The successful long-term use of osseointegrated implants to treat edentulousness has expanded its application to partially edentulous patients. Patients who are intolerant of or psychologically dissatisfied with removable partial dentures and have sufficient bone volume may opt for alternative treatment with the use of implants to replace the missing dentition. Implant treatment is also indicated for those patients who have compromised dentition that requires complete oral rehabilitation. Successful restoration with implant-supported prostheses has been reported in the treatment of patients with extreme occlusal attrition. A short-term clinical evaluation by Ericsson et al revealed that no significant biomechanical problems existed when implants were used in combination with the remaining teeth as abutments for fixed partial dentures (FPDs) in periodontally compromised dentition.

This article describes the occlusal rehabilitation of a partially edentulous patient who did not want a removable partial denture. Implants and extensive fixed restorations were used to restore posterior support and treat severely worn dentition, respectively. The treatment offered the patient a functional and esthetic result.

**CLINICAL REPORT**

A 66-year-old man presented with complaints of difficulty chewing and a recently fractured maxillary left central incisor. He had not previously worn a removable partial denture. An extraoral examination suggested that he had a reduced face height. There was severe loss of tooth structure from the lingual cusps of the maxillary teeth, with almost total loss of the left central incisor crown (Fig. 1). The mandibular teeth showed less severe tooth wear, but the canines were tilted mesially, resulting in poor canine guidance in lateral excursion (Fig. 2). There was also evidence of cervical abrasion and gingival recession of the canines with a caries lesion affecting the left canine. The occlusion in intercuspal position showed an excessive anterior or vertical overlap (Fig. 3), and in protrusion, contact was found on the remaining incisors. The occlusal plane was uneven, and the vertical dimension of occlusion (VDO) was reduced secondary to loss of posterior support and broken-down teeth. Radiographic exami-
nation revealed extensive caries that involved the maxillary FPD first premolar abutment and an early furcation involvement of the left mandibular molar. There was adequate bone in the posterior edentulous mandibular segments for implant placement (Fig. 4).

Diagnostic casts were mounted in centric relation in a semiadjustable articulator with the use of an arbitrary face-bow transfer and mandibular record base. Occlusal adjustment of the casts and a diagnostic wax-up that included the edentulous segments were carried out in the laboratory to achieve the desired tooth contour and occlusion at an increased VDO of 3 mm, measured at the incisors. The conventional method of evaluating a patient’s tolerance to an increased VDO is to provide a removable partial denture that replaces the missing teeth. Because the patient did not want to have a removable prosthesis, provisional fixed restorations on the natural teeth and the implants were planned.

Six titanium implants (Branemark, Nobel Biocare, Gotenberg, Sweden), 3 in each posterior segment, were placed as recommended after a 2-stage surgical protocol. Standard abutments were connected 3 weeks after surgical exposure. This type of conventional supragingival abutment was used to allow easier access for oral hygiene; esthetics were less of a concern in the posterior mandibular segments. At the provisional FPD insertion stage, the most distal implant in the left mandible was found not to have integrated and was removed. Because the patient did not wish to undergo surgery to replace the lost implant, a distal cantilever was unavoidable.

The maxillary restoration included a new FPD to replace the existing one, with the right canine as the mesial abutment and the first premolar extracted. Cast post and cores were constructed on the endodontically treated incisors. Endodontic therapy was elected because severe loss of coronal dentin made it impossible to obtain adequate retention without using the root canals. The right lateral incisor was endodontically treated because of periapical involvement. These teeth and the remaining maxillary and mandibular teeth were prepared for metal-ceramic crown restorations.

The preparation of all the teeth was performed in stages. The teeth were provisionally restored with long-term laboratory-fabricated heat-polymerized provisional prostheses. The less severely worn mandibular incisors were restored conservatively with composite (Filtex Z250, 3M Dental Products, St Paul, Minn.), and the anterior guidance was developed on the provisionally restored maxillary incisors. Other treatment options for the mandibular incisors were discussed with the patient. The fixed implant-retained provisionals were comfortable and ensured posterior stability during the period established to evaluate the patient’s tolerance to the newly established VDO.

