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Dental **PRODUCT SHOPPER**

TILTED IMPLANTS FOR A MANDIBULAR HYBRID PROSTHESIS

CASE PRESENTATION | 3

This case demonstrates the use of tilted implants and angled abutments to support an immediate fixed provisional hybrid restoration on 4 implants (see Sidebar, page 15A).

A 61-year-old male presented with this chief complaint: “I know I am losing my teeth and now is the best time for me to get the treatment.” He cited age, economics, and probable future problems. He also was concerned about esthetics. The dental history included a long process of periodontal treatment, including 2 major surgeries; the medical history was unremarkable.

The maxillary and mandibular dentition was hopeless due to bone loss and the periodontal condition. The patient did not want any kind of removable prosthesis, and fixed restorations would require replacement of teeth and gingival contour. Due to the extensive bone loss, we selected a hybrid prosthesis with a denture-teeth and acrylic design with a cast or milled bar as a substructure. Although the patient could have received an immediate provisional for the maxillary and mandibular arch at the same appointment, he elected to have only the mandibular arch treated.

Because of inadequate bone superior to the inferior alveolar nerve and posterior to the mental foramen, tilted implants and angled abutments were indicated for the right and left most distal implants. This would increase the A-P spread (see Sidebar), allow longer implants for more support, and eliminate the need for bone grafting. The 2 anterior implants would be placed vertically to receive straight abutments. On the day of surgery, the teeth would be removed, implants placed, and an immediate provisional fixed prosthesis delivered.

The case was set up for the same procedure as an immediate denture delivery with the denture converted to a fixed provisional restoration after implant placement.

The patient’s vertical occlusion was recorded before teeth extraction. A mark was made on the patient’s nose and chin, and a record of this distance was noted with the teeth together and by marking a tongue blade.

The following photo essay describes the steps taken in this case.

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Daulton Keith, DDS, has a private practice in Periodontics in Charleston, SC and serves on the faculty of the Medical University of South Carolina, College of Dental Medicine, as a Clinical Professor in the Division of Graduate Periodontics.

Henry Martin, CDT, is president of Restorative Arts Dental Laboratory in Charleston, SC. With more than 25 years of experience in implant restorations, Henry has advanced training and experience in most systems, making implants a specialty of Restorative Arts.

