

Implant Realities

Achieving success in implant dentistry

Vol. II • issue 3 • 2004



INTERNATIONALES TEAM FÜR IMPLANTOLOGIE
INTERNATIONAL TEAM FOR IMPLANTOLOGY

Feature articles



4

New Options in Prosthetic Reconstruction

*Robert C. Vogel, DDS
Palm Beach Gardens, FL*



7

The Use of Extended Healing Caps with the Straumann Dental Implant

*Jay Beagle, DDS, MSD
Indianapolis, IN*



9

Treatment Planning Implications of Implant Dentistry in the Partially Edentulous Patient

*Paul A. Fugazzotto, DDS
Milton, MA*



14

Treatment Options in Reconstruction of the Posterior Dentition

Part 2: Planning and Treatment Considerations for Implant-Assisted Restorations in the Posterior Maxilla: Esthetic

Dean Morton, BDS, MS; Will Martin, DMD, MS; James Ruskin, DMD, MD (University of Florida Center for Implant Dentistry); Todd Fridrich, CDT (Straumann USA, Inc.)



18

An Alternative Abutment for Deep Implant Placements in the Esthetic Zone Utilizing the synOcta® Meso Abutment

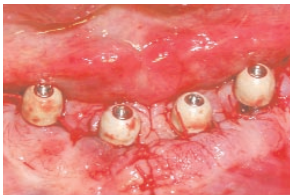
*Frank L. Higginbottom, DDS
Dallas, TX*



22

Immediate Loading of the Full-Arch Maxilla with Cemented Provisional Restorations Using Angled synOcta® Abutments

*Jeffrey Ganeles, DMD, FADC; Frederic J. Norkin, DMD; Julio Sekler, DMD, MMSc
Boca Raton, FL*



26

Factors in Implant Supported Mandibular Overdenture Designs

*David Todd, DMD, MD
Lakewood, NY*

In every issue

Editor's Note	1
Editorial	2
Feature Articles	4
Literature Review	29
Upcoming Events	32

Senior Editor: Paul A. Fugazzotto, DDS
Please feel free to contact me with any questions, comments, or submissions at progressiveperio@aol.com.

Surgical Editor: Jay Beagle, DDS, MSD
While the basic protocols for insertion of osseo integrating implants are well established, the field is now characterized by many exciting and innovative modifications of proven techniques. We will explore newer therapies, offer appropriate and helpful clinical "pearls" and remain on the cutting edge. Please contact me with any questions or submissions at jbeagledds@aol.com.

Restorative Editor: Frank L. Higginbottom, DDS
The restorative portion of this publication will address common problems, concerns, and interests of users of the Straumann® Dental Implant System. Both conventional and complex issues will be addressed. This section of the publication is hosted by US ITI members and other serious implant users and will serve as a venue for interesting case presentations as well as a sounding board for questions and answers to actual clinical quandaries. Please feel free to contact us with any concerns you may have at any time. In addition, if you feel you have valuable information to submit for consideration for publication, please e-mail me at bottom@dallaseshetics.com or phone me at 247/827-1150.

Laboratory Editor: Ira Dickerman, AAS, CDT
The laboratory technician plays an integral role in the success of implant restorative therapy. Beginning with input at the diagnostic and treatment planning phase, the appropriate utilization of the laboratory technician is crucial to the maximization of treatment outcomes. This section of the publication will explore the technical aspects of implant laboratory procedures as well as the role of the laboratory technician in diagnosing and treatment planning of both simple and complex cases. Please call me at 781/828-2808.

Editorial Board: Terry Charters, CDT
David Cochran, DDS, PHD
Jeffrey Ganeles, DMD, FACD
Robert A. Jaffin, DMD
Robert A. Levine, DDS, PC
H.P. Weber, DMD
Arnold S. Weisgold, DDS

Printing: Quinn Printing Co., Newton, MA

The opinions expressed in articles signed by the authors are not necessarily those of the publisher or the editors.

Welcome to *Implant Realities*

Implant therapy has irreversibly impacted the practice of clinical dentistry. While the opportunity to utilize newer therapies is obvious, the deep seated influence of implant treatment approaches is more subtle but no less dramatic. It could be argued that the DNA of clinical dentistry has evolved.

The recrudescence of many treatment approaches once utilized in attempts to manage various disease entities due to limitations in treatment options need no longer be tolerated.

This issue of *Implant Realities* explores the unique manners in which various clinicians have dealt with clinical challenges through the incorporation of well thought implant treatment modalities into their clinical armamentaria.

As always, I hope that you enjoy this issue of *Implant Realities*, and welcome your comments and manuscript submissions.

Sincerely,

Paul A. Fugazzotto, DDS

Senior Editor, *Implant Realities*

Past Performance is No Guarantee of Future Results

Arnold S. Weisgold, DDS

The title of this editorial is taken from the fine print often found at the bottom of many mutual fund advertisements. Paraphrased, it could very well be used as the heading for a discussion of esthetics and anterior implants, especially the single tooth variety.

If you are a little bewildered and bedazzled by promotional glitz accompanied by glamorous photographs and computer graphics as well as intimidated by resonant voices extolling better-than-life esthetic results, don't despair - *you are not alone!* Proudly, but sadly, I must say that I am too.

The "Holy Grail" of the dental profession is empowerment that it is able to transform a large measure of its own treatment approach. Surely the advent of the endosseous implant has achieved this. The forebearers of this concept flew in the face of accepted practices and made a mark on the landscape of the profession. They set a standard of excellence by which future efforts will be measured.

Concurrent with the enthusiasm generated by the endosseous implant has been equal excitement engendered by dental esthetics. By coincidence more than design, these two areas seem to have become popular about the same time (approximately the mid to late 1980s). Originally, their basic objectives appeared to be 'worlds apart,' but over the past decade or so, major advances have come about that have provided us with the means to make implants 'look like teeth.'

My great concern of late is that in our eagerness to achieve the ultimate esthetic result, we may fail to realize that sometimes this may be impossible.



Often in the lectures that I attend or papers that I read, I only see outstanding results. Rarely do I see esthetic failures. Sometimes I wonder if I'm the only one who has them!

Clinical practice is as much art and judgment as it is science, and at times it is inherently uncertain. Good clinicians seek up-to-date information and advice from the courses they attend and the journal articles they read. Unfortunately, less than forthright clinicians and questionable papers found even in peer-reviewed publications might make dental practice even more uncertain.

Occasionally, I have been asked to review and comment on papers that have been submitted for publication to various journals. I have seen situations where the "post-operative" photograph doesn't belong to the same patient as the "pre-operative" one. Other times I have seen porcelain laminates placed on the teeth adjacent

to the implant, but the author failed to mention that they were placed there to mask the "black triangles" between the implant and teeth. It is quite disconcerting to see beautiful photographs (with lips fully retracted) of the pre-operative condition, surgical techniques, interim prosthetic procedures, etc. but the lips not fully retracted for the post-operative view. As the reader of the paper, do I assume the result is excellent or otherwise? Fortunately, these situations are rare, but on occasion they do occur.

The linchpin of therapy is *diagnosis*. Esthetic diagnosis is about strategic issues; treatment is about tactical ones. All successful concepts of dental esthetics have similarities; all unsuccessful ones are unsuccessful. We all deal with the same problems: thin, delicate tissues that recede interproximally, triangular shaped teeth that result in "black triangles," implants placed too far to the facial or

towards the palate, implants positioned too close to adjacent natural teeth, and/or implants placed too far apically or not far enough. All of us are confronted with deficient edentulous ridges. About 10% of anterior edentulous spaces have adequate volume to place an implant *ideally* so as to achieve the ultimate esthetic result. But in most instances (approximately 90% of the time) we are faced with less than ideal situations. Once we recognize these problems (and see more of them in lectures and journal articles), we will be better equipped to deal with them or at least inform our patients beforehand that a less than desirable result may be in the offing. It will also allow us to take steps (such as ridge augmentations) to correct certain problems.

