EXPANDING THE BENEFITS OF IMPLANT THERAPY: IMPLANT-RETAINED REMOVABLE PARTIAL DENTURES

ROBERT C. VOGEL, DDS

ABSTRACT: The multitude of benefits patients derive from implant-based therapy has been well documented for more than 20 years. Implant-based modalities have expanded the options for replacing teeth and returning function in both partial and fully edentulous situations. This article is not intended to review the predictability of fixed implant-supported restorations or the overwhelming health, psychological, and functional benefits derived from removable overdenture therapy. This article will present the clinical and social advantages of an alternative treatment option—implant-retained removable partial dentures—that allows more patients to benefit from implant-based care.
Limitations in health, anatomy, finances, or social issues. This conservative treatment modality provides options for additional treatment in the future and accommodates changes in the remaining natural dentition.\textsuperscript{1,3} Limitations to conventional fixed prosthesis are often a result of advanced ridge resorption, with concurrent loss of facial esthetics caused by lack of facial support of the lips and soft tissues of the face, as well as inadequate ridge form that precludes ideal implant placement. Other limiting factors to be considered in fixed implant-supported restorations include lack of hygiene access, multiple surgical procedures, and cost. Limitations of conventional, nonimplant-supported RPD therapy\textsuperscript{4} include a lack of stability, minimal retention, periodontally compromised abutment teeth, and unesthetic clasps.\textsuperscript{5} These limitations frequently are accompanied by discomfort (of the underlying edentulous ridge), accelerated tooth loss, and traumatic forces, as well as patient reluctance to use the appliance routinely. Further, if a critical abutment tooth is lost, these appliances can be rendered useless. While there has been minimal literature on this treatment option, a recent literature review\textsuperscript{6} indicated that the use of implants in conjunction with remaining natural teeth in the form of an implant-retained RPD provides patients with exceptional service and benefits not attainable with more conventional treatment options. Mijiritsky and colleagues\textsuperscript{7} found that patients receiving this treatment had only minor prosthetic complications, great satisfaction, and improved chewing efficiency. The researchers determined that the treatment modality is viable and cost-effective. Other studies have confirmed improved esthetics,\textsuperscript{8,9} fewer patient visits,\textsuperscript{3,10} and the ability to avoid additional surgical procedures. The placement of dental implants in an edentulous space not only provides the biologic benefit of reducing bone resorption,\textsuperscript{11} but in the case of an implant-retained RPD, also provides distinct biomechanical advantage\textsuperscript{7} in reducing the effect of the reciprocal arm of a conventional RPD and improving the fulcrum line position, as well as offering superior retention and elimination of unesthetic clasps in the esthetic zone. The ability to have a flange on such a prosthesis also allows for replacement of facial esthetics and extraoral soft-tissue support lost from advanced ridge resorption. An implant-retained RPD also allows for the addition of prosthetic teeth with minimal modification to the prosthesis should a natural tooth be lost, as well as the ability to perform additional surgical procedures while maintaining the use of the prosthesis as a transitional appliance. In this author’s experience of placing more than 70 implant-retained RPDs, this modality has become a rewarding treatment option. For the patients, it has provided outstanding comfort and satisfaction. For the clinician, it has offered prosthetic simplicity and the ability to perform maintenance and modification over the long term. This modality also has provided the ability to transition patients into fixed implant-supported restorations through placement of additional implants with and without augmentation.

\textbf{FIGURE 2A} Initial presentation radiograph of 68-year-old man before loss of mandibular anterior bridge.

\textbf{FIGURE 2B} Mandibular anterior teeth following fracture and loss of bridge.

\textbf{FIGURE 2C} Long-span unilateral edentulous mandibular ridge after placement of one implant to eliminate chronic lifting of the saddle with associated food impaction and mucosal soreness.

\textbf{FIGURE 2D} Tissue surface of tooth- and implant-retained appliance with housing and retentive component cured into base.

\textbf{FIGURE 2E} Delivery of prosthesis with verification of borders and tissue contact.

\textbf{FIGURE 2F} Final prosthesis in full occlusion and function with elimination of trauma to edentulous ridge and remaining teeth as well as ideal retention.
procedures or to transition to a conventional implant overdenture after the loss of the remaining natural teeth. Further, these benefits are realized in a conservative and cost-effective manner.

