Case Study: Treating a Patient with Excessive Crown Height Space

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A 77 year old patient presented to the office for consultation regarding her failing maxillary fixed ceramometal bridges [Figs. 1-2]. These bridges were made in the 1990’s and #’s 3 and 4 had been restored with implants and splinted crowns in 2000. The fixed bridges were failing due to rampant decay, periodontal disease and root fractures [Figs. 3-5]. Xerostomia, a side effect of her current medications, was a contributing factor. Radiographic and clinical exam made it clear that most maxillary teeth were non-restorable and required extraction. Implants #’s 3, 4 and natural tooth #15 are all that could be salvaged. The patient requested a “new fixed bridge and for sure nothing removable.”

A discussion with the patient of restorative options ensued. As per Misch, five options of prosthetic replacement can be entertained. Fixed FP 1, 2, 3 and Removable RP 4, 5. It was immediately obvious FP1, FP2 restoratives were not possible, since too much bone and tissue were missing.

Crown Height Space

A fixed FP3 hybrid restoration that replaces the crown and uses pink colored restorative material is possible but may be difficult or contraindicated for the following reasons. Crown height space (CHS) is measured from the crest of bone to the proposed incisal edge position. The ideal CHS for a fixed implant prosthesis should measure between 8 and 12 mm. This patient’s CHS is approximately 18mm and this excessive crown height creates a vertical cantilever and magnifies the stress applied to the restoration and implants.

The maxillary anterior teeth are the most difficult teeth to restore from an esthetic and biomechanical point of view. Mandibular teeth place angled forces on the maxillary anterior restorations, increasing the risk of

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I felt a fixed restoration was a poor choice for this patient. Extensive grafting to decrease the CHS would be necessary to pursue fixed treatment. Unpredictable vertical bone grafting and its associated morbidity would be required. Removable RP #4 and #5 options seemed more suitable.

Benefits

An implant-enhanced removable partial denture (IERPD)$^{5,6,7}$ may be the ideal solution. This is a removable partial denture (RPD) that is enhanced by one or more strategically placed implants. This treatment would not require separate bone augmentation surgery, be less biomechanically stressful and more affordable. My patient was not convinced, however and still wanted a fixed restoration. A fixed restoration is often perceived as an “actual body part” by patients, and this was the only type of restoration she had experienced.

Phase I

Phase I treatment included the removal of all diseased hopeless teeth and insertion of a temporary, immediate acrylic partial clasped to #’s 3, 4, 15. Socket grafting was performed where her teeth had been extracted. This eliminated disease, permitted tissue maturation and allowed my patient to experience a removable prosthesis [Figs. 6-7]. The temporary partial also helped determine the amount of tissue that was missing by evaluating the width and height of the acrylic flange. This flange was necessary for facial and lip support [Fig. 8]. A profile view without the partial in place displays the lacking facial support [Fig. 9].

A review of the advantages and disadvantages of a FP3 hybrid vs IERPD restoration was undertaken with the patient. This full discussion is beyond the scope of this article.

Phase II

We mutually agreed to place 2 implants in the #7 and #10 positions to better secure her temporary partial. This, I explained, would be a test to see if an IERPD would work for her. I promised her if she was not satisfied, bone augmentation and additional implants would be placed, al-
lowing for a fixed restoration to be constructed.

The implants were placed and locator attachments were used [Fig. 10]. Formerly, her temporary acrylic partial had quite a bit of movement but now this disappeared, and she became much more comfortable. Models mounted in centric relation helped to show the excessive CHS and the maxillary bone loss in the typical vertical and palatal direction as expected [Fig. 11].

**Phase III**

A final treatment decision of a definitive IERPD was jointly made. A conventional RPD design was used, but a smaller horseshoe major connector was employed. A metal chrome cobalt framework is necessary to prevent fracture. By using attachments anteriorly and teeth posteriorly, a stable quadri-lateral design is created [Fig. 12].

The AP spread allows for minimal stress and no rocking. Acrylic flanges provide for facial support that would not have been possible with a fixed implant restoration [Figs. 13-15]. When the definitive IERPD was inserted with locator attachments, the patient was very satisfied and adapted extremely well.

**Discussion**

When treatment planning complex cases, the physiological limits of the patient’s anatomy and their psychological needs must be balanced. It is often best to proceed slowly and see how a patient responds before creating the final treatment plan. A patient’s psychological desire for a fixed restoration is often strong. Knowledge, experience and logic will usually lead us to the most appropriate treatment plan.

This case clearly shows how a conventional RPD can be enhanced by adding a few implants. Retention, support and stability are increased dramatically. A small island of remaining bone is all that is needed for this type of treatment. In this case with excessive interocclusal space, a removable restoration is less stressful to the implant abutments and more esthetic. The acrylic denture base is able to support and enhance facial esthetics in a non-surgical manner.

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References

Trends in Implant Markets

The following information was researched and compiled by the Millennium Research Group in Toronto, ON, Canada [416-364-7776; www.mrg.net]

From their Executive Summary of the 2009 Implant Report: “The European dental implant market, comprising sales of dental implant fixtures, final abutments, and other tools in Italy, Germany, Spain, France, Sweden, the UK, and Switzerland, was valued at over $1.6 billion in 2008. Over the forecast period, moderate market growth will be driven by rising dental implant procedure volumes, fueled primarily by heightened patient awareness of dental implant treatments and increased clinical adoption of dental implant therapy. Market expansion will, however, be limited by a lack of reimbursement for dental implant treatment in the majority of the countries covered in this report. Further restricting market growth will be the negative impact of the global economic crisis on patient spending patterns. In addition, smaller companies offering lower-priced dental implant systems have garnered a greater share of some of the larger European markets. As a result, the average selling prices (ASPs) of dental implants will decline through 2013 and the European competitive landscape will continue to change.”

Online Discussion Groups

We try to monitor various online discussion groups to share their views on implants with our readers. Recently, there was an interesting discussion on acesthetics@lists.acesthetics.com on endodontists placing implants. To learn about the benefits & how to join, go to www.ACEsthetics.com.

I have a patient that lost #30 (lower right first molar) due to a fractured root in a previous endo tooth. An endodontist has stated that he is going to place either an Ankylos or a 3i implant; he prefers the Ankylos. I have a lot of experience with 3i mostly using Atlantis custom abutments. I have no experience with Ankylos. My concern is having the somewhat small Ankylos abutment transition to the gingival margin of the crown very abruptly yielding a tomato on a stick appearance. Long-term, is this a problem? Is this a better route than using Atlantis on a 3i and producing an implant crown that appears much like a natural tooth? I’m looking for someone with experience with molars. I have no concern with anterior teeth and premolars.

Michael Waltz, Camp Hill, Pa

Michael, I have restored and placed a lot of Ankylos implants, and one of the best aspects of this system is the emergence profile. It looks really strange to people not familiar with Ankylos, but as far as esthetics go, you can’t beat it. Also due to the design, if placed properly, you get very little bone remodeling. I would