THE ROOT FORM UNIVERSAL IMPLANT

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This article will introduce the ''root form universal implant'' to avail the dentist and the patient the option of retaining the natural teeth while retaining a functioning removable prosthesis supported by root form implants.

INTRODUCTION

The subperiosteal implant was once the most popular implant. The universal subperiosteal implant, a derivative of the subperiosteal implant, was first introduced by Weber[1] in 1961. It was invented so that people could retain their anterior mandibular teeth even though they were missing the remainder of the arch's dentition. The universal subperiosteal implant was designed to use the anterior mandibular dentition and the subperiosteal implant principles but to allow modifications, too. As new endosseous forms of implants were introduced, such as the blade implant by Linkow[2,3] and the screw root form implants by Tremonte,[4,5] Lew,[6-9] Chercheve,[10-12] and Pasqualini,[13,14] the posterior edentulous segments were replaced with more permanent restorations rather than a removable prosthesis, as in the case of the universal subperiosteal implant, which soon lost most of its appeal.

In the 1980s, the popularity of Branemark[15] and the availability of a permanent nonremovable posterior replacement of a mandible edentulous ridge, which allowed the retention of the natural anterior dentition, sent the already unpopular universal subperiosteal implant to an even higher place on the shelf. However, circumstances when the unappreciated universal subperiosteal implant should still be considered include (1) if the patient wants to keep his or her anterior teeth, but anatomically the osseous support is inadequate for endosseous implants in the mandibular posterior; (2) if not enough occlusal bone is above the inferior alveolar nerve; or (3) if the ridge is too narrow buccallingually to support an endosseous implant.

Reflecting on the history of oral implants and on using subperiosteal and endosteal concepts, we must consider using combinations of techniques to help maintain the natural teeth while replacing the missing ones. Keeping these factors in mind, and remembering that ''history repeats itself'' and that the knowledge of oral implant history will aid in the multioptional replacement of lost dentition today, the following case study of the use of the universal root form removable denture is presented, which incorporates the universal subperiosteal implant's principles yet uses root form implants in lieu of subperiosteal ones.

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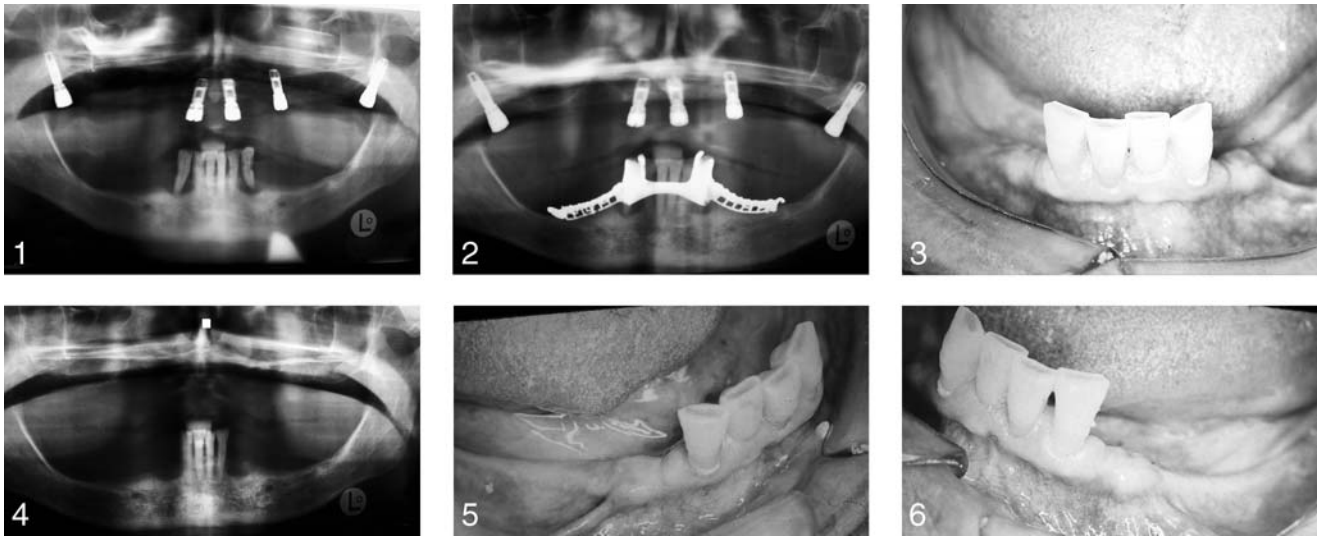


