



How to Optimize an Existing Removable Partial Denture

Using Narrow-Diameter Implants to Increase Support and Retention

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ABOUT THE AUTHOR



Dr. Pratt received his DDS from the University of Texas Health Science Center at San Antonio in 1981 and began private practice that year in his hometown of Atlanta, Tex. He began placing and restoring dental implants in 1988. Today, his practice offers all phases of general dentistry, including comprehensive surgical and restorative phases of implant dentistry. Dr. Pratt holds Fellowships from the AGD, the American Academy of Implant Dentistry, and the International College of Dentists. He has attended 6 world symposiums on dental implants in 5 foreign countries. He has had several of his implant cases published in national journals and has spoken on the subject of dental implants to educate both the public and his peers in the practice of general dentistry. He has also been involved with the Texas Dental Association's Texas Missions of Mercy and Smiles on Wheels where he has donated his services to those in need. He can be reached via e-mail at stenorpra@att.net.

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INTRODUCTION

Although dental implants are now widely used for supporting fixed prostheses and retaining or supporting complete dentures, their use in North America is still minimal when compared to the proven need.¹ A review of the literature reveals that dental implants are not nearly as widely used for supporting or retaining removable partial



Figure 1. The patient's "do-it-yourself" repair, done with a kit purchased at Walmart.



Figure 2. Resorbed lower posterior arch with insufficient bone width to place standard sized implants without grafting.



Figure 3. The existing lower partial framework fit well.

dentures (RPDs).² Recently, when this author polled an audience of surgeons who place implants and dentists who routinely restore implants, only 20% stated that they had used dental implants to help retain/support RPDs.

This utilization of dental implants can easily be incorporated into general and prosthodontic dental practices to aid the numerous patients who otherwise might not be able to function optimally and comfortably with their RPDs. Among the reasons patients often choose an RPD over other restorative options are financial or health

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concerns, lack of a distal abutment for a fixed partial denture, or lack of desire to commit to the time involved with bone grafting and subsequent implant placement for a fixed prosthesis.

Unfortunately, what patients usually do not realize is that an RPD, especially a mandibular Kennedy Class I or II prosthesis, can actually cause severe bone loss throughout time. In conjunction with an upper complete denture, the Kennedy Class I prosthesis is known to contribute to combination syndrome first described by Kelly³ in 1972. This bone loss can be prevented or minimized under a new RPD, or slowed or eliminated under an existing RPD, with the use of dental implants.

In many cases, if a patient has been wearing an RPD for a while, the bone loss mentioned above may be severe enough that standard-sized implants cannot be placed without bone grafting, which can be both expensive and time consuming. If the patient has insufficient bone for standard-sized implants and cannot afford or doesn't want to pursue bone-grafting procedures, small-diameter implants (SDIs) may be the implants of choice. Since FDA approval for "long-term intrabony applications" in 1997, SDIs have grown in use and public awareness.⁴

For many patients, SDIs offer several benefits over standard-sized implants. They can often be placed with no or minimal soft-tissue reflection. They can be placed in narrower ridges than standard-sized implants without bone grafting. Small-diameter implants can often be placed at a fraction of the cost of standard-sized implants, even though 2 SDIs are typically placed in the place of one standard-sized implant.

The following is a case in which a patient with a typical mandibular Kennedy Class I RPD was unable and unwilling to wear her partial due to its mobility while eating. SDIs were utilized to correct this problem.

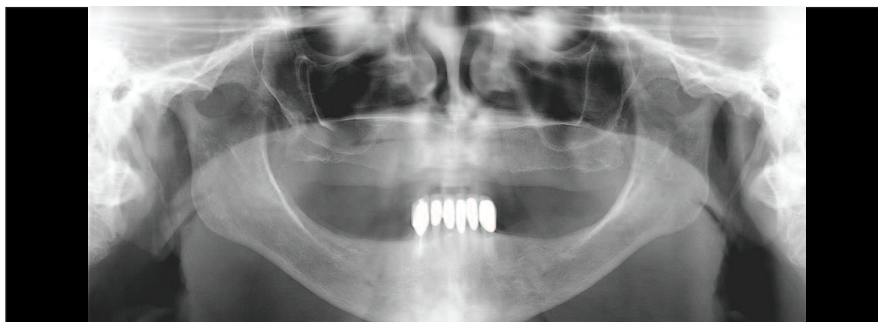


Figure 4. Panoramic radiograph reveals sufficient height to place 12-mm and 10-mm implants in first premolar and second molar sites, respectively.



Figure 5. Diagnostic model with drill guides placed, ready for .060 thermoformed surgical stent material.



Figure 6. Vacuum-formed .060 surgical stent trimmed and ready for sterilization.

