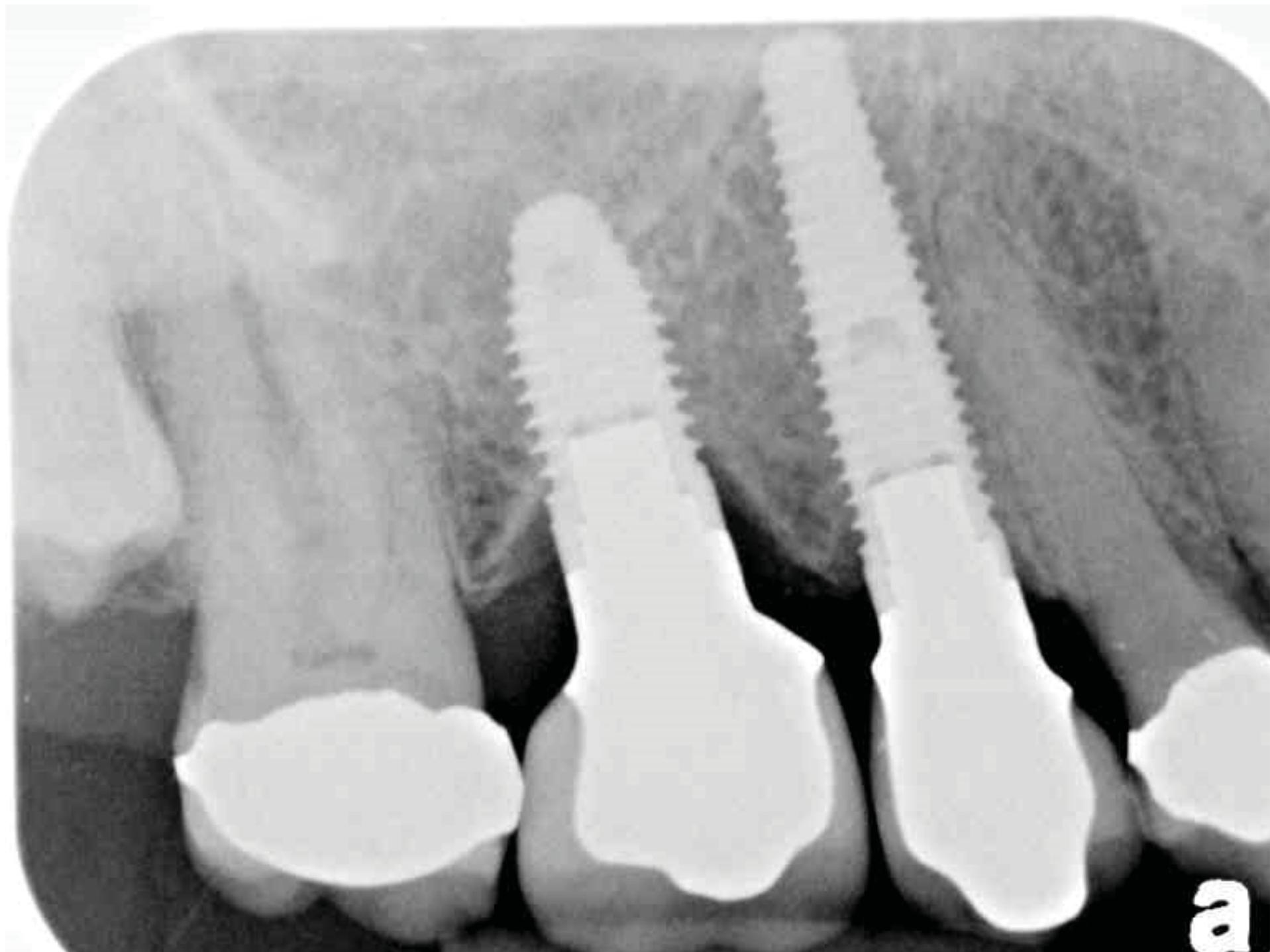


Monitoring bone levels

What constitutes normal bone loss/remodelling?

- Implant vs. tooth
- Microgap level
- Surface roughness level
- Stress concentrations
- Abutment connection
- Flat-top vs scalloped

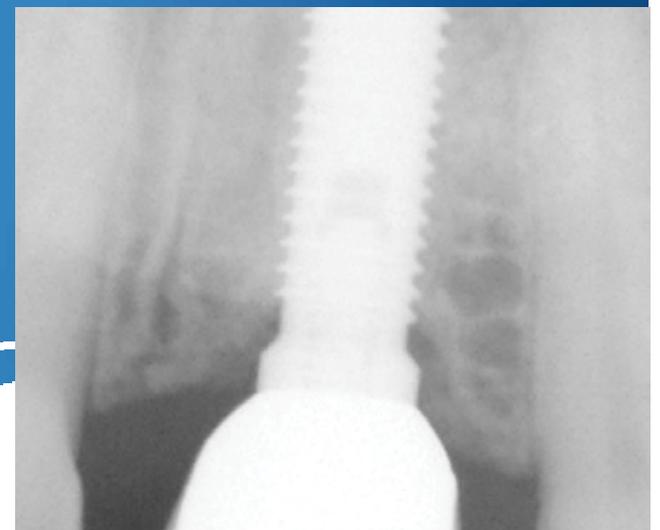




Clinical and radiographic evaluation of Brånemark implants with an anodized surface following seven-to-eight years of functional loading

Gelb, McAllister, Nummikoski,
Del Fabbro (2012) submitted

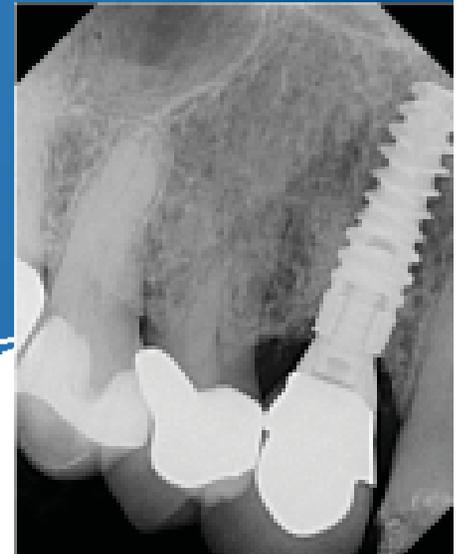
1.5 mm average bone loss



Two-year Evaluation of a Variable-Thread Tapered Implant in Extraction Sites With Immediate Temporization: A Multicenter Clinical Trial

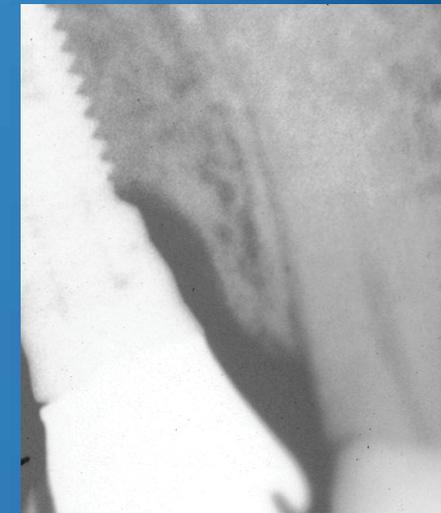
McAllister, et al (2012) JOMI

Nobel Active 0.5 mm average
bone loss



Biologic Width and Bone Loss

- Implant vs. tooth
- Microgap level
- Surface roughness level
- Stress concentrations
- Abutment connection



What constitutes an unhealthy implant with bone loss beyond normal?

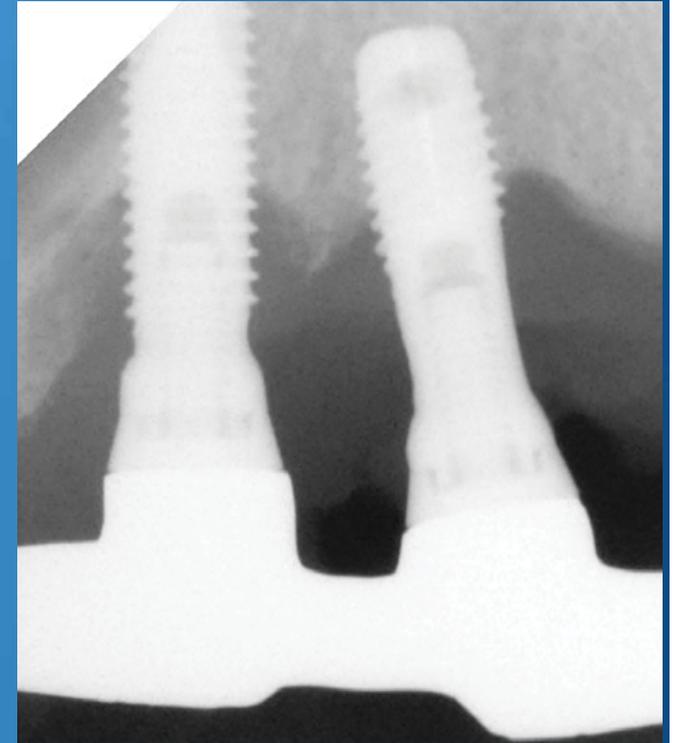


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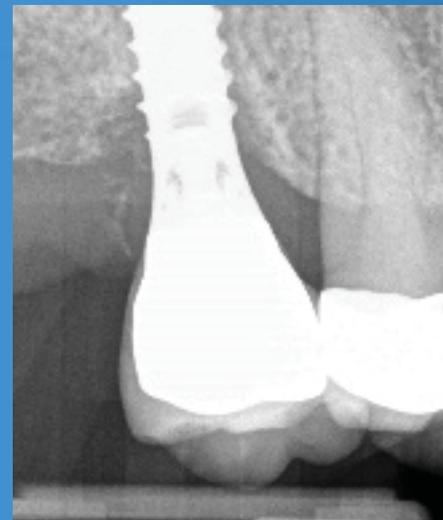
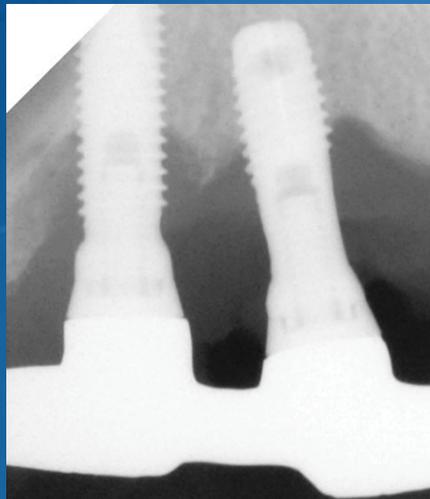
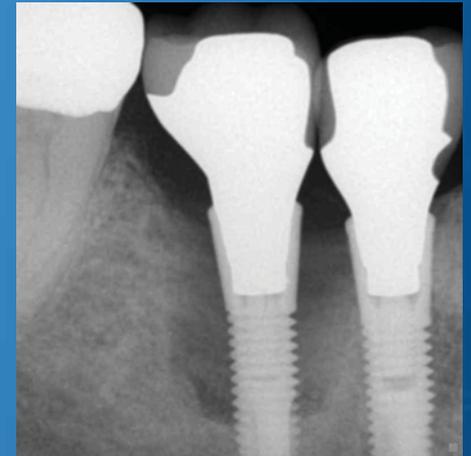
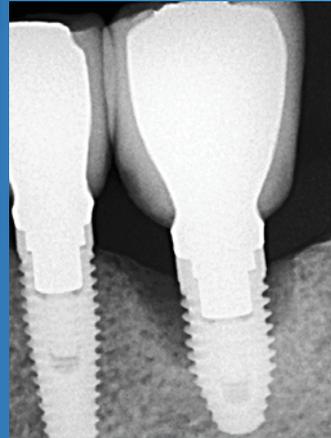
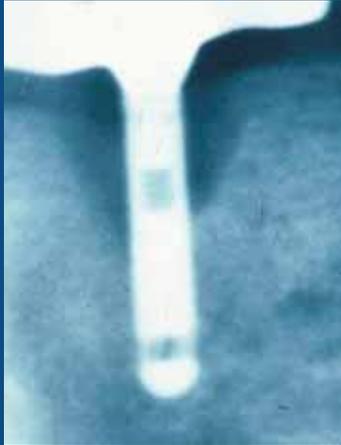
Evaluation and Diagnosis of the Problem

Examination

- Probing, radiographs, clinicals
- Comparison to baseline data
- Comparison to specific implant remodelling

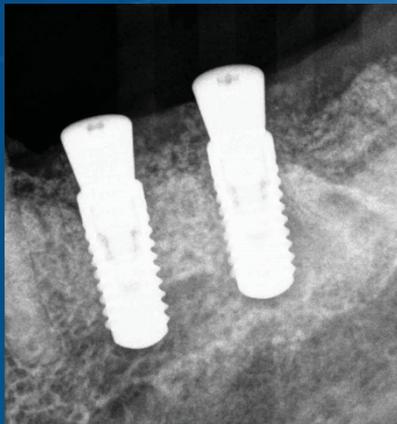


Is there a current surface or implant design that is resistant to peri-implantitis?

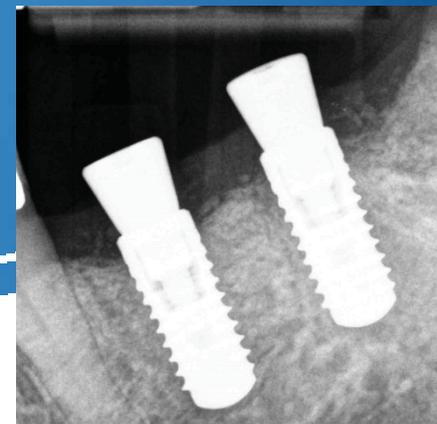


Bone level monitoring

- Identify risk factors associated with developing peri-implant diseases (BOP, marginal inflammation, purulent discharge, increasing probing depths)
- Establish radiographic baseline at **the time of implant placement** (Horizontal bone levels - BW)
- Establish clinical and radiographic baseline **at final prosthesis insertion** (Horizontal bone levels - BW)
- Employ methods that monitor implant health and determine inflammatory complications as part of an ongoing periodontal maintenance program
- Establish an early diagnosis and intervention, which will contribute to more effective management of peri-implant diseases



Perpendicular position!

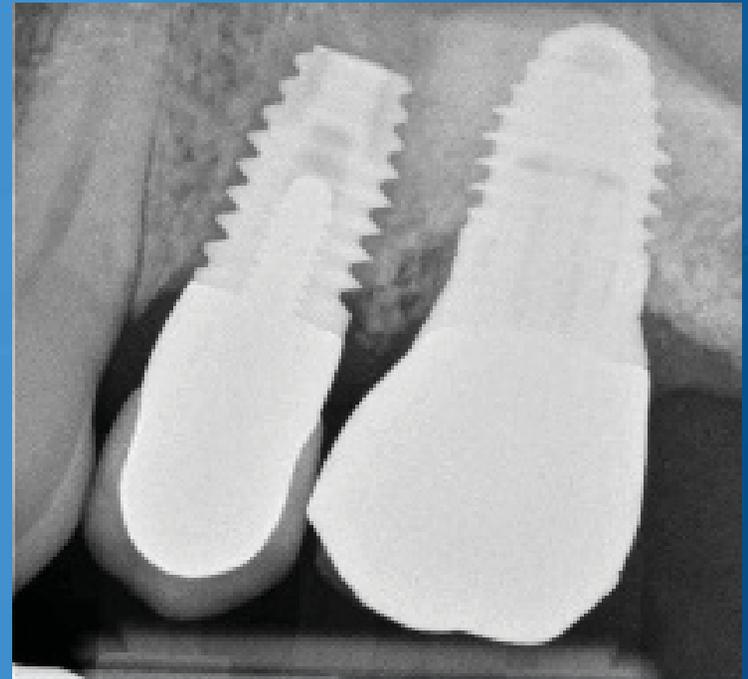
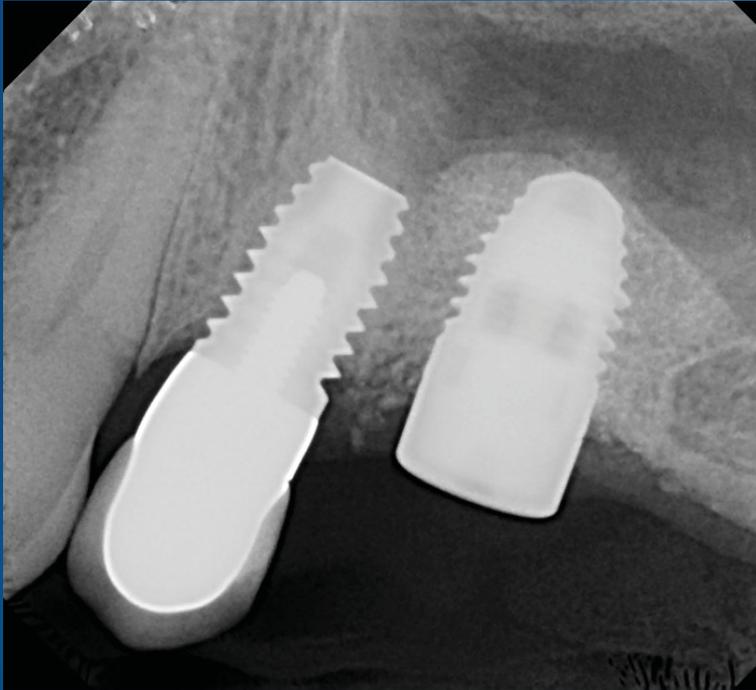




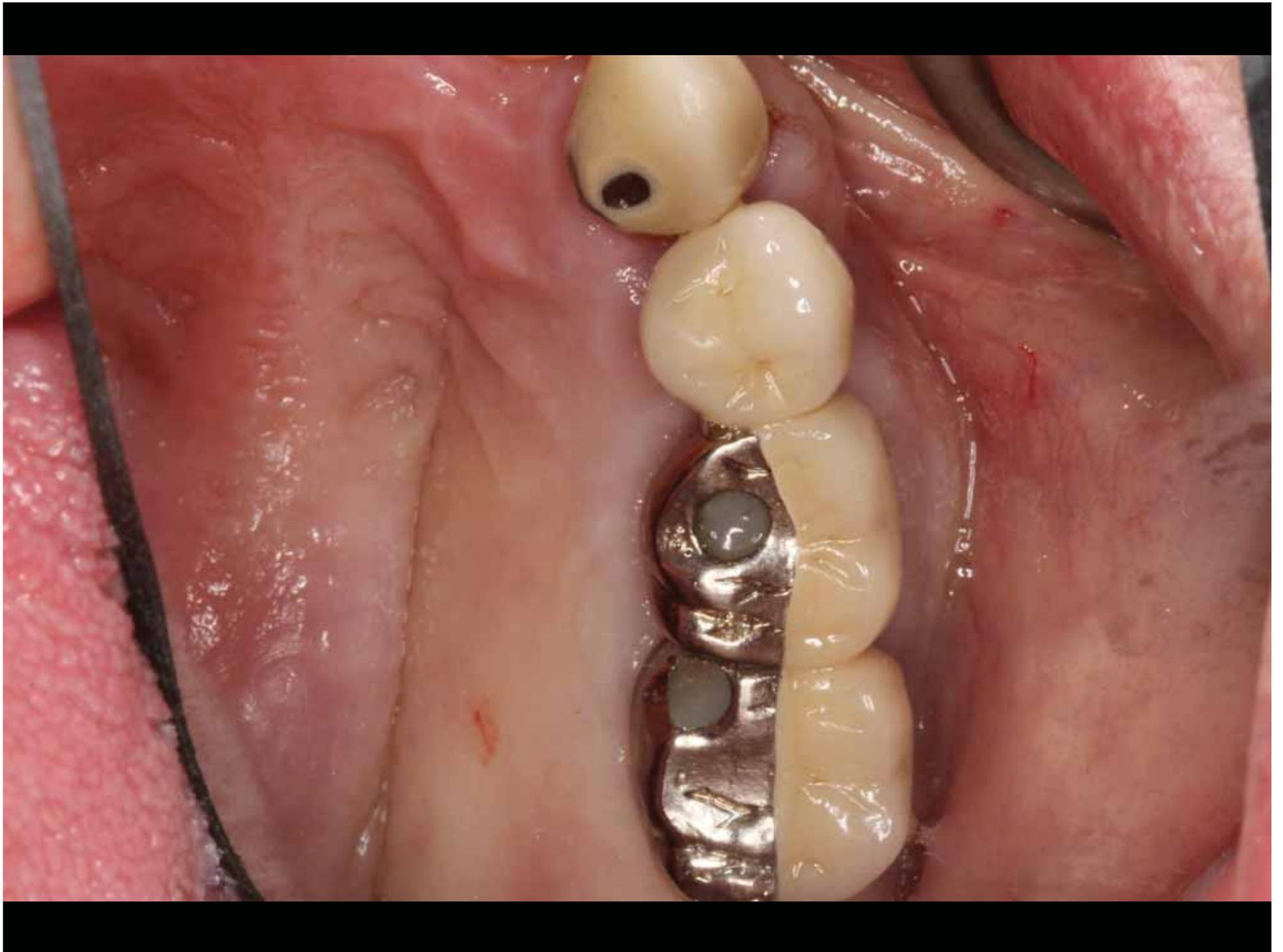
**Compare Implant Occlusion to Natural
Teeth w/ Mylar Shimstock
(short implant segments should be light until the
patient bites hard)**