There used to be a Rolls-Royce advertisement that states, "The Rolls-Royce automobiles do not break down – however, on occasion they fail to proceed." Again, to draw a parallel to our profession, "Endosseous implants usually do not break down – however, on occasion they fail to look life-like." Auspiciously, the vast majority of clinicians and authors are highly principled and passionately dedicated to their work. What we must see are more of their problems, failures, and clinical compromises (as someone said, their "closet cases"). Furthermore, for those clinicians just beginning on their 'journey' with the single tooth anterior implant, my only advice is that they not become discouraged – it's going to take a long time to reach an acceptable level of predictability and expertise. As to my own experience, it surely has been one of the most difficult and challenging procedures I've had to learn. Like the gentleman in New York who asked a passerby, "How do I get to Carnegie Hall?" with the answer, "Practice, practice, practice," one has to train the mind and eyes to uncover the various subtleties and nuances that are so important in dental esthetics.

The endosseous implant has provided us with the opportunity to replace an

anterior tooth without resorting to the "classical" fixed bridge. What a great innovation! However, it is not without a modicum of uncertainty and perplexity. Recently I presented a full day seminar on the single tooth anterior implant. Much of the day was spent dealing with problems (again, I may be the only one with these difficulties). At the conclusion of my lecture a young woman approached the podium, complimented me, and thanked me for sharing my experiences with the audience. Her final comment was a very telling one – after listening to my presentation she was convinced that, "*the single tooth maxillary anterior implant is not a game for the well-adjusted.*" I thought about this for a few days, and you know what? She is correct!

New Options in Prosthetic Reconstruction

Robert C. Vogel, DDS

The consistent predictability and proven reliability of osseointegrated implants have opened new possibilities in prosthetic reconstruction.

By incorporating today's technology and clinical techniques into one of dentistry's oldest and often-dreaded procedures — the removable partial denture (RPD) — optimal results can be achieved. This will allow the clinician to provide greater comfort and function for the patient while helping to preserve the bone, thereby increasing the patient's and clinician's satisfaction.

With the introduction of implant dentistry, the indication for RPDs has decreased to limited situations and often only as a last resort treatment option. In addition to the lack of ideal esthetics, the potential detriments from removable partial dentures to the natural dentition and edentulous areas are many: continued or accelerated bone loss, traumatic functional and parafunctional forces, uncontrolled movement transmitted to often compromised abutment teeth, the presence of unsightly clasps, and the reduction and splinting of natural teeth for precision attachments. While all these compromises can be

addressed by dental implants, there are still situations when an RPD is a viable option due to such limitations as health or finances.

Even when a conventional RPD is fabricated to the highest possible quality, many patients still present with ongoing complications. Situations such as irregular or thin mucosa covered ridges and resultant chronic irritation of the load-bearing tissues or increasing tooth mobility from traumatic functional or uncontrolled forces can now be successfully treated with new options.

The incorporation of dental implants into this area of prosthetic dentistry

allows us to address all of these concerns and provide a wonderful service to our patients with overwhelming satisfaction to both them and ourselves. The benefits obtained through the union of dental implants and RPDs include: uncompromised retention, elimination of clasps with improved esthetics, and control of detrimental forces to remaining teeth as well as providing a conservative and cost-effective treatment option to many patients.

The following 4 cases are shown to illustrate the benefit of Straumann dental implants and a retentive attachment (Locator) to address individual needs.

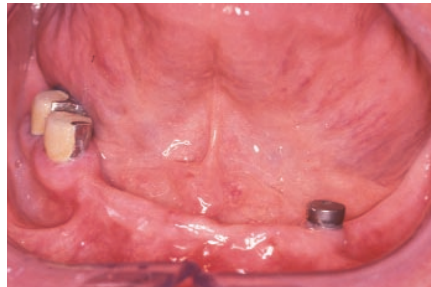


Figure 1A Extensive unilaterally edentulous mandibular arch following one stage placement of Straumann® RN implant in patient unable to tolerate conventional partial denture.

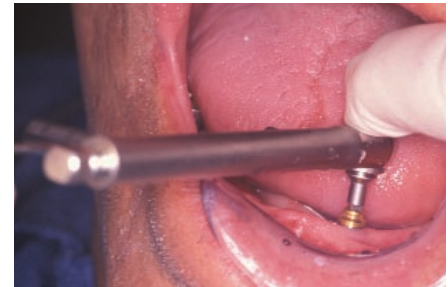


Figure 1B Placement of Locator abutment to 35 Ncm with use of the torque control device.



Figure 1C Try-in of appliance to verify border extension and occlusion.



Figure 1D Intaglio surface of partial denture with Locator housing and retentive element in place.



Figure 1E Final prosthesis in full occlusal function.

Case 1

Unilateral distal extension partial denture with chronic lateral movement resulted in traumatic rotational forces and lifting of the saddle due to lack of cross arch retention. The Locator attachment provides ideal retention and limitation of excessive lateral movement as well as functional stimulation of the residual edentulous ridge, which helps to preserve bone.



Figure 2A Placement of Straumann dental implant and Locator abutment following loss of natural tooth abutment crown and associated precision attachment.

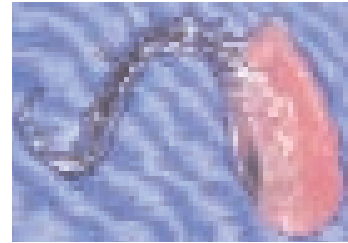


Figure 2B Final prosthesis with implant attachment in place eliminating the need for traumatic/unesthetic clasping of lateral incisor while providing ideal retention.

Case 2

Maxillary right cuspid (a tooth critical for a partial denture abutment and its associated precision attachment) was lost to recurrent decay and fractured to the gingival level. The Straumann dental implant and Locator attachment provide an ideal esthetic solution by eliminating need for an anterior clasp and protect remaining natural teeth from traumatic forces. This can further serve as an ideal transitional appliance while the patient undergoes sinus augmentation and additional implant placement for a posterior fixed bridge. Note: an existing appliance can be immediately retrofitted to accept the low profile attachment.

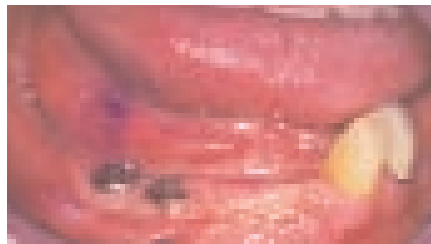


Figure 3A Severely atrophic unilaterally edentulous ridge with thin mucosa resulting in chronic sore spots and traumatic tooth mobility following placement of two Straumann® RN dental implants.



Figure 3B Placement of two resilient Locator attachment abutments.



Figure 3C Intaglio surface of appliance with retentive elements in place.



Figure 3D Final appliance ready for delivery.

Case 3

Patient presented with a severely atrophic flat ridge with thin mucosa, chronic sore spots, and tooth mobility. Two implants and resilient attachments provide ideal retention and shared load with the residual ridge by limiting traumatic forces to the teeth and underlying denture base. This solution can easily be transitioned to a conventional overdenture should the remaining teeth be lost and additional implants placed.



Figure 3E Appliance in function for 3 months with complete elimination of sore spots and tooth mobility.

Case 4

Ideal esthetics and uncompromised retention are achieved with a clasless partial denture; the palatal major connector provides support to occlusal forces and reduces stress

on natural teeth. This patient can be transitioned to fixed implant restorations with the future placement of additional implants.

The full integration of dental implants into every aspect of clinical dentistry never ceases to provide new possibilities and excitement in the care of our patients.



Figure 4A Patient suffered from chronic partial denture mobility, traumatic forces to remaining teeth, compromised esthetics from anterior clasps and a desire to undergo minimal surgical treatment.



