

Regeneration Of The Posterior Maxillae With Simultaneous Extractions And Immediate Implant Placement: A Case Presentation

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INITIAL PATIENT PRESENTATION

A 77-year-old female patient presented with partial edentulism—teeth Nos. 4, 5 and 13, and hopeless teeth Nos. 3, 6, 12 and 14 (Figure 1) due to advanced caries. The patient's chief concern regarded replacement of her maxillary posterior teeth. She stated, "I do not want anything that I must take out of my mouth and put in a glass." The

treatment plan accepted by the patient included extractions and immediate implant placement with simultaneous grafting. A two-stage implant surgical approach was to be performed with implant exposure four months post extraction and implant placement.

DIAGNOSIS

- Hopeless dentition due to advanced caries—teeth Nos. 3, 6, 12 and 14
- Missing dentition—teeth Nos. 4, 5 and 13
- Inadequate bone quantity and quality for immediate implant placement, without simultaneous regeneration due to alveolar defects created by immediate extraction
- Healthy periodontium (generalized 2-3mm sulcular depths) with minimal gingival recession
- Adequate interocclusal clearance with the opposing dentition

TREATMENT PLAN

- Fabrication of diagnostic casts, wax patterns and surgical guide
- Caries control teeth Nos. 2 and 15
- Extraction of teeth Nos. 3, 6, 12 and 14
- Immediate implant placement following extraction for teeth Nos. 6 and 12; implant placement in tooth sites Nos. 4, 5 and 13 with simultaneous grafting and resorbable membrane placement
- Osseointegration and soft tissue healing period
- Implant uncovering and temporary healing abutment connection four months post-surgery
- Implant level impressions and placement of definitive prostheses

SURGICAL TREATMENT

Following acceptance of the treatment plan, the patient was seen by the restorative dentist for impressions and fabrication of a laboratory processed surgical guide. On the day of surgery, the patient was pre-medicated with ibuprofen 600mg and amoxicillin 500mg. Local anesthesia was administered and teeth Nos. 3, 6, 12 and 14 were extracted using periostomes. The extraction sockets were carefully debrided with

[Clinical photographs demonstrate treatment of the maxillary left posterior quadrant only]