Occlusal Issues

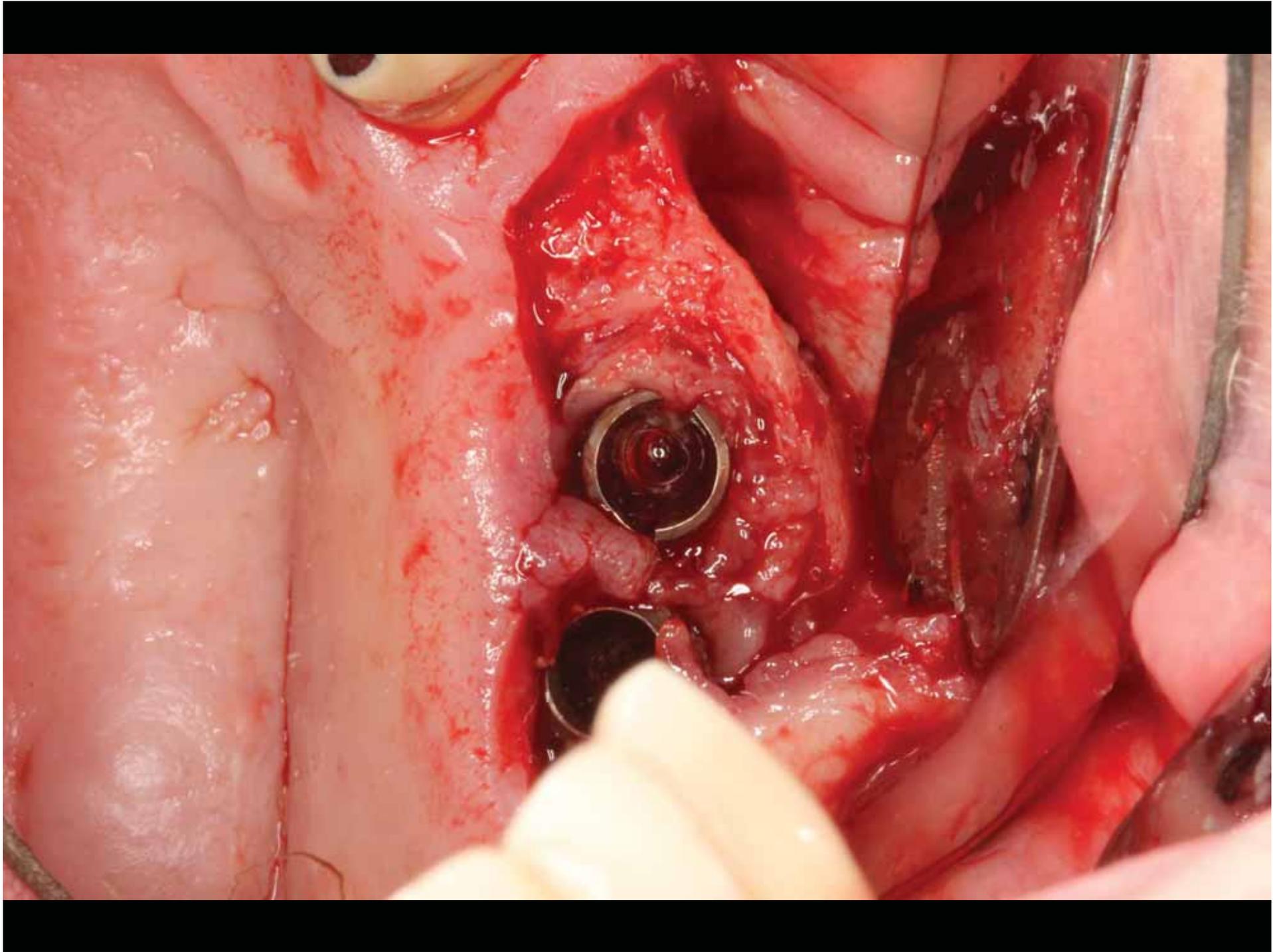


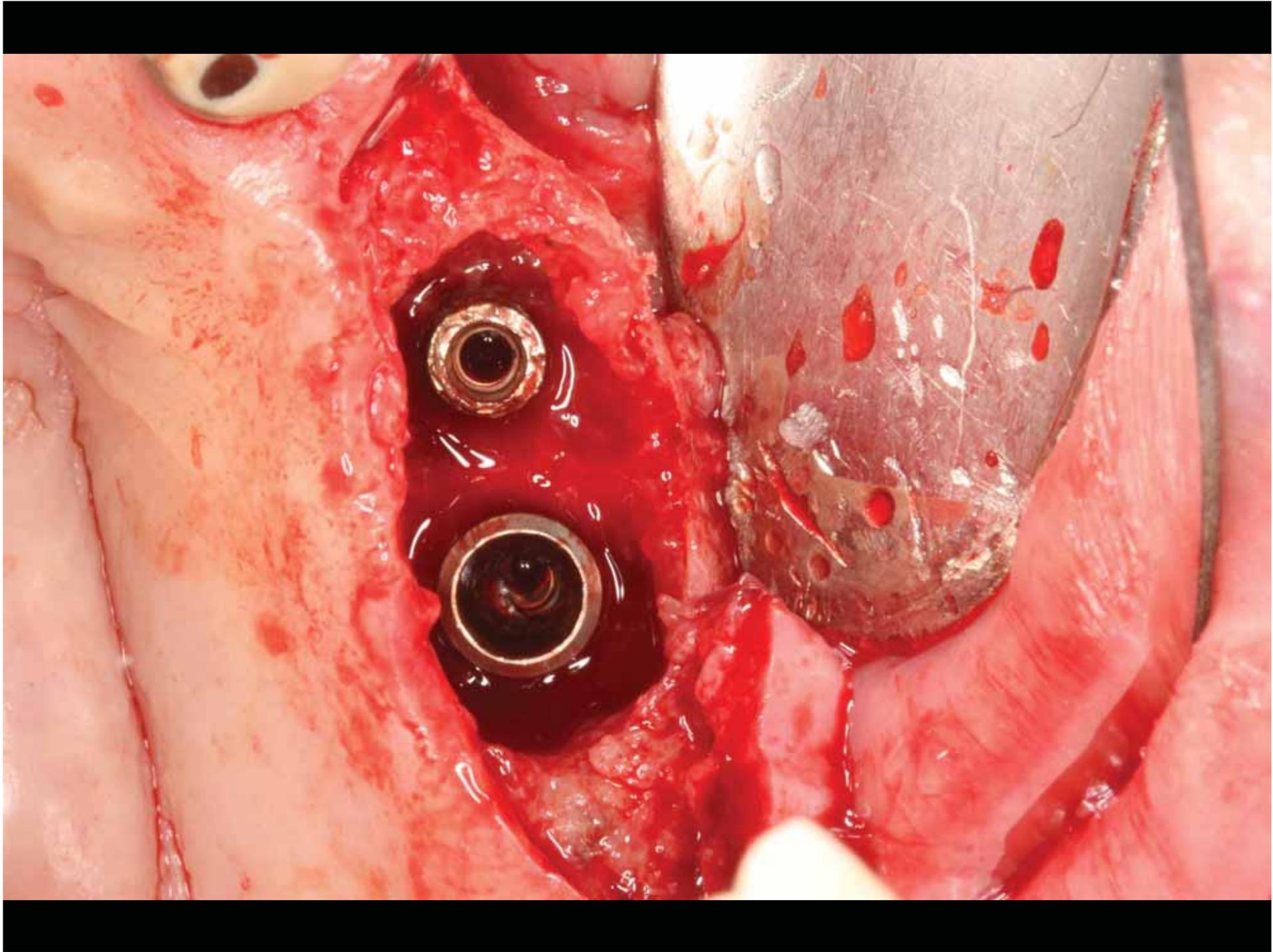








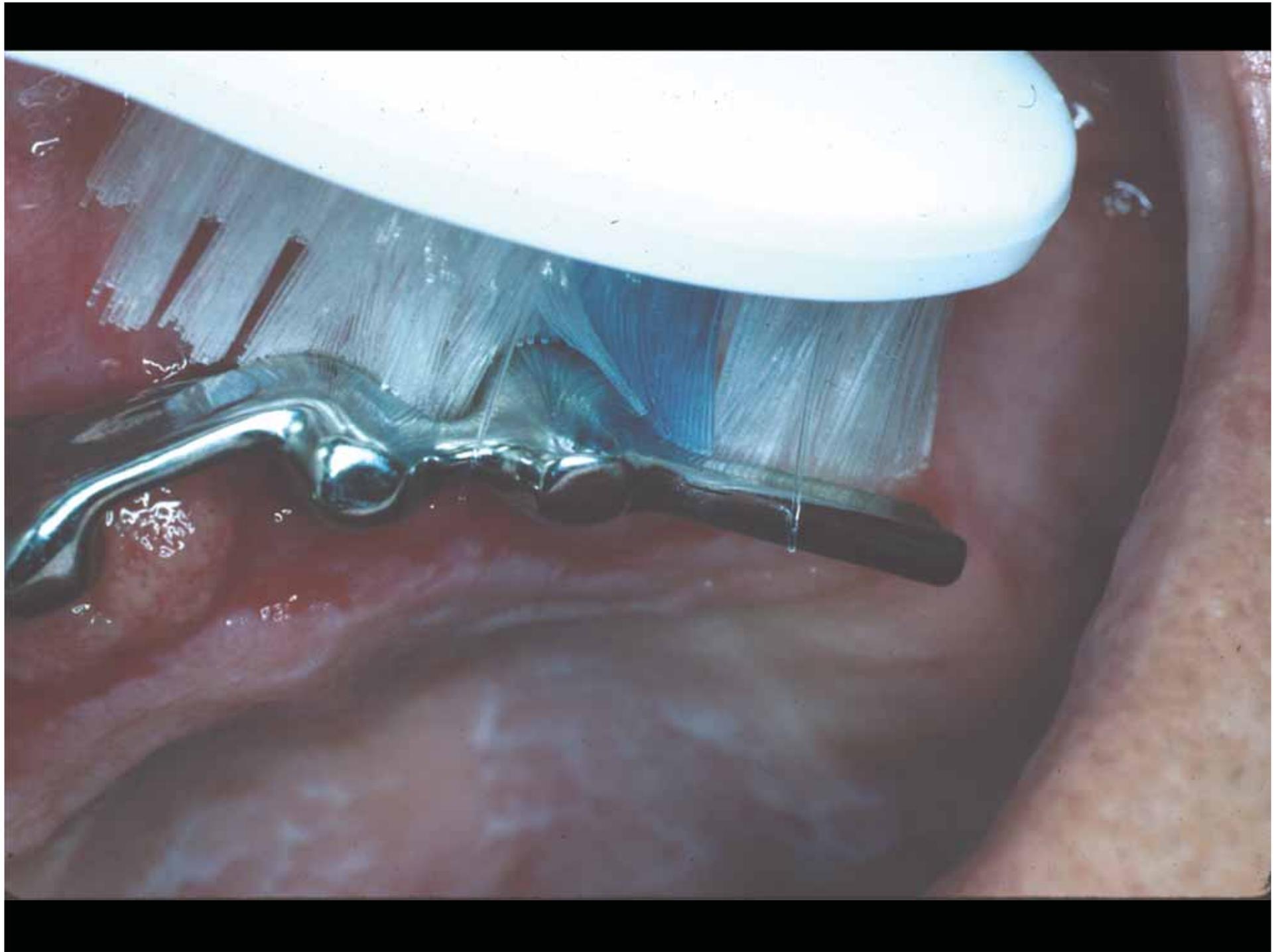




Implant OHI

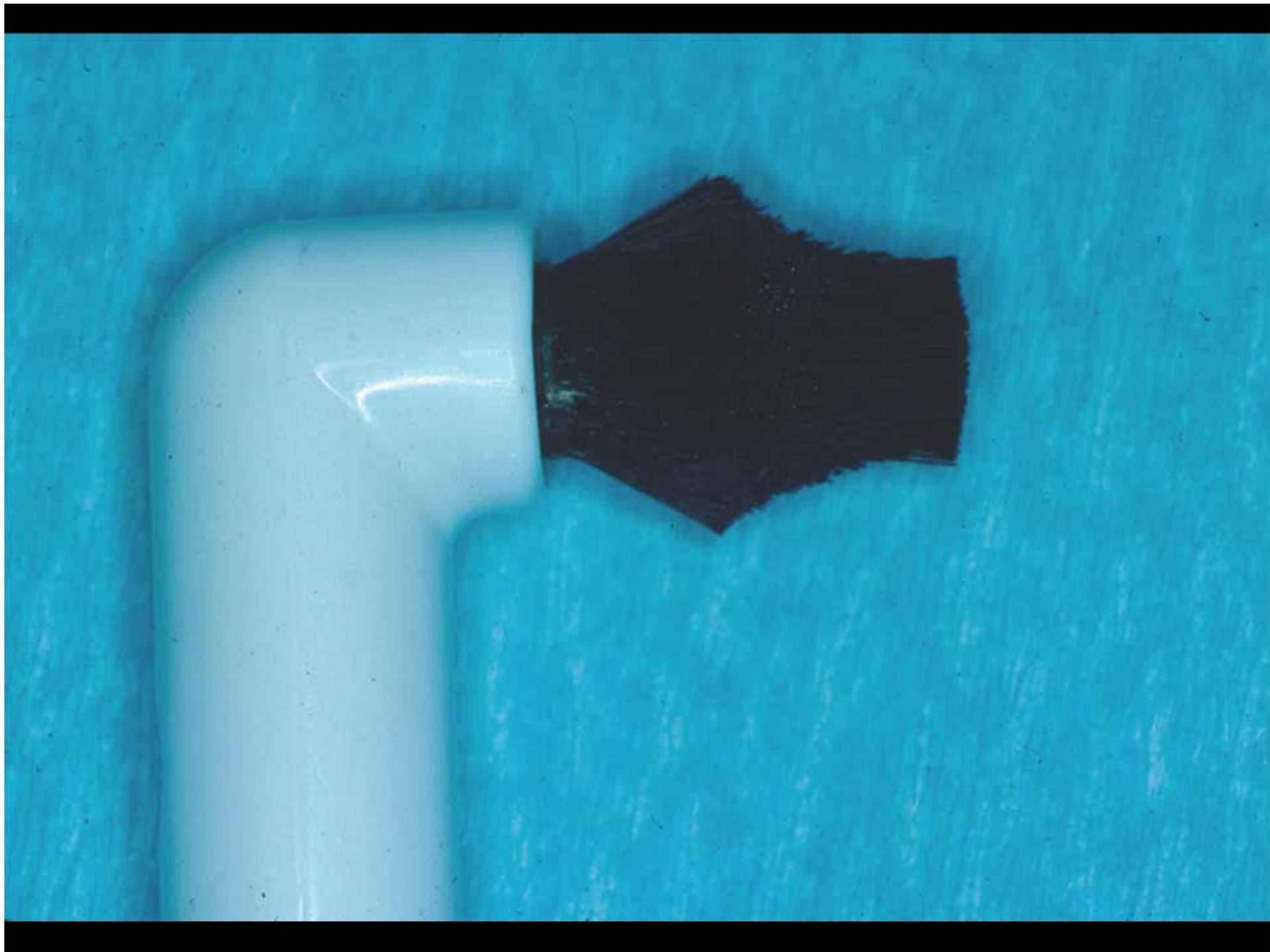
- Be creative for these patients as many are compromised.
- There are no consensus statements on proper implant OHI beyond what exists for a natural dentition.
- Recommended OHI of similar techniques to a natural dentition when single or multi-unit implants.
- Hybrids and bars require unique recommendations based upon access.

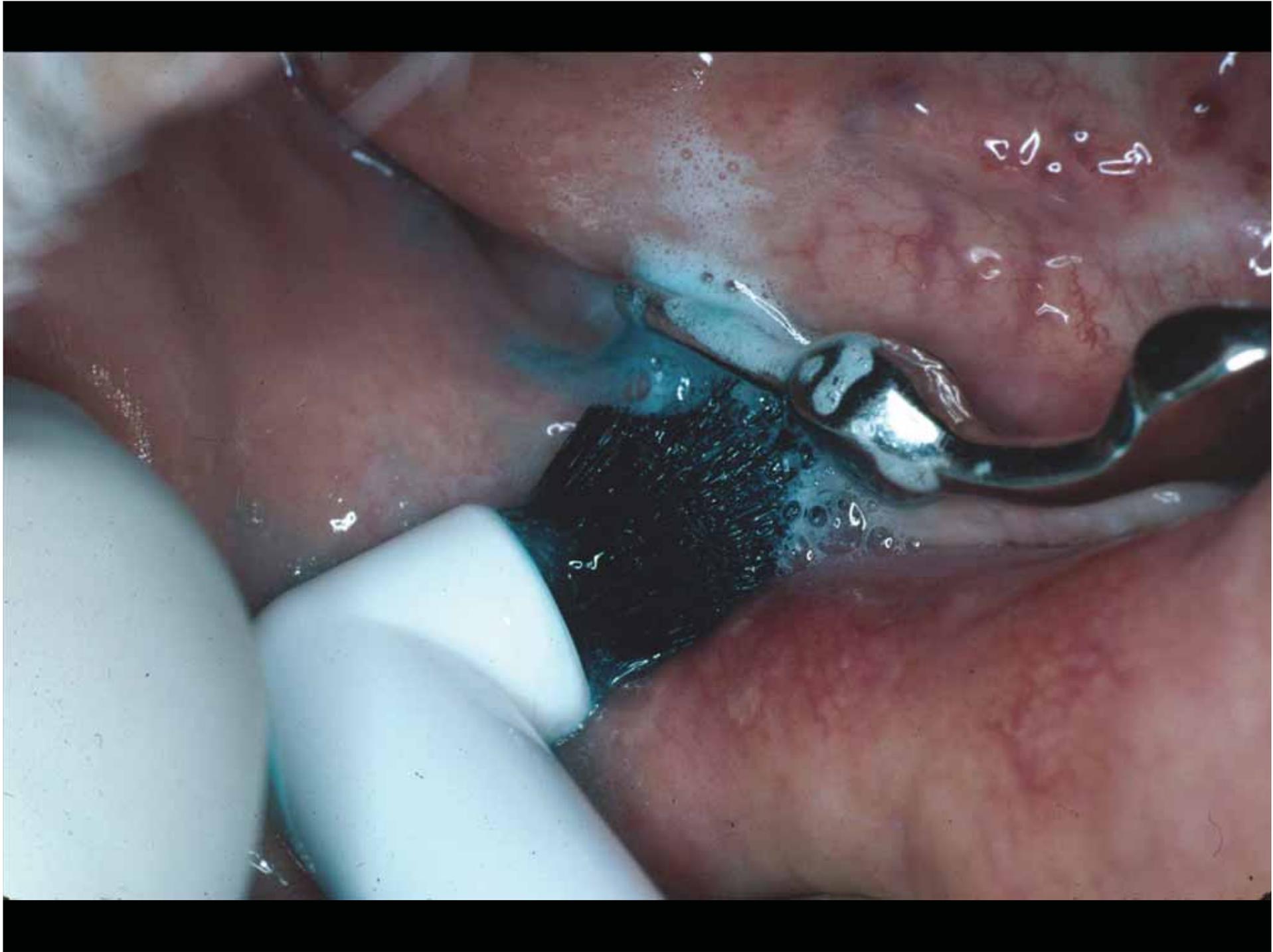


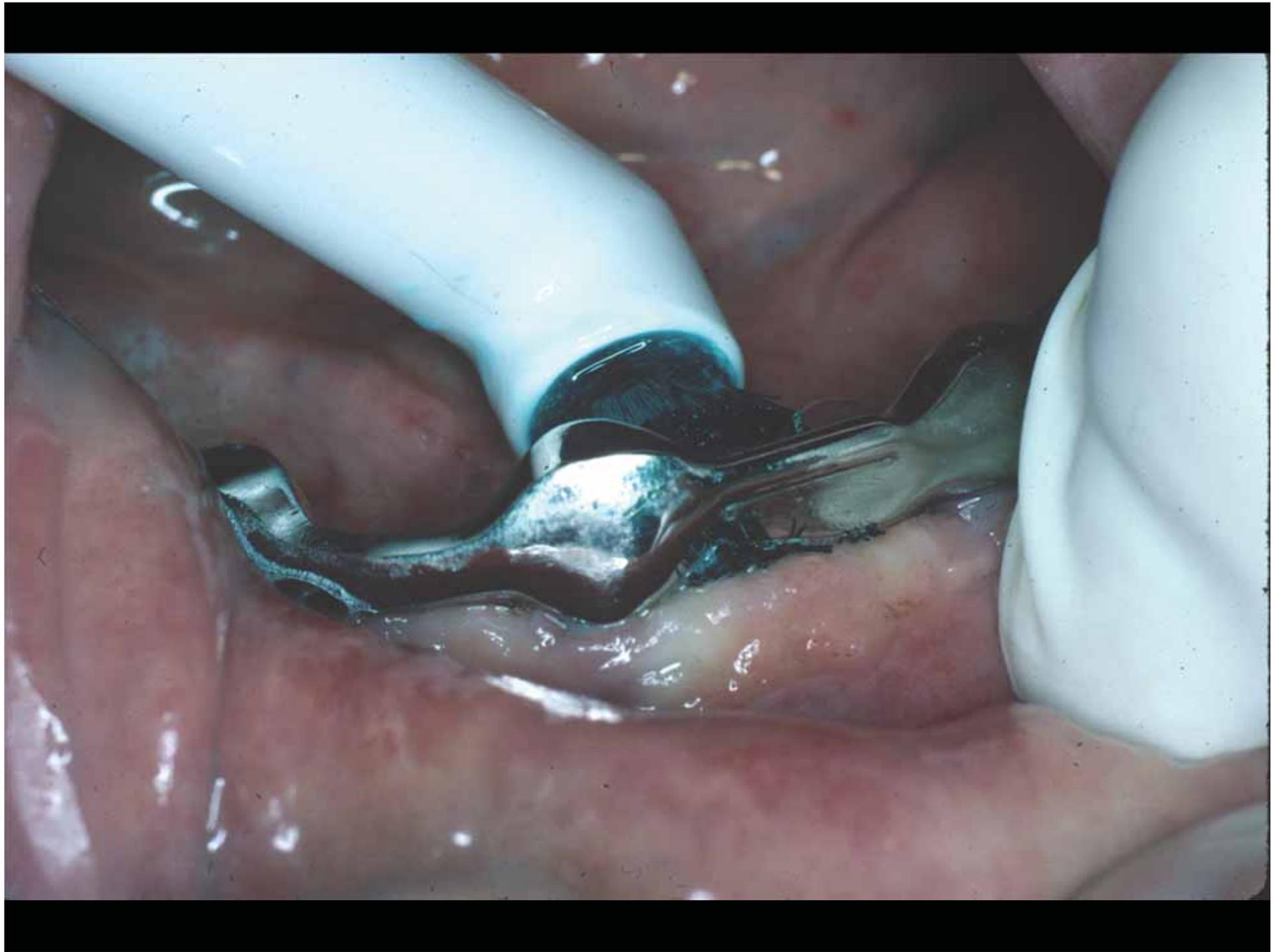


Rota-dent®





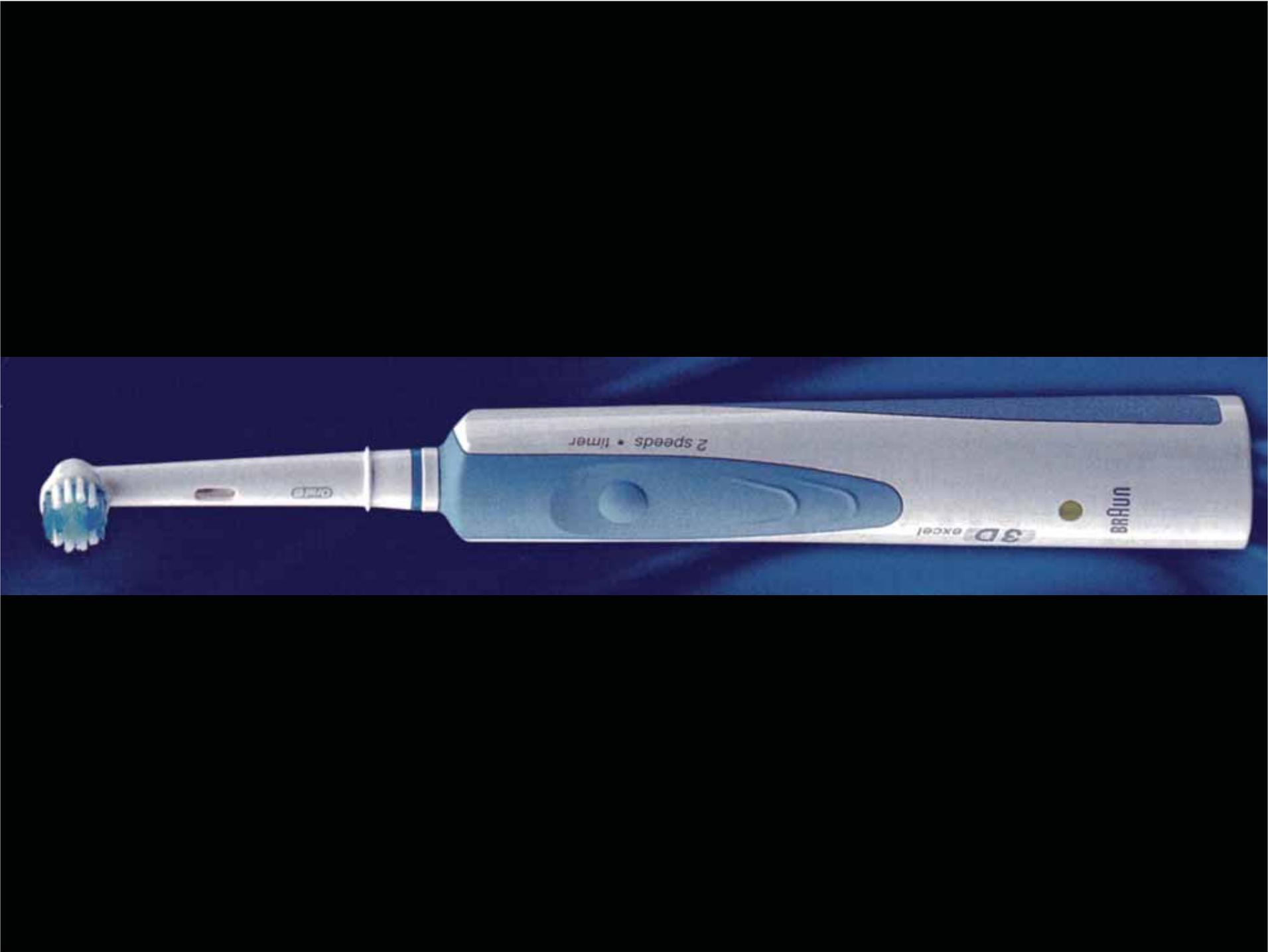




Comparative efficacy of a rotary and sonic powered toothbrush on improving gingival health in treated adult periodontitis patients.

- Patients in periodontal maintenance after surgical periodontal treatment, completed this study.
- A split mouth, blind, crossover design was utilized in this 12-week trial with each patient acting as his/her own control.
- After subjects alternately brushed one-half of their mouths with each of the instruments; a crossover in the brushing pattern occurred at 6 weeks, with no wash out period.
- The rotary instrument was significantly more effective ($P < 0.005$) than the sonic brush in removing plaque and reducing gingivitis in treated adult periodontitis patients.

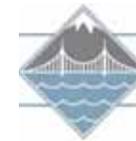






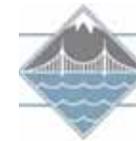
Benefit of the power component of sonic and rotation-oscillation moded of action for plaque removal using power toothbrushes.

- Each brush was tested with the power 'On' relative to a control of the same brush with the power 'Off' used like a manual toothbrush.
- Study 1 compared rotation-oscillation action (Oral-B Triumph with FlossAction brush head), and Study 2 compared sonic action (Sonicare FlexCare with ProResults standard brush head) with power on versus off.
- The two treatments in each study consisted of (1) brushing teeth per manufacturer's instructions of the power toothbrush and (2) brushing without power by using the power toothbrush like a manual toothbrush.
- Statistically significantly ($P < 0.0001$) greater plaque score reduction for the rotation-oscillation 'On' versus rotation-oscillation 'Off' treatment.
- Nonsignificant ($P = 0.426$) greater plaque score reduction for the difference between sonic 'On' versus sonic 'Off' regimen.



A randomized, parallel design study to evaluate the effects of a Sonicare and a manual toothbrush on plaque and gingivitis.

- Twice daily tooth brushing with the Sonicare Elite (Elite) and the Oral-B P40 manual toothbrush (MTB) on plaque accumulation and plaque-induced gingival inflammation.
- Both treatment groups demonstrated a significant reduction in number of bleeding sites relative to baseline ($p < 0.0001$); however, a significant difference in percent reduction in favor of Elite relative to MTB was found at week four: 82.5% vs. 75.8% ($p = 0.026$). Both toothbrushes were safe on oral tissues.
- Elite was significantly more effective than MTB in the reduction of plaque after two and four weeks of product use, and significantly more effective in the reduction of gingivitis and bleeding sites than MTB after four weeks.