Figures 4B & 4C Right and left posterior following integration of Straumann® RN implants and placement of Locator abutments.



Figure 4D Internal surface of new "clasless" partial denture with Locator housings and retentive elements in place. Note the use of angulation correction inserts (green) to allow for ideal path of insertion and removal.



Figure 4E Final clasless partial denture.



Figure 4F Clasless partial denture with uncompromised retention and ideal esthetics.

The Use of Extended Healing Caps with the Straumann Dental Implant

Jay Beagle, DDS, MSD

Since its inception, the Straumann® Dental Implant System has been the innovator with regards to non-submerged surgical placement and healing. Clinical studies have shown the success of non-submerged implants to be equal to or greater than that achieved with traditional submerged surgical methods.¹ Non-submerged techniques offer the advantages of a single surgical procedure, preservation of keratinized mucosa, reduced cost, and accelerated soft tissue maturation.

Non-submerged placement of Straumann dental implants requires positioning the SLA® surface and the smooth collar interface at the osseous crest, with the shoulder of the implant placed at the level of the soft tissue junction² (Figure 1). To prevent migration of the mucosa over the

coronal aspect of the implant, an extended healing cap of appropriate height is chosen (Figures 2, 3, 4). The height should be tall enough to stabilize the soft tissues and maintain a transmucosal healing pattern yet short enough to prevent any unwanted loading of the implant with the tongue, mastication of food, or the wearing of a removable prosthesis. An exception to this technique should be followed when implants are placed in Type IV bone quality. In these instances, prevention of premature occlusal loading is paramount. The placement of an internal closure screw is then indicated, using a semi- or fully submerged closure technique. The closure screw is then replaced by an extended healing cap at the time of second stage surgery, 12 weeks later. Placement of dental implants

involving the esthetic zone in the partially edentulous patient often precludes the use of a non-submerged placement technique. Many of these patients present with osseous and soft tissue topography that is not scalloped, but flat, and which does not support the re-creation of interdental papillae. Salama et al.³ suggest that to achieve gingival harmony with adjacent soft tissues, the interproximal papillae associated with dental implants must also be reconstructed. This generally requires that the soft tissue be developed not only horizontally but also vertically. Corn⁴ suggests that during soft tissue ridge augmentation, “dead space” can be created in flap management. He proposed that the space would fill naturally with soft tissue to enhance the augmentation procedure. This is



Figure 1 Proper positioning of a Wide Neck healing cap.



Figure 2 Flaps sutured around 3.0 mm Wide Neck healing cap.



Figure 3 Healing caps for Regular Neck Straumann dental implants.



Figure 4 Healing caps for Wide Neck Straumann dental implants.



Figure 5 Beveled healing caps for the Straumann® Dental Implant System.



Figure 6 Buccal view of 3.5 mm beveled healing cap prior to flap closure.

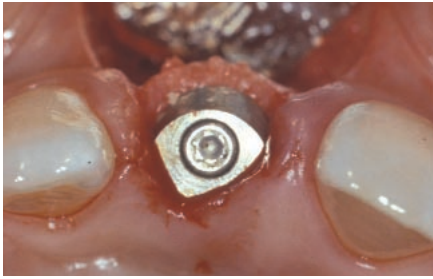


Figure 7 Occlusal view of 3.5 mm beveled healing cap prior to flap closure.

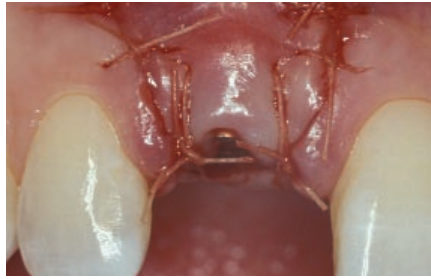


Figure 8 Buccal view of semi-submerged closure with beveled healing cap.

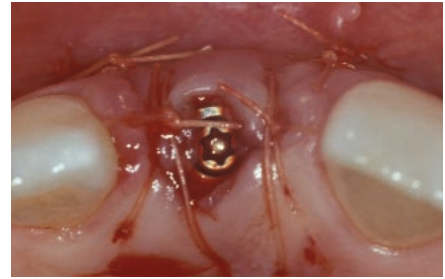


Figure 9 Occlusal view of semi-submerged closure with beveled healing cap.



Figure 10 Two-piece PEEK healing cap.



Figure 11 Buccal view of customized PEEK healing cap.



Figure 12 Occlusal view of customized PEEK healing cap.

much akin to the Buser et al.^{5,6} approach to guided bone regeneration in which mini screws are used as “tent poles” to support an ePTFE membrane, allowing for osseous regeneration.

By utilizing extended healing caps of appropriate height, Salama et al.⁷ have developed a submerged implant protocol designed to support the soft tissues and enable an increase in vertical soft tissue height during healing. They have termed this technique, which is essentially guided tissue regeneration without a membrane, “Guided Gingival Regeneration.”

To incorporate this technique in the esthetic zone with a Straumann dental implant, 2 mm and 3.5 mm beveled healing caps can be used (Figure 5). These healing caps are designed with a buccal bevel to reduce the volume of the cap in the critical zone of the buccal soft tissues and prevent perforation of the mucosal flap during healing. This healing cap is advantageous to use, as it covers the implant shoulder, supports the soft tissues in the approximal area, and pre-shapes a part of the transmucosal

soft tissue tunnel during the initial healing period.⁸ It also enables the use of either a submerged or semi-submerged healing pattern (Figures 6, 7, 8, 9).

In esthetic situations where additional horizontal or vertical soft tissue support is needed, custom healing caps can be created with the two-piece PEEK extended healing cap (Figure 10). These healing caps can be anatomically shaped and inserted at the initial surgery or following second stage mucoplasty allowing the implant to become transmucosal for restorative procedures (Figures 11 and 12).

Management of the peri-implant soft tissues is a critical factor in the success of dental implant procedures. Proper treatment planning is a key factor in deciding when to use a non-submerged, semi-submerged, or fully submerged healing approach. The opportunity to select appropriate healing caps will assist the surgeon in providing the patient an optimal result.

References

1. Buser D, Mericske-Stern R, Bernard JP, Behneke A, Behneke N, Hirt HP, et al. **Long-term evaluation of non-submerged ITI implants. Part 1: 8-year life table analysis of a prospective multi-center study with 2359 implants.** *Clin Oral Implants Res* 1997;8(3):161-72.
2. Buser D, von Arx T, ten Bruggenkate C, Weingart D. **Basic surgical principles with ITI implants.** *Ibid.* 2000;11 Suppl 1:59-68.
3. Salama H, Salama M, Garber D, Adar P. **Developing optimal peri-implant papillae within the esthetic zone: guided soft tissue augmentation.** *J Esthet Dent* 1995;7(3):125-9.
4. Corn H. **Soft tissue procedures in esthetic periodontal surgery: Annual Meeting;** *American Academy of Periodontology*: 1988.
5. Buser D, Dula K, Belser U, Hirt HP, Berthold H. **Localized ridge augmentation using guided bone regeneration. 1. Surgical procedure in the maxilla.** *Int J Periodontics Restorative Dent* 1993;13(1):29-45.
6. Buser D, Dula K, Belser UC, Hirt HP, Berthold H. **Localized ridge augmentation using guided bone regeneration. II. Surgical procedure in the mandible.** *Ibid.* 1995;15:10-29.
7. Salama H, Salama MA, Li TF, Garber DA, Adar P. **Treatment planning 2000: an esthetically oriented revision of the original implant protocol.** *J Esthet Dent* 1997;9(2):55-67.
8. Buser D, von Arx T. **Surgical procedures in partially edentulous patients with ITI implants.** *Clin Oral Implants Res* 2000;11 Suppl 1:83-100.

