Removable Prosthetics:  
*Bad Attachments or Bad Design?*

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Removable Prosthetics: 
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About the Author

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Disclosure: Dr. Kusek lectures for Straumann Dental Implants and consults with Convergent Dental.

The removable overdenture may be a design that needs closer observation. The patient exhibiting a poor ridge form or strong buccinator muscles may suggest heavy function on a removable prosthesis. The patient may not, however, be able to afford a fixed hybrid prosthesis or bar overdenture; nor would mini implants be a good solution.

According to Misch,“the RP-5 is a removable prosthesis that combines implant and soft-tissue support.” The prosthesis can have 2 to 4 implants that are splinted together, or it can have implants that are independent of each other. The main advantage is cost containment. Patients and clinicians need to realize that the area of soft tissue with which the prosthesis comes into contact will continue to lose bone and tissue support with time. Relines of the removable overdenture will, therefore, be needed with age. Maintenance of independent implants for overdentures is a huge plus. Home care for patients is significantly reduced with independent implants. Bars tend to make cleaning difficult for patients and clinicians. The type of ridge form makes a difference as far as the stability of the overdenture. Regarding the edentulous mandible, the square form offers the least amount of retention due to poor anterior-posterior (A-P) spread. The A-P spread is distance from the center of the most anterior implant to a line joining the distal aspect of the most distal implants.\(^2\)\(^3\) The posterior cantilever should not exceed 2.5 times the A-P spread. This length of this cantilever is altered by stress factors like parafunctional habits, implant width, and number.\(^4\)

**CASE REPORT**

**Diagnosis and Treatment Planning**

The patient, a 70-year-old male, was referred to us by his general dentist. Medically, the patient was a type 2 diabetic with dementia. The patient had implants placed in positions C and D (Figure 1). The restoration was an independent implant supported overdenture with LOCATOR attachments (ZEST Anchors). The patient presented with well-developed buccinator muscles (Figure 2), square arch form, and a flat ridge (Figure 3). His chief
Complaints were that he had to change LOCATOR attachments one week after completion of the original prosthesis, the overdenture was not retentive, and he was very frustrated with the amount of money spent for the implants and overdenture. Additionally, he had poor dexterity to seat the overdenture. His home dental care was extremely poor, as he formed calculus quickly, preventing proper retention of the overdenture.

After thorough clinical assessment, it was decided that (1) due to poor implant positions, additional implants would be needed to give better retention; (2) due to the arch form and dexterity, a higher attachment height would be needed to make it easier to seat the overdenture and prevent A-P displacement; (3) the cost to restore the case would need to be minimal, thus retaining the patient’s existing overdenture; and (4) records needed to treat the case would be CBCT and then reformation to a computer-planned treatment (SIMPLANT [DENTSPLY Implants]).

The solutions needed were as follows: (1) placement of implants in the most lateral positions, as determined by SIMPLANT planning (Figures 4 and 5); and (2) convert the attachments to ATLANTIS-type SynCone (DENTSPLY Implants) attachments that would make it easier to seat the prosthesis, provide increased retention, prevent anterior displacements, and also make the prosthesis easier to clean.

**Clinical Protocol**

Venipuncture was done on the left antecubital fossa to gain plasma-rich fibrin (PRF) to aid in the healing process. Venipuncture was done on the right antecubital fossa to start moderate sedation using Midazalon (Hospira), Diphenhydramine (West Ward Pharmaceuticals) and Nulbuphine (Hospira), that were titrated to get the patient on level III sedation (according to guidelines from the American Society of Anesthesiologists). Flap preparation, from the mandibular second bicuspid to second bicuspid (teeth Nos. 20 to 29), was completed using the Solea CO₂ laser (Convergent Dental) at a soft-tissue setting of 0.25-mm spot size, 20 pulses, and no water. The laser helped to make the needed cuts with minimal bleeding and prevented tissue shrinkage. The tissue was reflected with microelevators to expose the mental foramen and to expose the mental nerve. After the nerve was located, the alveolar crest was marked 5.0 mm anteriorly, which was done to prevent the surgeon from hitting the anterior loop of the inferior alveolar nerve. The osteotomy was begun with the use of round burs (1.4, 2.3, and 3.1 mm diameters, respectively). The positive positions of the round burs prevent jump and/or chatter of the pilot drill. The use of a 2.1-mm pilot drill was accompanied by external irrigation, and a radiograph was taken to make sure the drill was correctly positioned in the mandible. Drilling sequence followed by the use of 2.0, 2.75, 3.0, and 3.4-mm externally irrigated drills. The osteotomy site was lased with the Solea laser using the dentin setting, 10 pulses, 50% water, at a spot size of 1.0 mm. Implants (XiVE [DENTSPLY Implants]) were placed after the implant was
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coated with plasma from the PRF, and a portion of the membrane of the PRF was placed into the osteotomy site. After the implants were seated, an impression abutment was placed. The implant was verified to be correctly placed using radiographs. Impressions were taken (Aquasil Ultra [DENTSPLY Caulk]) using light- and heavy-body materials in a custom tray. Impression posts were removed, seated into analogs, and placed into the impression. The area was sutured with the use of 3.0 vicryl (Ethicon) sutures. The Solea CO\(_2\) laser was then utilized to de-epithelialize the tissue in the surgical site using the soft-tissue setting, no water, and 20 pulses at a one-mm spot size.\(^7\)

**Fabrication of Prosthesis and Delivery**

The case was sent to the Caladent Dental Laboratory (Glendale, Calif) with instructions to fabricate ATLANTIS Conus (DENTSPLY Implants) abutments (Figure 6) to mimic SynCone (DENTSPLY Implants) abutments. After the lab team fabricated the 2 abutments, they were seated in positions C and D. After one month passed for healing of the soft tissues, the female portion of the SynCone attachments were seated into the existing denture using a self-curing luting material (Quick Up [VOCO America]). After 3 months of healing was allowed for the implants in positions A and E (Figure 7), the ATLANTIS SynCone abutments were seated and the female portions seated into the patient's existing denture (Figure 8). The final 2 abutments were seated into the intaglio surface of the patient's existing denture.

The patient was instructed in (and practiced) seating and removing the overdenture. This was done using repeated demonstrations until he was able to accomplish seating of the overdenture correctly on his own. Oral hygiene was repeatedly stressed until finally, the patient was able coordinate proper cleaning with the use of an electric toothbrush (Sonicare [Philips Oral Healthcare]). The patient was placed on 3-month recall. All of the patient's chief complaints were eliminated with the treatment rendered.

**CLOSING COMMENTS**

This case serves to demonstrate that treatment for one patient may not be the correct treatment for another. As a clinician, one must make correct judgments and plans for treatment that will benefit the patient's needs. If this is not accomplished, then an alternative plan needs to be devised for the benefit of the patient's long-term goals.\(^*\)

**Acknowledgment**

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**References**

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POST EXAMINATION QUESTIONS

1. According to Misch, “the RP-5 is a removable prosthesis that combines implant and soft tissue support.”
   a. True   b. False

2. The type of ridge form does not influence the stability of the overdenture.
   a. True   b. False

3. The posterior cantilever should not exceed 3.5 times the anterior-posterior spread.
   a. True   b. False

4. In this case, venipuncture was done on the left antecubital fossa to gain plasma rich fibrin to aid in the healing process.
   a. True   b. False

5. In this case, using the laser helped to make the needed cuts with minimal bleeding and to prevent tissue shrinkage.
   a. True   b. False
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