Interproximal Aides



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Thornton

BRIDGE & IMPLANT
INTERDENTAL CLEANERS



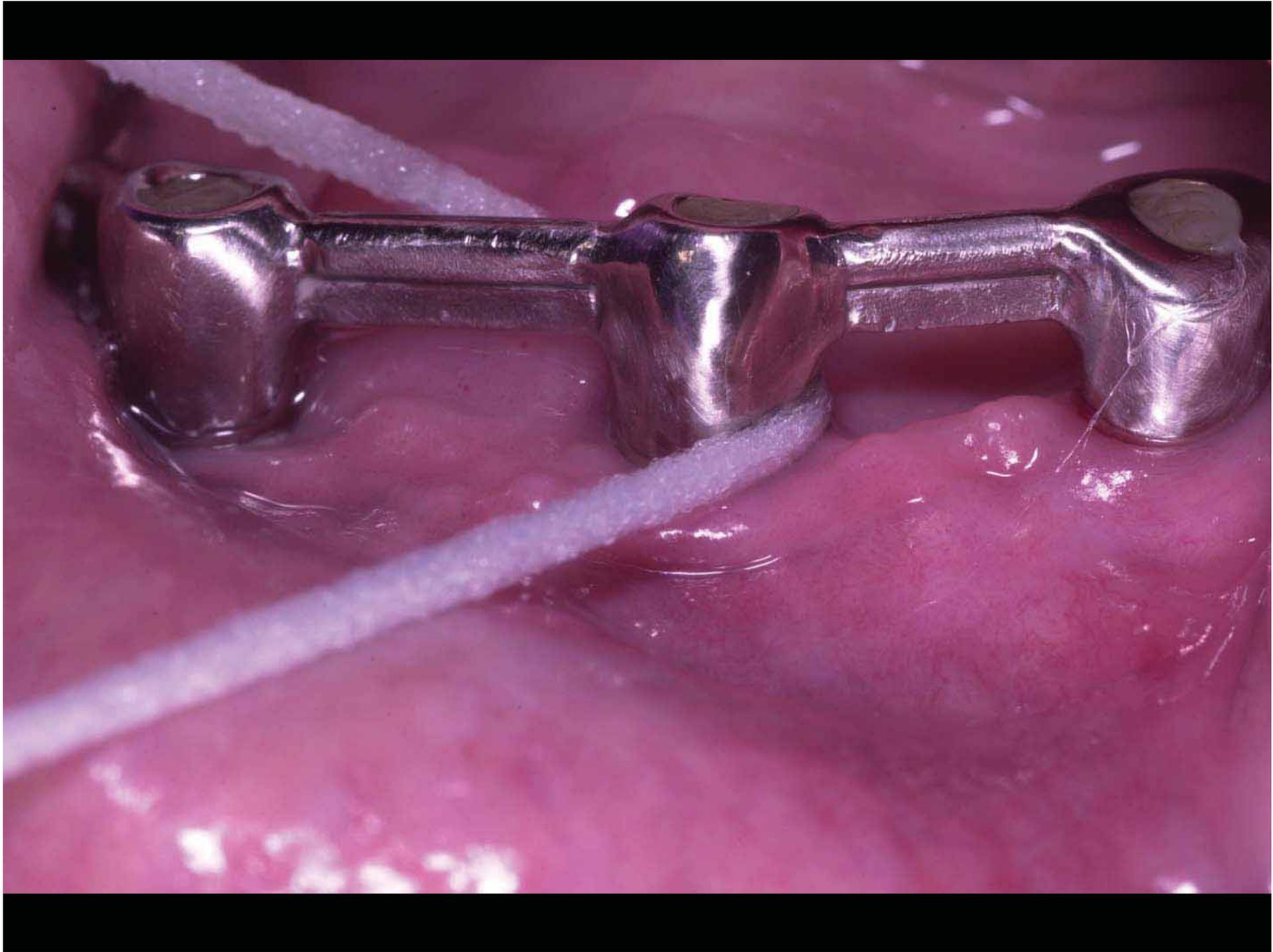
INTERDENTAL CLEANERS

2 1/2" Plastic Threader

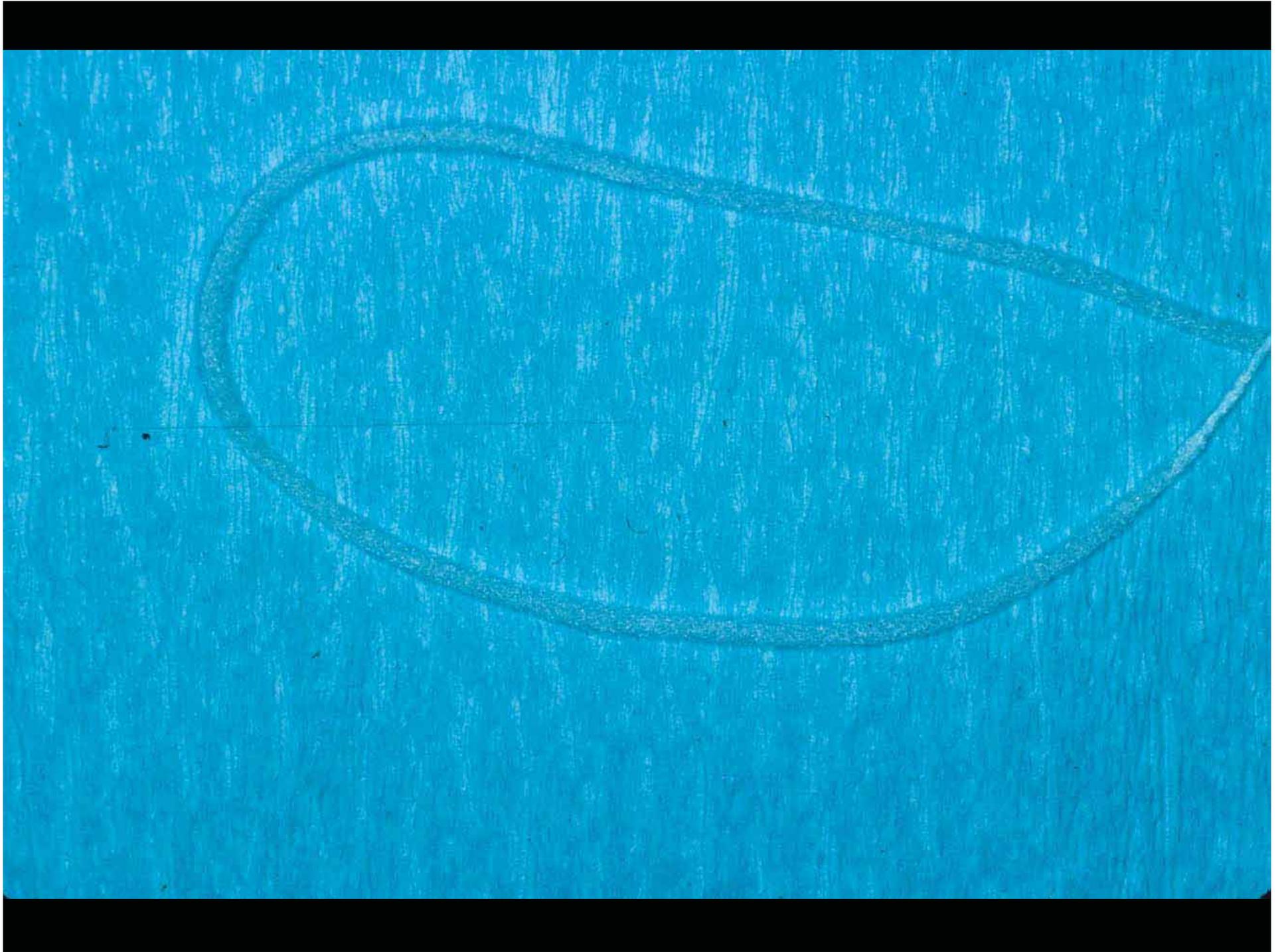
5" Spongy Filament Brush

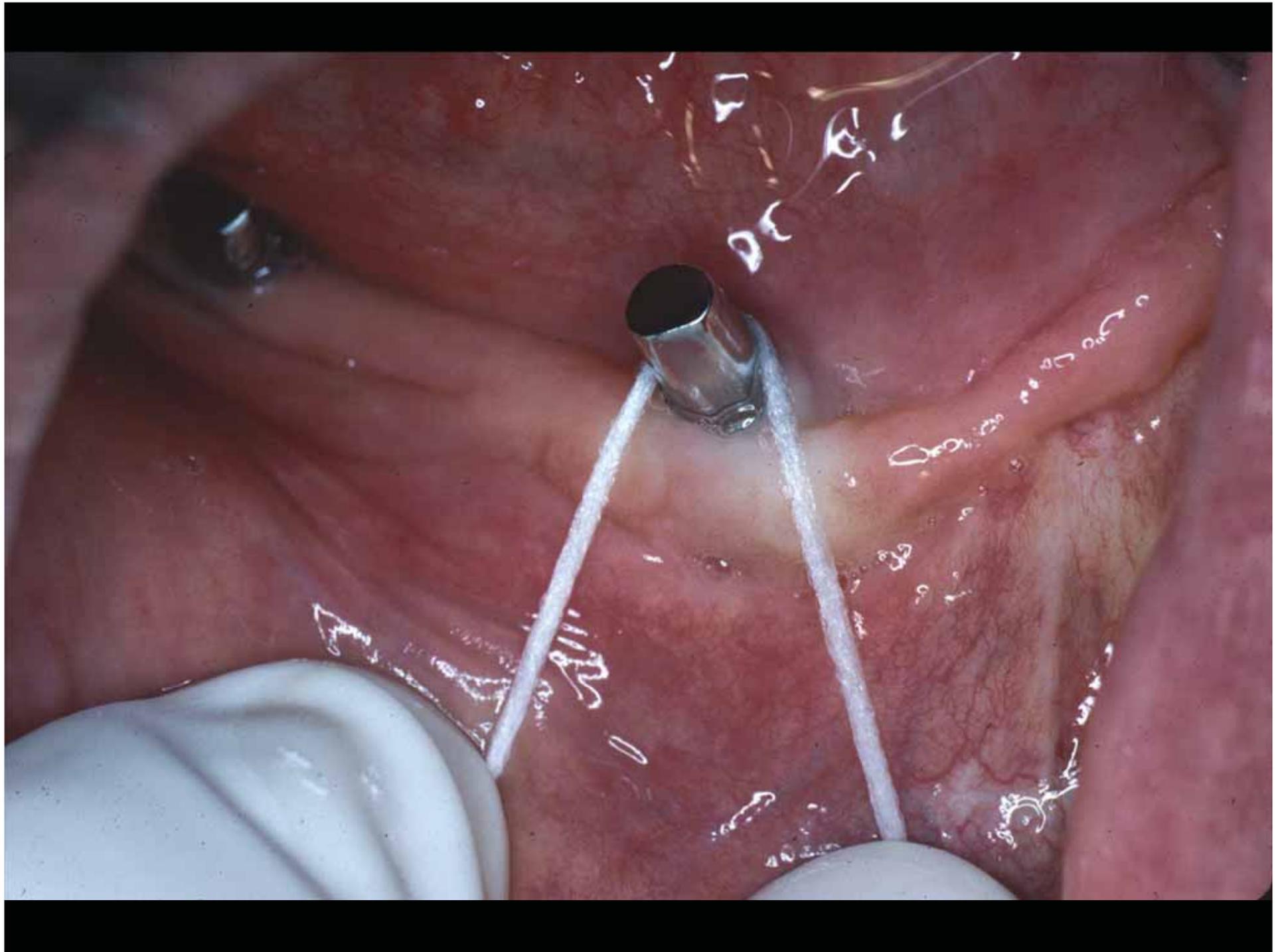
25.4 cm / 1.0 inches total length





Super
Floss®





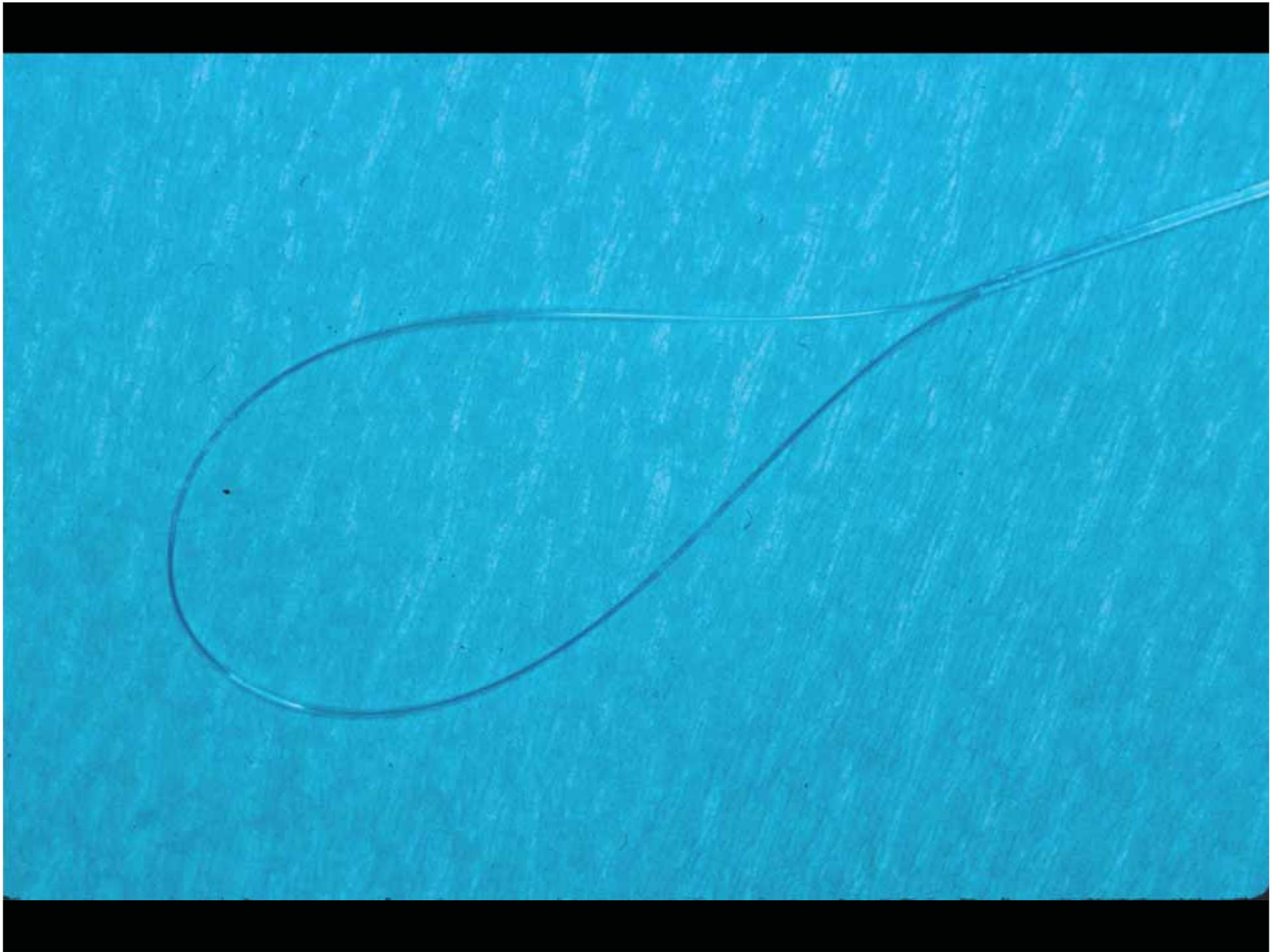


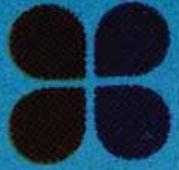
BUTLER



FLOSS THREADERS

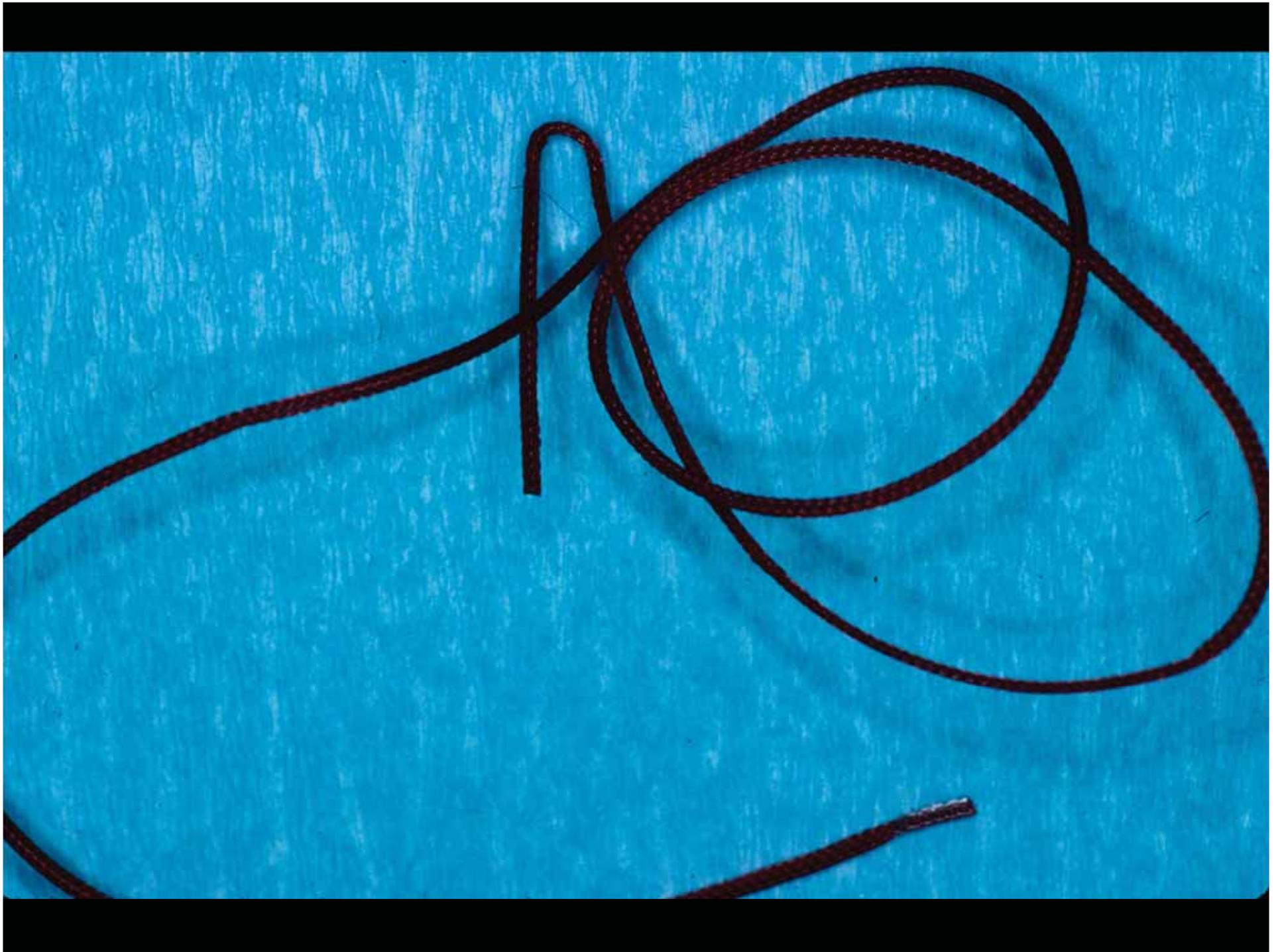
The **BUTLER G-U-M** Floss Threader is

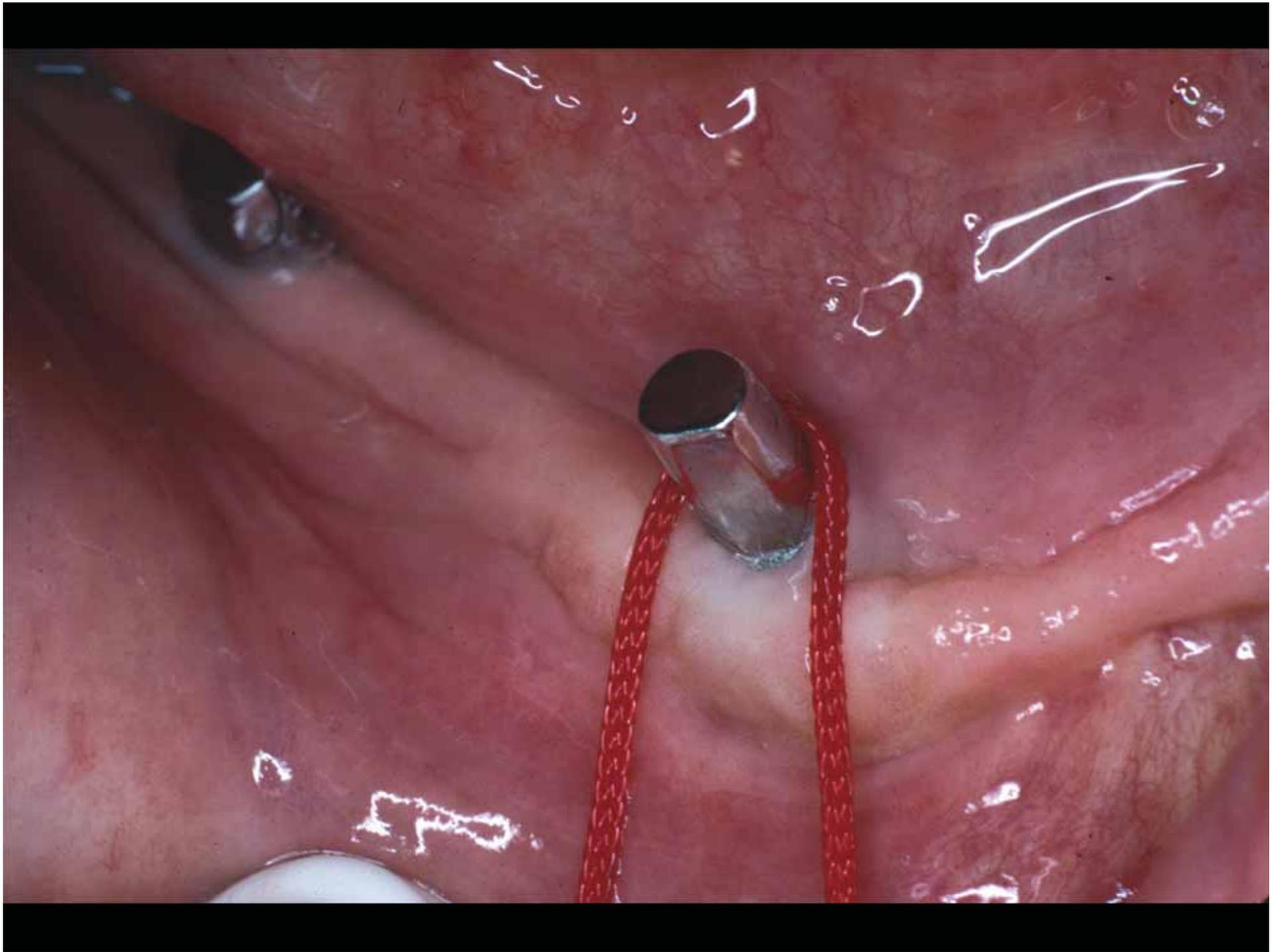


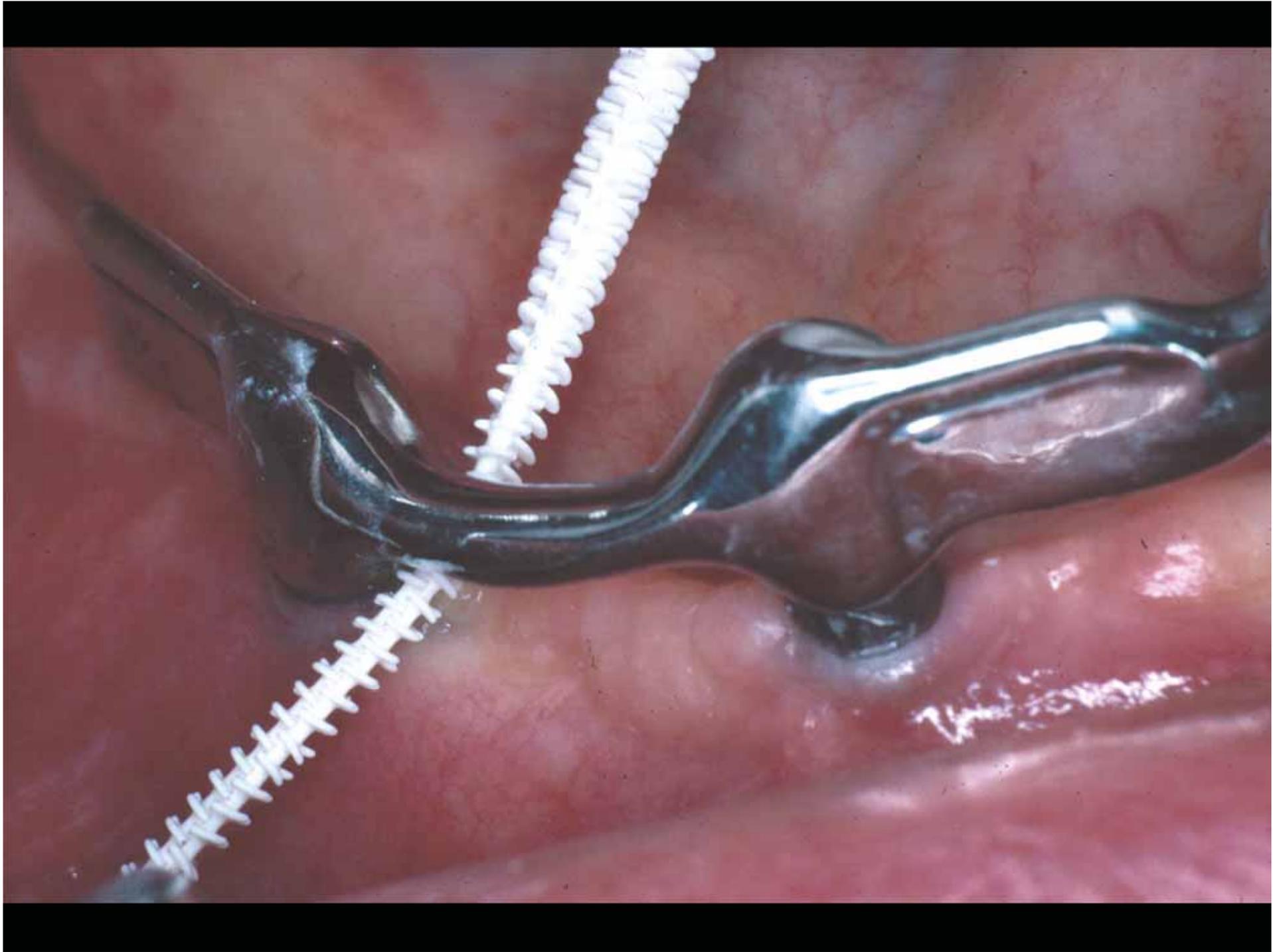
Butler  [®]