Fig. 1

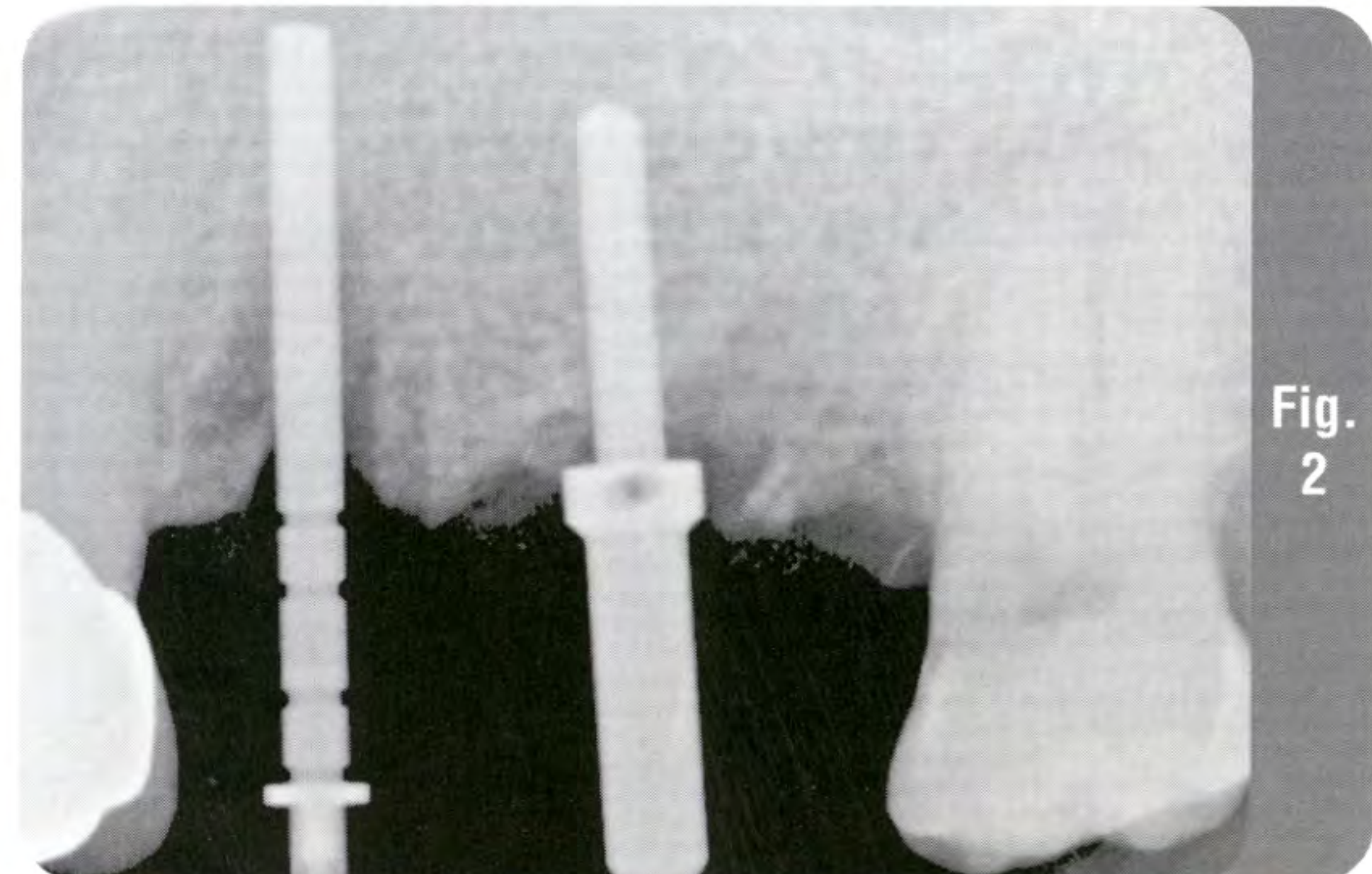


Fig. 2

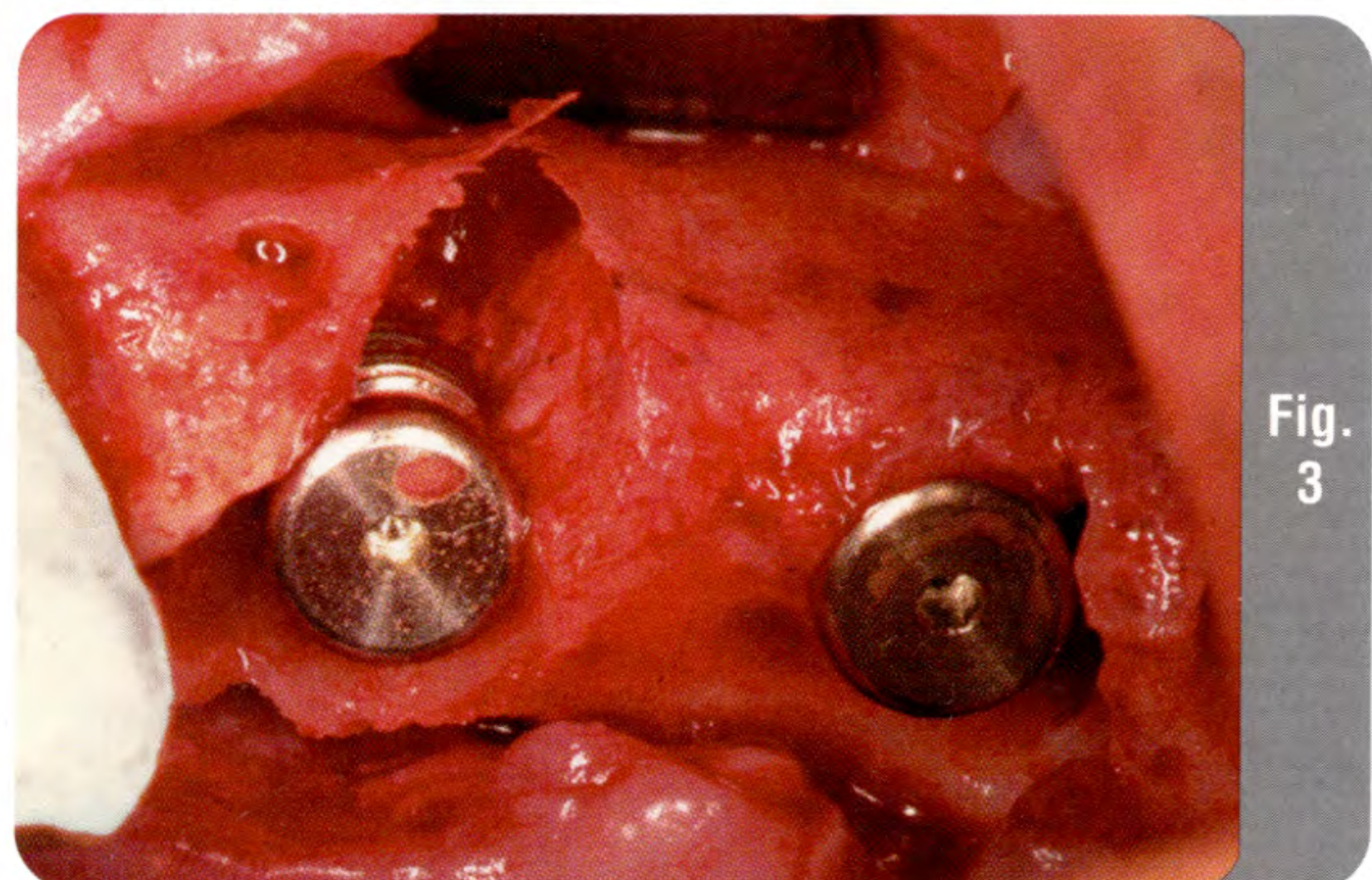


Fig. 3

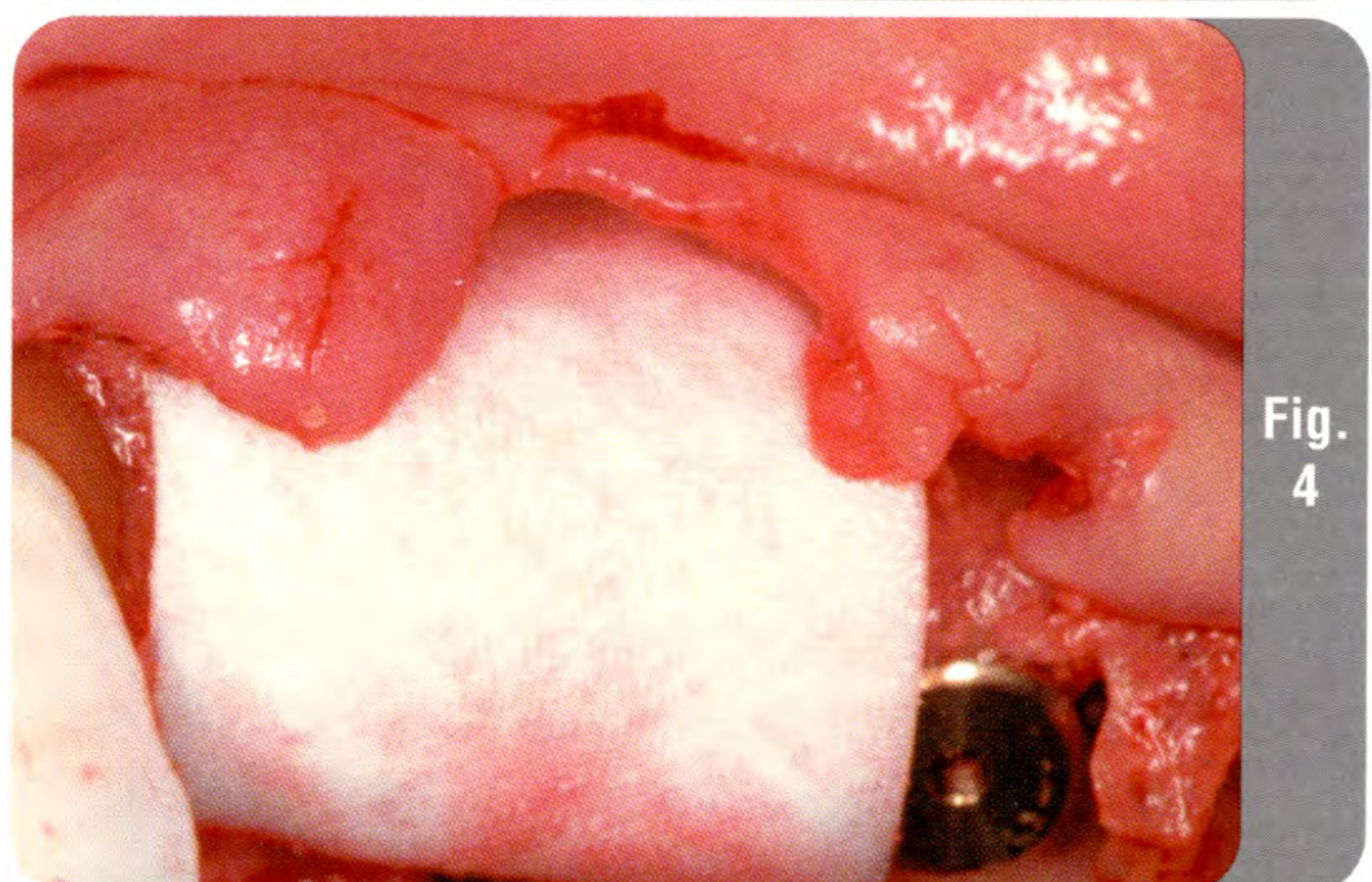


Fig. 4

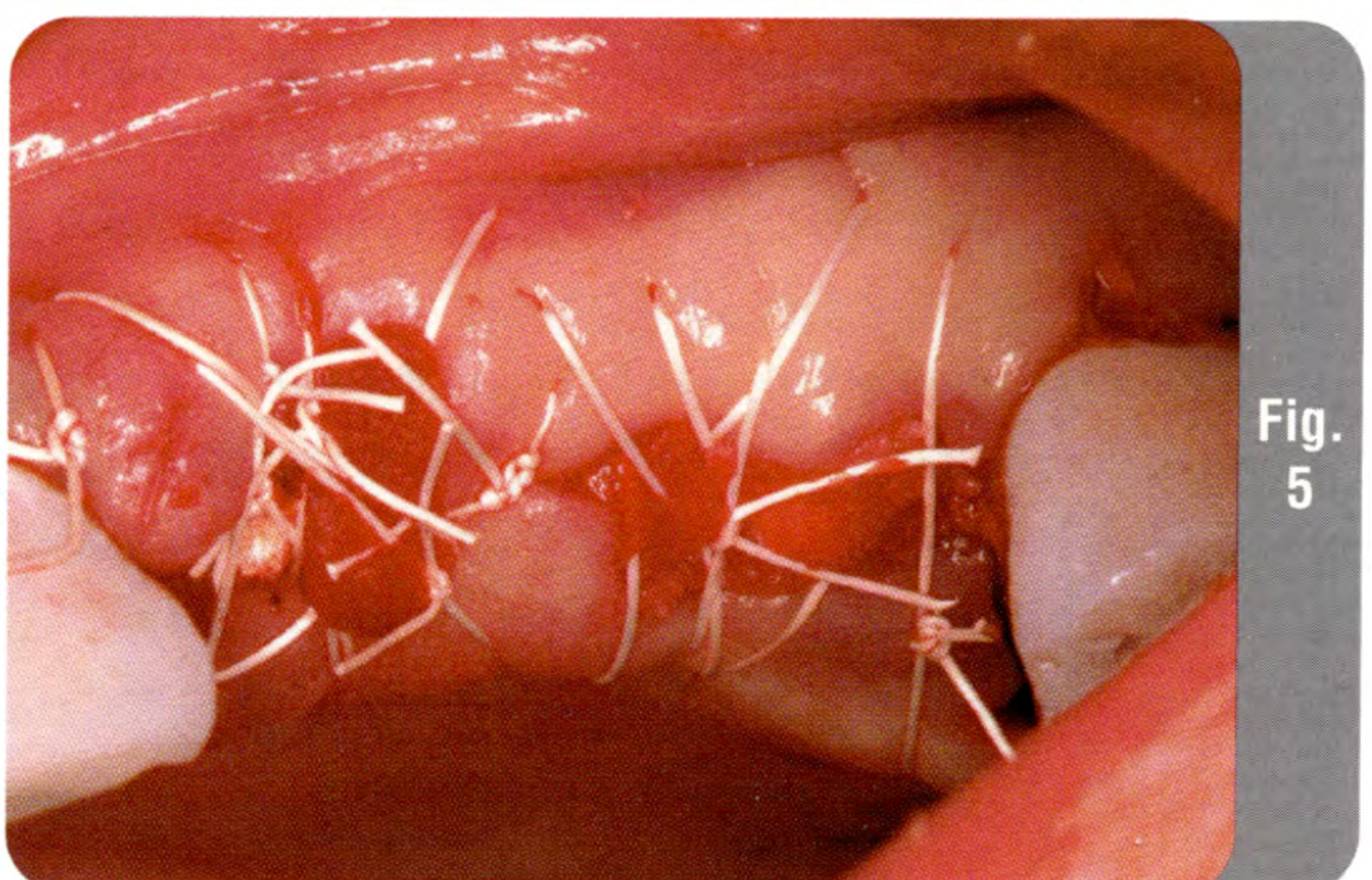


Fig. 5

hand and rotary instruments. Preparation of the osteotomies began in the maxillary left posterior quadrant in tooth sites Nos. 12 and 13. A 2mm twist drill was used first, followed by placement of a Gelb Depth Gauge in site No. 12 and a direction indicator in tooth site No. 13, to verify implant position (Figure 2). After implant direction was confirmed, preparation of the osteotomies continued with the 3mm twist drill and a countersink drill. Osteotomies were prepared for edentulous sites Nos. 4, 5 and 6, followed by placement of 4mm diameter OSSEOTITE® Implants in all five implant sites.

A small circumferential defect was present on the buccal aspect of edentulous site No. 4 and a large circumferential defect was present in edentulous site No. 6. The osseous defects were grafted with freeze-dried bone allograft (FDBA). A very large circumferential defect was present on the buccal aspect of edentulous site No. 12 with no bone to the 8th thread of the implant (Figure 3). The implant placed in edentulous site No. 13 had minimal thread exposure. Both tooth sites Nos. 12 and 13 were grafted with FDBA and covered with an OsseoGuard™ Resorbable Collagen Membrane (Figure 4). The membrane was hydrated with the fluids in the surgical site, draped over the graft and tucked under the soft tissue, without the need for tacking. An OsseoGuard Membrane was chosen in this case to cover the defects, due to its excellent handling characteristics and longer resorption profile (six months). Collagen plugs were then placed over all of the grafted sites, as primary closure was not attainable. Interrupted expanded poly-tetrafluoroethylene (ePTFE) sutures were placed to secure the collagen plugs and the soft tissue (Figure 5). This allowed for epithelialization of the wounds, without the need to place connective tissue grafts or distort the vestibule and normal anatomy.