FIGURES 1–6. FIGURE 1. Panorex before treatment. Note the maxilla with radiolucency where sinus lift was supposedly performed 1 week before. Also seen are 5 of the 7 implants inserted left with failing support and poor angulation. Mandible shows radiolucency around cuspids. Note the relationship of inferior alveolar canal and osseous level. FIGURE 2. Panorex first seen before treatment in our office with mandibular partial denture attached to #22 and #27. FIGURE 3. Mandibular arch after extraction of #22 and #27 with retained incisors. FIGURE 4. Panorex of Figure 3 with bone regeneration in area of extracted #22 and #27. FIGURE 5. View of mandibular right side of Figure 3 showing narrow, thin posterior ridge. FIGURE 6. View of left side of Figure 3. Note the thin, small, narrow posterior ridges. Occlusal view.

CASE PRESENTATION

Mrs C, a very distressed 83-year-old woman, presented to my office. She had a strong desire to have ''teeth that will work'' but was encountering serious problems. She had recently undergone treatment on her maxillary arch, including maxillary sinus lifts, and had 7 implants, albeit angulated and extremely mobile. The sinus lift technique as well as the 7 inserted implants had failed, probably because of poor diagnosis and poor technique. The previous dentist had attempted bilateral sinus lifts and had inserted 7 implants at the same time. The angulations of the implants were nonrestorable even if successful, which they were not. Radiographic interpretation of the area showed that treatment techniques were not performed well and that the sinus lift areas were void and radiolucent, resulting in failure, pain, and discomfort (Figures 1 and 2). Mrs C now could not eat, found it hard to speak, and was very uncomfortable because of the significant pain. Additionally, she had developed a distrust of dentists.

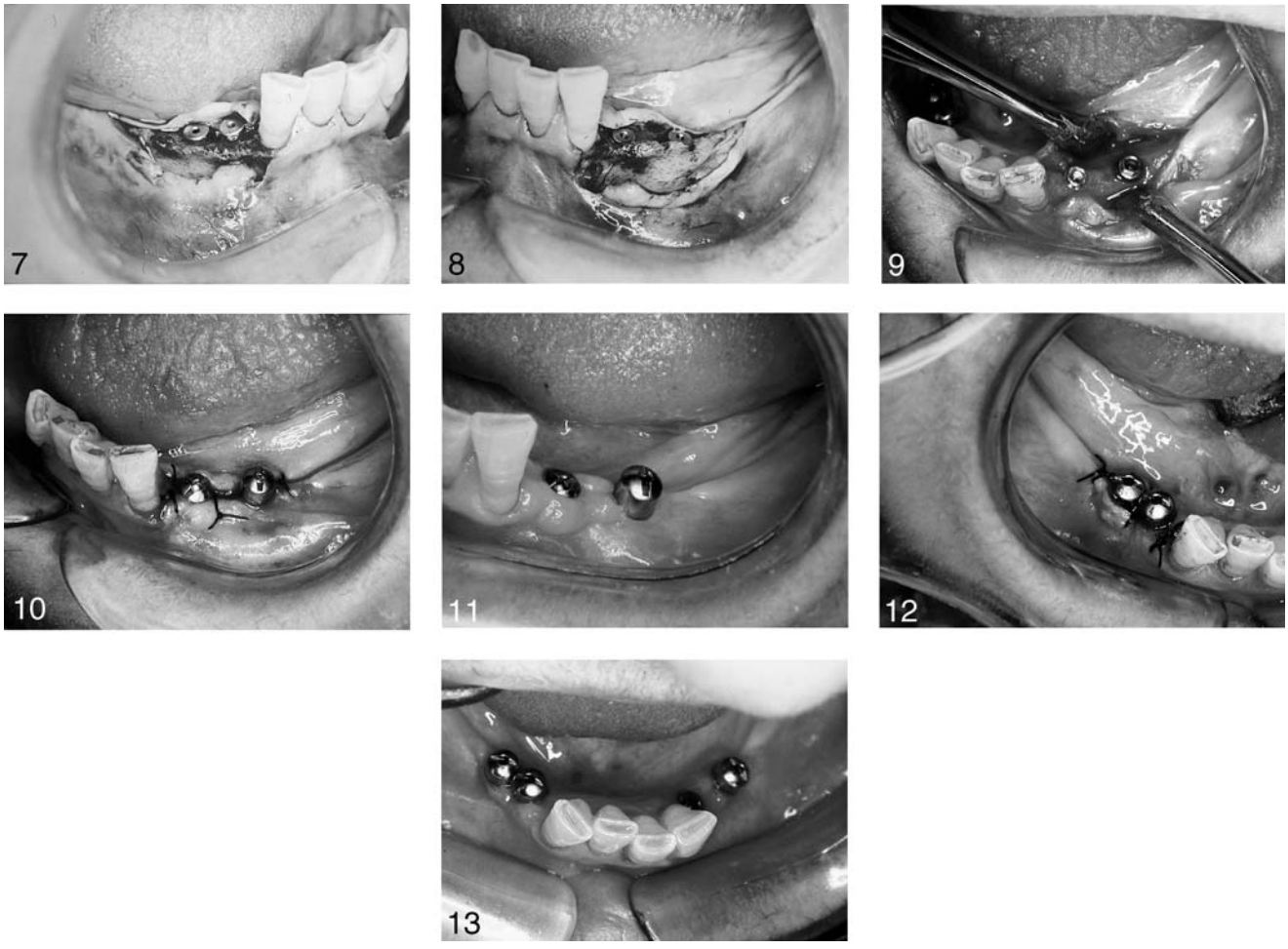
She presented with only 6 remaining anterior teeth (#22–#27) in the mandible. A removable partial denture was present with clasps attached to the cuspids. The cuspids #27 and #22 were extremely mobile. They had class #3 mobility, bone loss, and advanced periodontal disease. Localized periodontal abscesses were present; therefore, the cuspids had to be extracted. The posterior edentulous ridges were extremely thin B-L. Radiographic examination revealed a short osseous height, crestally to the inferior alveolar canal. No root form implant could be supported in the bicuspid molar regions without unpredictable adventurous ridge augmenting surgeries. Mrs C was emphatic after her recent oral experiences about no surgery with questionable results, and she was physically and emotionally exhausted.