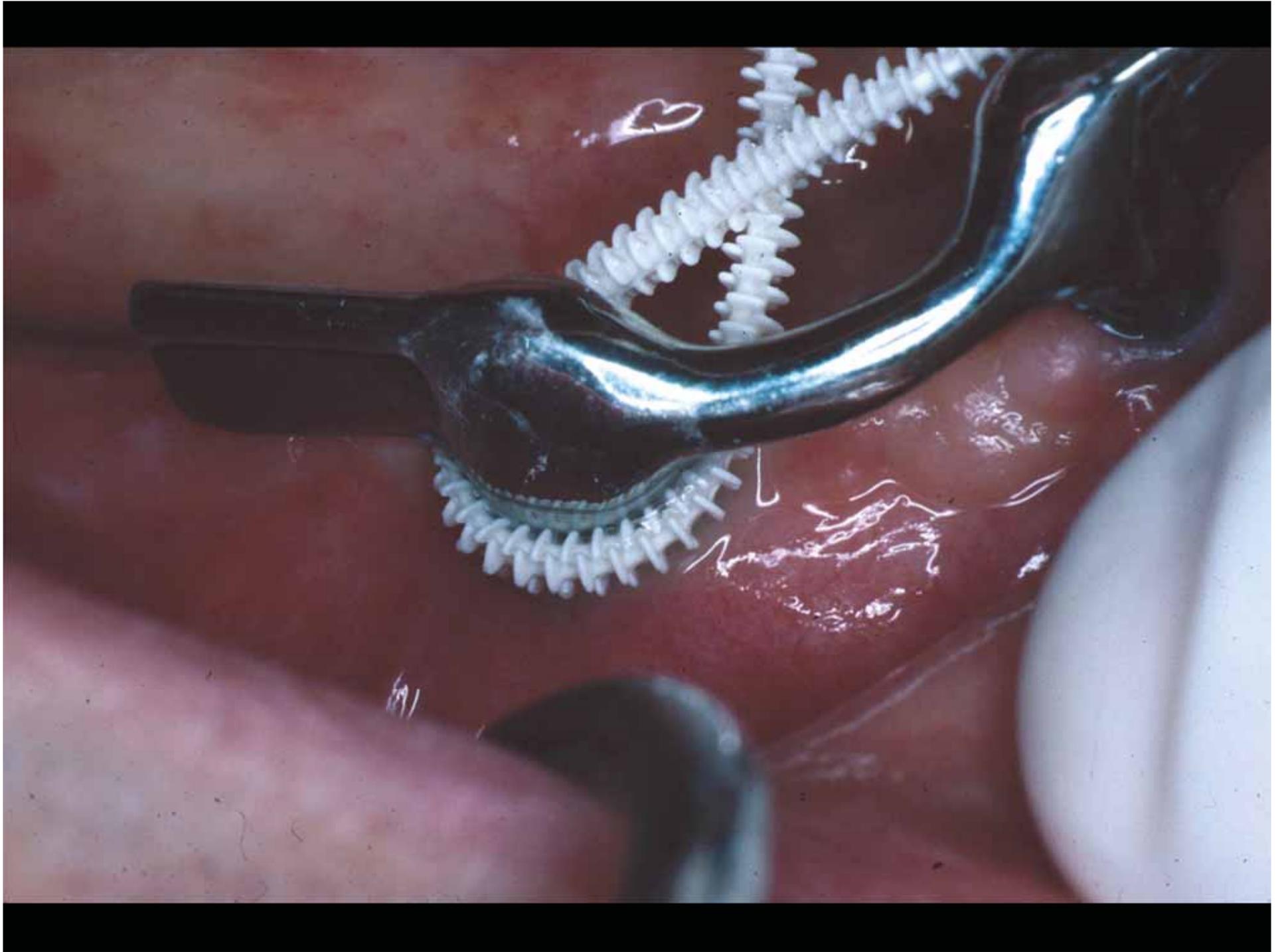
POSTCARE TM

*A Flossing Aid For
Dental Implants*

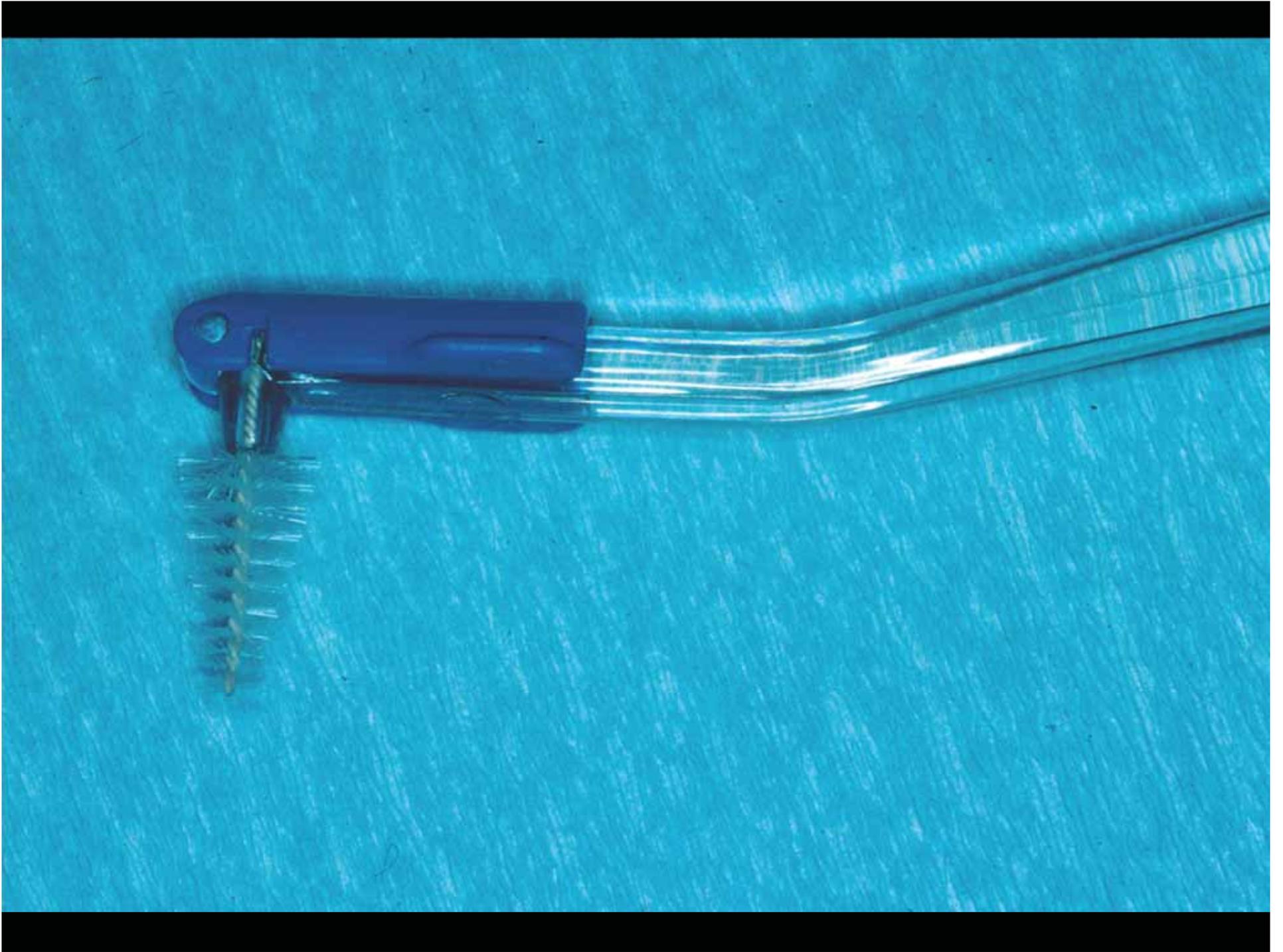


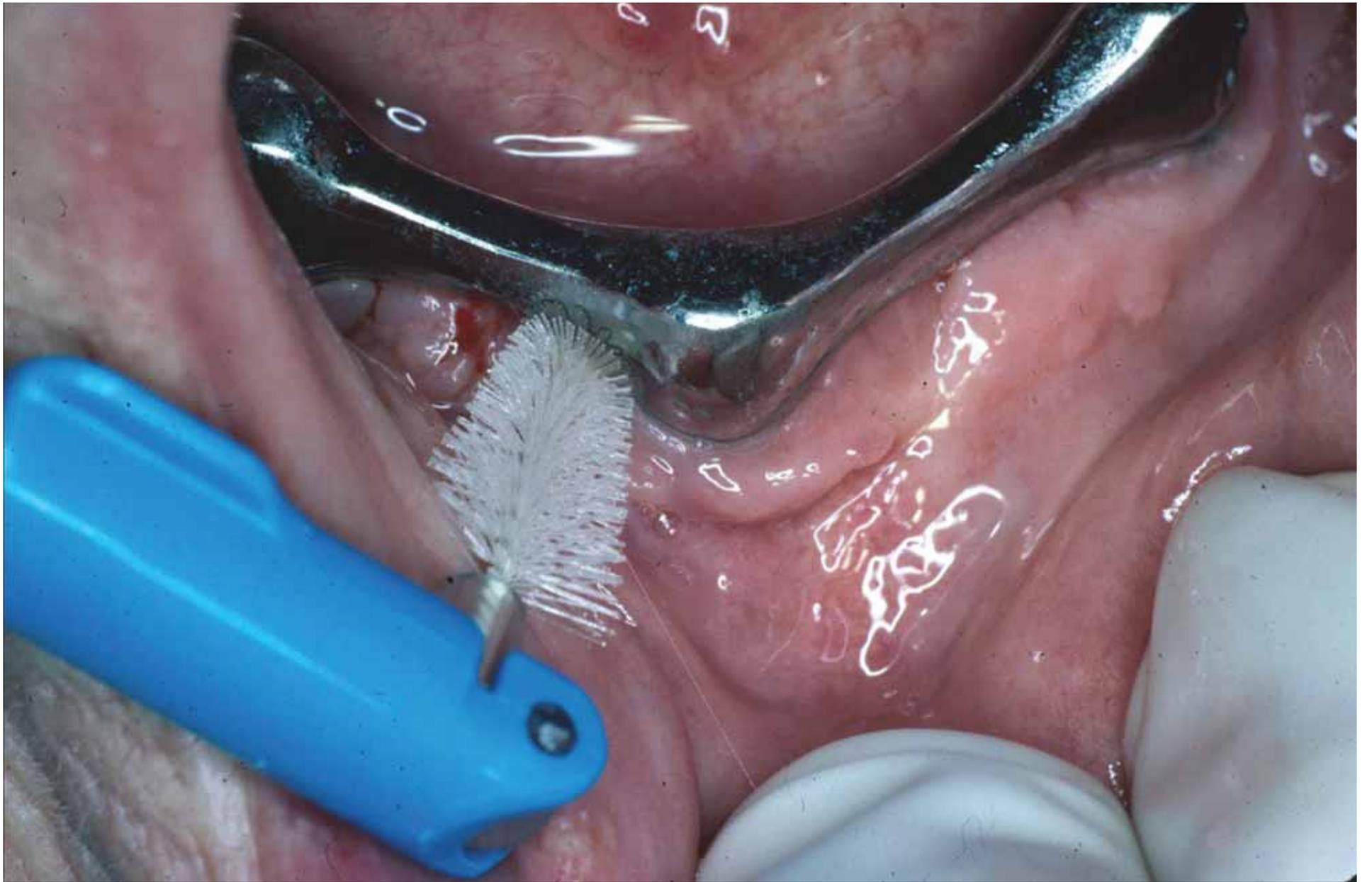


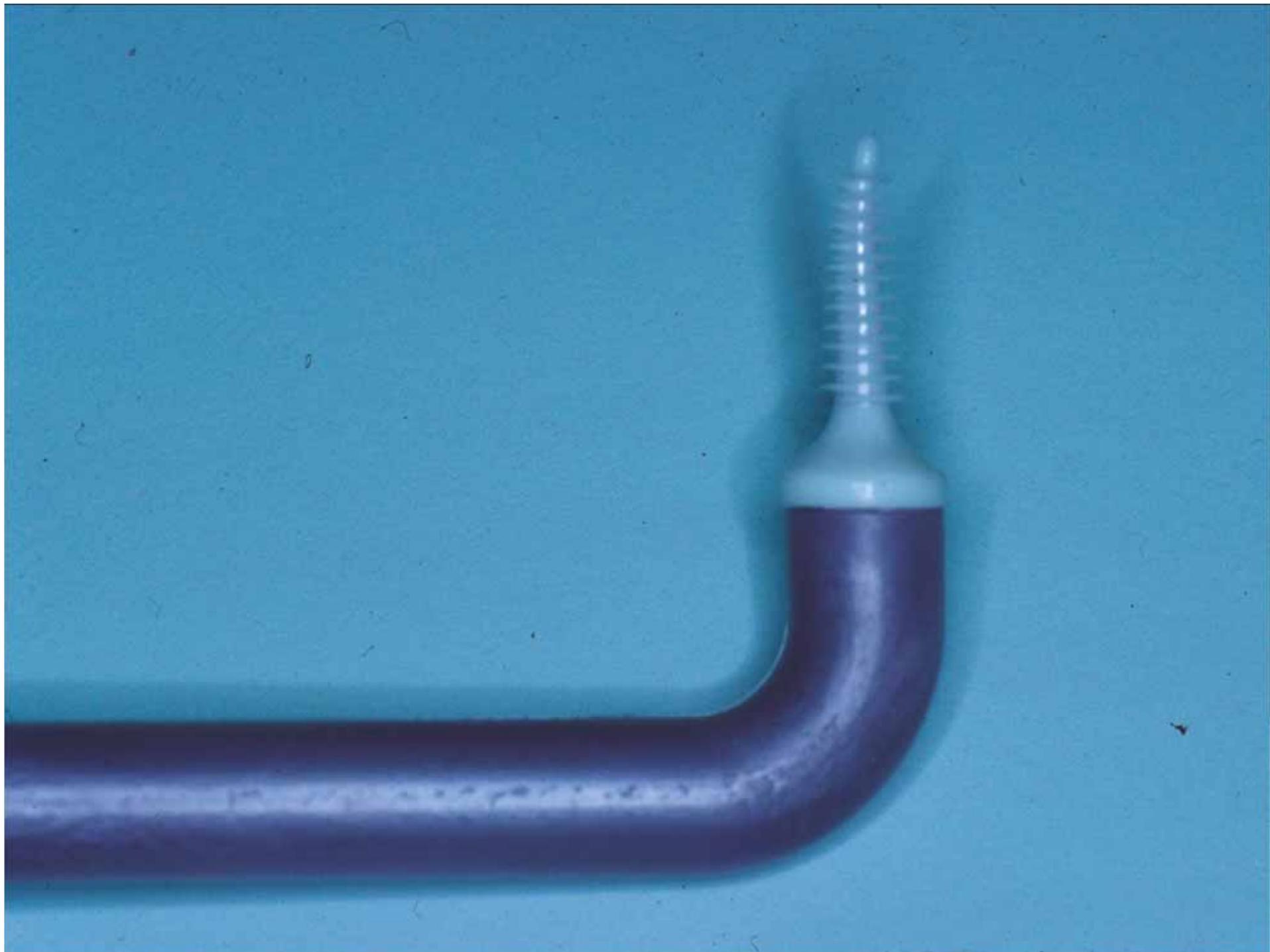


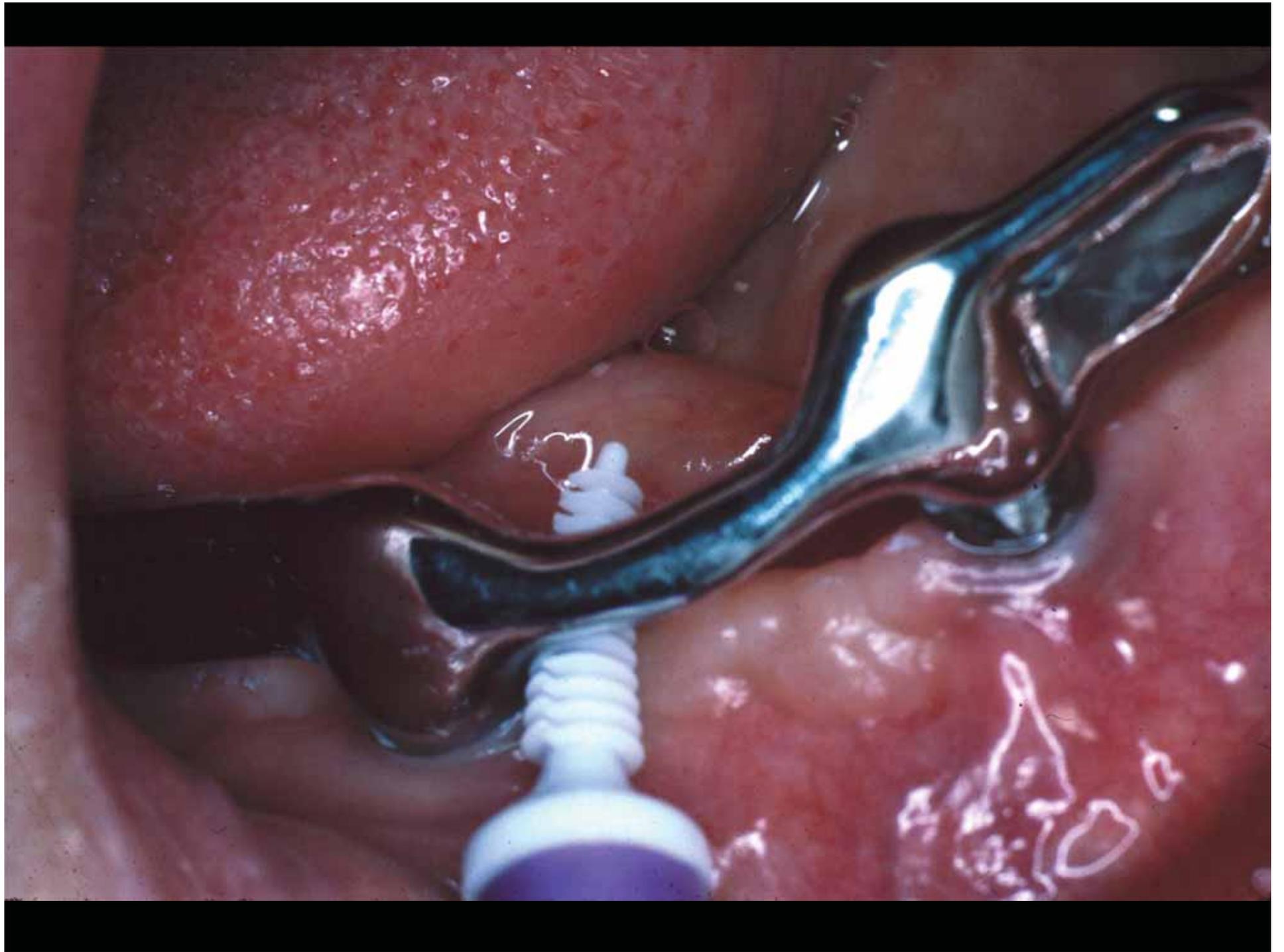




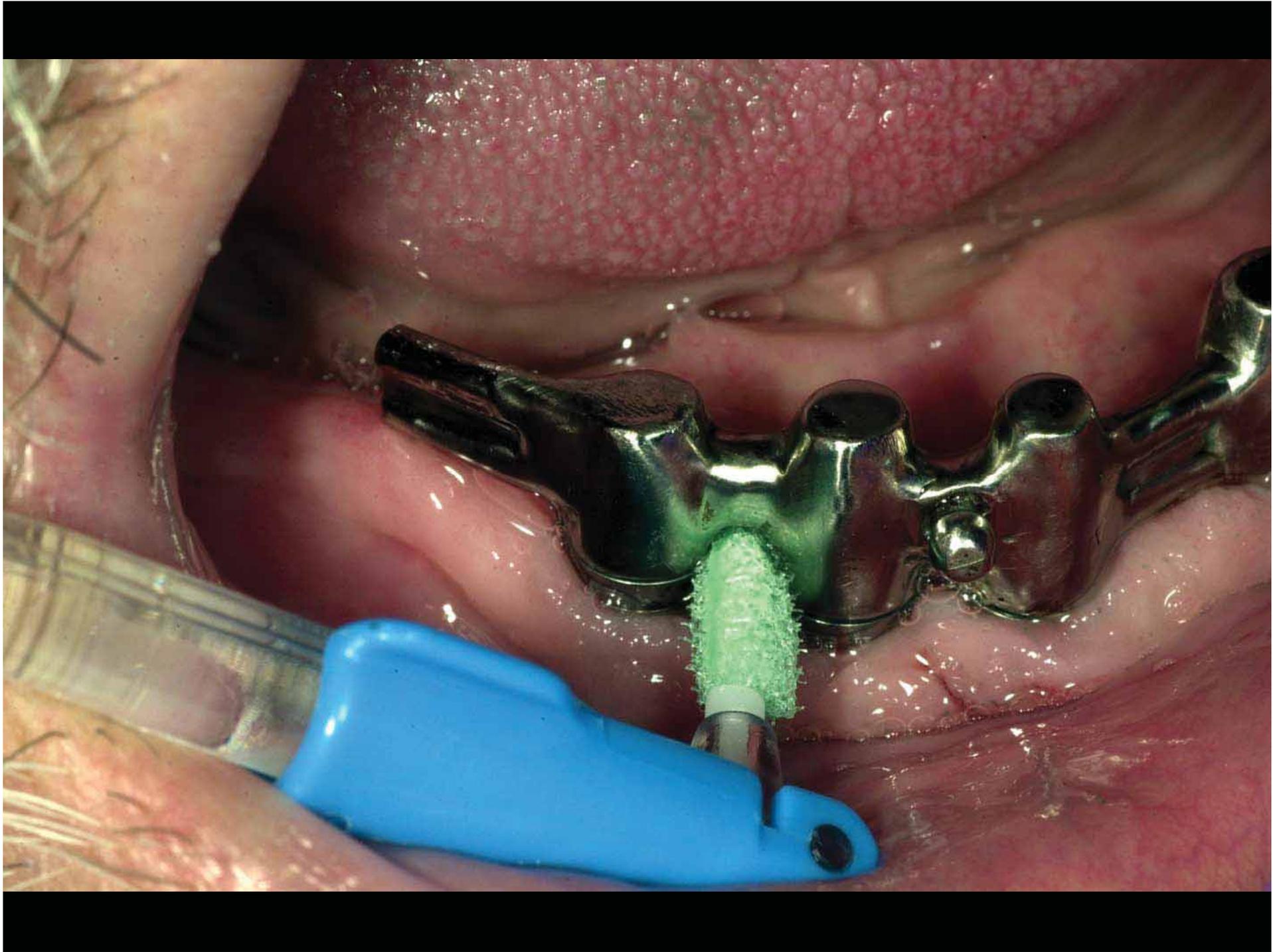




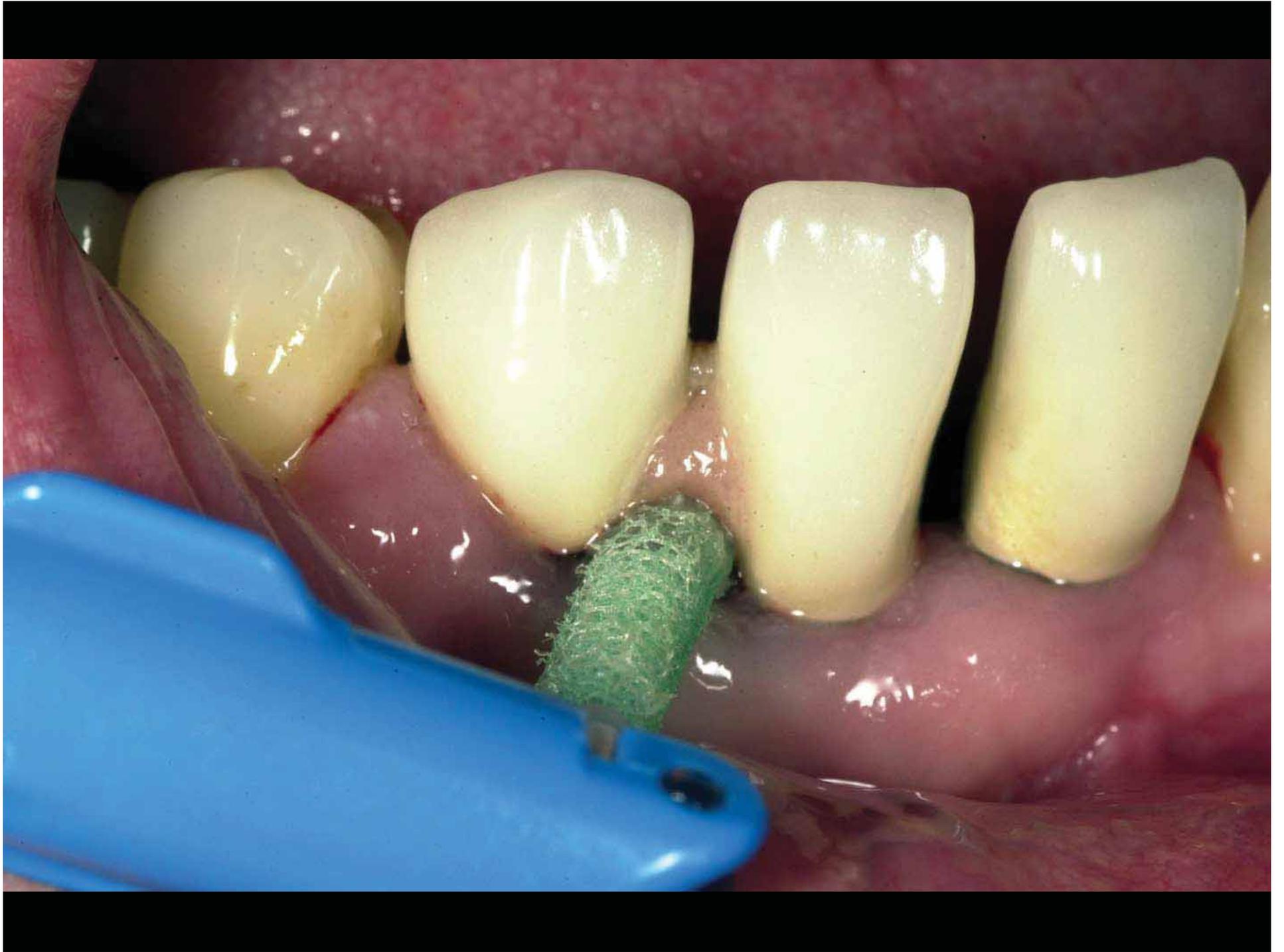














Interproximal gingivitis and plaque reduction by four interdental products.

- Plaque, Gingivitis, and Eastman Interdental Bleeding Indices (EIBI) compared with one of four products (Glide dental floss, Butler flossers, GUM Go-Betweens cleaners, and GUM Soft-Picks cleaners)
- Plaque was assessed at the final visit before and after using the assigned products. Plaque, gingivitis, and bleeding scores were evaluated by analysis of covariance using the baseline measurements as the covariate.
- In this study, dental floss, the recognized "gold standard" for gingivitis reduction, was matched in performance by flossers and an interdental cleaner with small elastomeric fingers, and surpassed by an interdental brush. All products performed comparably for plaque reduction and removal.



Water pik and Dental Implants?



Periodontal Associates
Dr. Thomas Eshraghi and Dr. Bradley McAllister

Quintessence Int. 2015 Feb;46(2):133-7.

Water jet with adjunct chlorhexidine gel for nonsurgical treatment of peri-implantitis.

Levin L, Frankenthal S, Joseph L, Rozitsky D, Levi G, Machtei EE.

OBJECTIVES:

The aim of this study was to evaluate the adjunctive effect of a dental water jet rinse mixed with chlorhexidine gel to the nonsurgical treatment for peri-implantitis.

RESULTS:

In total, 39 patients completed the study and were available for final examination. Three months following baseline visit the test group exhibited greater mean probing depth reduction (0.75 mm vs 0.27 mm; $P = .029$) as well as greater reduction in the number of sites presenting with bleeding on probing (2.26 vs 0.45 sites; $P = .011$). No significant change in bone level was observed at 3 months (mean bone gain was 0.18 mm).

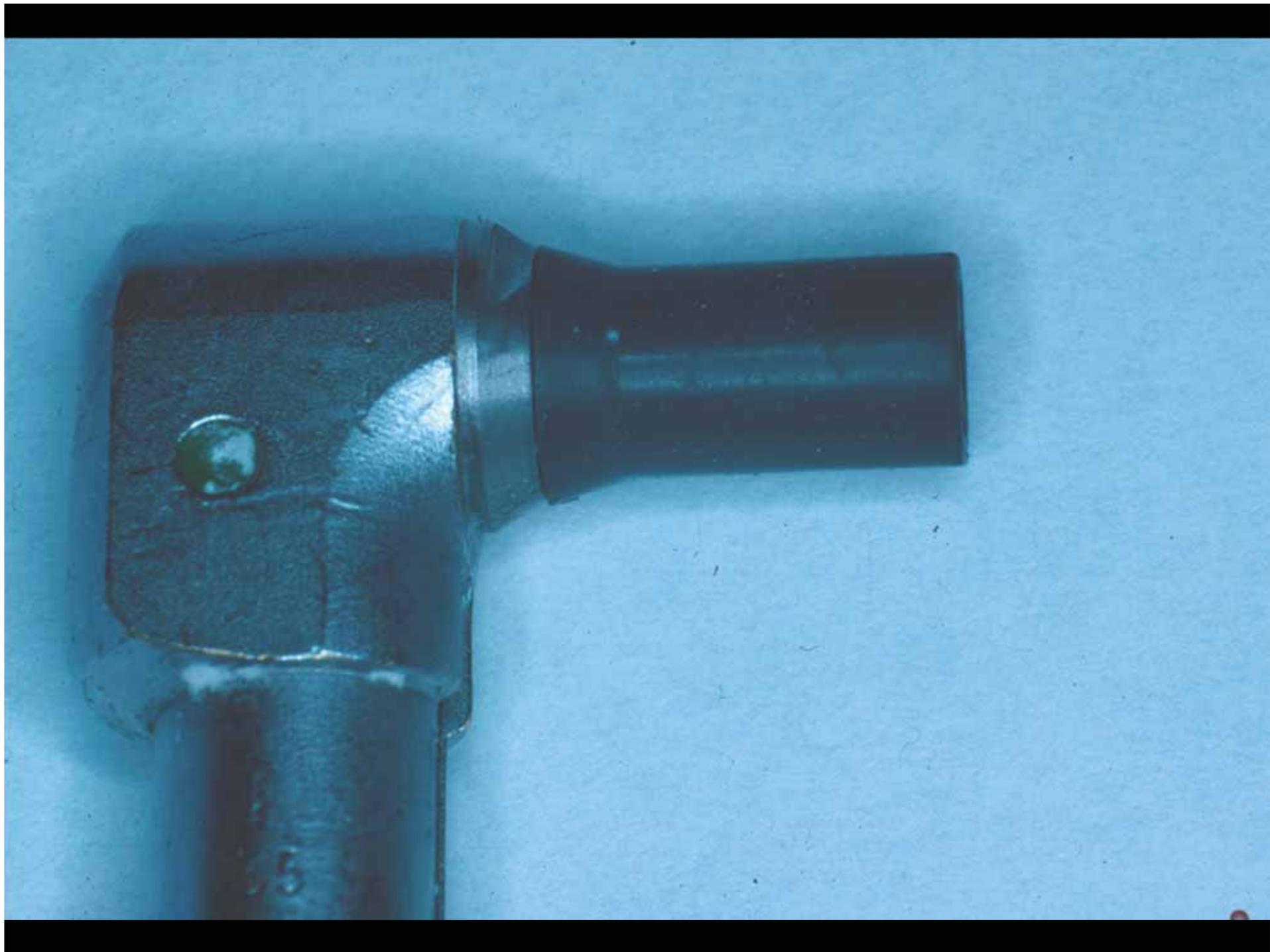
CONCLUSIONS:

Water jet mixed with chlorhexidine gel might supplement the response to nonsurgical treatment for peri-implantitis lesions. Further, larger-cohort studies are warranted.

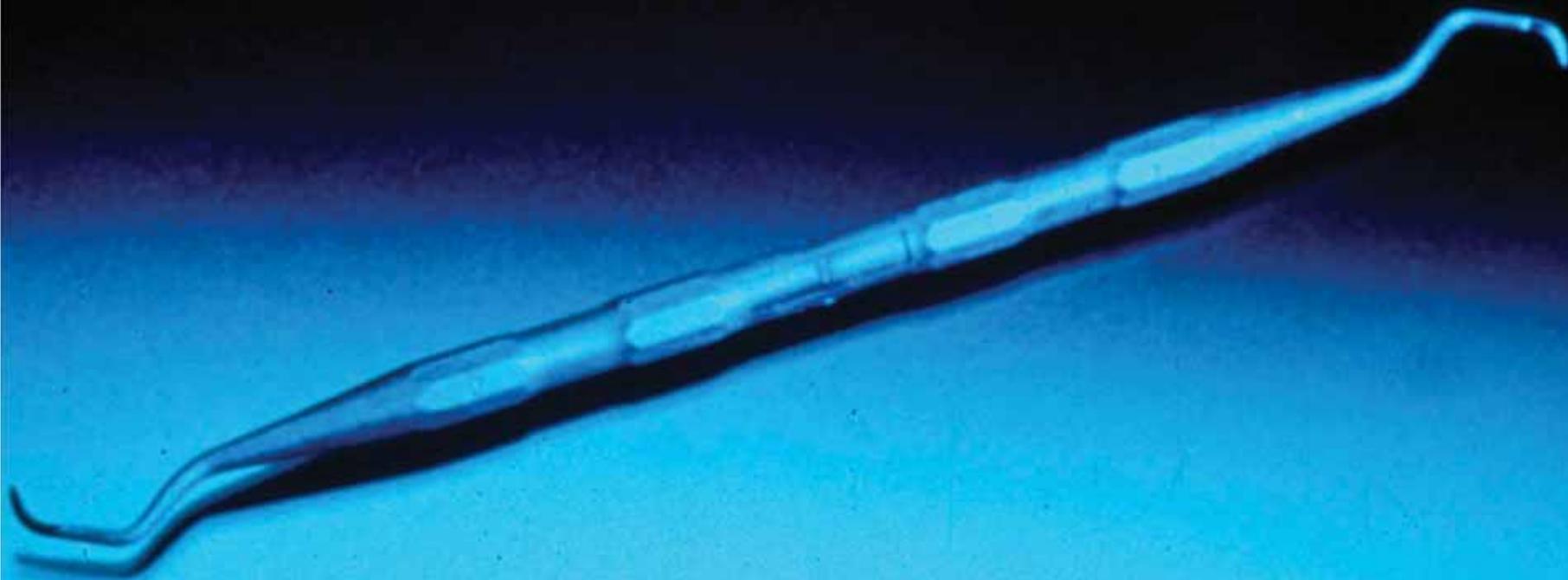
Implant Recall Cleanings

- Treat as you would a natural tooth without cavitron and light scaler use.
- With heavy deposits use special scalers.
- Use a 3 month interval for 1 yr then return to regular frequency of 3-6 months if stable.
- If problems persist, consider referral for 3D imaging and treatment.





The Implant-Prophy+
PLASTIC DENTAL INSTRUMENT SYSTEM



COORDINATED SET OF 4 POPULAR SCALERS



**COL
13/14U**



**GR
5/6**



**GR
11/12**



**GR
13/14**

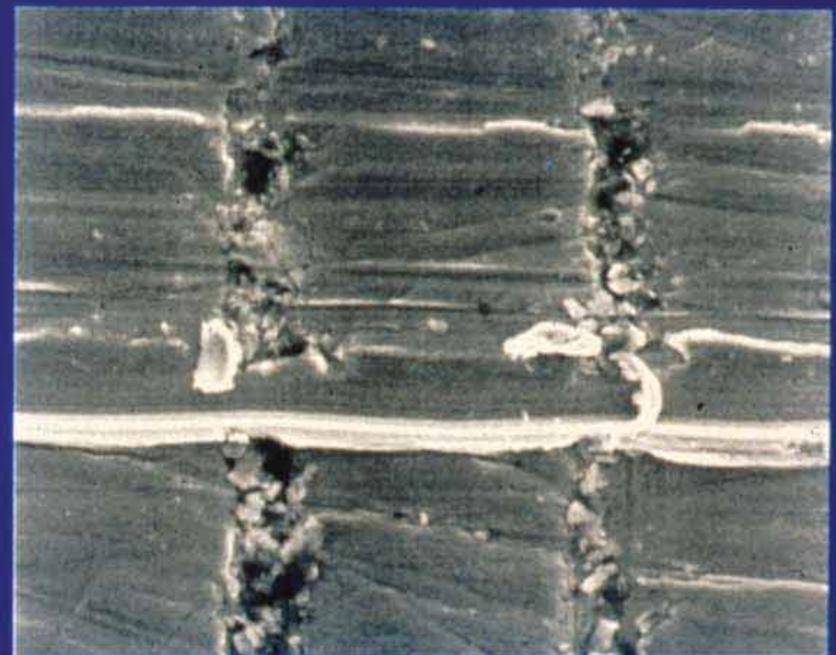
SAFE FOR IMPLANTS
—USES NO REINFORCING FIBERS



SEM PHOTOS SHOW THAT COMPOSITE INSTRUMENT CAN ALTER ABUTMENT SURFACE

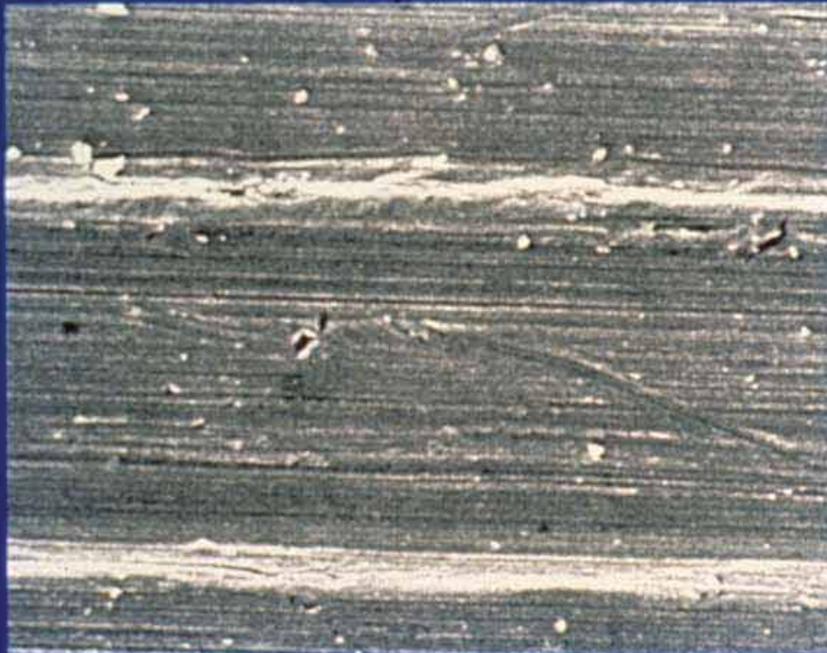


**AFTER 30 WORKING STROKES
WITH STAINLESS STEEL
INSTRUMENT AT X2000**



**AFTER 30 WORKING STROKES
WITH GRAPHITE COMPOSITE
INSTRUMENT AT X2000**

**SEM PHOTOS SHOW Implant-Prophy+ INSTRUMENTS
PRODUCE NO VISIBLE EFFECT ON ABUTMENT SURFACE**



CONTROL AT X2000



**AFTER 30 WORKING STROKES
WITH Implant-Prophy+
INSTRUMENT AT X2000**

The Implant-Prophy+
PLASTIC DENTAL INSTRUMENT SYSTEM

can be ordered from:

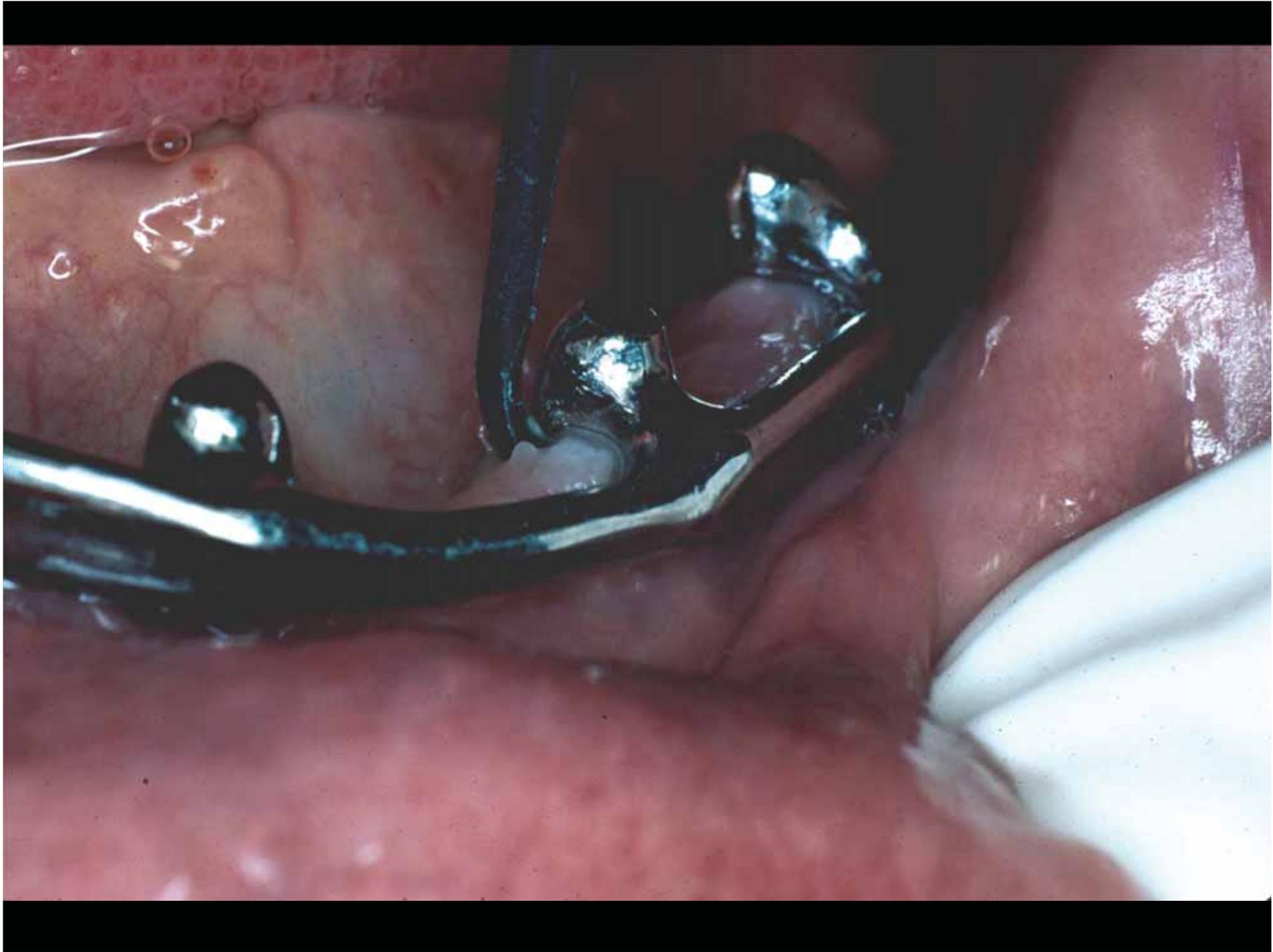
ADVANCED IMPLANT TECHNOLOGIES, INC.

by calling:

1-800-876-4620





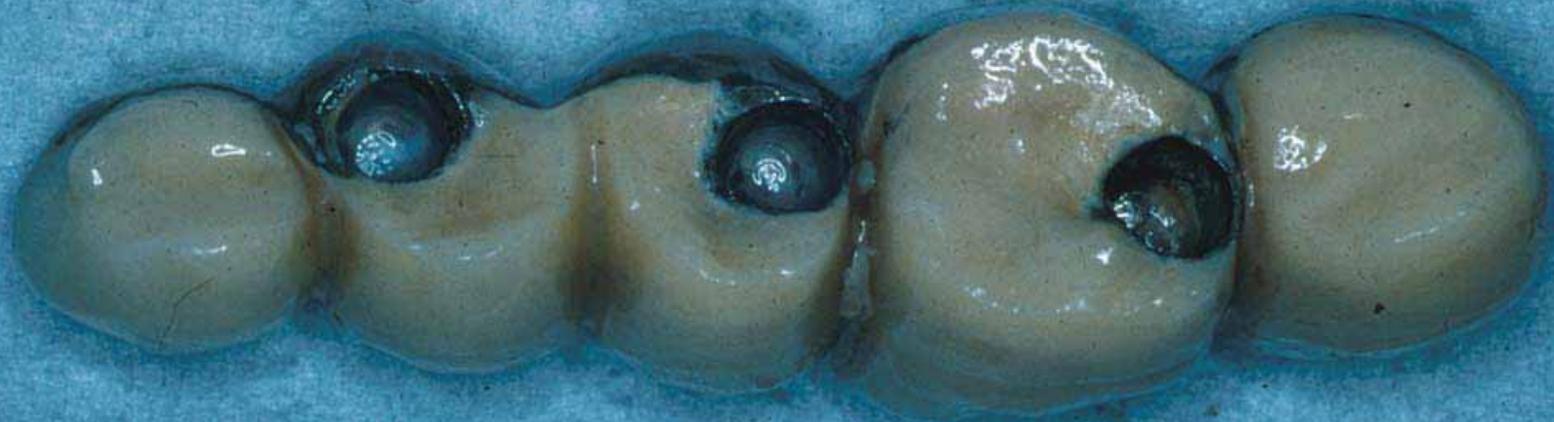


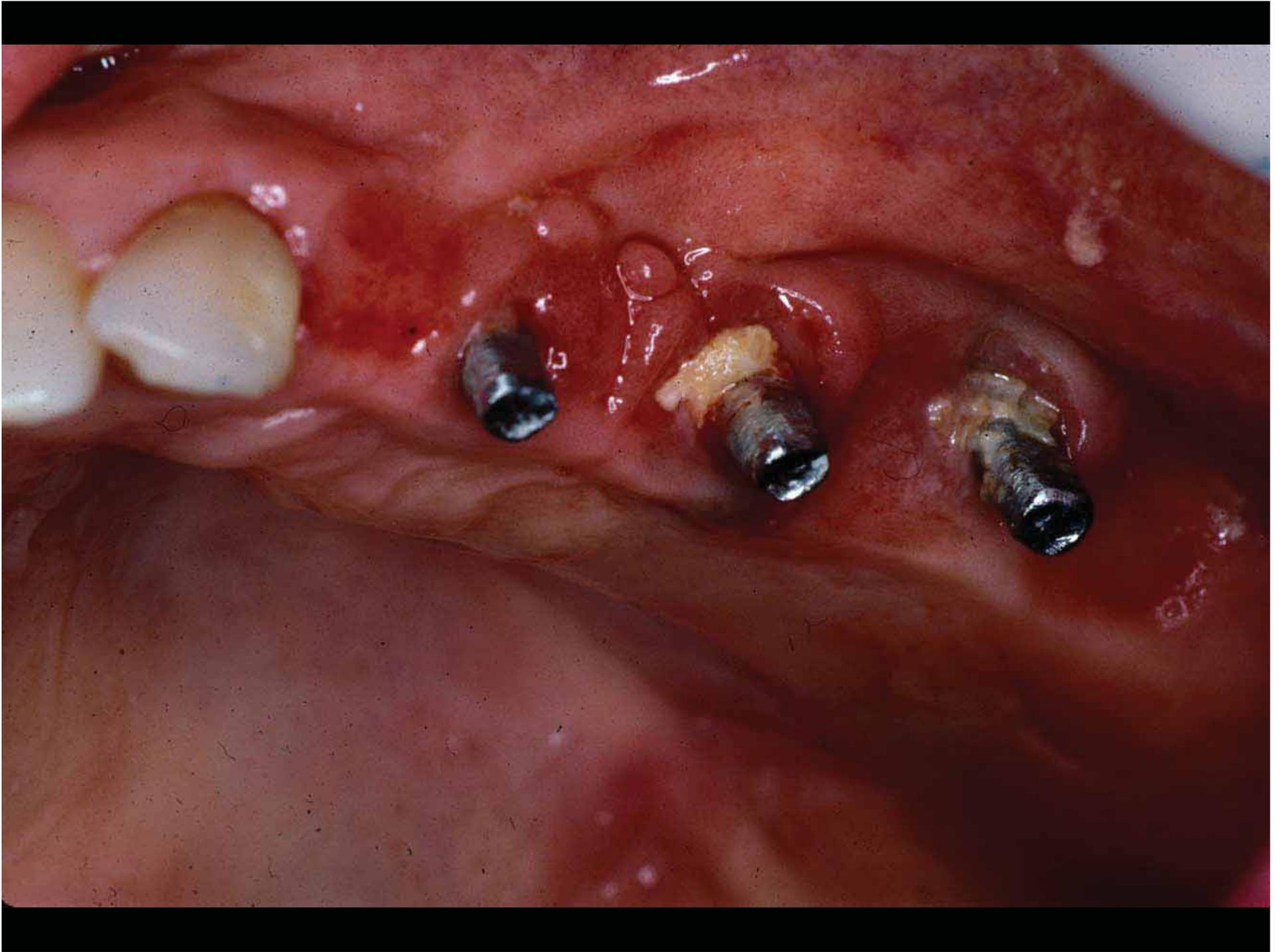
Cleansible Restoration (best prevention!)