At the three week post-operative check appointment, the cover screws were exposed over the implants in tooth sites Nos. 5, 12 and 13. No bleeding, inflammation or suppuration was noted. The patient was seen again two months later and healing remained within normal limits.

Four months post-tooth extraction and implant placement, the patient was seen for second-stage surgery. Healing was uneventful. Radiographic examination of the implant sites demonstrated excellent bone regeneration. A palatal approach was used bilaterally in order to augment the volume of soft tissue and the zone of attached gingiva on the buccal aspect (Figure 6). Excellent regeneration of the bony defects was visualized, with complete osseous coverage over all the implants. In tooth site No. 12, 5-6mm of regenerated buccal bone was noted (Figure 7). EP® Titanium Healing Abutments were placed on the implants. The palatal soft tissue flaps were positioned toward the buccal aspect allowing for increased buccal tissue thickness and augmentation. Interrupted resorbable sutures were placed (Figure 8) and periapical radiographs were taken to verify full seating of the healing abutments. The patient was seen for post-second stage evaluation at two weeks and healing was noted to be progressing well. Four weeks later further maturation of the mucosa around the healing abutments was noted (Figure 9). A periapical radiograph was taken (Figure 10) and the patient was dismissed to the restorative dentist for impressions and fabrication of the definitive prostheses.