After a satisfactory trial period of 3 months, final impressions were made in polyether impression material (Impregum, ESPE Dental AG, Seefeld, Germany). Centric jaw relation was registered at the VDO established by the provisionals. Anterior guidance was provided to the technician through mounted diagnostic casts of the provisional restorations. The framework castings were evaluated for fit intraorally before porcelain application. The restorations were luted with zinc polycarboxylate cement (Poly F, Dentsply, Surrey, United Kingdom). The implant-retained FPDs were attached to the abutments with gold screws, and the access holes were filled with light-polymerized composite. The occlusion was developed with maximum intercuspation in centric relation position at an increased VDO. The centric stops on the maxillary incisors were located on the metal surfaces of the ceramic metal-crowns because the opposing teeth were natural (Fig. 5). A canine-protected occlusion with protrusive disclusion was established to reduce lateral forces on the mandibular implant-supported prostheses.
At a follow-up appointment, the mandibular incisors were prepared for ceramic veneers because the patient wished to improve their appearance. The patient was placed on a strict recall schedule for hygiene follow-up and monitoring of the changes in the implant bone level. The restorations were in function successfully for 2 years without any problems. At 2.5 years, as a result of fracture, both ceramic veneers on the mandibular central incisors were replaced with ceramic-metal crowns (Fig. 6).

DISCUSSION

Extensive prosthodontic reconstruction of a patient with severe tooth wear and a long edentulous span can be a great challenge, as it involves the commitment of both the dentist and the patient. Complete reconstruction has the advantage of allowing one to idealize the occlusion. A simple treatment option available for worn dentition is to restore it with overlay removable partial dentures. This is a cost-effective treatment, and because the dentures are removable, the patient can easily perform oral hygiene. However, patients tend to dislike removable dentures because they are bulky and uncomfortable and lack stability; this is especially true with distal extension restorations.

Balshi and Wolfinger described the occlusal rehabilitation of a patient with loss of posterior support and tooth wear; the remaining teeth were sacrificed and replaced with a complete-arch implant-supported fixed detachable prosthesis. In the patient treatment presented here, an organized approach to occlusal reconstruction with fixed restorations was implemented, and osseointegrated implants were used to support the mandibular prostheses. The use of implants eliminated the need for removable partial dentures in both the provisional and permanent stages. The natural teeth were retained, and implants were placed because the teeth had a favorable prognosis and adequate bone for implants existed in the posterior edentulous spans. It was also easier to achieve a good passive fit on a short-span partial denture than on a more complex cross-arch framework. Sacrificing the remaining teeth, which could be considered a radical approach, might have been traumatic to the patient. Furthermore, with the reported high survival rate of implants in the posterior mandible and favorable long-term continuous prosthesis stability, this procedure offered a rational treatment option for a patient with a long posterior edentulous span.

A distal cantilever on the left, implant-supported FPD was unavoidable because of the loss of an implant. The decision not to connect the prosthesis to the distal natural tooth was made because of the guarded prognosis of the tooth. The loss of a natural tooth, if it is splinted to the implants, inevitably will result in alteration of the design or the need to remake the prosthesis. The potential risk of biomechanical complication with tooth-implant connections (because of the difference in their mobility) had to be considered as well. Apparent tooth intrusion has been reported when natural teeth are attached to implants in fixed restorations. However, there is also the possibility of occlusal overloading of the 2 implants; this concern had to be monitored closely.

SUMMARY

In the patient treatment presented, an organized approach to occlusal reconstruction with fixed restorations was implemented, and osseointegrated implants were used to support the mandibular prostheses. The use of implants eliminated the need for removable partial dentures in both the provisional and permanent stages.

REFERENCES


Access to The Journal of Prosthetic Dentistry is reserved for print subscribers!

Full-text access to The Journal of Prosthetic Dentistry Online is available for all print subscribers. To activate your individual online subscription, please visit The Journal of Prosthetic Dentistry Online, point your browser to http://www.mosby.com/prosdent, follow the prompts to activate online access here, and follow the instructions. To activate your account, you will need your subscriber account number, which you can find on your mailing label (note: the number of digits in your subscriber account number varies from 6 to 10). See the example below in which the subscriber account number has been circled:

Sample mailing label

This is your subscription account number

<table>
<thead>
<tr>
<th>3-DIGIT 001</th>
</tr>
</thead>
<tbody>
<tr>
<td>SJ P1</td>
</tr>
<tr>
<td>FEB00 J010 C: 1 (1234567-890) U 05/00 Q: 1</td>
</tr>
<tr>
<td>531 MAIN ST</td>
</tr>
<tr>
<td>CENTER CITY, NY 10001-001</td>
</tr>
</tbody>
</table>

Personal subscriptions to The Journal of Prosthetic Dentistry Online are for individual use only and may not be transferred. Use of The Journal of Prosthetic Dentistry Online is subject to agreement to the terms and conditions as indicated online.