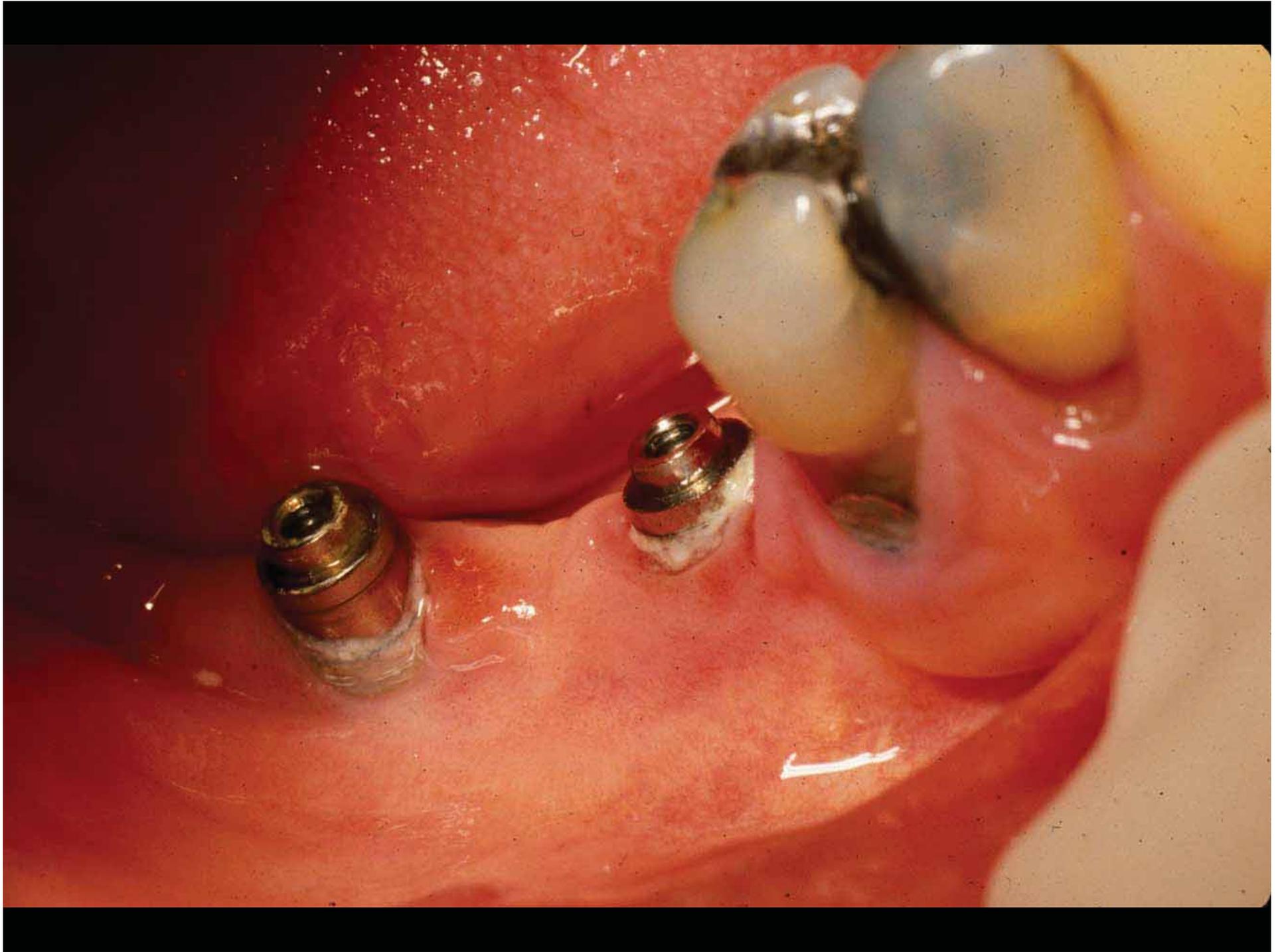
Make sure the restoration is cleansible by
the patient and the hygienist



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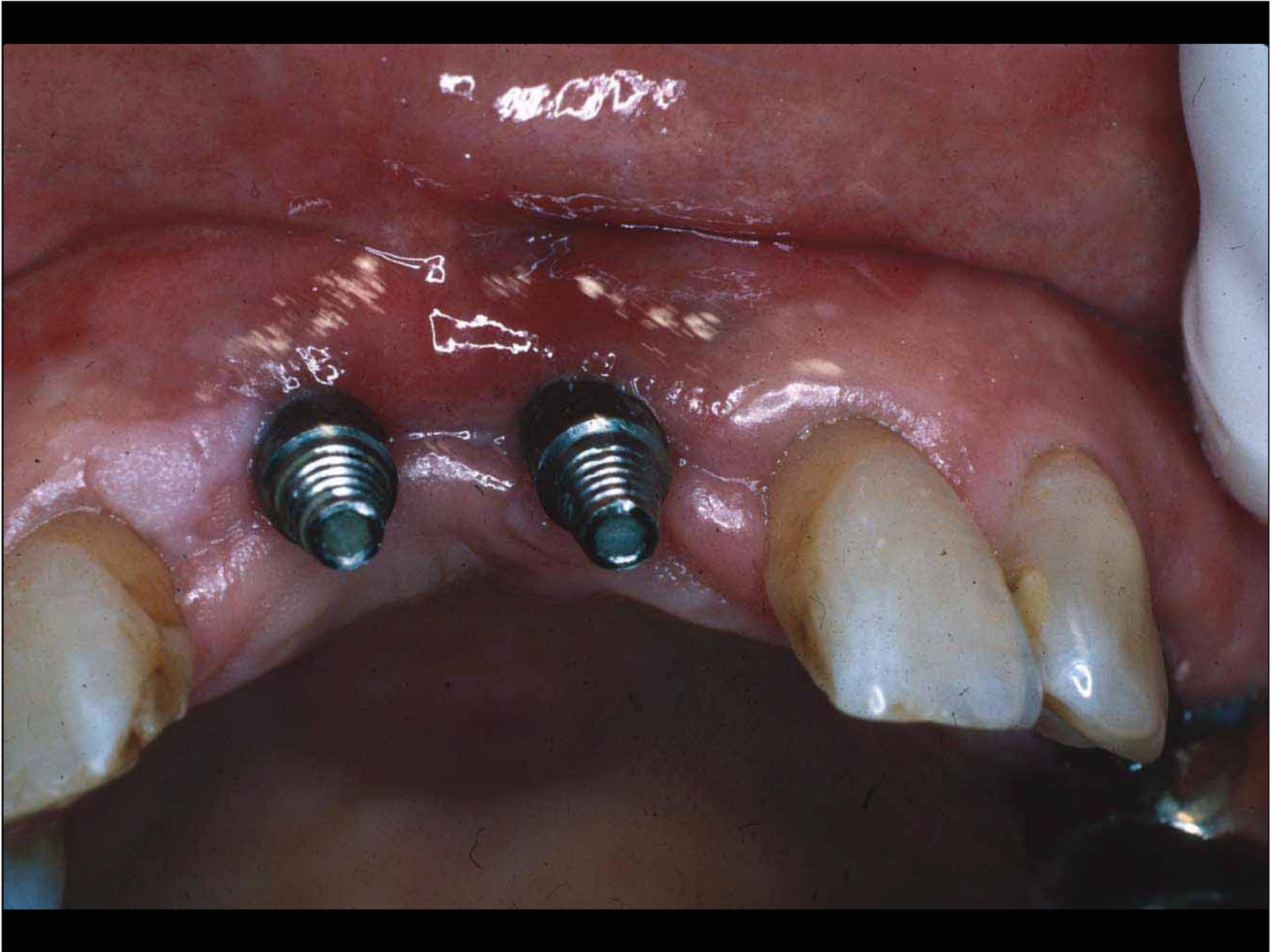


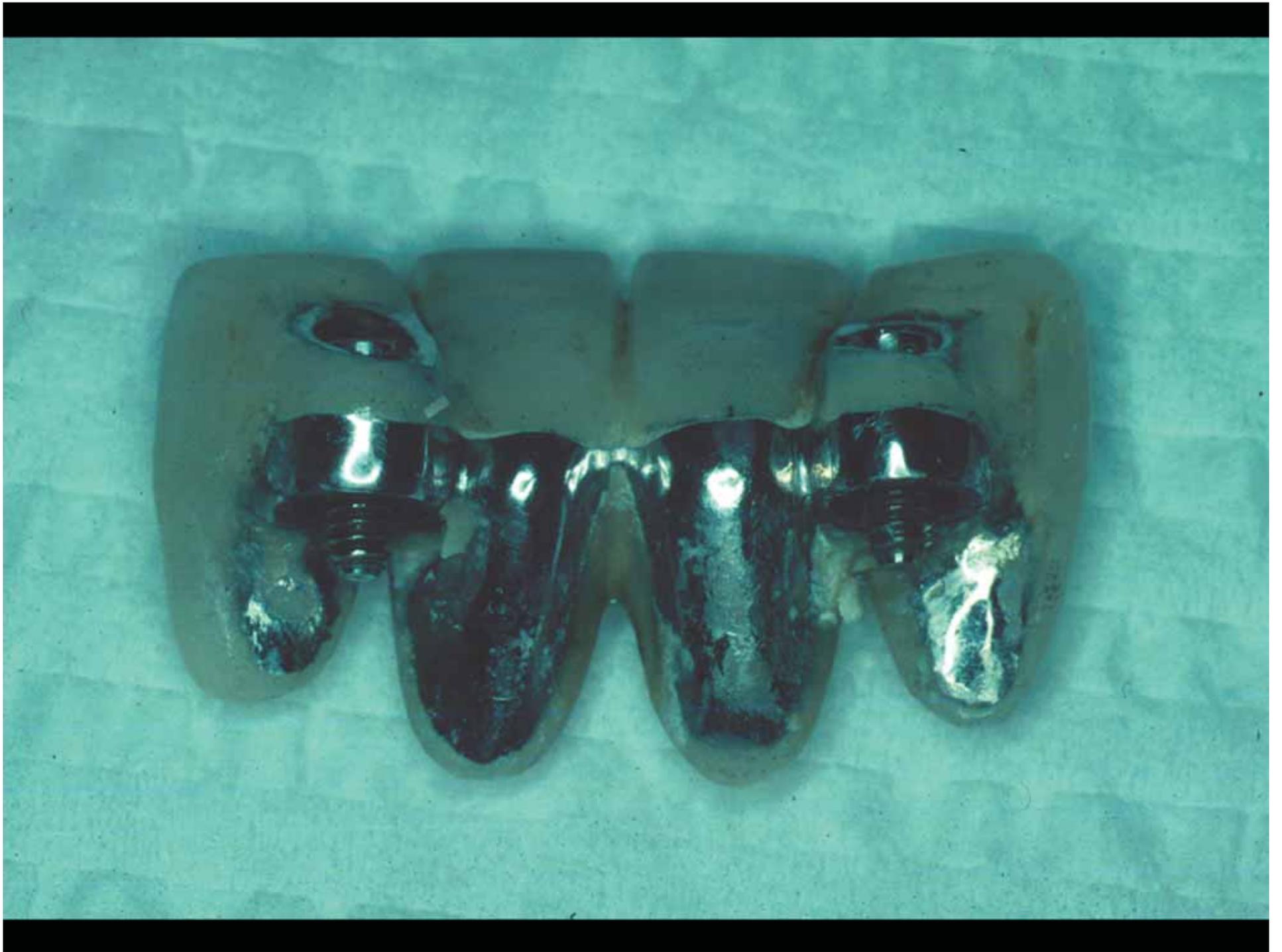


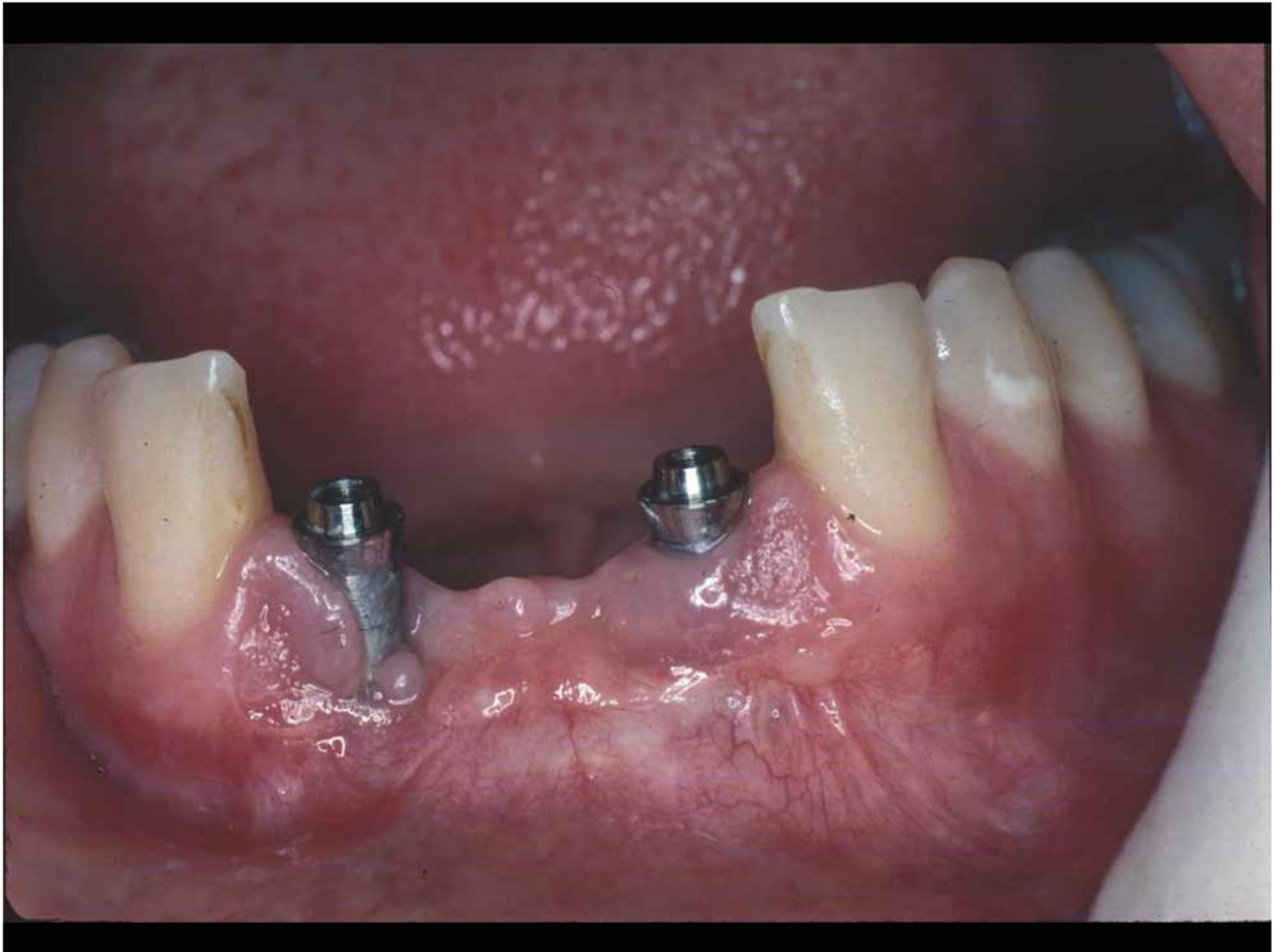










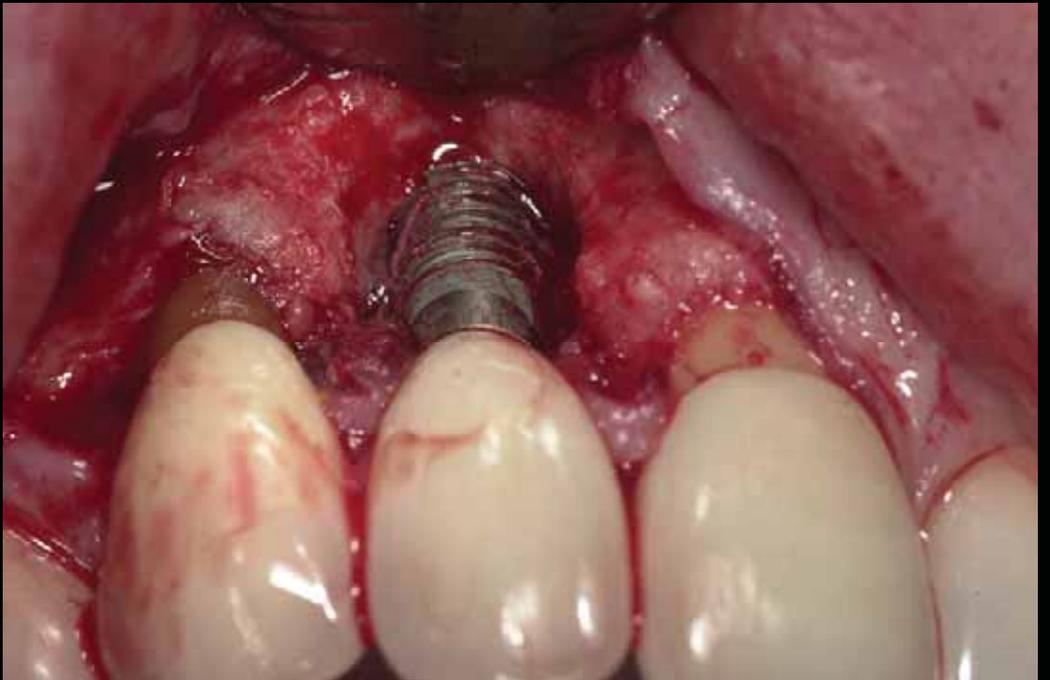


Residual Cement (my # cause of failure)

After cementation of the restoration make sure no cement remains in the sulcus.



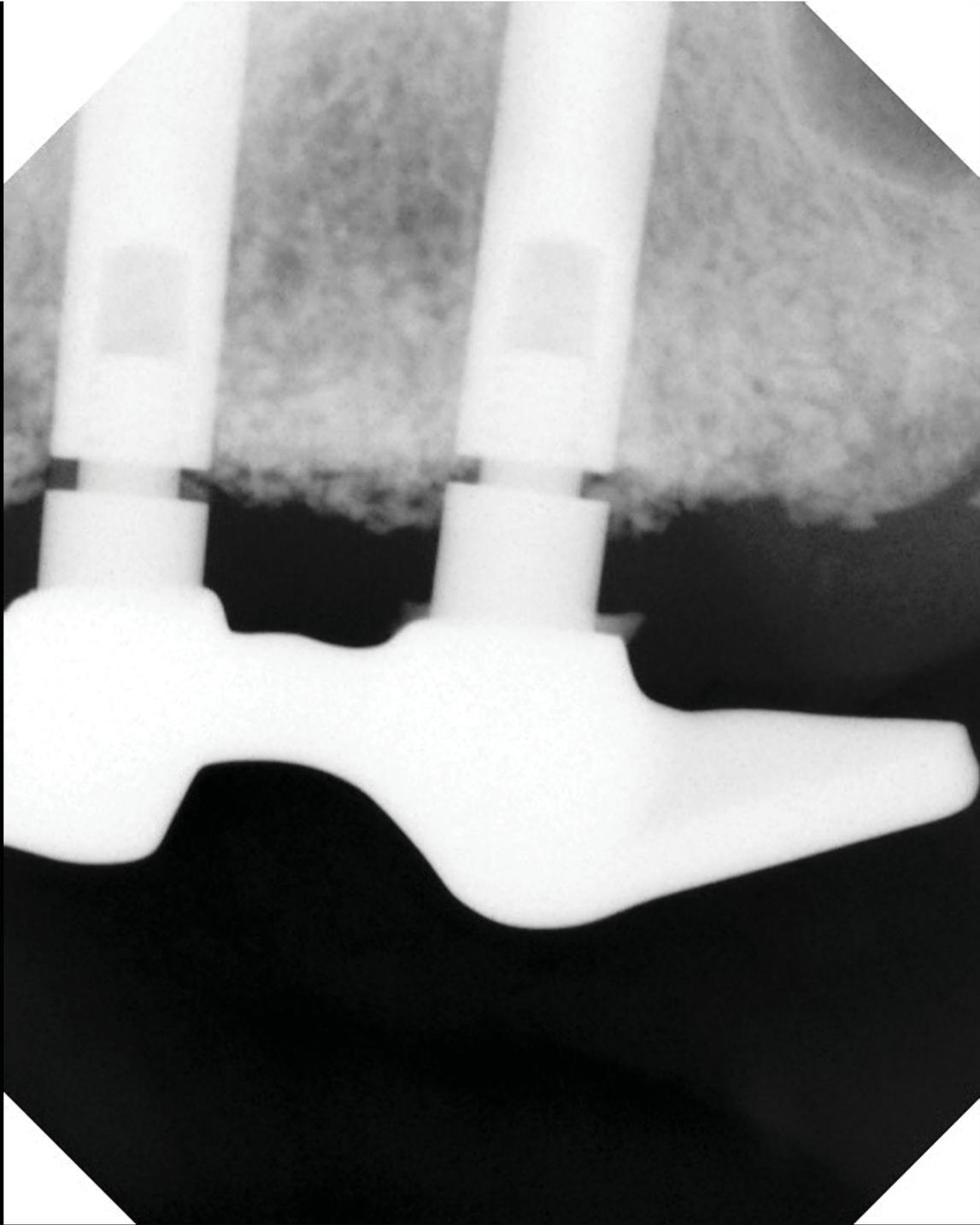




Restoration Fit

After seating the restoration make sure the components are seated properly by taking a radiograph.







Is Keratinized Tissue Necessary Around Dental Implants?

Evans, Vastardis (2003) WSP
Periodontal Abstracts 51:37-40



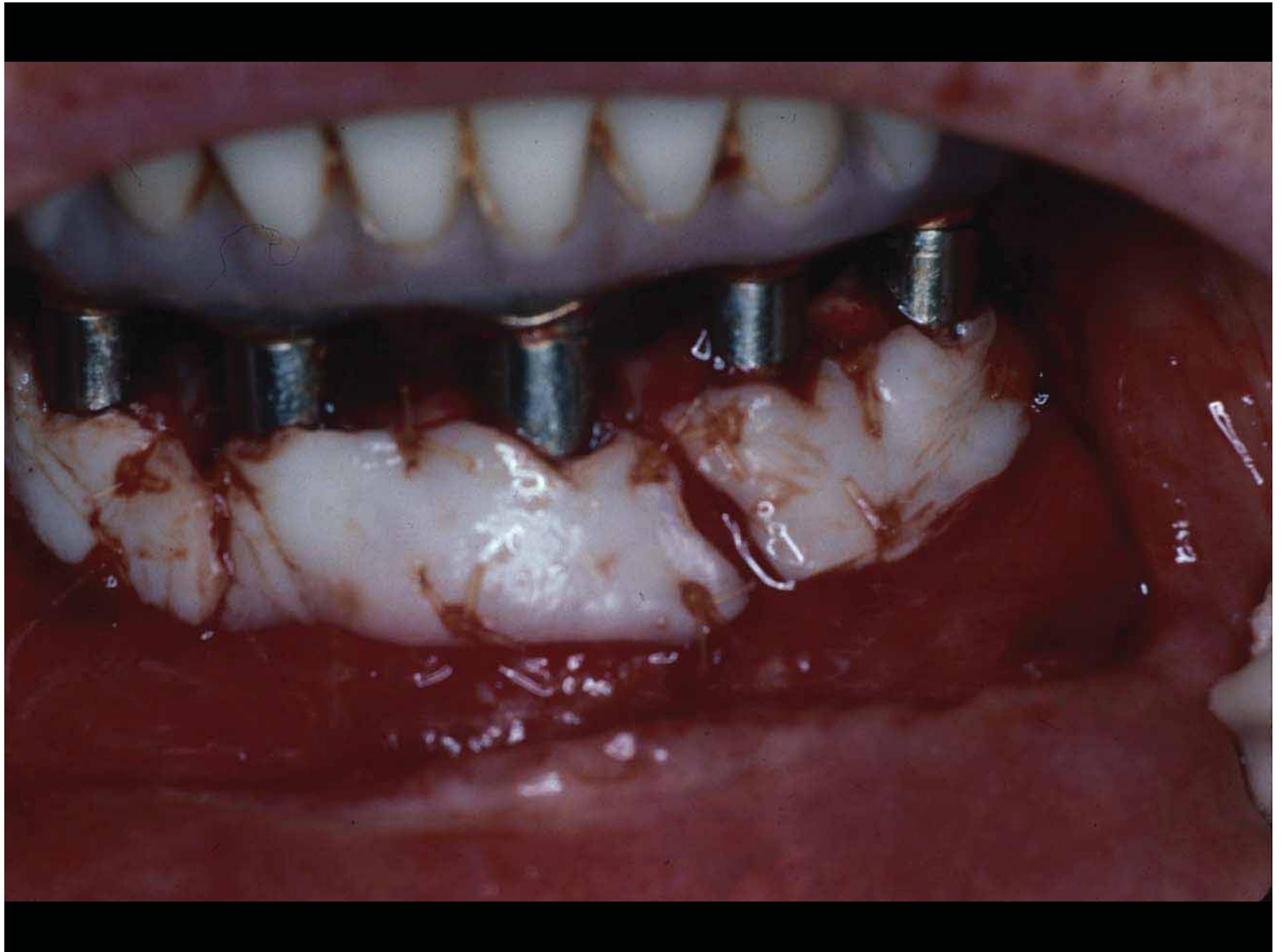
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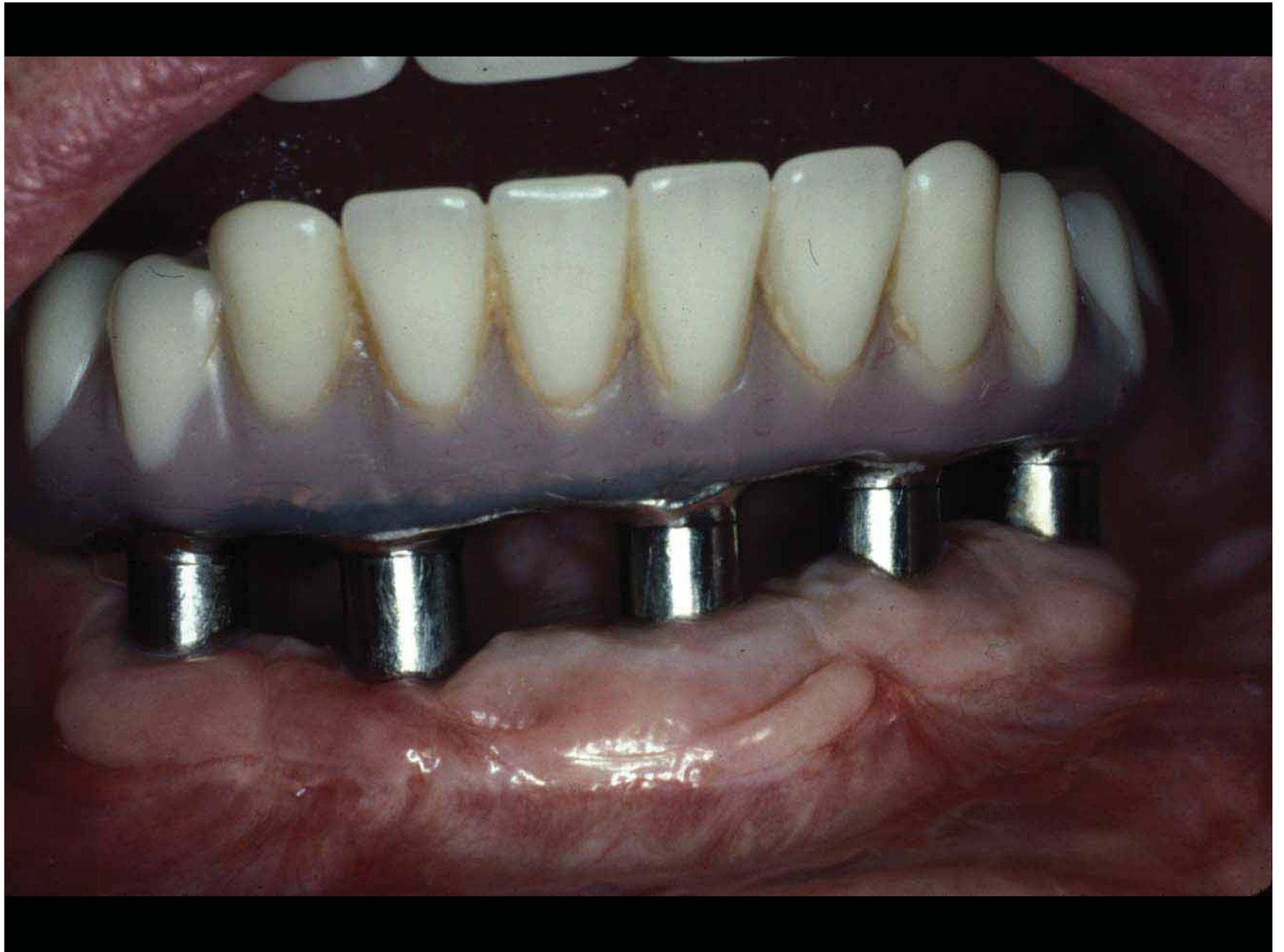
Keratinized Tissue

Just like with natural teeth, a 2-3 mm band of keratinized tissue is desired, but not mandatory for health.