We recommended a treatment plan that included removing the remaining maxillary failing implants and fabricating a complete denture. The mandibular arch was to have a full overdenture retained with a bar supporting implants. Mrs C was not enthralled about implants, especially after her poor experience. However, she consented because she refused to lose her remaining lower anteriors.

Concerning the overdenture, the posterior occlusion would be restored with balancing side occlusion because it was to oppose a full maxillary denture.

Using principles of dental history with today's source availability, we proceeded and adapted forms and techniques to meet the patient's need.

The maxillary arch was treated as we planned, resulting in a complete denture that was well retained. If Mrs C were to ever need or request a nonremovable prosthesis, we could approach it and use the denture as a provisional. We fabricated an overdenture in

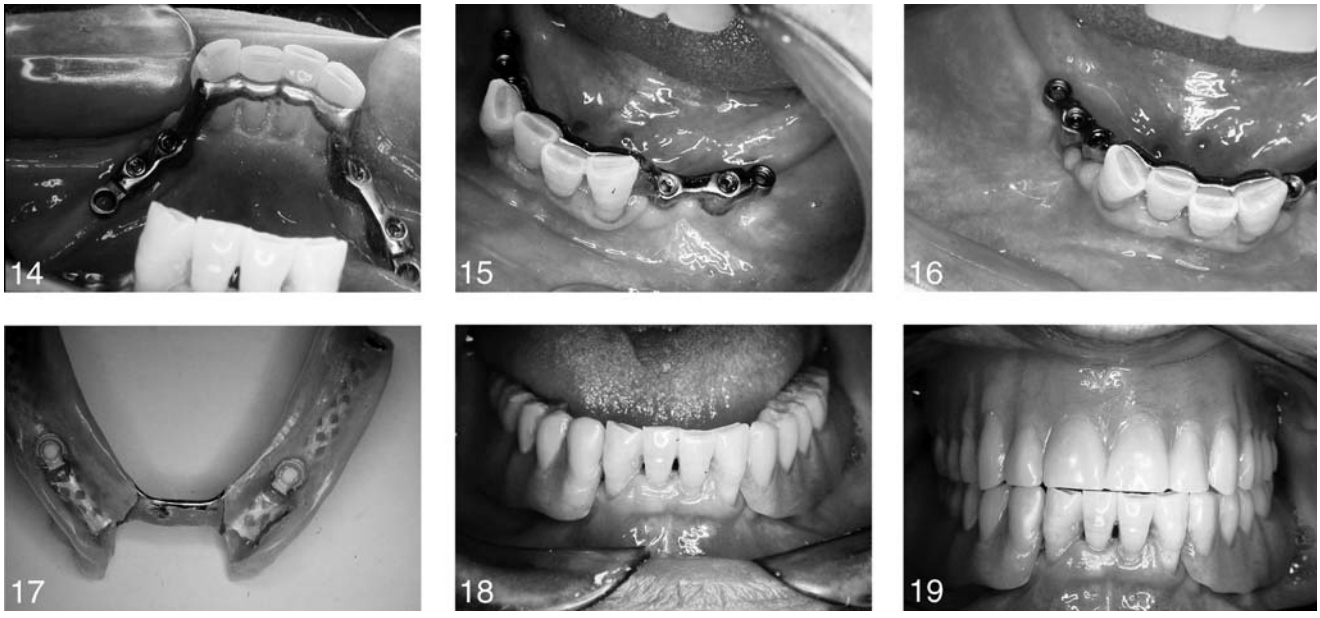


FIGURES 7–13. FIGURE 7. Right side showing implants 3 months after insertion with cover screws. FIGURE 8. Left side showing implants 3 months after insertion with cover screws. FIGURE 9. Uncovered implant exposing external hexed implants with excellent integrated bone. FIGURE 10. Left side with healing screws placed and tissue sutured after surgical exposure. FIGURE 11. Healed left side with healing abutments. FIGURE 12. Right side sutured with healing abutments in place. FIGURE 13. Occlusal view of healed tissue with healing abutments in place.

the concept of a universal subperiosteal implant denture, keeping Mrs C's #23 to #26 teeth (the teeth she wanted to retain) yet using root form implants and an overbar retention. We extracted the #22 and #27 teeth and placed bone grafts in their sockets to preserve the osseous support (Figures 3 through 6).

The mandibular posterior ridges, as previously stated, were quite thin. The thin B-L ridge prevents the implants from being placed more distally. The avoidance of any "extra" surgery was paramount after Mrs C's experience with the maxillary arch. We inserted 2 root form implants in the lower right at the #21 and #22 sites and 2 root form implants in the lower left at the #27 and #28 areas. After extraction of the cuspids, we performed bone graft regeneration techniques. A regenerative healing time was observed before inserting the implants (Figures 7 through 12).

