

Small Diameter Dental Implants for Retention of Mandibular Overdentures – A Clinical Case Report

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As the elderly population continues to grow, so does the number of individuals who are either partially or totally edentulous. Many of these people struggle with wearing dentures that are ill-fitting, and/or unstable and tend to create challenges with speech and eating.¹ The use of dental implants to replace natural teeth has been well documented.² For years, implants have also been available to rehabilitate edentulous arches in conjunction with various fixed and removable denture prostheses. Furthermore, the use of two to four implants to support mandibular overdentures (an area of the mouth that is particularly prone to denture instability) has been shown to have success rates of up to 96%.^{3,4}

As denture wearers age they face predictable challenges. Their bones continue to resorb, either

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due to the lack of stabilizing dental root structures and/or functional pressure from the denture acrylic. Relines become a necessi-

ty to replace the resorbed bone and to maintain the fit of the dentures. For many, bone loss eventually leads to challenges in wearing a denture at all.⁵ For many patients, financial constraints and health issues limit ideal bone augmentation and traditional implant placement. This article presents an optional treatment modality for consideration — small diameter dental implants.

CLINICAL CASE

A 76-year-old male presented with three remaining lower anterior teeth that required extractions. The teeth were non-salvageable. He had been wearing an ill-fitting partial denture for many years. His health history was non-contributory except for one prophylactic aspirin tablet



FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4



FIGURE 5



FIGURE 6

daily. His major complaints were: a lower denture that was not secure enough to allow him to speak and to eat properly. Several treatment options were presented including conventional implant placement (as the ideal scenario) or the option of a more conservative implant procedure utilizing small diameter implants (Atlas Narrow Body Implants — Dentatus, USA), utilizing a more conservative surgical procedure.

Figures 1 & 2 show the edentulous ridge prior to the implant surgery. The soft tissue was thick, and in good condition. The ridge width was fairly thin in most areas, except the canine positions, which had been extracted two months previously. The patient was anesthetized with local infiltration. Ridge thickness was estimated using bone calipers to ensure adequate bone for implant placement.

Prior to beginning the surgery, the soft tissue was marked with a sterile denture marking pencil to

select potential implant sites based on the previous evaluation with the calipers and radiographs. The denture was then placed over top of the markings which transferred passively onto the denture base. The locations of the markings were evaluated to make certain that they fell within the denture body in a suitable position for implant placement. The initial osteotomy was started without raising a flap using a short profiling drill through the soft tissue (Fig. 3). The osteotomy was performed under copious irrigation with sterile saline at 800rpm to the desired implant length of 10mm.

A 2.2mm diameter reamer was then used to enlarge the osteotomy to the desired size of the final implant (Fig. 4). The implants were carried into the osteotomy site with the sterile carrier directly from its package until resistance was met (Fig. 5). A manual driver was then used to seat the implants to their desired length (Fig. 6). The process was repeated

until all four implants were placed in position (Figs. 7 & 8).

The prosthetic phase was performed next with the preparation of the denture base to receive a silicone liner (Tuf-Link silicone relined material — Dentatus, USA) that allows secure adaptation to the specially designed implant heads referred to as a “Dome keeper” (Fig. 9). The system used in this case was uniquely designed to allow cushioned support and stabilization with gentle, firm retention. Furthermore, the retention is accomplished successfully without the use of housings, o-rings or adhesives.

The denture base was prepared with a series of specially designed drills prior to placement of the resilient liner (Fig. 10). The sequence of burs used allows for the creation of adequate space for the implant heads as well as retention for the resilient retainer that facilitates retention of the denture. Prior to placement of the resilient retainer, the denture



FIGURE 7

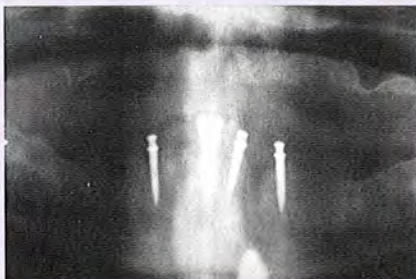


FIGURE 8



FIGURE 9



FIGURE 10



FIGURE 11



FIGURE 12

should fit passively in place over the implants and ridge (Fig. 11).

Once the passive fit was verified intra-orally, the denture base and residual ridge was swabbed with a chlorhexidine rinse to remove any loose particles of debris. The Tuf-Link resilient liner was dispensed onto a mixing pad and spatulated under pressure for 40-60 seconds. It was then spread into the denture base and placed into the mouth. The denture was maintained without movement for 6-7 minutes under light biting pressure to allow all the liner to set to a stable resilient form.

The placement of specific well-defined grooves in the denture base is the key to holding the resilient liner in place. A groove with a heavy beveled finishing line around the entire periphery of the denture firmly locks the liner in place (Fig. 12). Once the liner has set, it is removed from



FIGURE 13



FIGURE 14

the denture with a pointed tool and gentle tug. The excess flash material is trimmed away with fine scissors along the well-defined retention groove in the denture base (Fig. 13). The liner is then placed back into the denture base with gentle finger pressure, and the tissue side is polished to remove any remaining roughness prior to delivery (Fig. 14).

RESULTS & SUMMARY

The patient in this case presented was provided with the option of traditional dental implants but chose to use the small diameter implants due to cost, ease of placement and the ability to func-

tion immediately. This narrow diameter implant system is typically placed in solid bone; thus, initial stabilization along with the resilient retainer allow for immediate loading. Since the Atlas implants are designed to function without o-rings or housings, they exhibit less lateral forces that can challenge implant integration. The patient was instructed to wear the denture for 10-14 days without removal, except for cleaning. He attended two post-operative appointments for evaluation of fit and healing during that period. At two months the patient is extremely happy with the fit and stability of his mandibular

dentures. He reports they are comfortable, secure and that he is able to speak and to eat better than prior to treatment.

The use of small diameter dental implants provides a viable alternative to traditional implant overdenture treatments. Although traditional endo-osseous implants are tried and tested, some patients may not be a suitable candidates for this kind of treatment. Their ridge size may be limited, a situation which necessitates bone grafting. Some patients not interested in bone grafting, while others may present with health problems that prohibit extensive surgical interventions. Still other patients may not be in a financial position to afford the costs of traditional implant therapy.

This article is not intended to position small diameter implants as the primary choice of treatment for all edentulous patients. Rather, this is an additional treatment modality to consider. The use of small diameter implant systems allows the dental practitioner to be able to provide a suitable alternative to the edentulous patient's treatment options. They are easier to place, less invasive and more affordable. The results provide a secure, well-fitting and comfortable denture. **OH**



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Oral Health welcomes this original article.

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