**CLINICAL CASES**
The following clinical cases explore the rationale, design, and benefit of this treatment option. An important note of consideration in Cases 2 and 4 is that of the combined use of natural teeth and implants in one arch. As teeth are considered resilient because of the presence of a periodontal ligament, and osseointegrated implants are considered rigid because of direct contact with bone, the author recommends using a “resilient” implant attachment (Locator® implant attachment systems, Zest Anchors, Inc, Escondido, CA) to provide the level of resilience needed for an implant-retained, tissue-supported appliance and to allow for normal movement of the teeth.

**Case 1**
A 53-year-old man presented with an RPD that was esthetically unacceptable because the clasp was visible on the anterior teeth. Periodontally compromised abutment teeth created a lack of denture retention (Figure 1A). Treatment options were presented, including bilateral posterior augmentation with seven implants to provide a fixed restoration, which was not financially feasible for the patient at that time. Strategic placement of four implants in areas of adequate existing bone (Figure 1B) allowed for the fabrication of a claspless partial denture (Figure 1C and Figure 1D) with ideal esthetics and retention (Figure 1E). This option offered the ability to transition to a full-arch fixed restoration with grafting and additional implants or to a conventional maxillary overdenture if the remaining natural teeth were lost. Added benefits realized from this treatment were decreased mobility of the natural teeth through elimination of traumatic forces and retention of proprioception. This option also was more economically feasible for the patient.

**Case 2**
A 68-year-old man presented with a long-span unilateral edentulous mandible (Figure 2A and Figure 2B). The patient was unable to tolerate his existing RPD because of lifting of the saddle, which allowed food to enter, and chronic mucosal soreness of the edentulous ridge from food entrapment and rotational movement of the appliance. The patient had a desire to maintain his existing teeth as long as practical. The placement of one implant (Figure 2C and Figure 2D) provided ideal retention to eliminate lifting of the saddle and restricted the rotational movement to result in elimination of chronic mucosal sore spots as well as removal of traumatic forces from the remaining teeth (Figure 2E and Figure 2F). This conservative procedure allows for placement of additional implants, should they become necessary.

**Case 3**
A 62-year-old patient presented with a need for posterior occlusion. The six anterior teeth were periodontally stable but compromised by decay and abfraction in the gingival third (Figure 3A). A lack of posterior bone through resorption and sinus expansion precluded placement of implants distal to the first bicuspid region without significant augmentation. Health concerns were a consideration, limiting the number and extent of surgical procedures. Additionally, structural compromise of the natural teeth created a high risk of fracture if conventional clasping or full-coverage restorations were used. Bilateral placement of single implants (Figure 3B and Figure 3C) provided uncompromised retention and esthetics (Figure 3D) with the ability to transition to posterior fixed implant-supported bridges in the future if additional implants were placed. This conservative treatment option did not rely on compromised teeth for retention or require preparation of the teeth for full-coverage splinting, as would be required with a precision-attachment partial denture. The treatment also required only minimally invasive surgery and was cost-effective.

**Case 4**
A 70-year-old woman presented having recently lost her remaining mandibular right cuspid and first bicuspid (Figure 4A and Figure 4B). Placement of two implants...
provided ideal retention (Figure 4C and Figure 4D), a level of occlusal support (Figure 4E) on the irregular residual ridge with thin overlying mucosa, and the ability to convert to a traditional implant overdenture should the teeth on the left side be lost.

CONCLUSION
Implant-retained RPDs should be presented to patients whenever an RPD is considered or conventional fixed prosthetic options are met with limitations. This treatment modality offers the multitude of benefits of implant-based therapy—biologic, biomechanical, social, and psychological—to more patients.

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REFERENCES

ABOUT THE AUTHOR: Robert C. Vogel, DDS, is a fellow of the International Team for Implantology. He lectures internationally on implant dentistry with an emphasis on simplification, confidence, and predictability of implant prosthetics through ideal treatment planning and team interaction. He maintains a private practice focusing on implant prosthetics and reconstructive dentistry in Palm Beach Gardens, Florida. He may be reached at centricrelation@pol.net.