The Treatment Planning Implications of Implant Dentistry in the Partially Edentulous Patient

Paul A. Fugazzotto, DDS

Introduction

Both the predictability of osseointegrated implant therapy and its impact upon the practice of clinical dentistry are well recognized. From the replacement of less predictable procedures, through the utilization of less invasive procedures, to the provision of previously undreamt of treatment options, the impact of implant therapy on everyday practice continues to evolve and increase.

It is imperative that implant therapy be viewed neither as a panacea nor a replacement for proven, predictable therapies. Implant therapy must be appropriately integrated into patient treatment planning and execution of care.

Utilization of implant reconstructive therapy does not allow the clinician to abandon the basic tenets of diagnosis, case work up, treatment planning, and meticulous performance of therapy. The concepts and foundations of appropriate surgical and restorative intervention and the reality of the need to establish both microbiologic and force equilibriums are of paramount importance to maximize the longevity of performed care.

The purpose of this paper is to highlight various areas in which implant therapy significantly impacts and many times alters our patient treatment planning.

Comprehensive examination, case workup, and diagnosis

The introduction of implant therapy into the treatment armamentarium

does not simplify diagnosis, case workup, or treatment planning. By affording newer avenues of care in addition to traditional approaches, implant therapy places additional demands upon diagnosis and case workup in order to appropriately explore all treatment plan options. In most instances, such a case workup includes face bow mounted models and 1 or more laboratory diagnostic wax-ups to help fully identify the scope of the oral health problems present and to enumerate not only the treatment options but the reasonable expectations from each option.

The importance of joint consultations between all restorative dentists, specialists, and laboratory technicians involved in the treatment of the case cannot be overemphasized. It is only through such sharing of knowledge and specific viewpoints that the most appropriate treatment plan for a given patient, as well as viable options, will evolve.

Replacing less predictable therapeutic options

The periodontally involved furcation has long represented a significant challenge to conscientious clinicians. A periodontally involved furcation cannot be predictably maintained through professional and patient oral hygiene measures. Periodontally involved multi-rooted furcated teeth demonstrate further attachment loss and are lost more frequently than their non-furcated counterparts. This understanding has led to a variety of treatment approaches.

While Class I furcation involvements

are easily eliminated through the use of odontoplasty, providing the patient with an environment more amenable to home care measures and thus more maintainable over time, Class II periodontally involved furcations cannot be treated predictably in such a manner. The resultant deep tooth indentations evident after elimination of a Class II periodontally involved furcation via odontoplasty pose plaque control difficulties in and of themselves.

These facts led to the development of various root resective techniques to separate the roots of teeth with deeply involved periodontal furcations, retain 1 or more of the separated roots, perform necessary endodontic therapy, and utilize the root or roots as partial support for fixed prosthetics. While root resection and subsequent restoration in appropriately diagnosed and executed scenarios can be predictably maintained long term, the level of diagnosis and technical expertise required, in addition to possible post therapeutic sequelae of root fracture and/or carious involvement, remain daunting. In addition, the financial ramifications of root resective therapy, endodontic treatment, post and core build up, and fixed prosthetic restoration often render such a therapeutic option unrealistic for many patients.

Guided Tissue Regenerative therapy (GTR) offers an alternative to root resective techniques. Histologic and clinical reports have demonstrated the ability to regenerate lost attachment apparatus and supporting alveolar bone following the exclusion of epithelial cells from a failing periodontally

involved furcation area, thus allowing repopulation of the periodontal defect with the desired periodontal ligament and osseous precursor cells. GTR therapy is highly diagnostic and technique specific. Unfortunately, the literature has also demonstrated the unpredictability of GTR therapy in many periodontally involved furcations when utilized inappropriately.

While both resective techniques and GTR therapy offer viable means for resolution of periodontally involved furcations in many situations, the application and utilization of these treatment modalities must be carefully considered before embarking upon a final course of therapy. The feasibility of the overall treatment plan, the predictability of treatment of a given tooth and lesion through root resective or GTR techniques, the financial ramifications of care, and the ability of the patient to exercise appropriate post therapeutic plaque control measures are all factors that may result in less than ideal treatment outcomes.

The introduction of implant reconstructive therapy, with or without concomitant Guided Bone Regenerative techniques (GBR), affords the clinician a highly predictable means by which to reconstruct posterior sextants in the face of deeply periodontally involved furcations. As our understanding of implant surgical techniques, implant body surfaces, and force distribution have evolved, implant use in maxillary and mandibular posterior regions has demonstrated high levels of predictability under function over time. The importance of the advent of regenerative therapy in the utilization of implants in posterior areas cannot be overemphasized. The introduction of various rough surfaced implant bodies has led to increased implant to bone surface area, a shortening of the time necessary to achieve osseointegration before implant loading, and increased implant survival both at the time of implant uncovering and under function. Appropriately

executed GBR treatment allows the predictable rebuilding of damaged alveolar bone at the time of tooth removal, with or without concomitant implant placement; the regeneration of atrophic ridges post tooth extraction and resorptive healing; and the augmentation of pneumatized sinus areas to afford bone for implant placement in previously untenable sites.

Although similar success rates for up to 15-21 years between root resective and restored molars and molar position implants have been reported, it is important to recognize 2 significant caveats. The first is that the indications described for the utilization of root resective and restorative techniques were found to be less universal than those for implant placement in posterior regions. The second caveat involves patient financial challenges. Tooth removal and replacement with individual implants and crowns often entails less of a financial commitment than root resective and restorative therapy, which may mandate a full arch reconstruction to afford the necessary strength to be gained under function through cross arches splinting.

When faced with a scenario of posterior edentulism, there is no doubt that implant placement and restoration provide a much more stable result with regard to patient comfort and function and in terms of lessening of forces being placed upon remaining anterior teeth than the “more conventional” treatment option of a bilateral distal extension removal partial prosthesis.

Improving treatment outcomes of “conventional” prosthetic options

While often less financially daunting than root resective therapy and resultant full arch reconstruction, implant-supported fixed reconstructive treatment modalities may still

represent a financial commitment beyond many patients’ means. In such situations, implants may be utilized to help stabilize removable partial prostheses, improve comfort and function, and lessen forces being applied to abutment teeth.

In the instance of a bilateral distal extension removable partial prosthesis, placement of single implants in first molar positions and utilization of overdenture abutments in the implants and various attachment designs in the undersurface of the prosthesis easily accomplishes such goals with a lesser financial commitment.

Implants may be employed at lesser points along a removable partial prosthesis to improve retention, function, and comfort and to lessen force application to remaining abutment teeth. For example, a patient with no teeth anterior to the bicuspid may find that placement of 1 - 2 implants in the anterior segment is highly beneficial for the aforementioned reasons. The same is true of a patient attempting to utilize a unilaterally retained removable partial prosthesis due to a lack of natural abutments in a given quadrant.

In many cases, the implants and abutments may be placed and the attachments “retrofitted” to the undersurfaces of an existing removable partial prosthesis to lessen further the financial impact to the patient.

Replacement of more invasive therapies

Use of implants to replace single missing teeth has greatly expanded over the last decade. Once controversial, such implant application is now viewed as preferable when faced with a single missing tooth and intact, non-restored teeth mesial and distal to the edentulous space. The advent of various implant body surfaces often allows the restoration of single implants 6 - 8 weeks after insertion thus further

underscoring the desirability of such a treatment approach when compared to preparation and invasion of adjacent unaffected teeth.

When faced with deeply decayed natural teeth, tooth extraction and implant placement, with or without concomitant regenerative therapy depending upon the situation, may be preferable to crown lengthening osseous surgery, endodontic therapy, post and core build up, and full coverage restoration of the tooth in question. Should the aforementioned decay be interproximal, the necessary crown lengthening osseous surgery often results in removal of extensive osseous support from the adjacent tooth. If the subgingival decay is on the buccal or interproximal aspects of a tooth in the patient's esthetic zone, the required crown lengthening osseous surgery often results in an esthetically unacceptable treatment outcome. In such a situation, orthodontic super eruption of the tooth prior to crown lengthening osseous surgery could be considered. However, the clinician is now adding an additional treatment modality and expense to an already questionable situation.