Non-Surgical Treatment

If local factors are significant and can't be removed with the non-metal instruments consider:

Mini currets from Hu Friedy (sgc sub 06, sgc 1/26, sas 11/12 6 and sas 13/14 6) or the cavitron



Non-Surgical Treatment

If non-surgical approach is not effective, treatment with Arestin q 3months with recalls and/or Periostat may be performed WITH the understanding that any improvements will be small.



Local delivery of Antibiotics

- *Theoretical Advantages:*

- 1) Higher concentration delivered to site

- 2) Reduced risk for adverse side effects

- 3) Reduced interaction with other drugs

- 4) Reduced risk of emerging antibiotic resistant strain

- 5) Non dependent on patient compliance



Local delivery of Antibiotics

Tetracycline

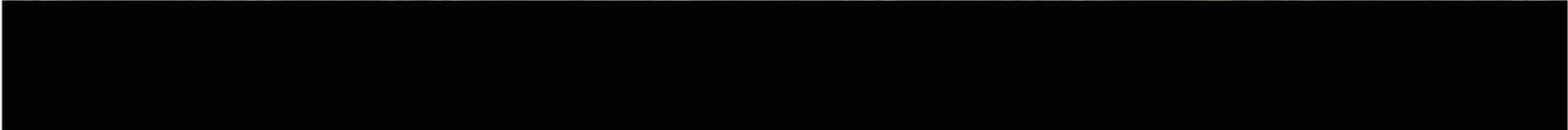
- Tetracycline fibers - 10 days- mucositis – Dec. in ging. hyperplasia & BOP around 80% of implants, Schenk et al. COIR, 1997
- Tetracycline fibers - peri-implantitis – Improvement in PD, BI and anaerobic rods, rebound in 6-12 mo. Two of 25 pts still had purulence. Mombelli et al. COIR, 2001

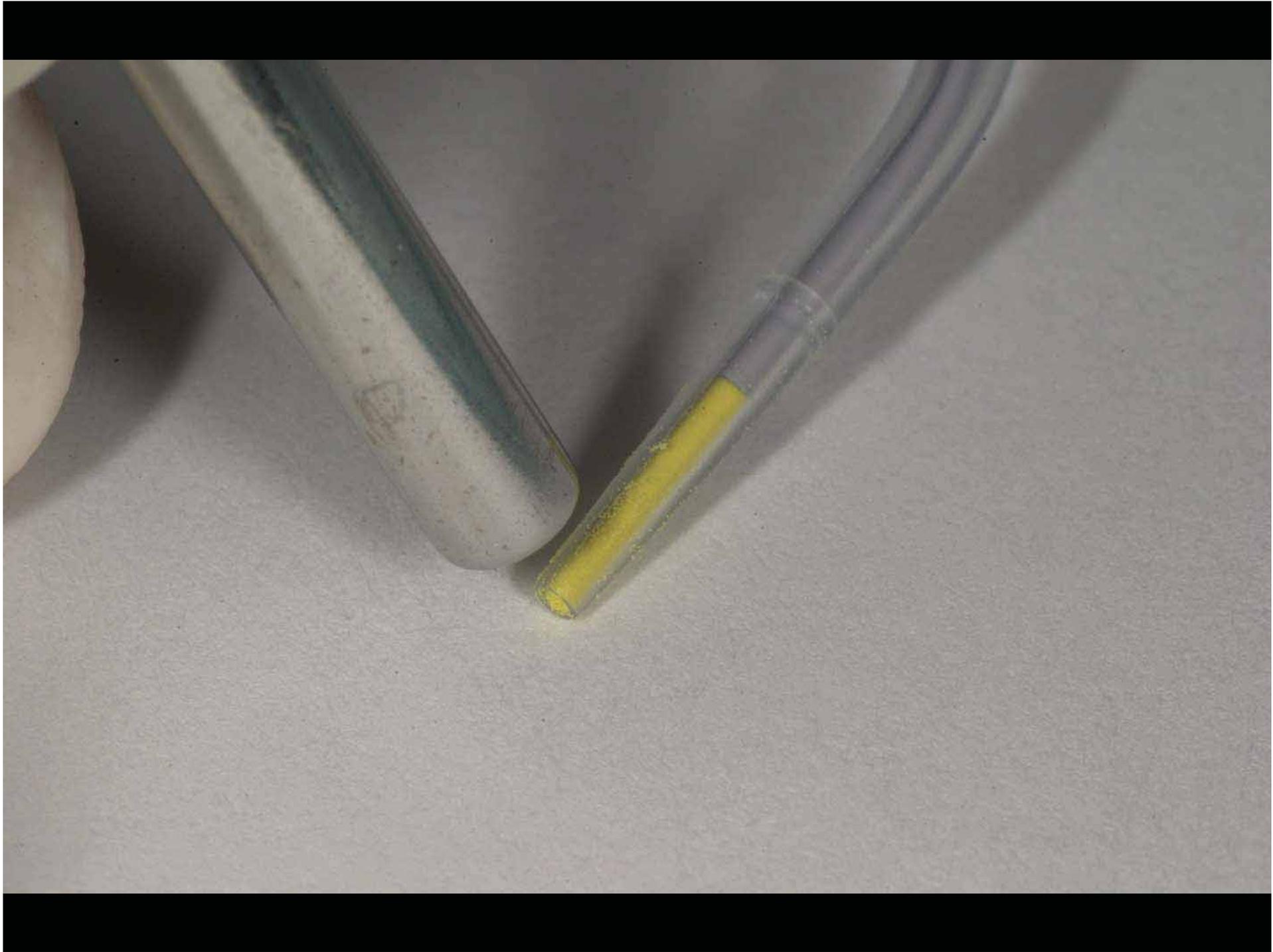
Slow release doxycycline – peri-implantitis

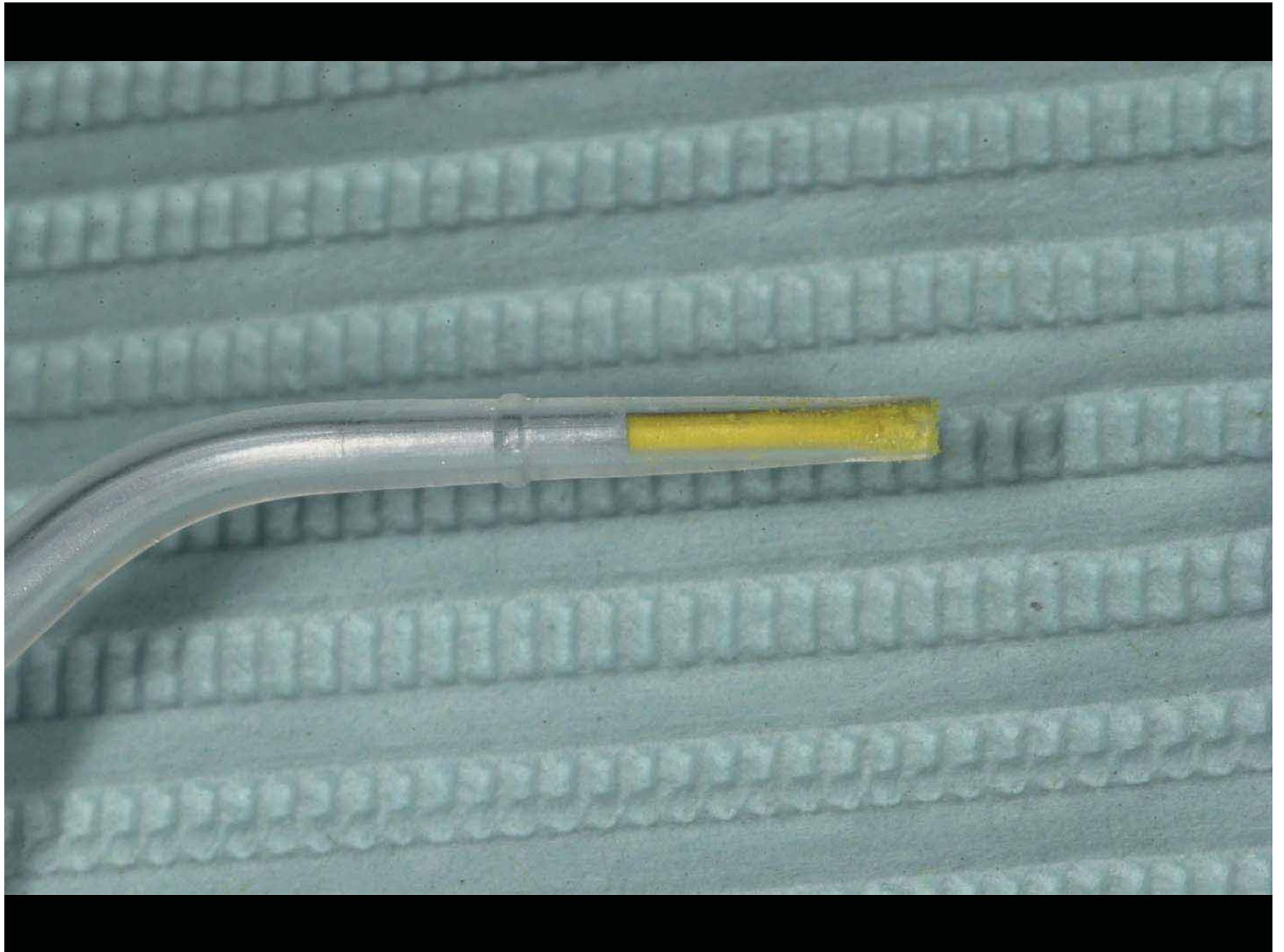
- Additional one mm of PD reduction and clinical attachment gain with doxycycline than with mechanical debridement.
- Reduction of BOP at 18 weeks. Must repeat at 6mo

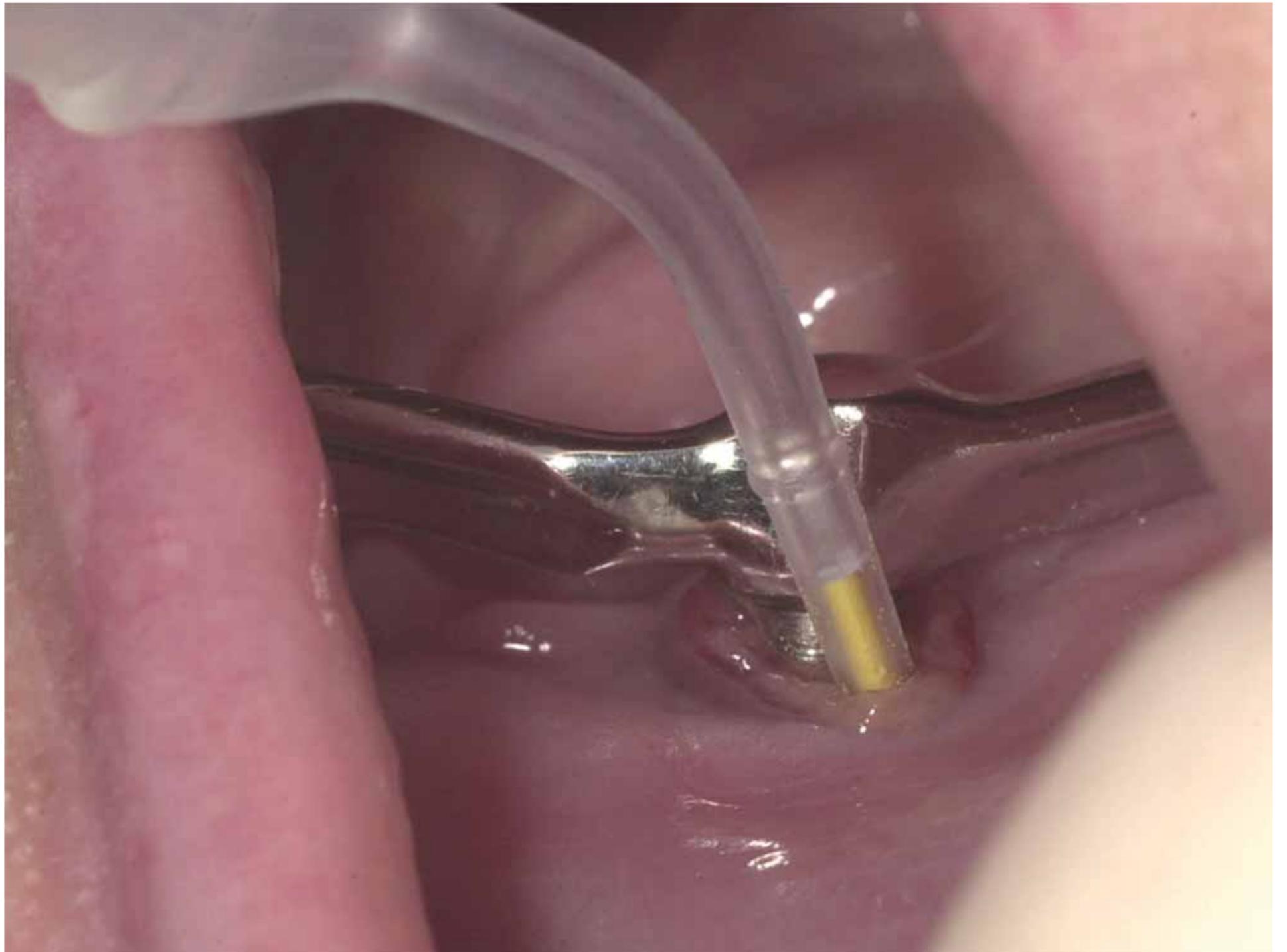
Buchter et al. Brit JOMS 2004.











Antibiotics in the treatment of peri-implantitis.

- Use of systemically administered or locally delivered antibiotics in the treatment of peri-implantitis.
- A literature search was conducted using MEDLINE through the PubMed database of the US National Library of Medicine using studies up to 2011. Studies on the microbiology of peri-implantitis lesions were hand selected.
- Two studies on the use of systemically administered antibiotics in the treatment of peri-implantitis were identified. Both studies involved a case series without controls.
- Five studies on locally delivered antibiotics were found. In all cases, local antibiotics were used in conjunction with mechanical debridement and chemical disinfection with antimicrobial agents such as chlorhexidine digluconate or hydrogen peroxide.
- The additional effects of local antibiotics were noted in all studies but were in general moderate.
- The current available scientific information on the use of locally or systemically administered antibiotics is insufficient to allow any firm specific recommendations for the use of these drugs.
- Local application of minocycline or doxycycline as an adjunct to mechanical debridement and irrigation with an antimicrobial agent may be effective in moderately deep lesions.
- Surgical access by full-thickness flap surgery in deeper lesions is probably necessary to halt the progression of bone loss.
- No sound scientific basis is available for the use of systemic antibiotics.

van Winkelhoff AJ. Eur J Oral Implantol. 2012;5 Suppl:S43-50.



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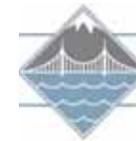
Local delivery of Antiseptics

Essential Oils (Listerine):

- Less plaque and BOP than control
- No change in probing depths, Ciancio et al. JOP,1995

Triclosan – dentifrice, mouthwash

- Inflammation reduced over 6 months
- BOP decreased from 54% - 29%... inc in NaFI controls.
- #of sites with 5mm + pocketing significantly reduced.....not so in controls
- Less plaque, Less BOP, reduction in G- anaerobes over 6mo.



Local delivery of Antiseptics

Chlorhexidine

- Subgingival irrigation - Chlorhexidine
- Clinical improvement over controls – PD, CAL, inflammation, Trejo et al. COIR,2006,-animals, Felo et al. AJD,1997 – *humans, daily administration*
- No additional benefits over mechanical debridement at 30 days. Bid x 10 day TPS and HA implants ,Porras et al. JOP, 2002. Lavigne et al. 1994.



Peri-implantitis

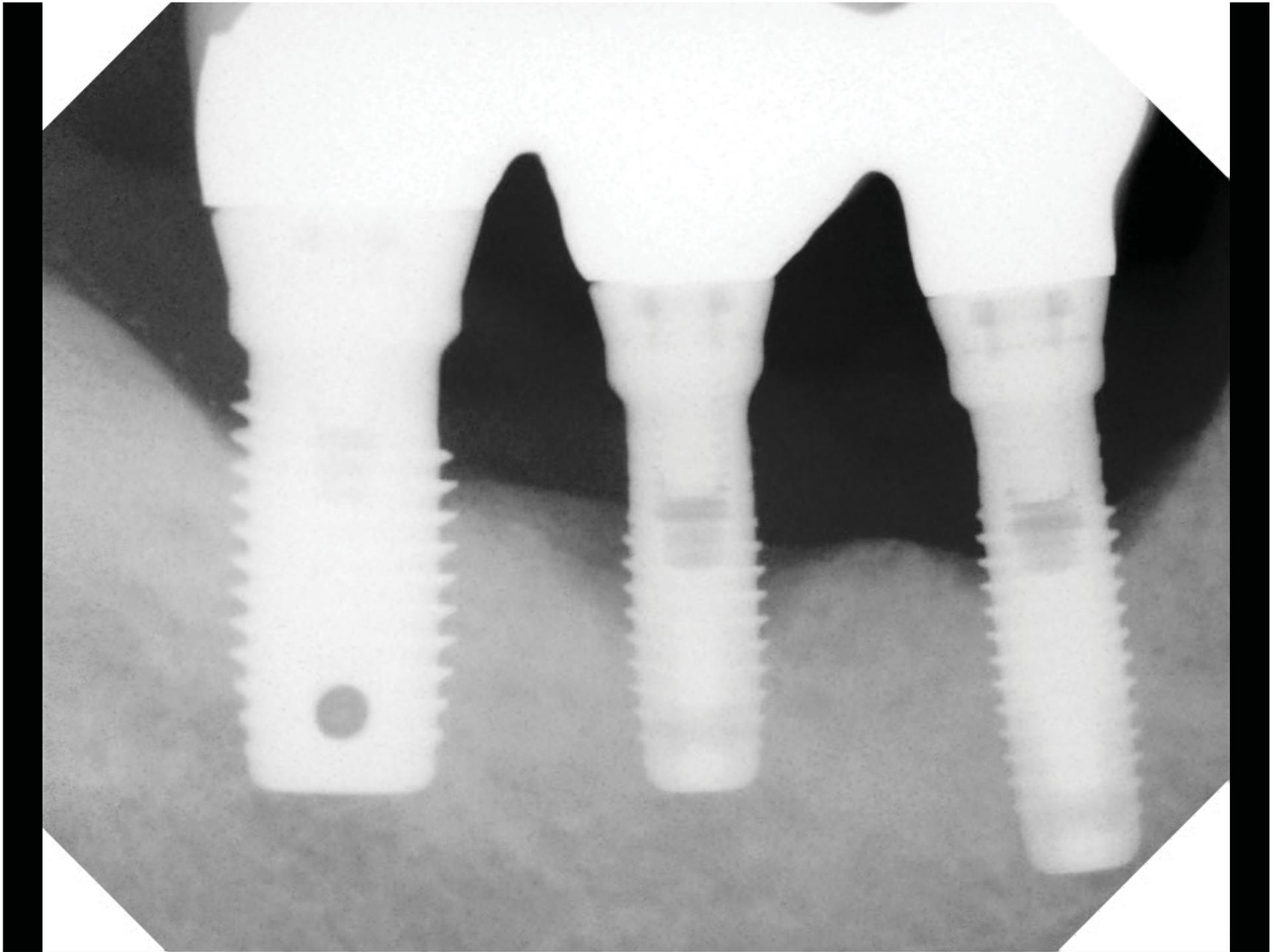
All of these things help to prevent it, but removal or repair is sometimes required (TP, smokers, PC, etc).

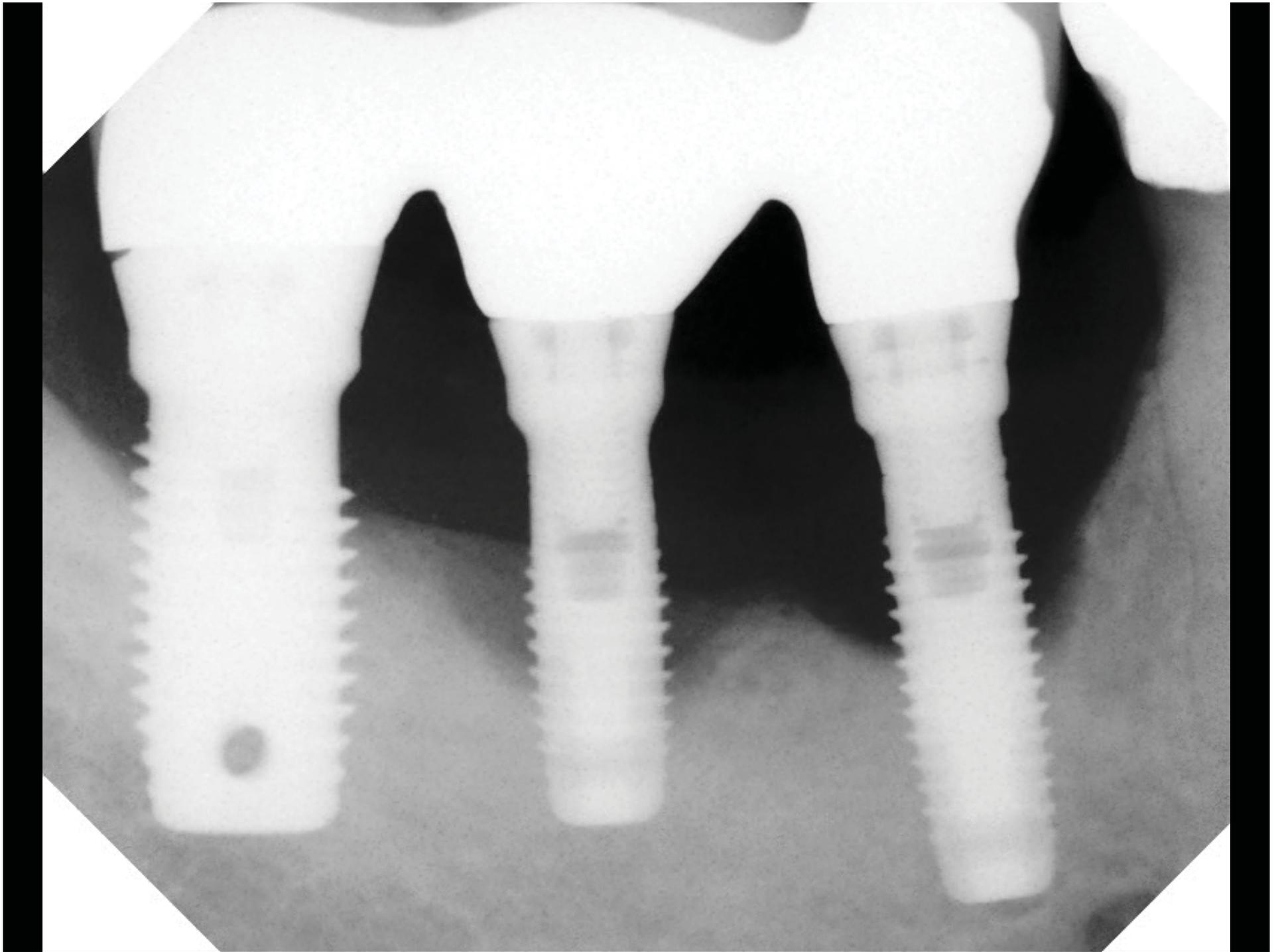


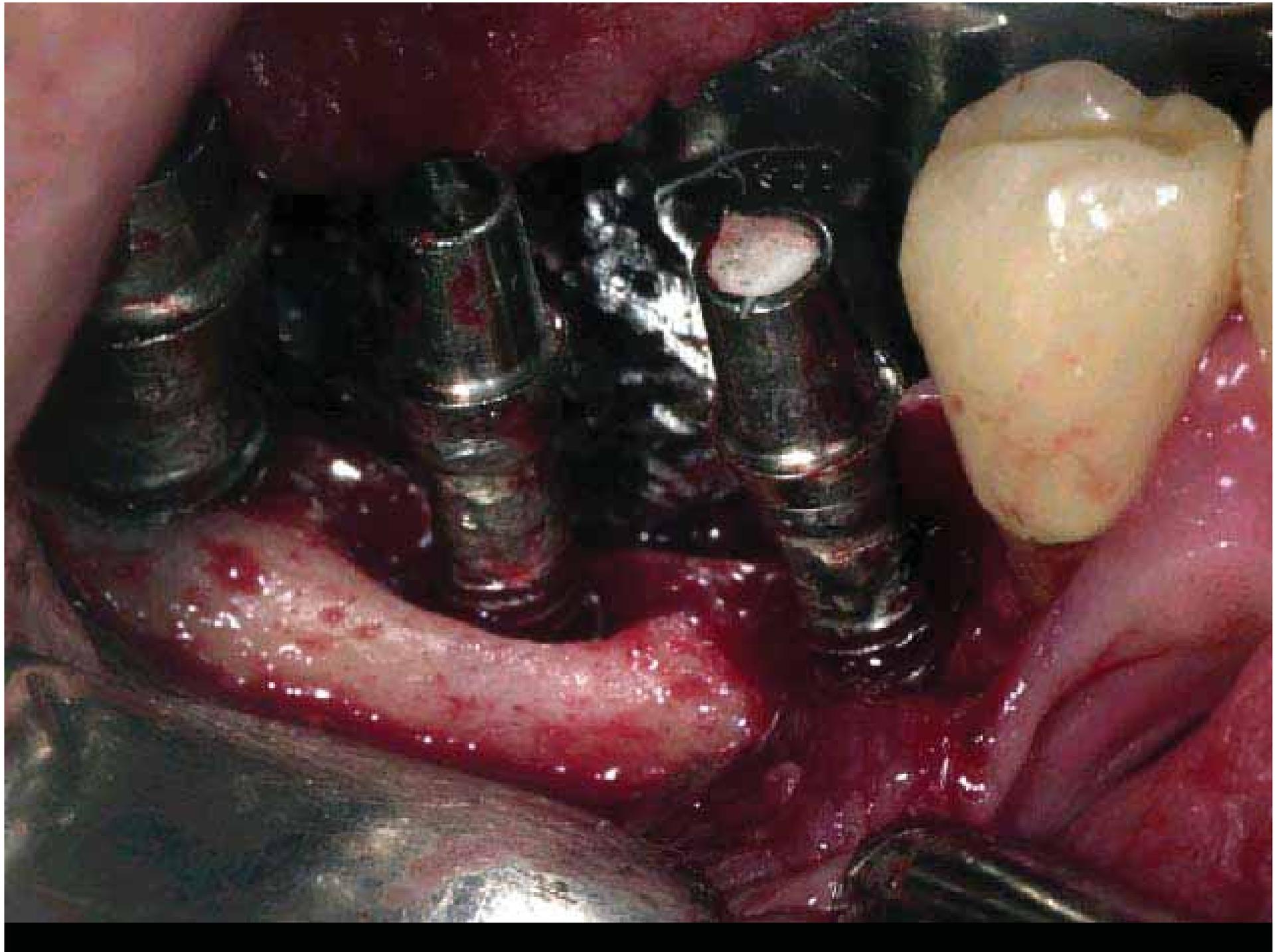
Implant Removal

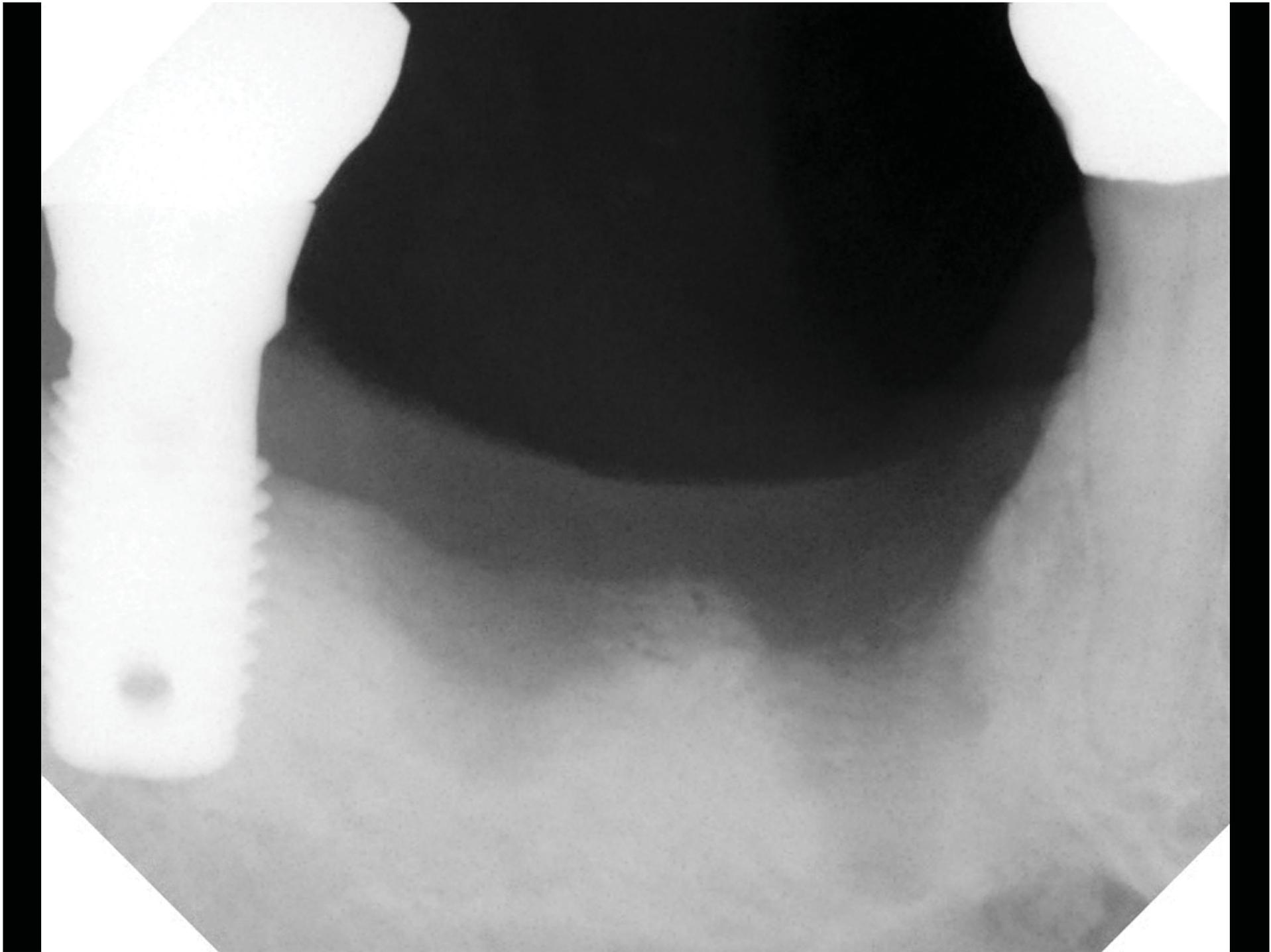
If a large defect exists and the etiology of the bone loss has not been addressed implant removal may be indicated.