After an uneventful healing period, the fabrication of the mandibular denture and coordination with the restorative dentist proceeded with zest attachments, correct fitting of the root form retained bar, and a lingual apron. We fabricated a custom-made bilateral Vitallium bar (Howmedica Corp, Chicago, Ill). The lingual bar also was able to give lingual support to the 4 remaining mandibular incisors. The bar was retained by 4 endosseous root form implants (Figures 13 and 14) and was rigidly connected bilaterally to both sides' implants while supporting the incisors (Figures 15 and 16). The distal part of each bar had a female zest reception for extra retention. The mandibular partial overdenture snapped firmly and retentively into place (Figure 17).



FIGURES 14–19. FIGURE 14. Lingual view of occlusal bar screwed into implants, lingual bar supportive of retained incisors, and female portion of zest attachment. FIGURE 15. Buccal occlusal view of overdenture bar in place. Left side. FIGURE 16. Buccal occlusal view of overdenture bar in place. Right side. FIGURE 17. Overdenture. Internal view. FIGURE 18. Mandibular prosthesis firmly in place. Facial view. FIGURE 19. Facial view. Final prosthesis. Maxillary, full denture. Mandibular, universal root form. Prosthesis in balancing occlusal function while retaining the patient's natural incisors.

With the mandible firmly retained, the overdenture was balanced occlusally with the maxillary full denture while fully stabilizing the mandible. This design allows for cross-arch stabilization, root form retention, lingual apron support of lower anteriors (which can act as a place to add the incisors if they were to fail in the future), and vertically supported balancing occlusion (Figure 18). Mrs C has retained her remaining natural dentition while wearing a functioning, very well-retained removable prosthesis—the ''root form universal implant.'' Now in her 90s, she is functioning very well; she has her pride and confidence back; and she can masticate and smile where before she had pain, failure, and poor function (Figure 19).

CONCLUSION

This case study presented an 83-year-old woman in nonphysiological function. She came from a traumatic dental experience to a positive one, and she can now function in confidence and comfort. The use of the root form universal implant allowed her to keep her only remaining natural teeth, the 4 lower incisors. Using root form endosteal implants and referring to a universal subperiosteal concept in design, we fabricated a unique yet cleansable firmly attached bar that retained the removable mandibular partial denture in a firm functioning appliance.

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