Expense must be factored in to the comparison of various treatment modalities. It is a reality of clinical practice that, while many treatment approaches are technically feasible, the time and expense necessitated by such therapeutic modalities may be difficult to justify when simpler, less expensive, and as predictable alternative therapeutic options exist.

These arguments should never be construed as a justification for implant placement in all situations. Often tooth retention is preferable to removal and replacement with an implant due to certain indications such as: the lack of need for endodontic therapy, endodontic therapy having already been performed prior to examination; the location of the carious lesions on the buccal or lingual aspects of the

tooth, which is easily exposed without jeopardizing support to adjacent teeth; the unsuitability of the patient to undergo implant therapy due to systemic reasons, psychological concerns, smoking habits, etc.; or the patient's stated desire to maintain natural teeth wherever possible. In addition, the necessity to perform extensive regenerative therapies to effect appropriate implant placement, or the presence of various limiting anatomical structures, may indicate that a fixed prosthesis is preferable to an implant and a single crown in the replacement of a single missing tooth. For example, if tooth # 3 is missing and a significantly pneumatized sinus is noted in this area, resulting in inadequate bone coronal to the floor of the sinus for implant placement, a 3-unit fixed splint may be preferable to performance of a sinus augmentation procedure, subsequent implant placement, and eventual implant restoration.

Conclusions

There is no doubt that the introduction of predictable implant reconstructive therapy has significantly altered the landscape of comprehensive patient treatment planning. However, rather than being viewed as a replacement for predictable conventional treatment modalities, implant therapy must be considered as an adjunct to our already existing treatment armamentarium.

Treatment planning decisions regarding utilization of implants or "more conventional" therapeutic approaches must be based upon a given patient's needs, desires, and clinical scenarios. Such decisions should never be motivated by manufacturer claims, a clinician's desire to perform "more exciting" therapies, or questions of financial remuneration.



Figure 1 Two Straumann implants with Locator attachments in the anterior region.



Figure 2 The attachments have been retrofitted into the existing removable prosthesis to lessen the financial impact of therapy. Restorative dentistry by Dr. John Murphy, Milton, MA.

Case 1

A 43-year-old male presented with five remaining maxillary teeth. The maxillary arch had previously been restored with a conventional removable partial prosthesis due to financial limitations. The unfavorable force distribution under function was resulting in increasing mobility of the abutment teeth. Following periodontal regenerative therapy to rebuild alveolar bone and attachment apparatus around the remaining five teeth, Straumann implants were placed in the maxillary anterior region. Locator attachments were placed on the implants and the female housings for the attachments were retrofitted into the existing removable partial prosthesis. The result was a more stable and mechanically favorable outcome with a minimum of financial commitment.

Case 2

A 42-year-old female presented to the office with severe carious breakdown of teeth #'s 2, 4, and 5. Treatment options included the following:

- A. Removal of teeth #'s 2, 4, and 5, and fabrication of a unilateral removable partial prosthesis. Such an approach was unacceptable in terms of comfort, function, and long term stability.
- B. Fabrication of a fixed splint on teeth #'s 2, 4, and 5: The long term prognosis of such a prosthesis was highly questionable due to the compromised nature of the abutment.
- C. A conventional fixed splint on teeth #'s 2, 4, 5, 6: While the addition of tooth #6 would add support to the prosthesis, it would entail involvement of an unaffected tooth. In addition, tooth #2 would still be ill suited to serve as a terminal abutment for the fixed prosthesis.



Figure 3 Teeth #'s 2, 4, and 5 are severely decayed.

- D. Removal of teeth #'s 2, 4, and 5, and placement of implants in the positions of #'s 3, 4, and 5 at the time of tooth removal: This option was chosen. No implant was placed in the position of tooth # 2 as tooth # 31 was absent. A Wide Neck Straumann implant was placed in the position of tooth #3; a 4.1 Tapered Effect Straumann implant was placed in the position of tooth #4; and a Regular Neck 4.1 mm Straumann implant was placed in the position of tooth #5. The implants were restored with solid abutments and single crowns.



Figure 4 Three Straumann implants (a Wide Neck, a Tapered Effect, and a Regular Neck) have been placed at the time of tooth removal, and subsequently restored.



Figure 5 A clinical view of the final restorations. Restorative dentistry by Dr. Thomas Analletto, Needham, MA.

Case 3

A 77-year-old male presented with a hopeless tooth #3. Rather than consider either edentulism in this area or utilization of a distal extension removable partial prosthesis, tooth #3 was extracted and augmentation therapy was performed at the time of tooth removal.

Subsequent to maturation of the regenerating hard tissues, two 4.1 mm wide x 9 mm long Straumann implants were placed in the positions of teeth #'s 2 and 3, and restored with single crowns.



Figure 6 Tooth #3 is fractured. Note the minimal amount of bone coronal to the floor of the sinus.



Figure 7 Two Straumann implants were placed at the time of tooth extraction and augmentation, and subsequently restored. This radiograph demonstrates stability after 3 years in function. Restorative dentistry by Dr. Richard Baker, Braintree, MA.

Case 4

A 47-year-old female presented with carious breakdown of teeth #'s 10, 11, and 12. Teeth #'s 10 and 11 demonstrated severe carious destruction in the pulpal canals, rendering them non-restorable. Tooth #12 was deemed suitable to receive a restoration. Treatment options included:

- A. Removal of teeth #'s 10 and 11 and fabrication of a fixed splint including teeth #'s 9, x, x, 12: This treatment option would necessitate relying upon tooth #12 as a terminal abutment for a fixed splint, in a highly unfavorable milieu, due to the absence of tooth #11 to help provide support under function.
- B. Extraction of teeth #'s 9, 10, and 11, and fabrication of a fixed splint including teeth #'s 8, 9, x, x, 12, 13: While this approach would provide greater stability under function than the aforementioned option, it necessitated involvement of two additional teeth.
- C. Extraction of teeth #'s 10 and 11, and placement of Straumann implants at the time of tooth removal, followed by restoration of natural teeth 9 and 12, and the implants in the positions of 10 and 11 with single crowns: This option was chosen.



Figure 8 Teeth #'s 10 and 11 are severely compromised by decay in the canals. Tooth #12 is predictably restorable.



Figure 9 Two Straumann implants have been placed at the time of tooth extraction.



Figure 10 A view of the final restorations. Restorative dentistry by Dr. Gary Nankin, Quincy, MA.

Treatment Options in Reconstruction of the Posterior Dentition Part 2: Planning and Treatment Considerations for Implant-Assisted Restorations in the Posterior Maxilla: Esthetic

Dean Morton, BDS, MS; Will Martin, DMD, MS; James Ruskin, DMD, MD; Todd Fridrich, CDT

Although restoration of the posterior regions of the mouth often presents unique difficulties for the treatment team, implant survival remains high. Challenges encountered when treating the posterior maxilla are related to the anatomic characteristics of the area. Reduced bone quality and quantity and the consequent soft tissue deficiency often lead to the need for enhancement procedures, to provide adequate implant support, and to establish an environment capable of sustaining an esthetic and functional restoration. Implants may be positioned immediately on extraction of the teeth, thus limiting or preventing bone and soft tissue loss. The demands of the patient, the number and position of missing teeth, and the functional and occlusal requirements of the restorations are also influential

in the formulation of the final treatment plan and the achievement of an esthetic outcome.

Magne and Belser (2002) have listed objective and subjective criteria to be considered when assessing a patient with esthetic demands. Several of the criteria address the supporting soft tissues (gingival health, inter-dental closure, zenith of the gingival contour, and balance of the gingival levels), while others directly relate to the teeth (axis, level of inter-dental contact, relative tooth dimensions, tooth form and character, surface texture, color, incisal edge configuration, lip line, and smile symmetry). Treatment planning for implant-based therapy must be cognizant of these factors, and the final outcome must be assessed in relation to them.