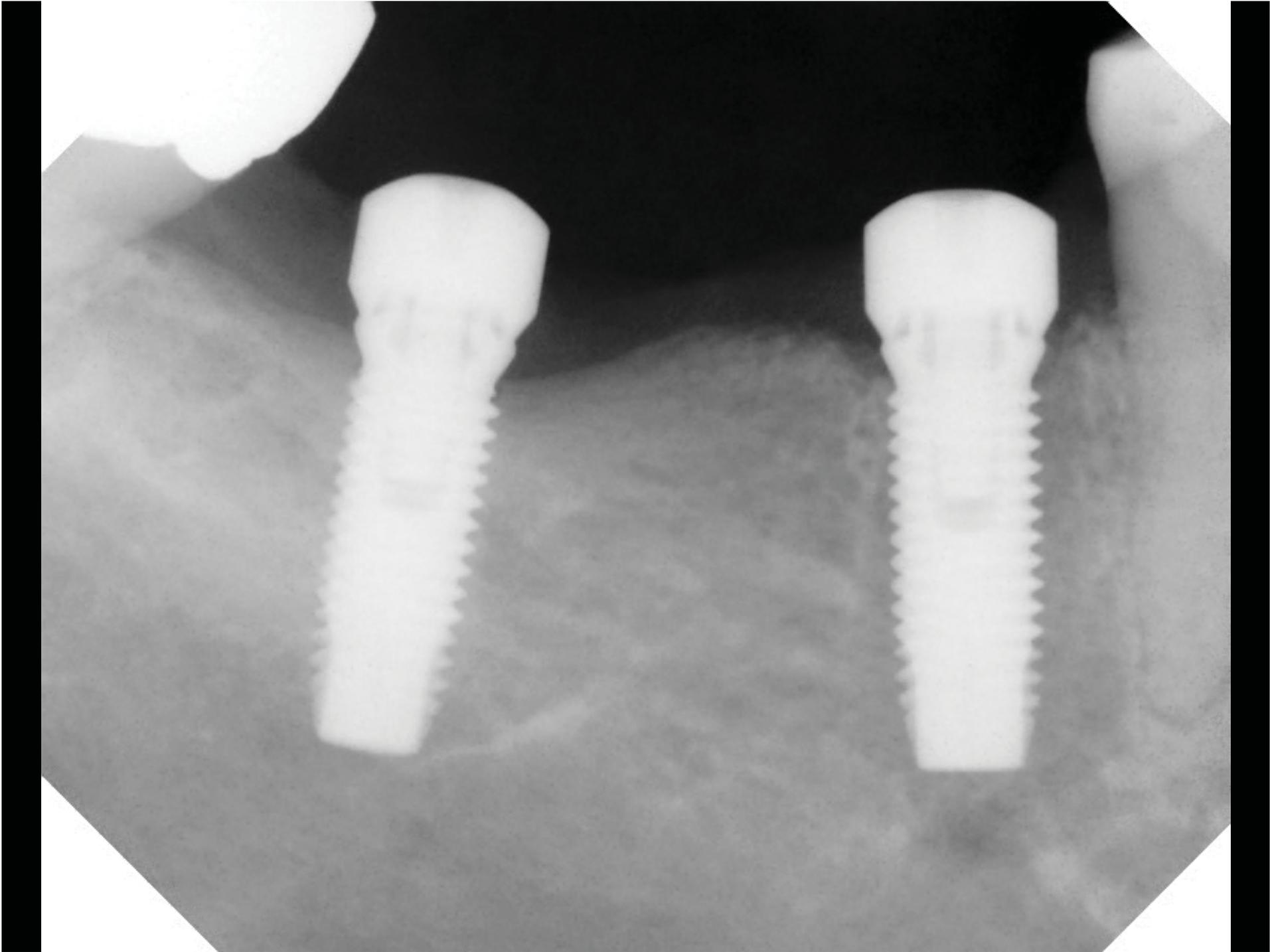


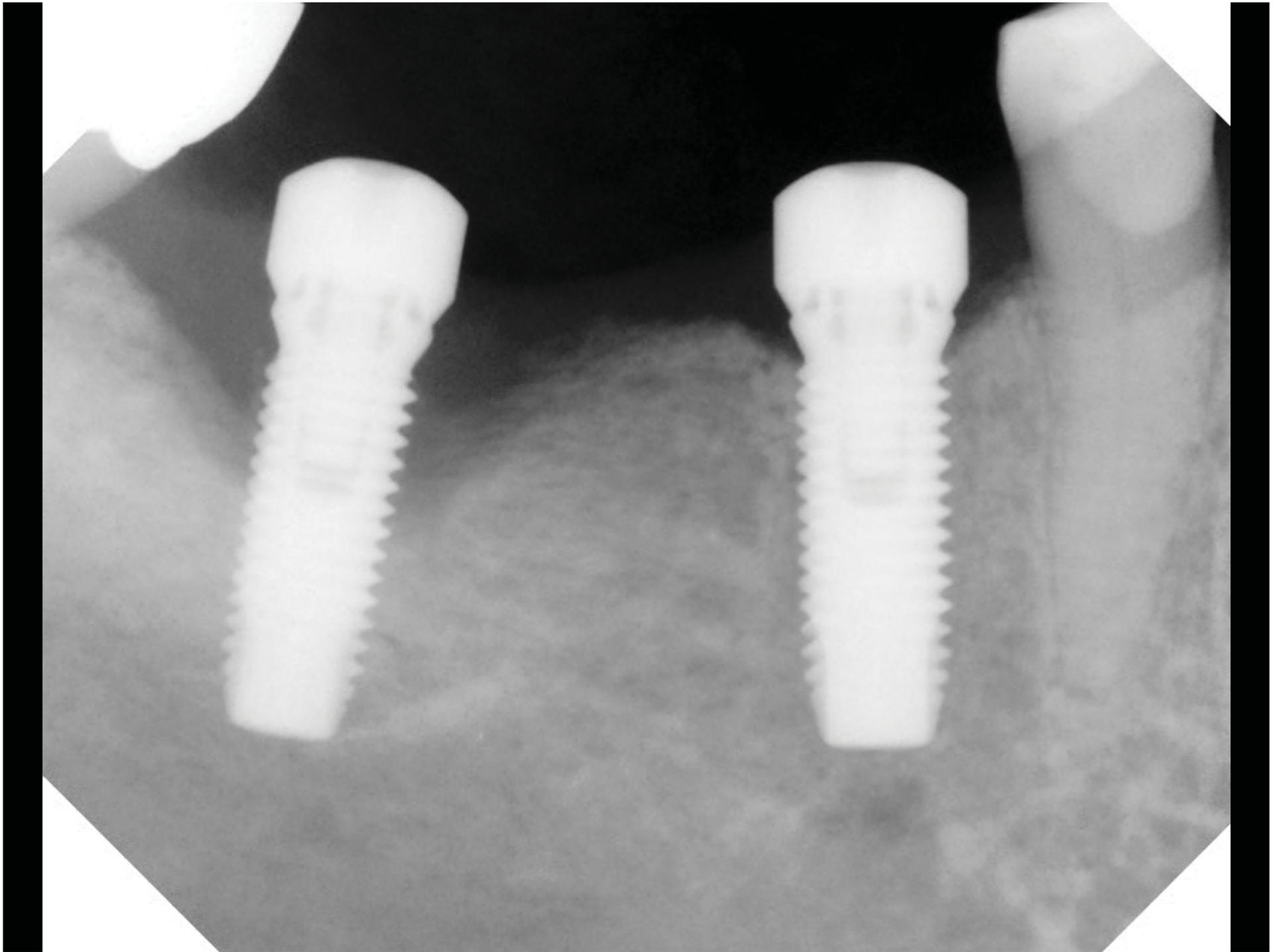


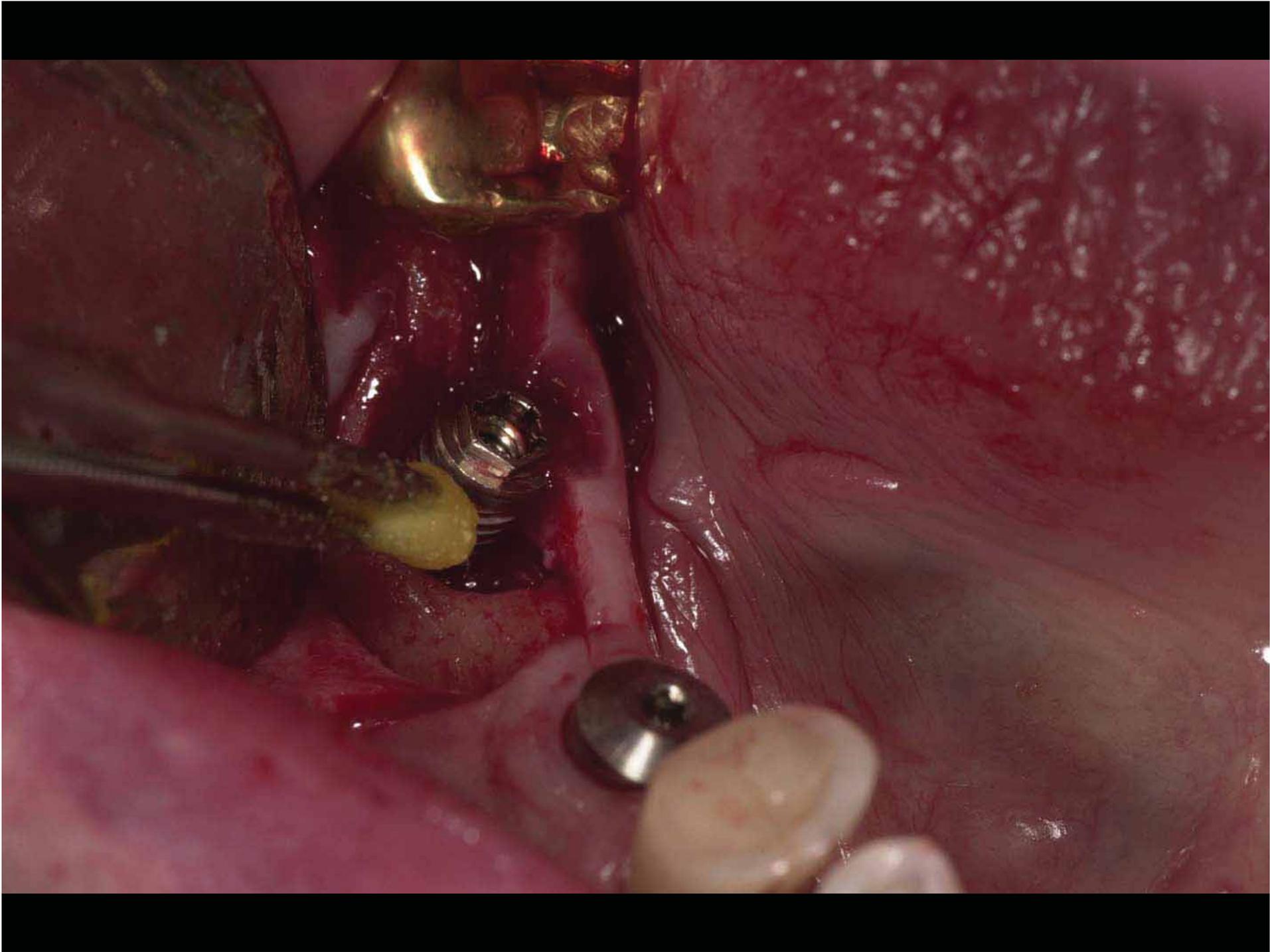
Implant Repair

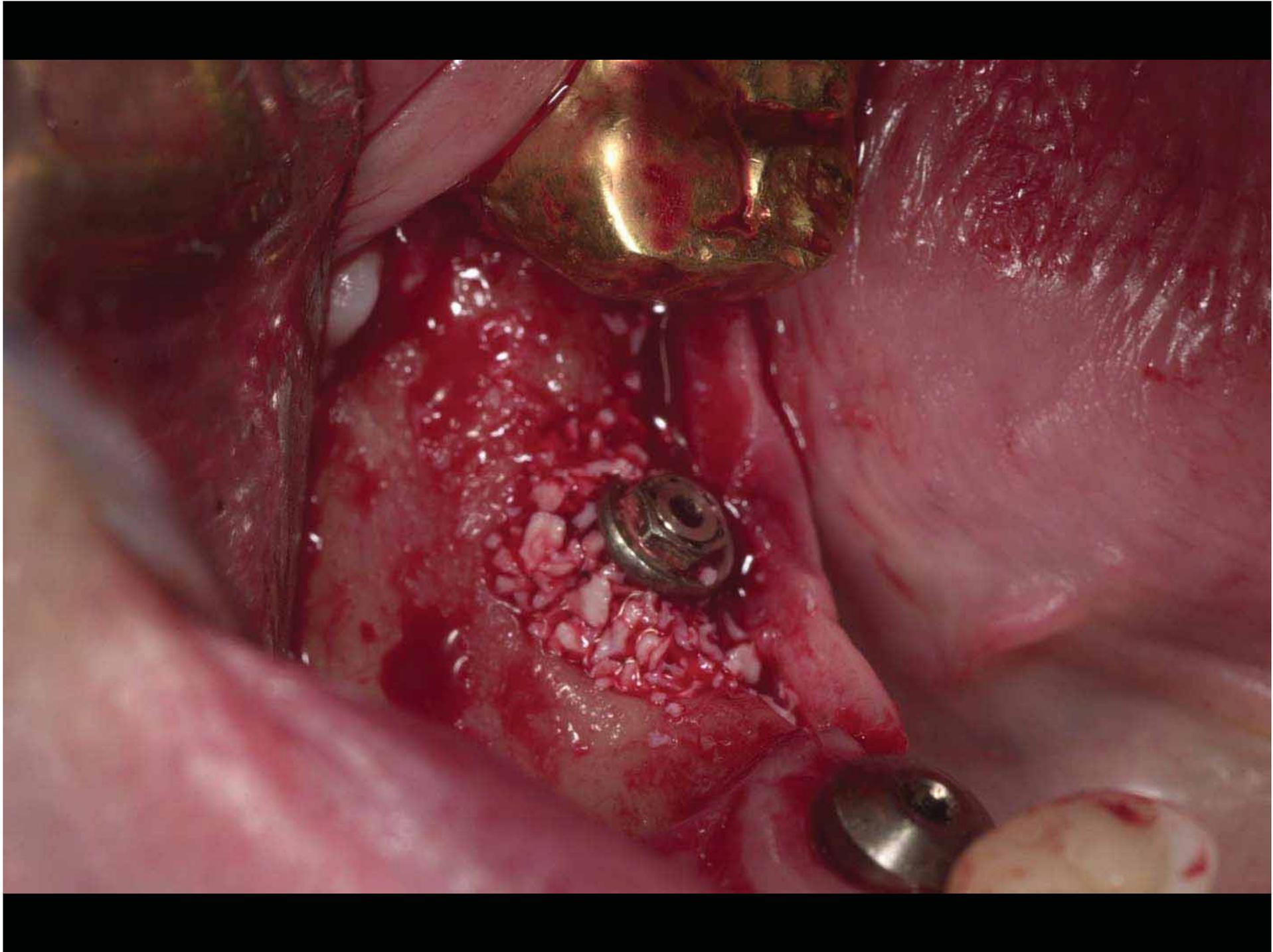
If a small angular defect exists and the etiology of the bone loss has been addressed implant repair may be indicated.

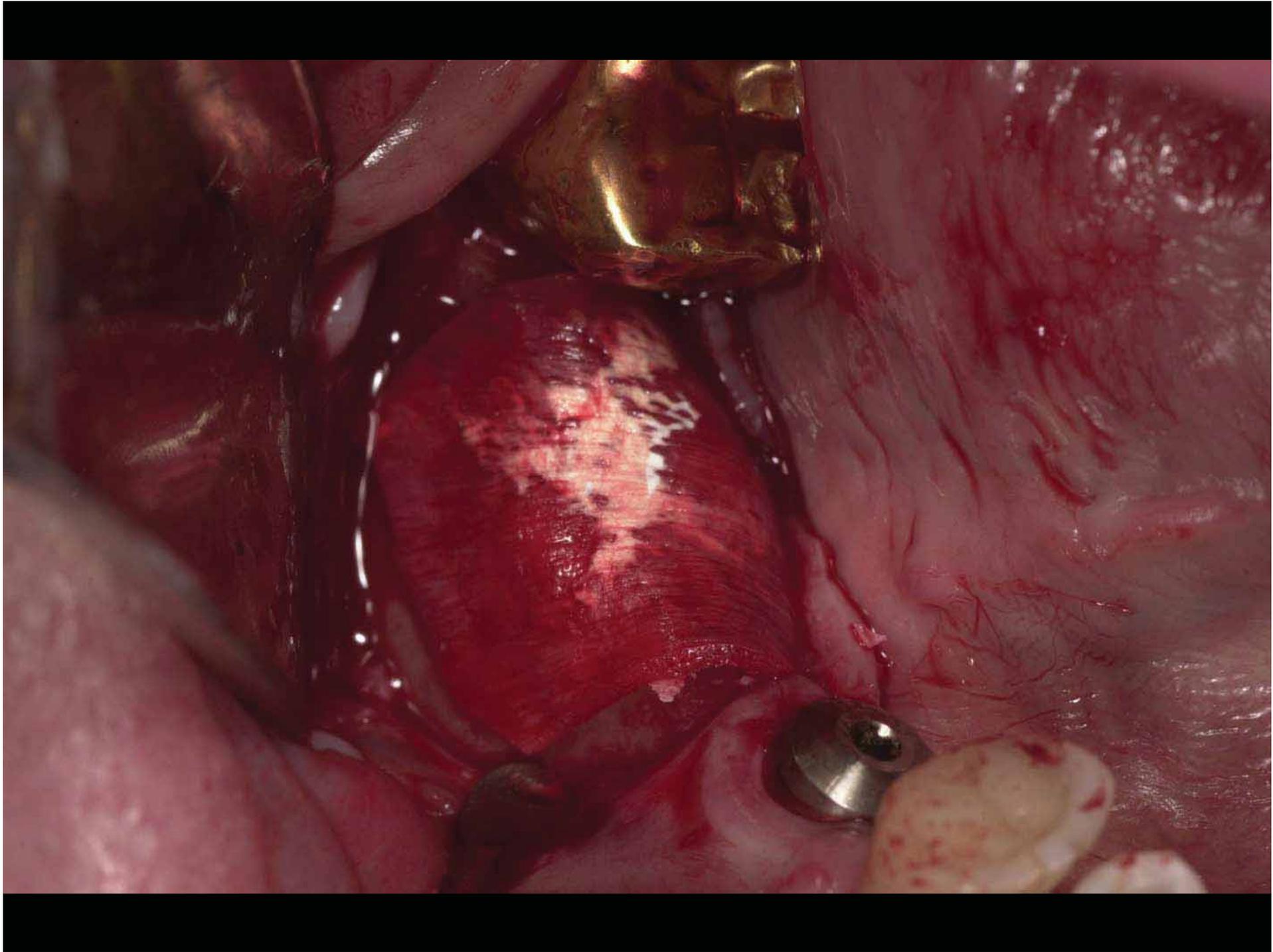


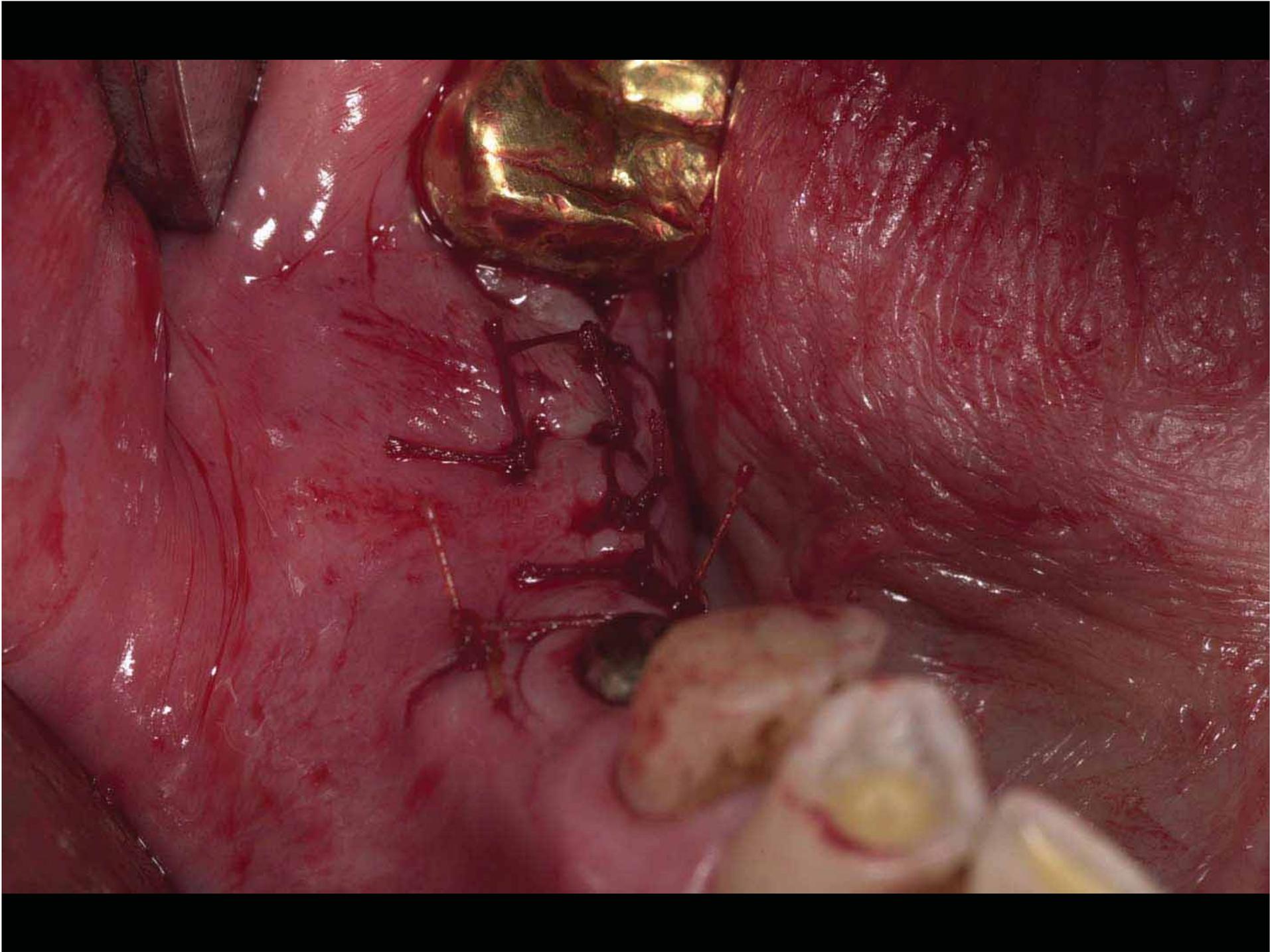


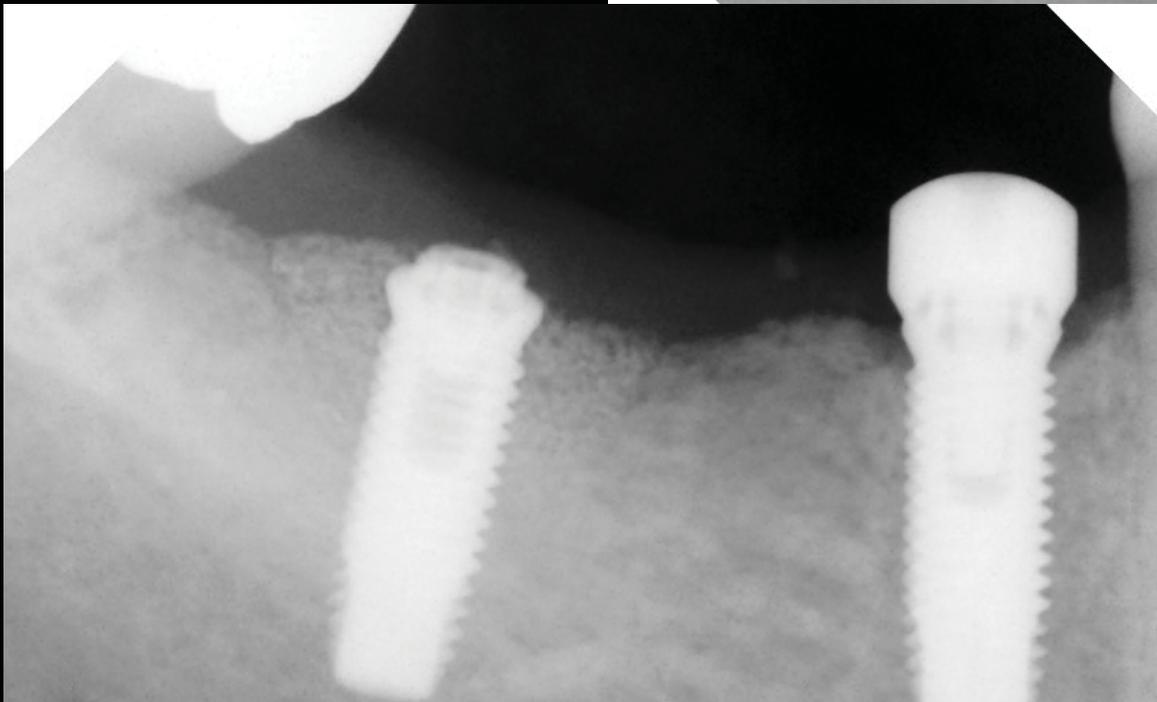
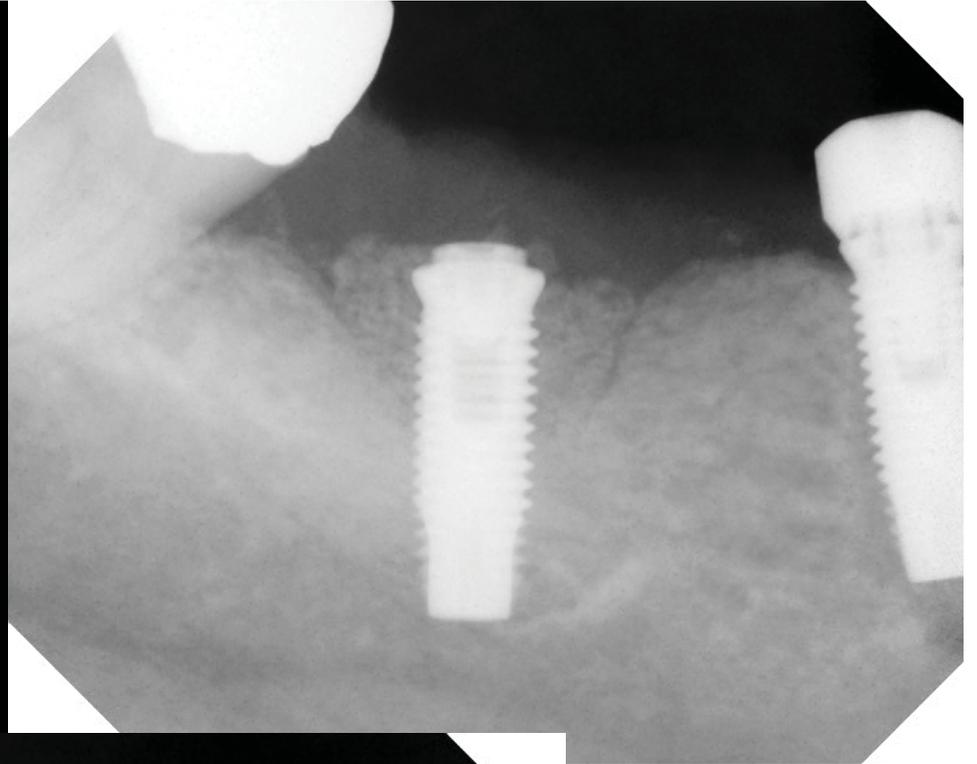