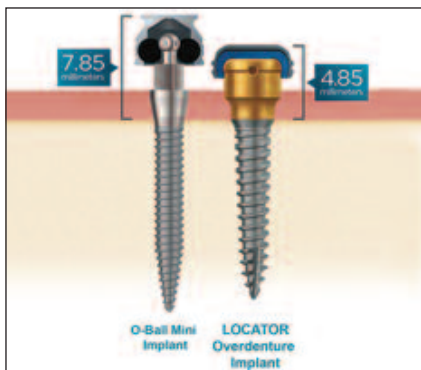


Figure 7. The LOCATOR Overdenture Implant (LODI) (ZEST Anchors) can save as much as 3 mm of vertical height over an o-ball type attachment.



Figure 8. The 2-piece design of the LODI allows the clinician to easily replace the LOCATOR abutment (ZEST Anchors), if attachment wear occurs throughout time.

CASE REPORT

Diagnosis and Treatment Planning

A 70-year-old female presented with a chief complaint of a broken maxillary denture. While out of town, she attempted to repair the fractured denture with a denture repair kit that was purchased at Walmart (Figure 1). She gave a history of having "3 upper dentures made in as many years." She said

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Figure 9. Surgical stent “snapped” into place by engaging undercuts on teeth Nos. 22 to 27, utilized at this time to mark osteotomy sites with 1.2-mm pilot drill.



Figure 10. Small flaps reflected to conserve attached gingiva.

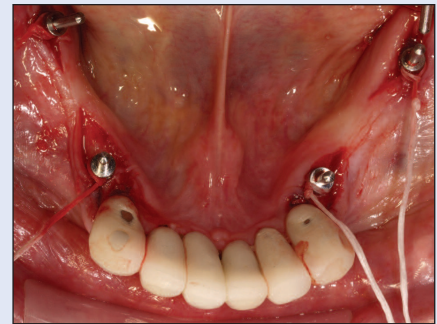


Figure 11. Paralleling pins in place after osteotomies prepared. Site No. 31 angled buccally to avoid lingual undercut.



Figure 12. Closure obtained with 4-0 Cytoplast PTFE sutures (Osteogenics Biomedical).

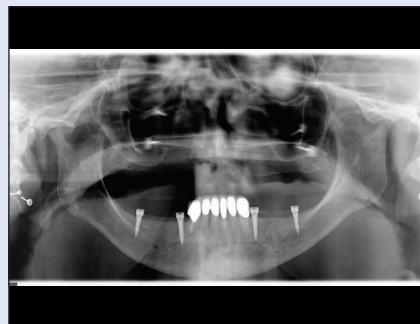


Figure 13. Immediate post-op panoramic radiograph.



Figure 14. Two weeks post-op, immediately after suture removal.

that all 3 had broken in the anterior region and anterior teeth had broken out of them. Since she did not sleep with her denture in, she attributed this problem to the fact that her lower RPD was loose and always came out when she was trying to eat. For this reason, she did not wear her lower partial, chewing only with her lower natural teeth (teeth Nos. 22 to 27).

Her medical history revealed that she was on a blood pressure medication, which controlled her blood pressure within normal limits. No other significant findings were noted.

Clinically, the maxillary arch was fairly well preserved without the significant anterior resorption that is usually seen in cases in which lower anterior teeth oppose a maxillary denture. Edentulous areas in the lower arch were resorbed to the extent that placing standard-sized implants would be impossible without bone grafting. However, there appeared to be sufficient bone to place narrow-diameter implants (Figure 2). Although her lower partial was not retentive enough for her to eat with, the

framework fit the existing teeth very well (Figure 3). A panoramic radiograph revealed that there was sufficient bone height in the posterior mandible to place 12-mm implants in the first bicuspid sites and 10-mm implants in the second molar sites (Figure 4).

It was explained to the patient that she seemed to be an excellent candidate for narrow-diameter implants to help support and retain her loose (but otherwise well fitting) lower partial. A treatment plan was presented to her that consisted of a new maxillary denture, 4 narrow diameter implants in the posterior mandible, and rebasing her existing partial framework. The patient accepted this treatment plan and was ready to get started as soon as her work schedule allowed.

Treatment Protocol

Impressions were made for diagnostic casts and for the fabrication of a surgical stent to aid in the placement of the mandibular implants (Figures 5 and 6). Whenever possible, this author prefers to use a restrictive surgical stent to allow

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Figure 15. Alginate pick-up impression of the lower partial rebase impression.



Figure 16. Black processing males and metal housings placed on LOCATOR abutments.



Figure 17. Rebased partial with lingual vent holes allowing escape of excess acrylic while picking up LOCATOR males.

for precise placement of parallel implants.

The implant of choice for this application was the LOCATOR Overdenture Implant (LODI) (ZEST Anchors). Available in diameters of 2.4 mm and 2.9 mm, the 2.4-mm diameter implant was ideal for this patient's thin ridges. The LODI was chosen instead of mini implants with a ball attachment due to the need for decreased vertical height (Figure 7). This author has used the LOCATOR Abutment on standardized implants for years, preferring the varying degrees of retention that are available versus the retention offered with ball type attachments. The LODI was also chosen over a one-piece clone of the LODI due to the fact that the abutment can wear throughout time, especially if patients are not meticulous about rinsing abrasive toothpaste from both their mouth and the intaglio surface of their prosthesis. The LODI, being a 2-piece implant, allows for changing worn abutments at a later date (Figure 8).