Case Report

The patient presented with chief concerns related to esthetics (Figure 1) and functional inadequacy (Figure 2). Intraoral evaluation revealed approximately 6 mm of inter-occlusal space at rest (Figure 3). Lateral views illustrated the disrupted incisal and occlusal planes, and retained deciduous teeth. Inter-occlusal space is demonstrated in between the posterior teeth with the patient at rest (Figures 4 and 5). Radiographic analysis confirmed the absence of most permanent teeth and detailed no evidence of disease or pathology (Figure 6).

The esthetic evaluation revealed a multitude of concerns. Although the gingival tissues were healthy and of



Figure 1 A pre-operative smile view.



Figure 2 A pre-operative anterior view of maximum intercuspation.



Figure 3 A pre-operative anterior view at rest position.



Figure 4 A pre-operative right view at rest position.



Figure 5 A pre-operative left view at rest position.

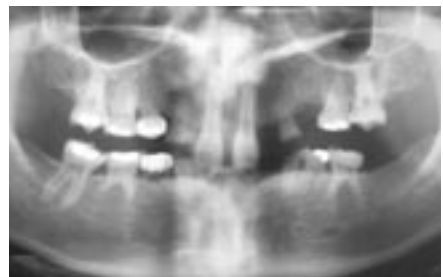


Figure 6 A pre-operative panoramic radiograph.

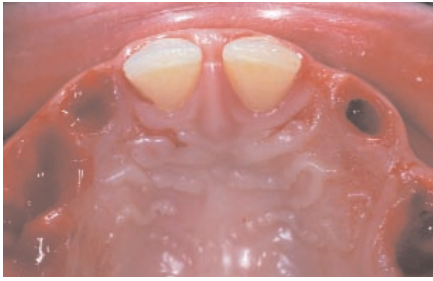


Figure 7 Minimally traumatic extractions have been carried out in the maxilla.

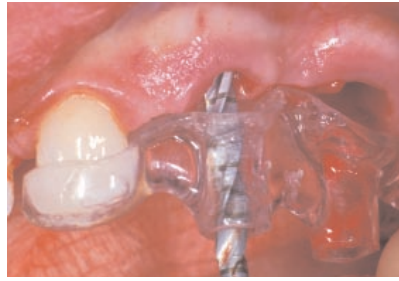


Figure 8 The surgical template is in place.

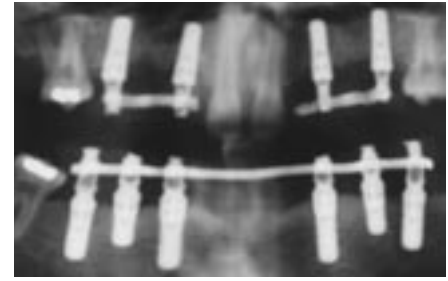


Figure 9 A panoramic radiograph post placement.

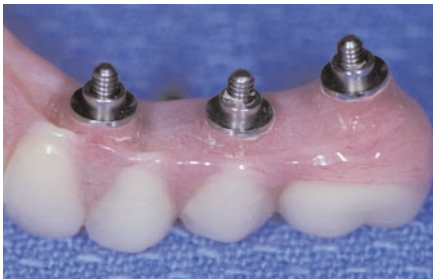


Figure 10 A view of the mandibular provisional prosthesis and titanium temporary synOcta® abutments for bridge.



Figure 11 A view of the provisional restorations 8 weeks post implant placement.



Figure 12 A view of the mandibular implants 8 weeks post implant placement.

appropriate color, the gingival architecture was problematic as a result of missing and mal-positioned teeth. The planned restorations would need to establish appropriate tooth proportion and symmetry, and develop harmony with the supporting soft tissues if an improvement to the deficient smile was to be realized.

After considering several treatment options, the patient chose to pursue implant-based rehabilitation. The treatment plan included several stages:

1. Extraction of the deciduous teeth and immediate implant placement.
2. Immediate loading of the implants with two short span provisional fixed partial dentures in the maxilla and a complete arch provisional restoration in the mandible.
3. Subsequent to implant healing, definitive restoration of the maxilla with metal-ceramic fixed prostheses, and restoration of the mandible with a fixed-detachable (hybrid) prosthesis.

The deciduous teeth were removed with a minimum of trauma to the bone and surrounding soft tissues (Figure 7). Surgical templates, fabricated from the diagnostic wax-up, communicated the desired three-dimensional position of the implants (Figure 8) to the surgeon. Tapered Effect implants were positioned in the maxilla to maximize implant stability, and wide body implants were utilized in the mandible to maximize both implant stability and support for the future prosthesis (Figure 9). Polyvinyl siloxane impressions were made of both arches to relate the implants, and modified baseplates and wax rims used to obtain inter-occlusal articulation records.

The casts were articulated, and provisional restorations were laboratory fabricated and delivered within 48 hours of implant placement. The maxillary provisional restorations were cement-retained on angled synOcta® abutments, chosen to idealize the path of placement. The mandibular provisional fixed-detachable restoration was screw-retained by synOcta® (for bridge) titanium abutments (Figure 10).

The provisional restorations remained in place for eight weeks while the implants healed (Figure 11). The definitive restoration of the mandibular arch was undertaken first, to provide a stable arch against which the maxillary restorations could be fabricated. Further, the bone in the maxilla was considered less ideal, and as such was afforded additional healing time.

Subsequent to removal of the provisional restoration the tissues were evaluated (Figure 12) and an implant-level polyvinyl siloxane impression was made (Figure 13). The definitive mandibular restoration was fabricated on synOcta® 2.5 abutments, which were positioned and torqued to 35 Ncm (Figure 14) prior to delivery of the prosthesis. The mandibular fixed prosthesis was evaluated for fit, adaptation to the soft tissues, and occlusion. Subsequent to assessment of the patient's satisfaction, the restoration was torqued to place with SCS occlusal screws (Figure 15). The restoration of the maxillary arch began with a polyvinyl siloxane impression of the implants and the

soft tissue contours (Figure 16). Shade communication was improved through clinical photographs that identified the appropriate base shade (Figure 17) and displayed the surface texture of adjacent teeth (Figure 18). The master cast incorporated implant analogs (Figure 19) and was articulated against a cast of the opposing mandibular restoration (Figure 20). A cast of the maxillary provisional restorations was cross-articulated against the mandibular cast to illustrate the appropriate tooth positions and lengths to the dental technician (Figure 21).

Using matrices fabricated from the cast of the provisional restorations, two-piece cementable abutments

were chosen, positioned, and adjusted to facilitate fabrication of the metal-ceramic restorations (Figures 22-24). The restorations were checked orally for adequacy of fit, occlusion, and esthetics. Subsequent to confirmation of the patient's satisfaction with the esthetic result, the restorations were definitively cemented (Figures 25 and 26).

The two-week follow-up appointment confirmed soft tissue healing with the improved contour and adaptation of the definitive restorations (Figure 27). Lateral views confirmed the esthetic results which were possible (Figures 28 and 29). Note the pink ceramic papilla developed between teeth 5

and 6. The final radiographic result confirmed implant and tooth health (Figure 30).



Figure 13 Final impression and tissue analog - mandible.



Figure 14 Positioning and torquing synOcta® 2.5 abutments.



Figure 15 Mandibular definitive prosthesis.

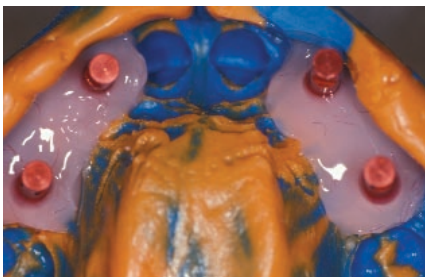


Figure 16 Final impression and tissue analog - maxilla.