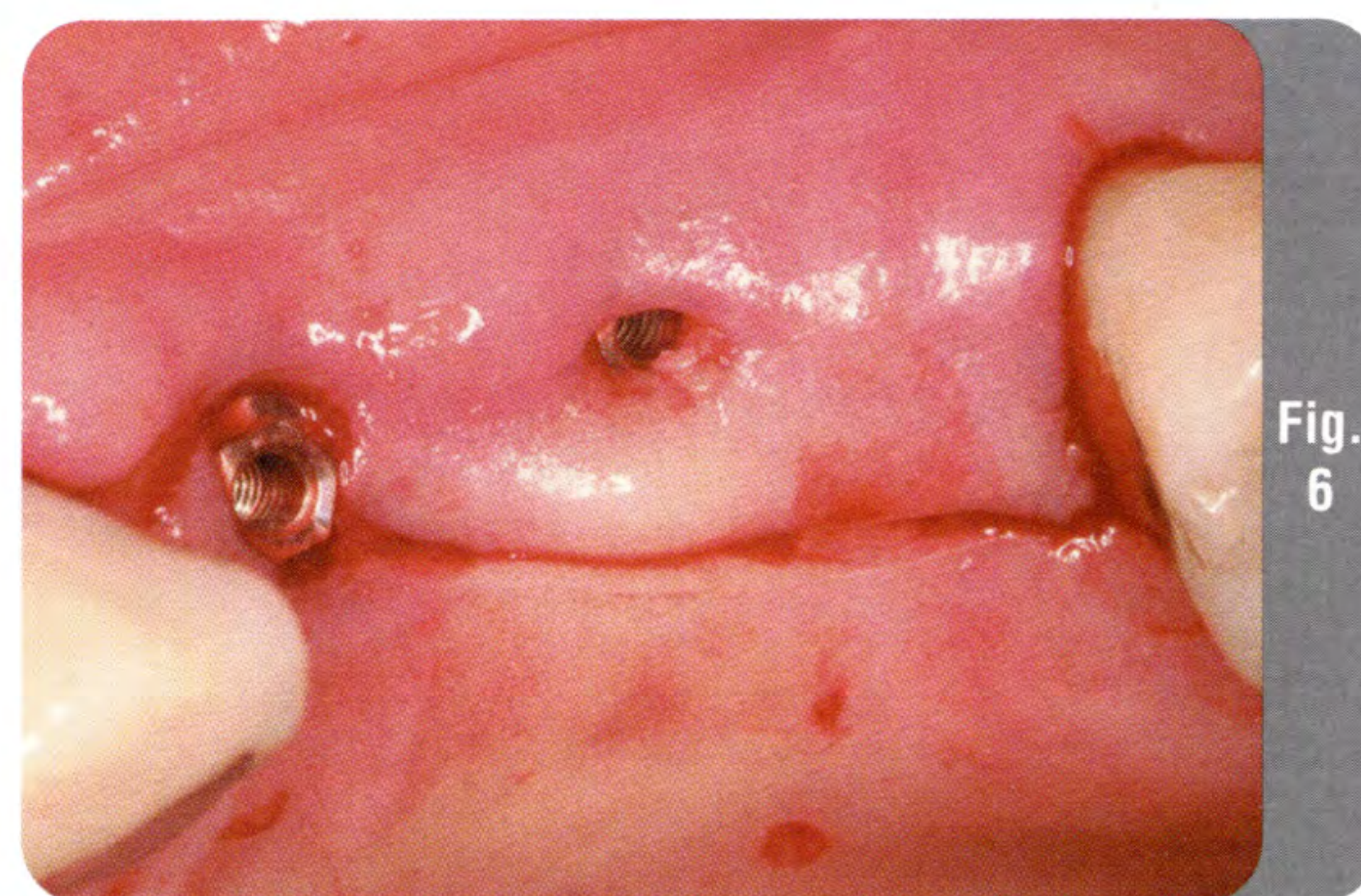


Fig. 6

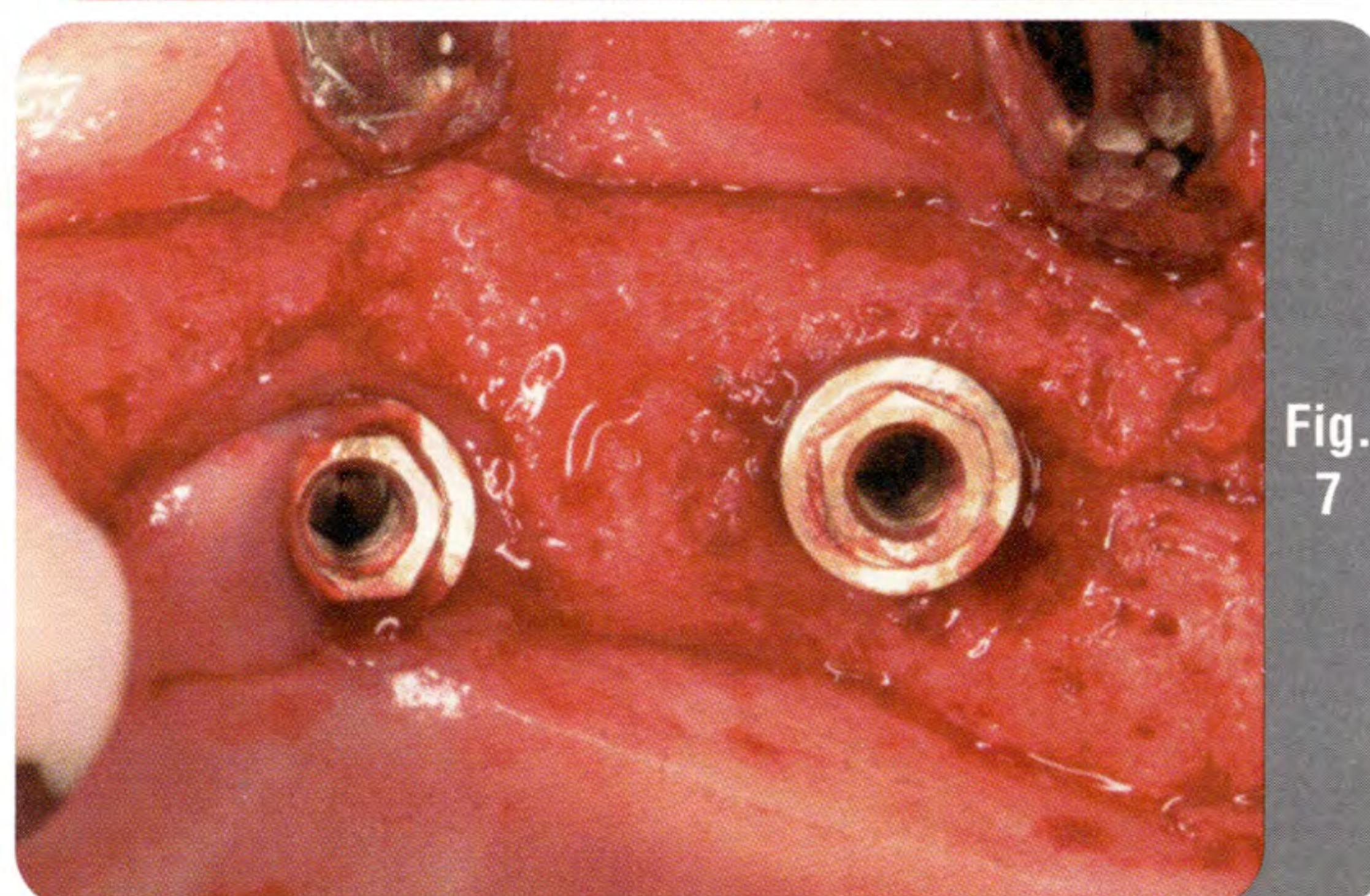


Fig. 7

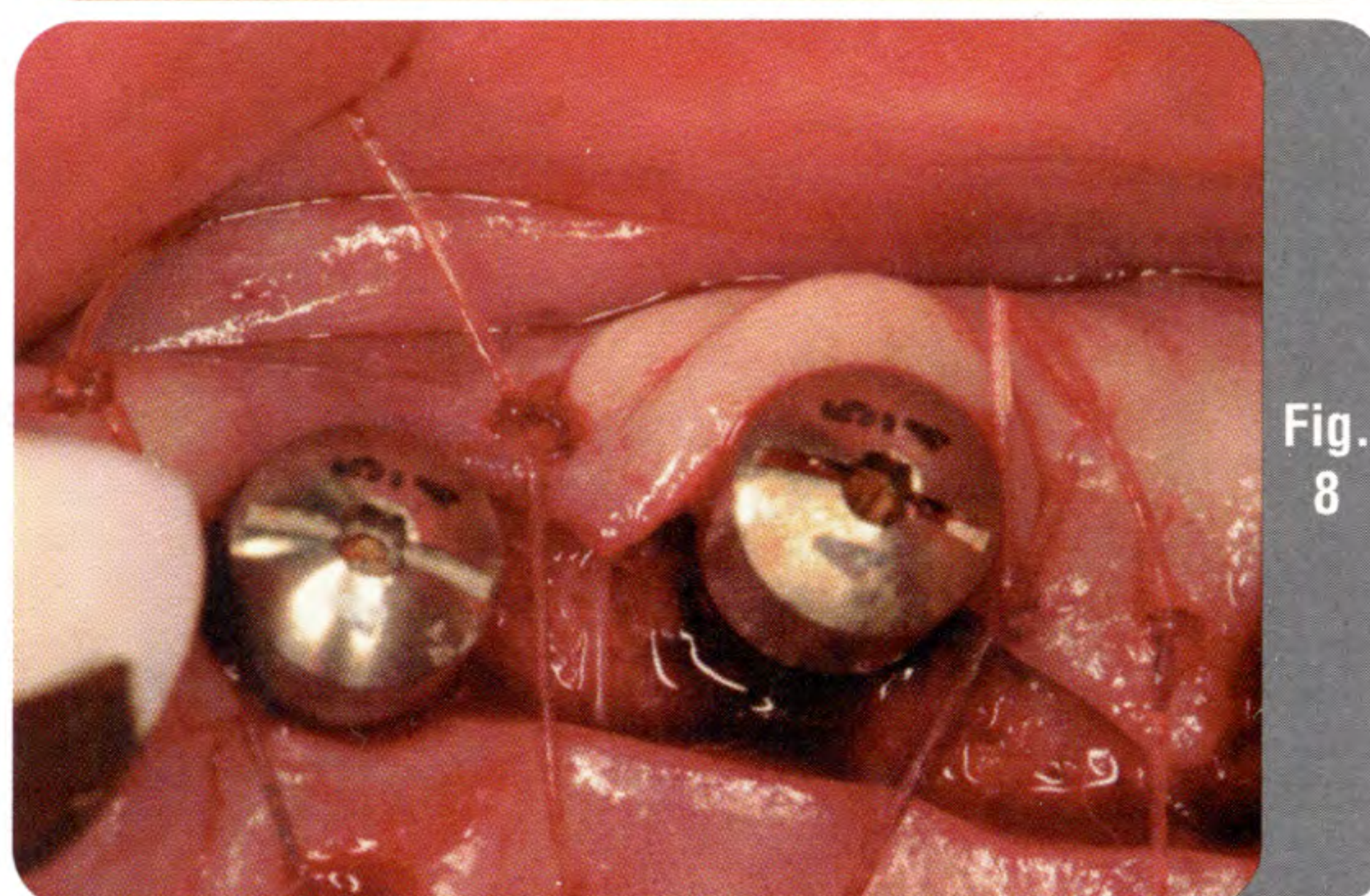


Fig. 8

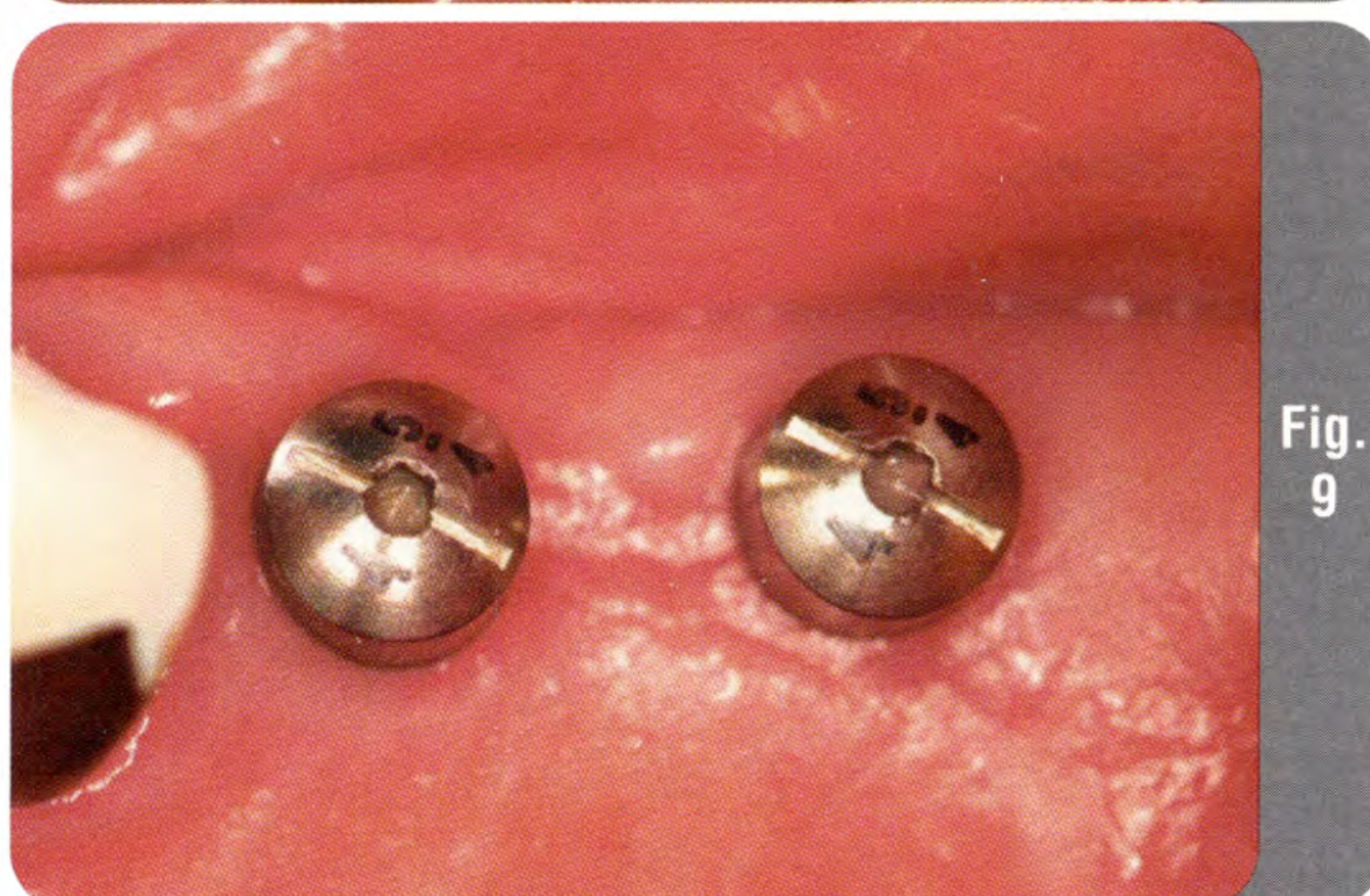


Fig. 9

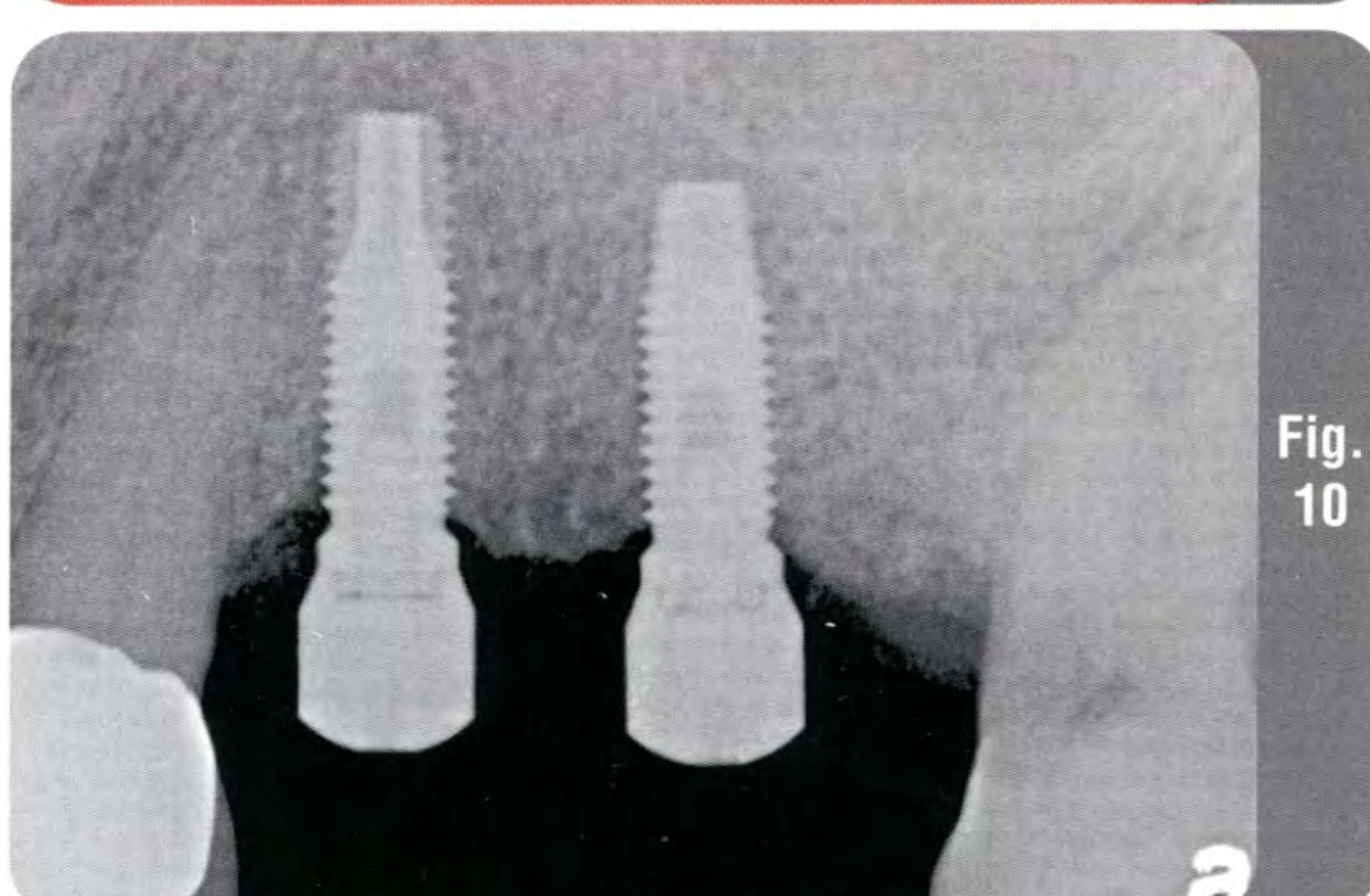


Fig. 10



Fig. 11



Fig. 12

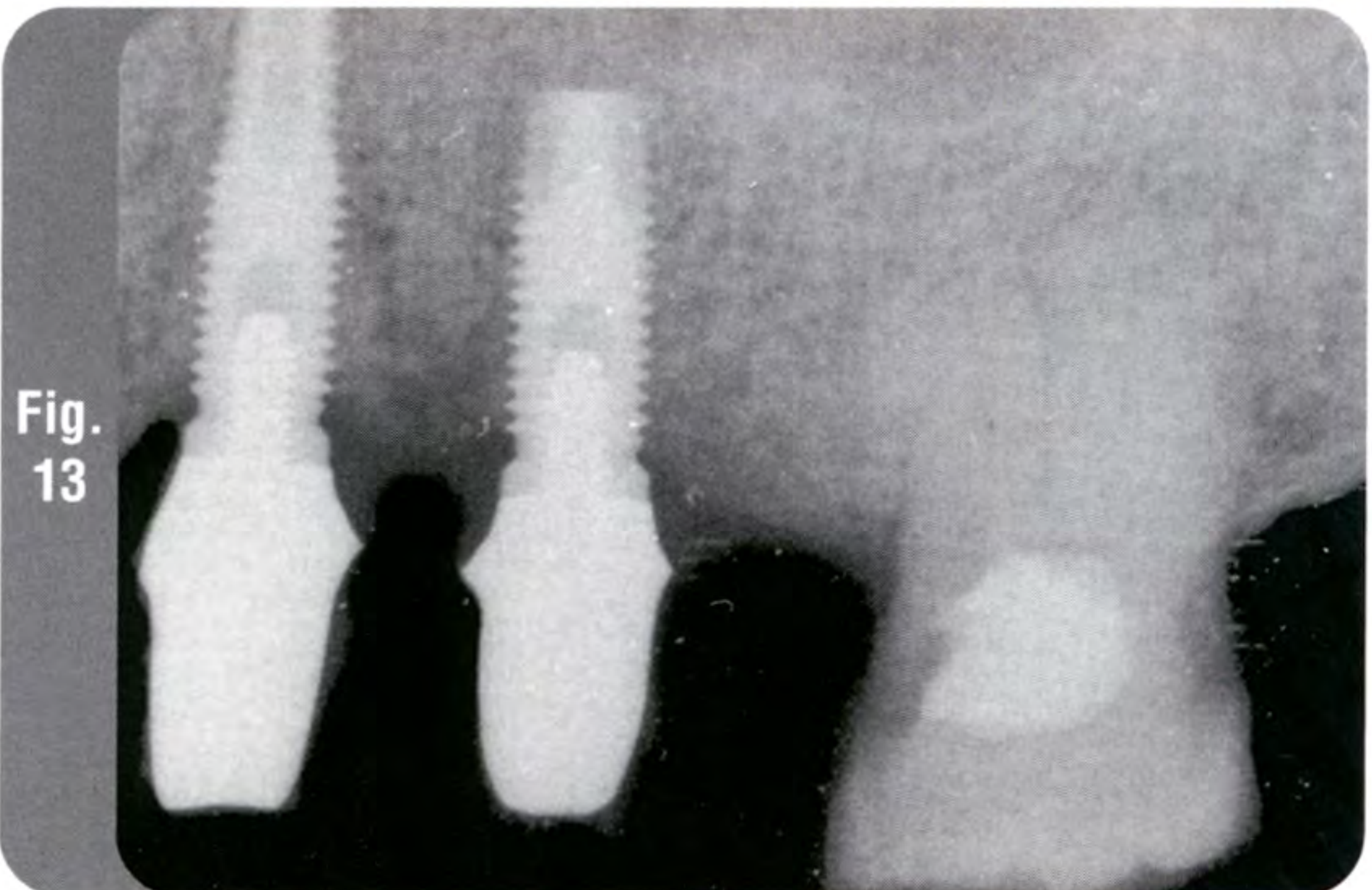


Fig. 13



Fig. 14

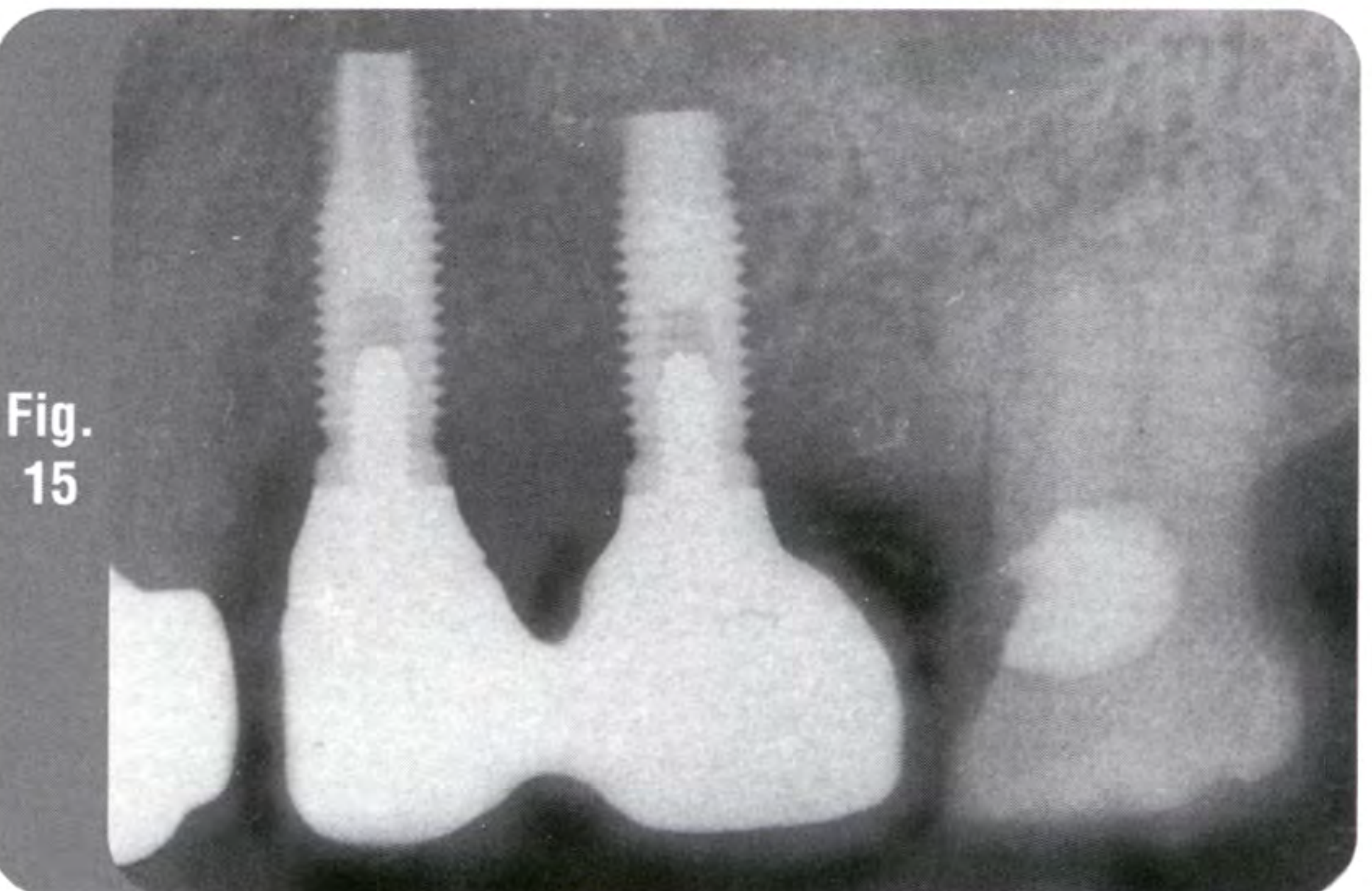


Fig. 15

RESTORATIVE TREATMENT

In the restorative office, the patient presented with excellent soft tissue healing around the titanium healing abutments and adequate attached gingiva for fabrication of the definitive prostheses. Osseous regeneration and second stage surgical design allowed for significant soft tissue enhancement. The healing abutments were removed, impression copings were placed and complete seating was verified via radiographs. An implant level impression was made with polyvinylsiloxane material. An alginate