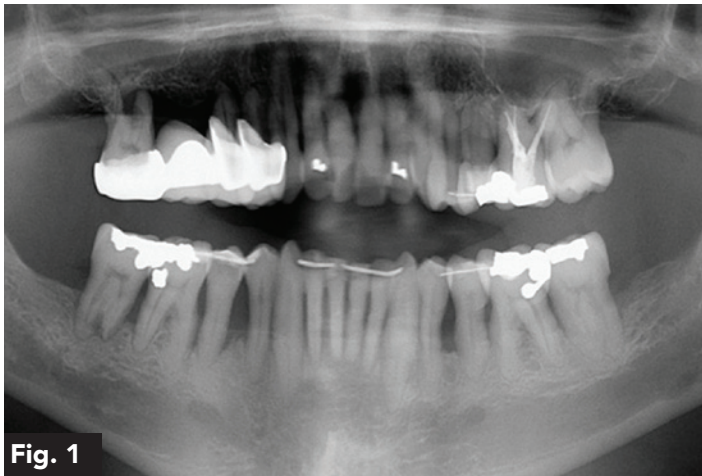


Fig. 1



Fig. 2



Fig. 3

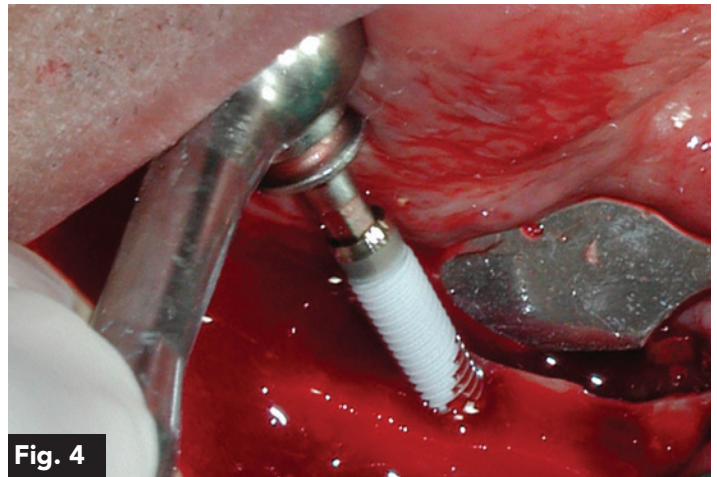


Fig. 4

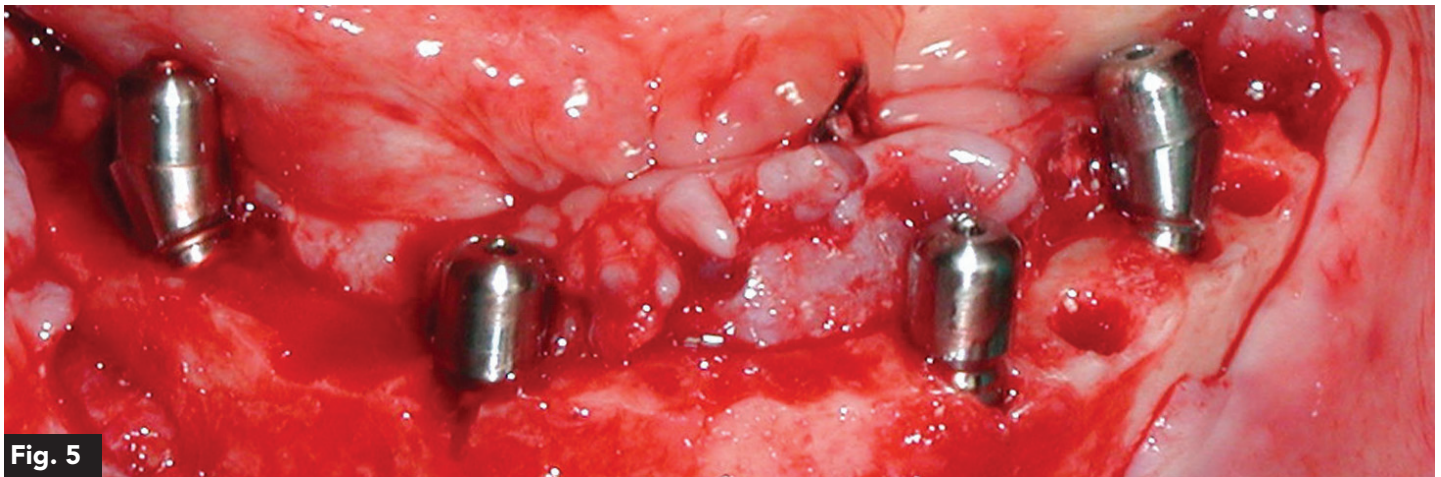


Fig. 5

Figure 1 and Figure 2—Preoperative radiograph and pre-operative retracted view.

Figure 3—An immediate denture was fabricated, as was a surgical guide to ensure that screws exit lingual to the incisal edges in the anterior and on the occlusal in the posterior. The denture and occlusal index are shown on the articulator. The index ensures reproduction of correct vertical dimension of occlusion and centric occlusion on the immediate provisional.

Figure 4—Following extraction, bone contouring, and confirmation of adequate space, the osteotomy for the right and left distal implants were prepared at 30 to 35 degree angles. The implants were then placed in the osteotomy site (shown) with a torque greater than 30 Ncm

and were ready for placing a provisional fixed restoration. The 2 posterior implants were placed in a tilted position and the 2 anterior implants were placed in a vertical position.

Figure 5—Four implants were placed. Positions 20, 27, and 29 received Tapered Screw-Vent 3.7 mmD x 16 mm implants (Zimmer) and position 22 received a 4.1 mmD x 16 mm. Implants in positions 20 and 29 received Angled Tapered Abutments (Zimmer) and 22 and 27 received straight Tapered Abutments (Zimmer). The case was then ready for conversion of the immediate denture to a fixed provisional restoration. (If the implants had not reached a torque value for a fixed provisional, the denture would have received a soft liner and delivered as an immediate denture.) Tapered Abutment Titanium Healing Caps were placed on the 4 abutments (shown).



Fig. 6



Fig. 7



Fig. 8

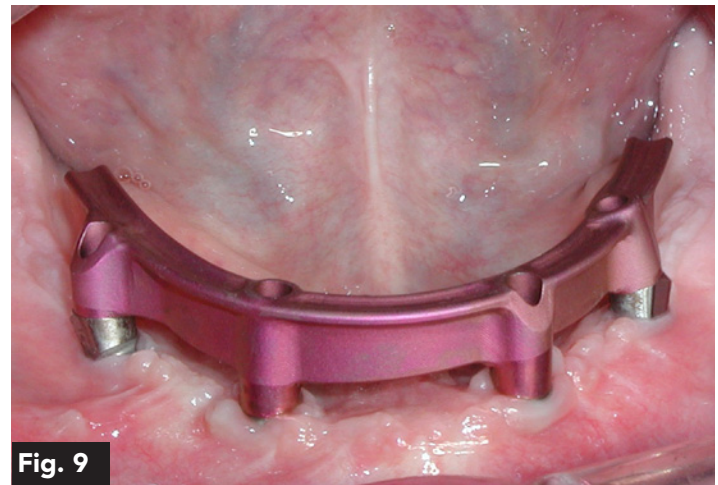


Fig. 9

Figure 6—The denture was placed in the mouth with the premade index and a quick-set bite registration material was placed in the denture. The patient closed into centric and into the pre-recorded vertical dimension.

Figure 7—Following healing caps removal, placing of Tapered Abutment Indirect Transfers, and suturing, an impression was made to make a working cast outside the mouth. An accurate cast was made with a quick-set stone and Tapered Abutment Replicas. The healing caps were placed on the analogs (replicas) in the cast and it was mounted on the selected articulator using the occlusal recording made in the patient's mouth for centric and vertical. After it was converted to a fixed provisional using the Titanium Temporary Copings, the denture was delivered to the patient (shown). It did not incorporate a cantilever extension due to potential of acrylic fracture. The provisional denture should not be removed for 8 to 10 weeks. The final prosthesis will cantilever to occlude with the maxillary first molar.