Figure 17 Base shade communication is performed.



Figure 18 Surface texture and shade communication is carried out.



Figure 19 A view of the maxillary master cast.



Figure 20 A view of the articulated maxillary master cast.



Figure 21 A view of the cross articulated cast of provisional restorations.

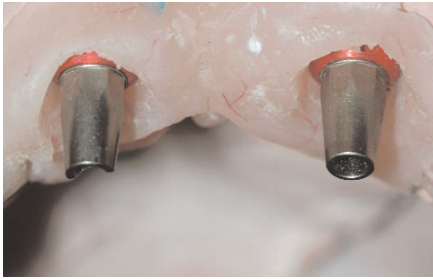


Figure 22 A lateral view of the adjusted abutments.



Figure 23 A palatal view of the adjusted abutments.



Figure 24 A buccal view of the adjusted abutments.



Figure 25 An occlusal view of the definitive restorations on the day of placement.



Figure 26 An anterior view of the definitive restorations on the day of placement.



Figure 27 An anterior view of the definitive restorations two weeks post placement.



Figure 28 A left lateral view of the definitive restorations two weeks post placement.



Figure 29 A right lateral view of the definitive restorations two weeks post placement.



Figure 30 A panoramic radiograph of the completed restorations.

An Alternative Abutment for Deep Implant Placements in the Esthetic Zone Utilizing the synOcta® Meso Abutment

Frank L. Higginbottom, DDS

Today the most frequently employed restorative option for the partially edentulous patient when using the Straumann® Dental Implant System is the solid abutment supporting a cemented crown. This approach may become problematic when the implant must be placed more deeply in the anterior region. Such placement often results in an interproximal shoulder depth of 5-7 mm or more, depending upon the severity of the gingival scallop. In these instances, a cement-retained restoration with a deep interproximal margin would result in a marginal placement that presents a problem for cement removal by the dentist and oral hygiene measures for the patient.

For these reasons it is advisable to place a screw-retained crown in cases with deeper implant placements. This may be achieved with a single crown retained by an occlusal screw. However, many times the anatomy of the anterior maxilla will not allow the use of this simple solution, due to a screw access position that is not lingual to the lingual incisal edge of an upper incisor.

One option is Straumann's synOcta® gold abutment, a cast-to abutment designed for the fabrication of custom restorations where the laboratory technician waxes the abutment and directly casts onto it.

Another option is the use of a synOcta® meso abutment, which is a one-piece titanium component that fits directly into the implant (Figures 1 and 2) and retained to the implant with a basal screw. The meso abutment fits into the internal octagon connection of the implant and contacts the implant shoulder. The abutment screw



Figure 1 Illustrations of the synOcta® meso abutments in the 4.8 mm and the 6.5 mm shoulder configurations.

is torqued to 35 Ncm. The synOcta® meso abutment allows for angulation correction and marginal placement control with one component.

The meso abutment is available for both the 4.8 mm and the 6.5 mm implant shoulders. A synOcta® implant level impression is first taken with either an open tray synOcta® impression coping or the traditional impression cap and synOcta® positioning cylinder. When the implant is placed subgingival, it is recommended that an open tray impression coping is used to help ensure complete seating onto the implant shoulder. An impression is made and a provisional restoration is fabricated. The impression is forwarded to the laboratory technician for the fabrication of the final restoration. The technician fabricates a soft tissue cast and shapes the peri-implant space.

An alternative approach is to complete the model work in the dental office and have the patient return when the peri-implant tissues have been shaped by a provisional restoration. The provisional restoration is then used to fabricate a soft tissue cast union exactly resembling the contours created in the mouth. The technician selects the appropriate synOcta® meso abutment and shapes

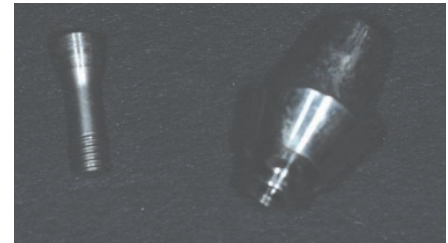


Figure 2 The synOcta® meso abutment is a one-piece abutment with a basal screw. The abutment screw is titanium alloy with niobium and aluminum. The screw has a tapered broad neck, producing a good frictional contact with the mating surface of the abutment.

it to create a uniform cement line that is 2 mm below the gingival margin. It is crucial that the tissue model be accurate. The soft tissue contours should be allowed to stabilize for one month prior to fabrication of the soft tissue cast.

After laboratory fabrication of the final restoration, the synOcta® meso abutment and finished cementable crown are returned to the dentist for placement. The provisional restoration and abutment are removed and the synOcta® meso abutment is seated and double torqued to 35 Ncm. The final crown is fitted and the occlusion and contacts adjusted. When the crown is acceptable, the crown is seated with appropriate cement.

Case 1

A 51-year-old male patient presented with a non-restorable maxillary right central incisor. The tooth was removed and an implant placed in a mature site after 45 days of healing. Proper implant positioning dictated a deep shoulder placement. A solid abutment was not considered appropriate due to the depth of placement. A synOcta® meso

abutment was selected to change angulation and raise the cement line to a manageable level for a cemented crown (Figures 3-19).



Figure 3 A transmucosal healing abutment is in place at twelve weeks post surgery.



Figure 4 The healing abutment is removed, note the immature peri-implant space.

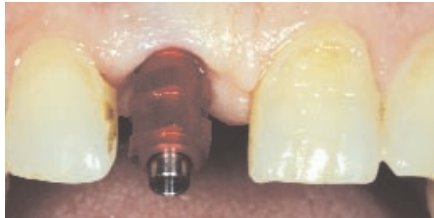


Figure 5 A synOcta® screw-retained impression coping is seated.

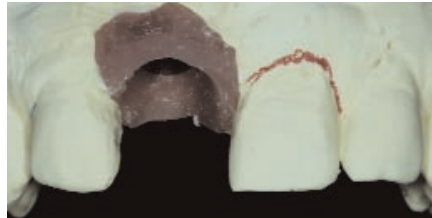


Figure 6 A view of the working cast with the soft tissue analog in place.



Figure 7 A view of a synOcta® meso abutment for the standard shoulder prior to its customization to adjust the marginal depth of the cement line and angulation.

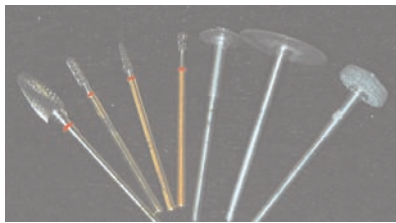


Figure 8 Various SHP burs and discs are used to machine the synOcta® meso abutment.



Figure 9 The synOcta® meso abutment is seated on the master cast.

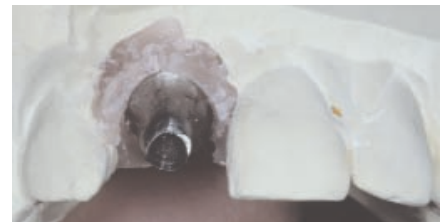


Figure 10 A facial view of the shaped synOcta® meso abutment.

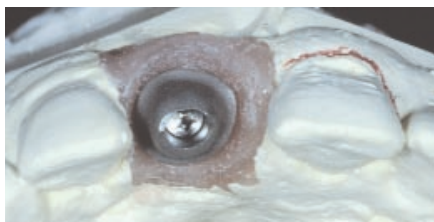


Figure 11 An occlusal view of the shaped synOcta® meso abutment.



Figure 12 A view of the finished synOcta® meso abutment.