impression was made of the opposing arch and sent to the commercial dental laboratory along with the implant impression, occlusal record and shade selection for fabrication of custom cast abutments. Splinted restorations were chosen for better occlusal load distribution.

The patient returned to the restorative office a few weeks later for abutment and framework try-in. The healing abutments were replaced by the custom cast abutments and oriented with the aid of duralay verification indexes (Figure 11). The frameworks were then seated and the fit was checked clinically and radiographically. Once the fit was verified, the abutments and frameworks were then removed and sent back to the laboratory for porcelain application.

The patient returned to the restorative office two weeks later for abutment seating and placement of the definitive restorations. The healing abutments were removed. The custom abutments were seated and secured with square Gold-Tite® Abutment Screws tightened to 32Ncm of torque (Figure 12). A verification radiograph was taken (Figure 13). The restorations were tried in, adjusted interproximally and contoured for optimal occlusal contacts in centric and eccentric positions, then cemented (Figure 14). Post insertion radiographs were taken (Figure 15) and the patient was dismissed with oral hygiene instructions.

CLINICAL OVERVIEW

This clinical case presentation illustrates a partially edentulous patient with hopeless teeth due to advanced caries. The treatment plan accepted by the patient included extraction of the hopeless maxillary posterior teeth and immediate implant placement. Due to the severity of the osseous defects created by the extractions, simultaneous guided bone regeneration was necessary. The defects were grafted with freeze-dried bone grafts (FDBG) and the maxillary left defects were covered with an OsseoGuard™ Membrane, which was chosen in this case due to its excellent handling characteristics—drapability and a longer resorption profile (six months). A two-stage surgical procedure was performed with implant exposure four months post extraction, implant placement and regeneration.

Restorative Colleague: Dr. Steven Regenstein, Westport, Connecticut

††† Dr. Sonick received his dental degree from the University of Connecticut, School of Dental Medicine in Farmington, Connecticut, completed his General Practice Residency at Metropolitan Hospital in New York and received his Certificate in Periodontics from Emory University School of Dentistry in Atlanta, Georgia. He later received his Certificate in Implantology from Harvard School of Dental Medicine. Dr. Sonick maintains a private practice, limited to periodontics and implant dentistry in Fairfield, Connecticut.