Figure 8—After 3 months, the patient was scheduled for final impression. The tissue was healthy and the implants were stable. A custom tray was fabricated for a direct open tray impression. The Tapered Abutment Direct Transfers were placed and connected with dental floss, which supported the addition of ERA PickUp material (Sterngold) to stabilize the transfers (shown) in the impression. A final impression was sent to the lab, who will return a try-in set-up before the bar substructure is made.

Figure 9—The try-in set-up and a verification jig were returned from the lab. The jig was made on the working cast and tried on the implants to confirm accuracy of the cast that was made from the impression. The next step was the esthetic try-in. After patient acceptance of the set-up, a confirmation occlusal registration was made for the laboratory (AccuFrame Plus, Cagenix Inc, Memphis, TN) to mill a CAD/CAM bar (shown). It is essential to have an esthetic try-in prior to the bar construction to assure that proper tooth position can be accomplished without interference from the bar.



Fig. 10

Figure 10—After the fit was confirmed, the bar was returned to the laboratory for a wax-up and an optional second esthetic try-in. Then the laboratory was ready to fabricate the prosthesis (shown).



Fig. 11

Figure 11—The prosthesis was placed on the implants and evaluated for fit, occlusion, and patient acceptance.

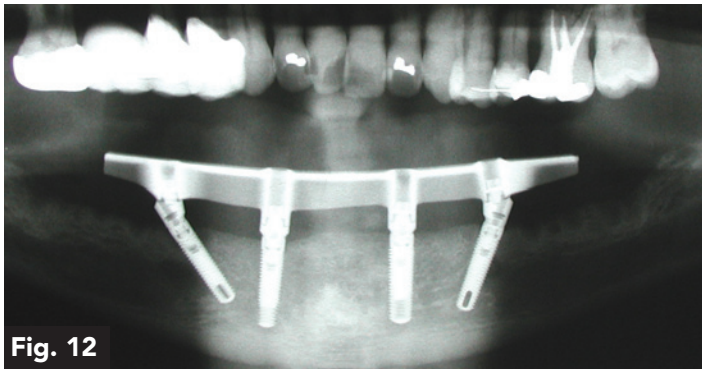
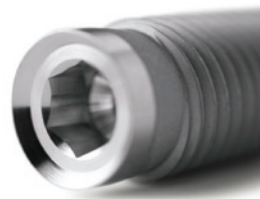


Fig. 12

Figure 12—After the coping screws were torqued to 20 Ncm, a final radiograph was made. The patient was given oral hygiene instructions and the screw access holes were covered with a provisional filling material. At the one-week evaluation visit, a definitive material was placed to close the screw access holes.

GO-TO PRODUCTS USED IN THIS CASE



TAPERED SCREW-VENT IMPLANT

Tapered Screw-Vent implants are available in 3.7, 4.1, 4.7, and 6.0 mm. The friction-fit, internal hex platform reduces stress and resists abutment screw loosening.

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ANGLED TAPERED ABUTMENTS

Zimmer Angled Tapered Abutments offer the flexibility to place implants off-axis and choose from multiple surgical protocols.

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Treatment Philosophy Behind this Case

Options for replacing missing dentition include complete dentures, implant-retained or implant-supported removable dentures, or some form of fixed restoration. While most patients would prefer to have a fixed restoration supported by dental implants, poor bone quality and/or inadequate bone quantity or anatomical structures can complicate implant placement. Surgical options to correct this problem can increase time of treatment, make it a complex procedure, and significantly increase the overall cost. Many patients have financial limitations and cannot have the costly treatment.

In the resorbed mandible, it is difficult to place implants distal to the mental foramen due to the inferior alveolar nerve. The anterior loop of the mental nerve also limits how close the implant can be placed anterior to the mental foramen.

Usually a mandibular fixed hybrid prosthesis will have a cantilever distal extension to provide occlusal support through the first molar area. The critical factor in determining the limitation to cantilever extension is the anteroposterior distance (A-P spread). It is defined by Dr.

Carl Misch in *Dental Implant Prosthodontics* as a measurement of the distance between a line joining the center of the most anterior implant and a line through the distal of the most distal implants. Various authors have suggested methods to evaluate and design the A-P spread. A determination of the A-P spread will suggest the acceptable length of the cantilever distal to the most distal implant on each side. An accepted fact is the greater the A-P spread, the less cantilever extension is needed to achieve adequate posterior occlusion. This increase also better distributes the forces of occlusion to all of the implants. Tilted implants and angled abutments have a significant advantage in multiple-unit fixed-prosthetic cases with anatomic limitations.

Tilting the implants in the mandible avoids critical nerve structures and increases the A-P spread. With this design, longer implants can be used for increased bone support. The literature confirms that immediate loading of implants in the anterior mandible has a high rate of success whether it is with 4, 5, or 6 implants. Patient selection, meticulous surgery, proper restorations, and maintenance are keys to success.