At the surgical appointment, local anesthesia was obtained by infiltrating around each site buccally and lingually with a total of 3 carpules of articaine 4% with 1/100,000 epinephrine. The surgical stent was placed, and osteotomy sites were marked through the gingiva using the 1.2-mm pilot drill (Figure 9). The stent was then removed and, in order to retain as much attached gingiva as possible, small flaps were made and reflected (Figure 10). The stent was then replaced and osteotomies were made using the appropriate drills and drillstops. The osteotomy for site No. 31 had to be angled slightly buccally to avoid a lingual concavity of the mandible in that area (Figure 11). LODI Implants were then placed; 2.4-mm x 12-mm LODIs in the first bicuspid areas and 2.4-mm x



Figure 18. Intaglio surface of lower partial with the appropriate LOCATOR males in place.

10-mm LODIs in the second molar regions. Insertion torque for each implant was recorded. All implants seated with an insertion torque of slightly greater than 30 Ncm (except No. 18, which seated to greater than 70 Ncm). Flaps were closed with 4-0 Cytoplast PTFE sutures (Osteogenics Biomedical) (Figure 12) and a postoperative panoramic image was made (Figure 13). The patient's partial was relieved to ensure there was no contact with the LODI Abutments.

At the 2-week post-op appointment, sutures were removed (Figure 14) and the final impression for the maxillary complete denture was made. Three days later, occlusion rim adjustments, bite records, and a rebase impression for the partial were made (Figure 15).

At the delivery appointment, which was 2 weeks later, both the upper and lower prostheses were checked for pressure spots using pressure indicator paste (a 50/50 mixture of zinc oxide powder and Crisco). After pressure areas were adjusted, vents were cut through the lingual surface of the lower partial and the LOCATOR housings

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containing the black processing males were captured with self-cure acrylic (Figures 16 and 17). Blue, 2-pound attachments were placed in housings corresponding to all parallel implants and a red, 2-pound extended range male was placed in housing No. 31 due to the implant having an angulation greater than 10° (Figure 18).

At the 24-hour post-delivery appointment, minor adjustments were made to the anterior labial and left posterior buccal flanges of the maxillary denture. The right buccal flange of the lower partial also required adjustment. At the one-week postoperative check, the patient reported that she was very satisfied with her result. She stated that, for the first time since having her partial, she was able to eat comfortably with it. When Brenda was asked if she minded taking a portrait image for this article, she stated, "Absolutely not, if it might help someone else as much as you've helped me" (Figure 19).

CLOSING COMMENTS

Patients with RPDs are often overlooked as candidates for dental implants, unless they are willing to discard their RPD for a more expensive fixed implant-supported alternative. This case clearly exemplifies how a patient with an unsatisfactory but otherwise well fitting RPD can benefit from strategically placed small-diameter implants that virtually change a Kennedy Class I RPD into a Kennedy Class III RPD. The LOCATOR attachments also offer excellent retention of the RPD.

Placement of SDIs can be a more economical choice for the patient who might otherwise need bone grafting to place standard size implants. In this case, and similar Kennedy Class I cases, the patient, with the aid of dental implants, may very well be able to avoid the effects combination syndrome and its consequences as one ages.



Figure 19.
 Brenda's post-op smile.

REFERENCES

1. Christensen GJ. Dental implants: Where do we go from here? *Clinicians Report*. 2013;6:1-2.
2. Silva MAB, Consani RLX, Oliveira GJPL, et al. Association between implants and removable partial dentures: review of the literature. *RSBO*. 2011;8:88-92.
3. Kelly E. Changes caused by a mandibular removable partial denture opposing a maxillary complete denture. *J Prosthet Dent*. 1972;27:140-150.
4. Christensen GJ, Child PL. The truth about small diameter implants. *Dent Today*. 2010;29:116-120.

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 - a. True
 - b. False
- 2. Bone loss can be prevented or minimized under a new RPD, or slowed or eliminated under an existing RPD, with the use of dental implants.**
 - a. True
 - b. False
- 3. Since FDA approval for "long-term intrabony applications" in 1997, small-diameter implants (SDIs) have grown in use and public awareness.**
 - a. True
 - b. False
- 4. Patients with RPDs are often overlooked as candidates for dental implants, unless they are willing to discard their RPD for a more expensive fixed implant-supported alternative.**
 - a. True
 - b. False
- 5. Placement of SDIs can be a more economical choice for the patient who might otherwise need bone grafting to place standard size implants.**
 - a. True
 - b. False

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Please check the correct box for each question below.

1. a. True b. False
2. a. True b. False
3. a. True b. False
4. a. True b. False
5. a. True b. False

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