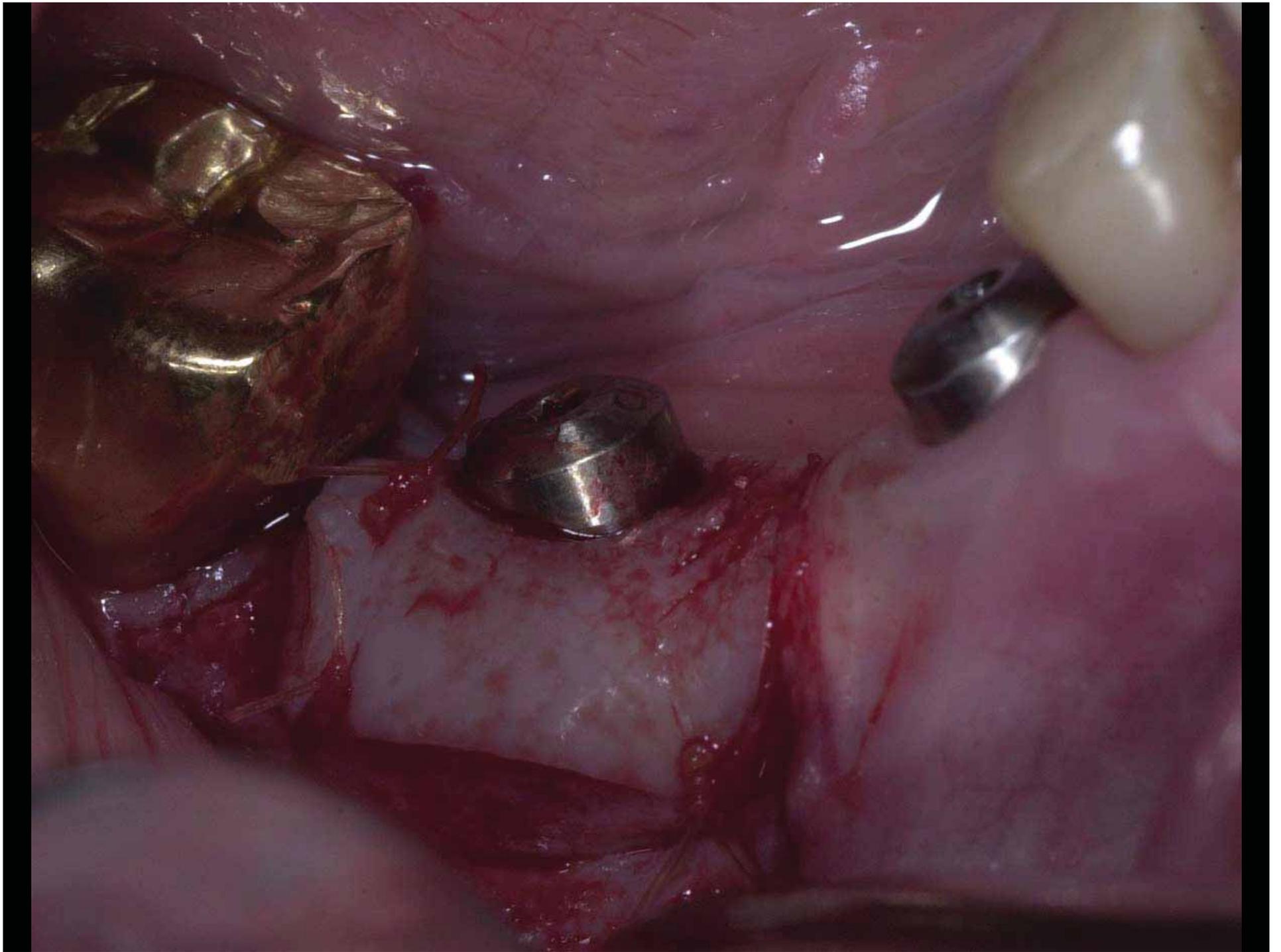


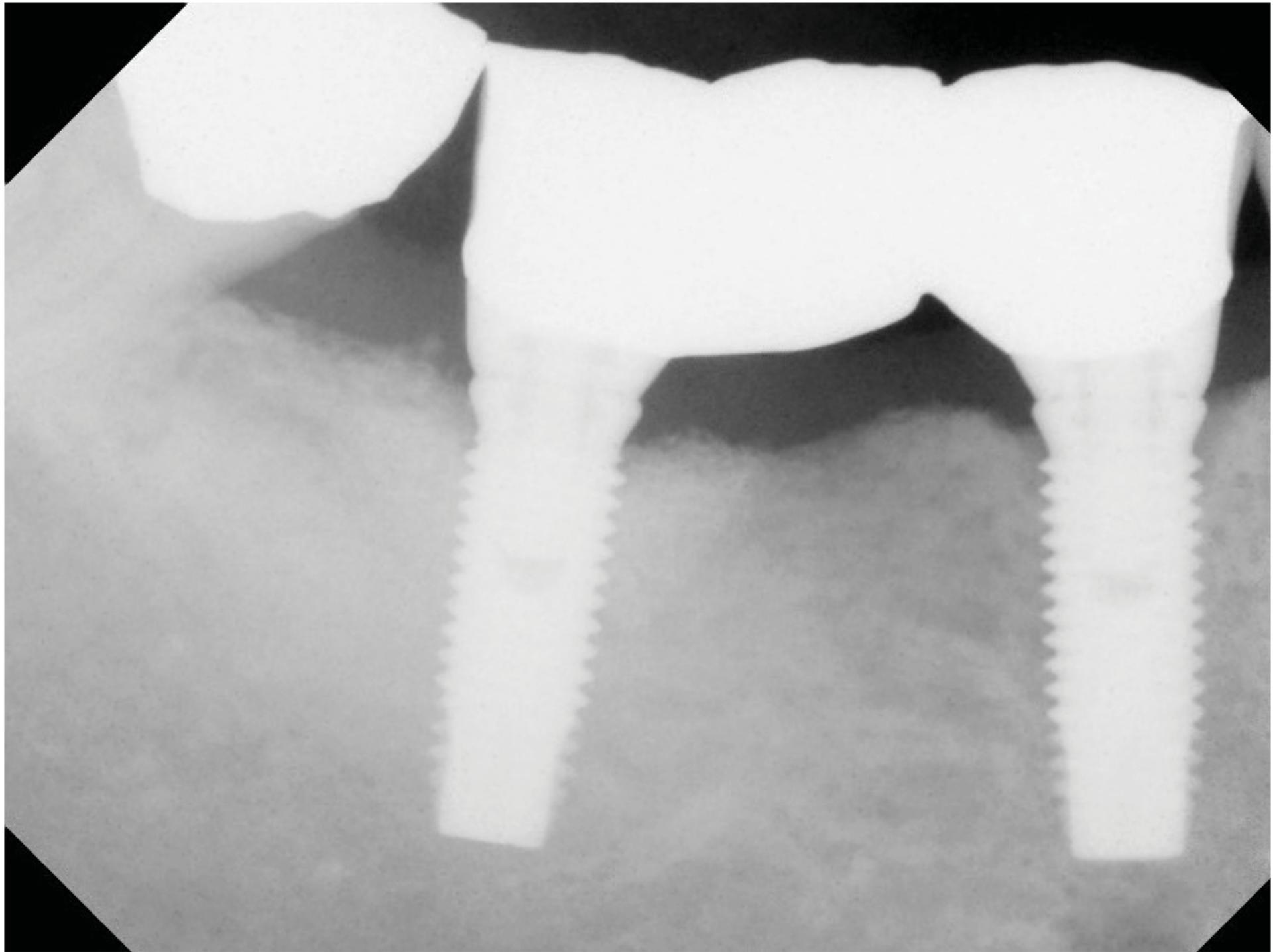














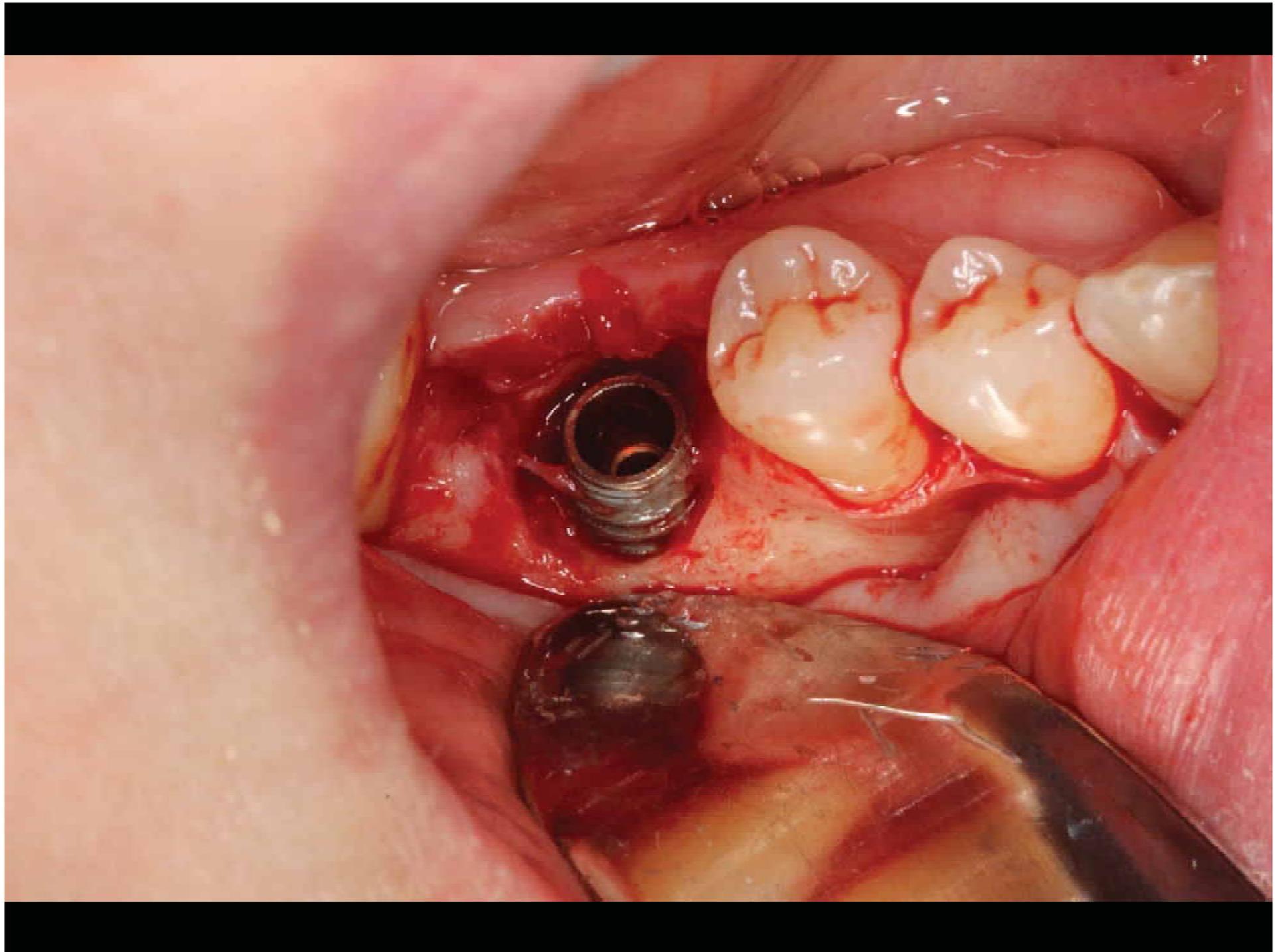
Repair of large implant defect

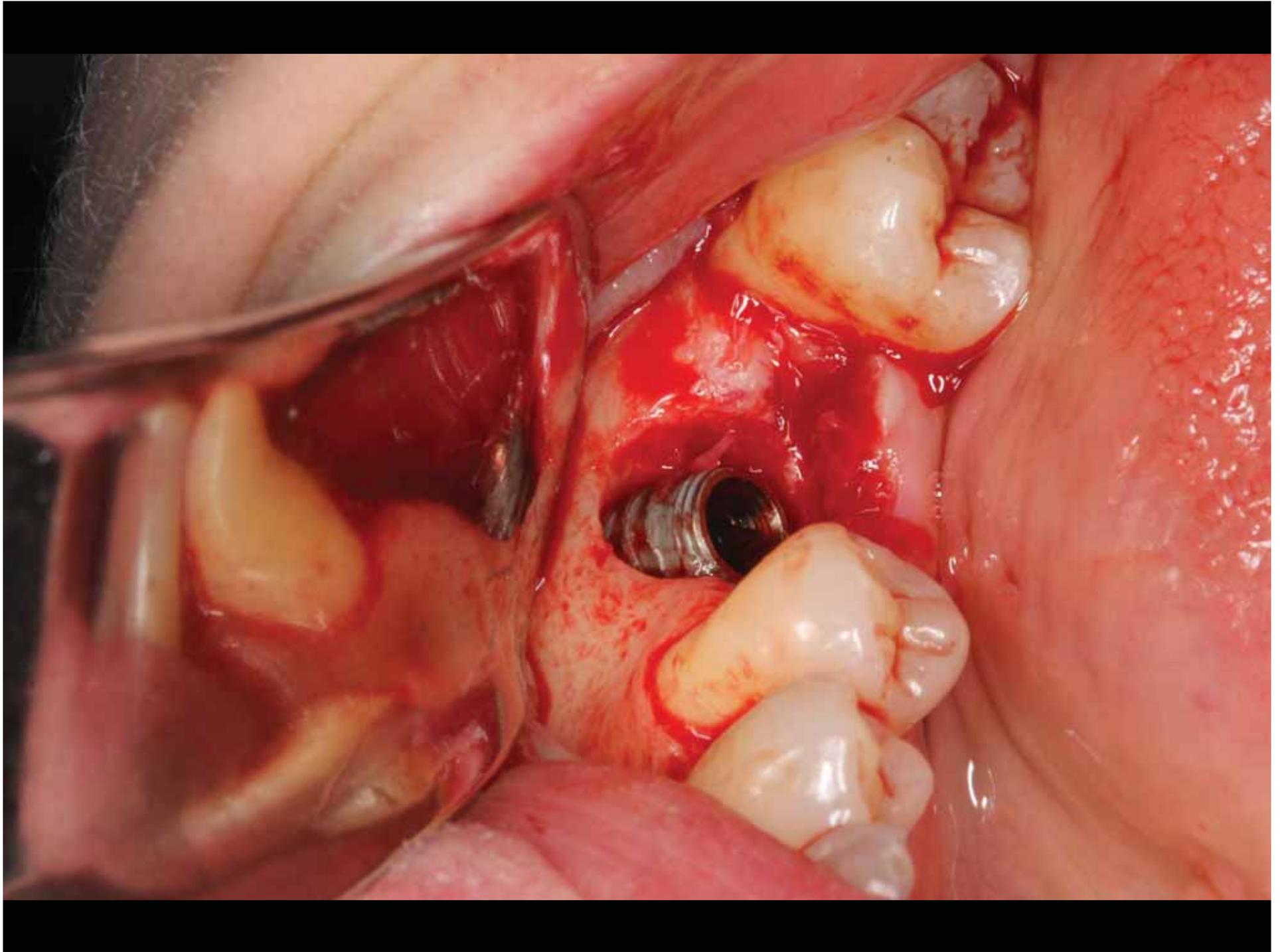


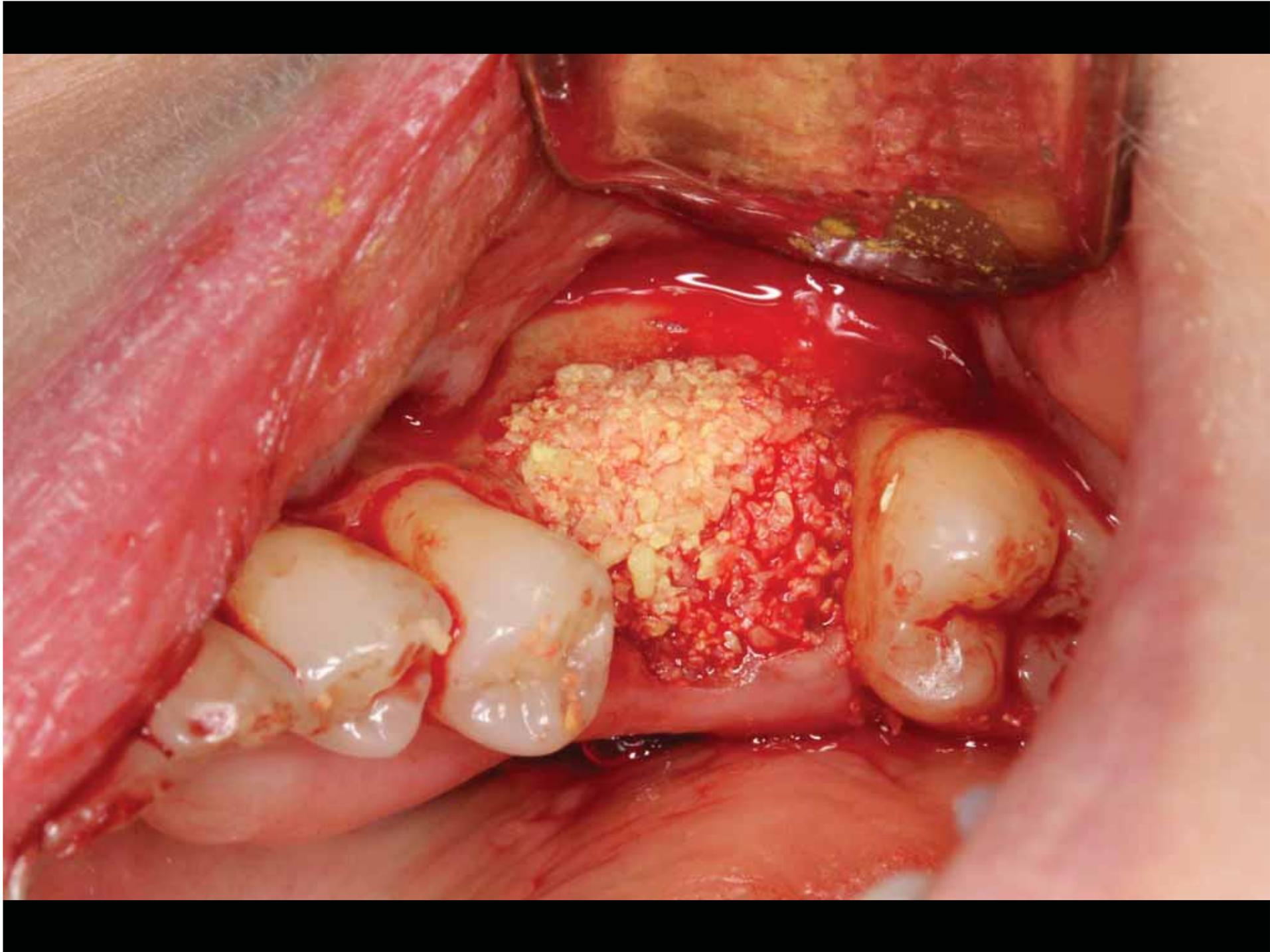
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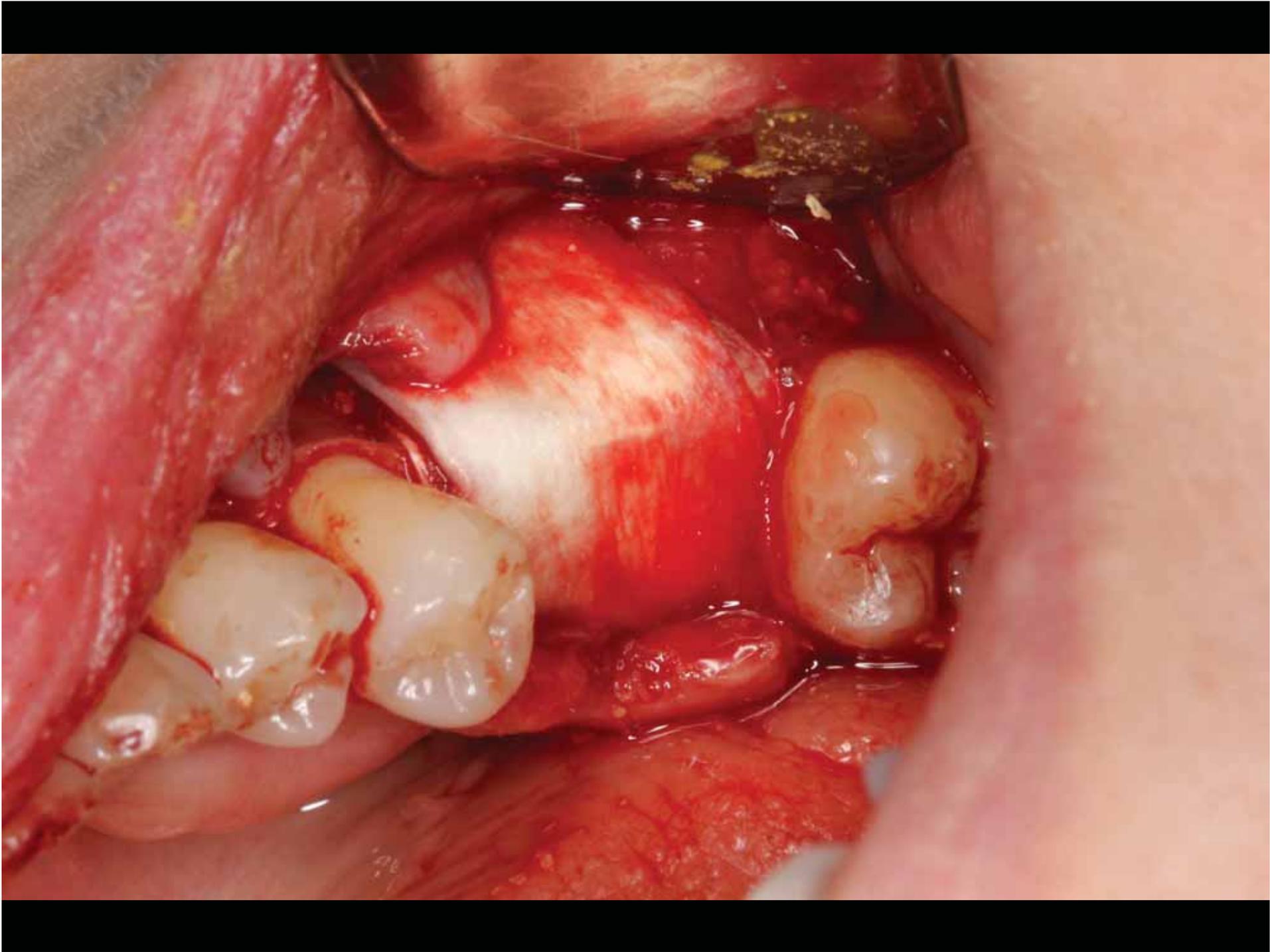


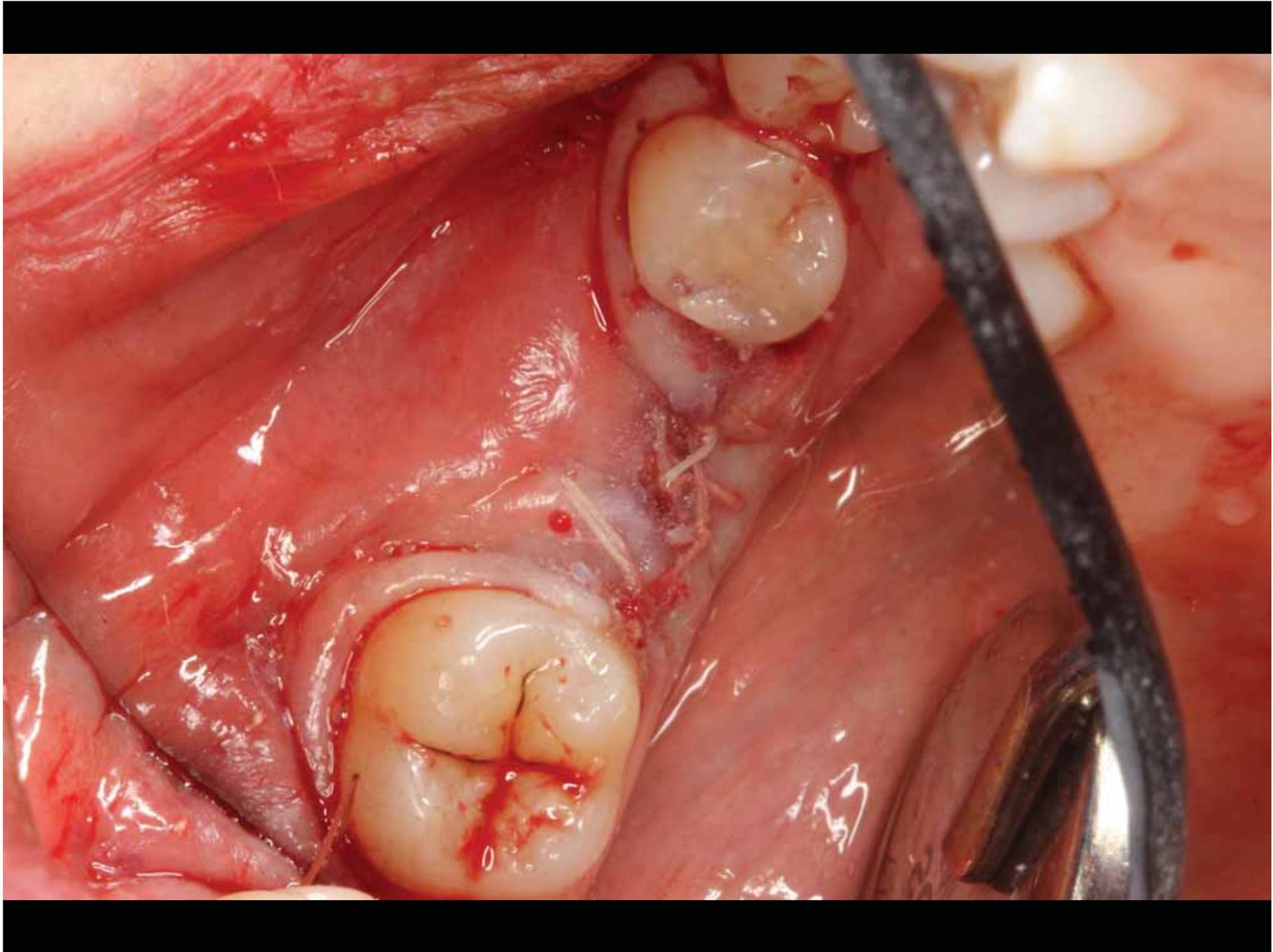






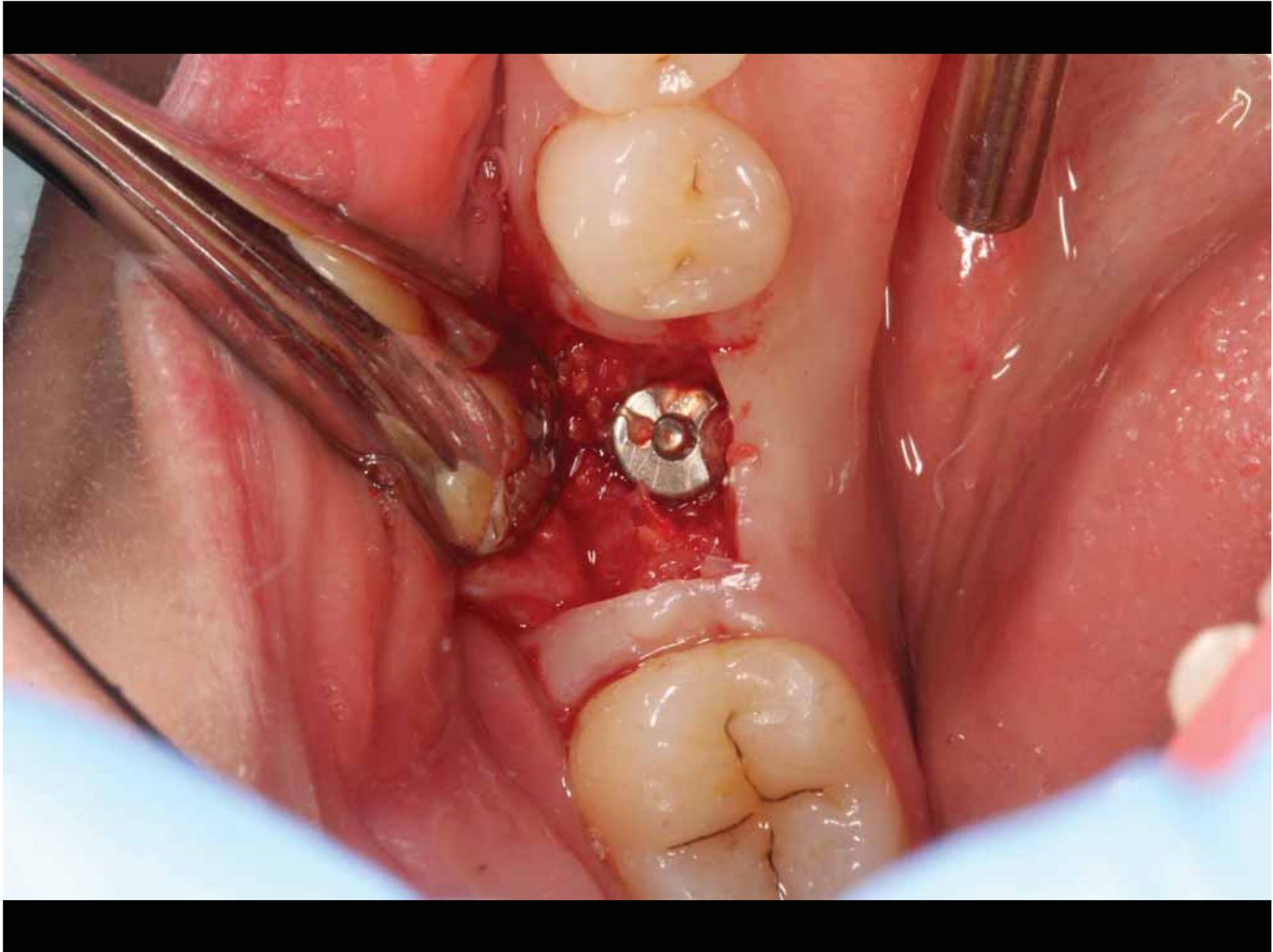












Thank You

For case advice or questions, email me at

Thomas.eshraghi@gmail.com



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