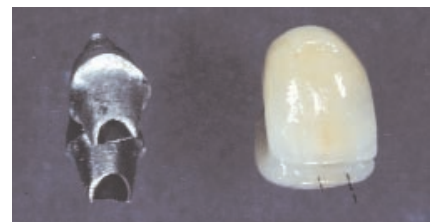


Figure 13 The finalized custom synOcta® meso abutment and a single PFM crown for cementation has been fabricated.



Figure 14 The patient's provisional restoration is used to shape the gingival tissues.



Figure 15 A solid abutment is used as the interim abutment for the provisional restoration.



Figure 16 A view of the peri-implant space created by the emergence profile provisional restoration.



Figure 17 The synOcta® meso abutment is seated and double torqued to 35 Ncm.



Figure 18 The final PFM crown is seated, and cemented with the cement of the clinician's choice.



Figure 19 A final radiograph of the restored implant.

Case 2

A 55-year-old male patient presented with a maxillary right canine demonstrating external resorption, following endodontic treatment and subsequent fracture. This situation necessitates deep implant placement, resulting in a deep interproximal margin placement. The restorative solution involves correcting the marginal placement for a cemented crown with the use of a synOcta® meso abutment (Figures 20-27).



Figure 20 The patient presents with a fractured maxillary right canine.



Figure 21 The radiograph demonstrates external root resorption.

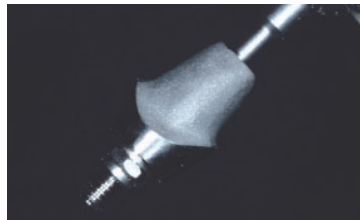


Figure 22 A view of the customized synOcta® meso abutment.



Figure 23 Views of the porcelain fused to high noble metal and shaped synOcta® meso abutment.

Case 3

A 63-year-old female patient presented with a fixed partial denture, and non-restorable anterior abutments. Implants were placed in the canine and premolar positions. The fact that the implant in the canine position was an immediate placement necessitated it being placed more deeply, and resulted in a marginal placement that was not appropriate for a traditional cemented margin. A synOcta® meso abutment was used to facilitate the placement of a cemented porcelain fused to metal crown (Figures 28-36).



Figure 24 A view of the provisional restoration shaped peri-implant space, with the provisional restoration removed.



Figure 25 The synOcta® meso abutment is seated and torqued to 35 Ncm.

Case 4

A 70-year-old patient presented at a maintenance visit with a failing post and core. It was not deemed advisable to fabricate a fixed bridge from the premolar implant to the lateral incisor. Immediate implant placement and load was accomplished using a Wide Neck implant. A cemented crown was utilized with a synOcta® meso abutment as the retentive element (Figures 37-42).



Figure 26 A view of the final cemented porcelain fused to metal crown.



Figure 27 A radiograph of the restored implant.

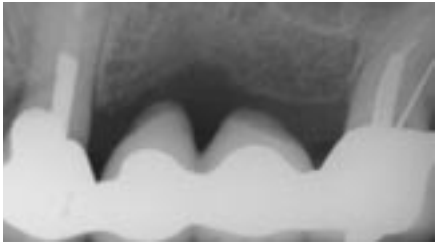


Figure 28 The maxillary left canine is unrestorable, and the lateral incisor is unfavorable as an abutment for a fixed bridge.



Figure 29 A view of the master cast with synOcta® meso abutment placed prior to the machining process.



Figure 30 An occlusal view of the completed synOcta® meso abutment.



Figure 31 Comparison of the pre-machined synOcta® meso abutment and the completed abutment is instructive.



Figure 32 A view of the completed synOcta® meso abutment and porcelain fused to metal crown.



Figure 33 An occlusal view of the peri-implant space shaped by the provisional restoration.



Figure 34 The synOcta® meso abutment is seated and abutment screw is double torqued to 35 Ncm.



Figure 35 The final porcelain fused to metal crown is cemented to place.



Figure 36 A radiograph of the restored implant.



Figure 37 A radiographic view of the non-restorable maxillary right canine.

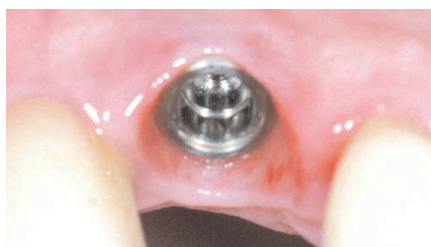


Figure 38 A view of the healed and shaped peri-implant space after provisionalization.



Figure 39 Views of the final shaped abutment and porcelain fused to metal crown.



Figure 40 The synOcta® meso abutment is seated and torqued twice to 35 Ncm.



Figure 41 The final cemented restoration seated.

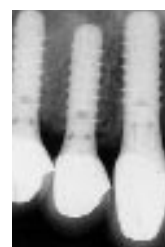


Figure 42 A radiograph of the final results.

Immediate Loading of the Full-Arch Maxilla with Cemented Provisional Restorations Using Angled synOcta® Abutments

Jeffrey Ganeles, DMD, FADC; Frederic J. Norkin, DMD; Julio Sekler, DMD, MMSc

The immediate loading and restoration of dental implants has been shown to be successful in well over 100 scientific papers during the last decade. Summarizing these papers and drawing conclusions from them was the mission of one of the sections of the ITI Consensus Conference held in Gstaad, Switzerland in August 2003. The results of this meeting will soon be published as a special supplement to the International Journal of Oral and Maxillofacial Implants. A significant number of case series and reports exist for different clinical case types. However, an area of study with relatively little documentation is immediate loading of the full-arch maxilla.

Traditionally, full-arch maxillary cases have been perceived as being more difficult or presenting more obstacles than full-arch mandibular cases. Impediments to successful treatment include qualitative and quantitative difficulties in maxillary bone as compared to mandibular bone. Another factor is that the shape of the edentulous maxilla often precludes parallel placement of dental implants, while mandibles often lend themselves to straight alignment.

In an article published in 2001, Ganeles et al.¹ identified several different options for creating immediately loaded provisional restorations. In that article and in subsequent practice, the preferred technique for full-arch provisional restorations was the Laboratory Processed, Cemented (LPC) version. Advantages of this technique include the ability to provide an accurate, passively fitting, easily adjustable, and esthetic provisional restoration given the tight time constraints of immediate loading. One of the requirements for using this

technique is aligning the implants so that there is a path of insertion on the Straumann® solid abutments. The external taper of these abutments is 6°, so that for a restoration to seat properly, implants must all be within approximately 16° of parallel. This requirement can be modified by reducing the precision of fit of a restoration, creating more space internally around an abutment that is significantly out of alignment. Creating a looser fit increases the tolerance to seat a restoration significantly but reduces the retention and stability, both key elements in successful immediate loading.

In maxillary immediate loading cases, implants are selected and placed in order to maximize implant surface area and engage optimal bone density. Frequently, 3-dimensional radiographic imaging, planning, and (eventually) image-guided surgery are used in order to place the implants. Most often, the apices of the implants are directed palatally towards the junction of the palatal vault, maxillary sinus, and floor of the nose in order to gain maximum stability. The net effect of this positioning is that implants are frequently more than 30-40° out of alignment, beyond the ability to reasonably create a path of insertion on solid abutments with rigid provisional restorations. To solve this dilemma, alternatives include use of screw retention, which also has limited alignment correction ability, use of custom abutments, or use of synOcta® angled abutments. Custom abutments or synOcta® Meso abutments are impractical in an immediate loading context, as they require significant laboratory time to fabricate or modify, interfering with the objective of delivering a full-arch

provisional restoration in a timely manner.

The following case report illustrates the techniques necessary to satisfy the conflicting objectives of providing a rigid, accurate, esthetic, laboratory-processed, cement-retained, immediately loaded provisional restoration on implants that significantly diverge.

Case 1

AC is a 45-year-old, healthy male suffering from advanced periodontitis in the maxillary arch, caries, and posterior bite collapse, including loss of occlusal vertical dimension and posterior support. His desire was to replace his failing dentition with a new maxillary fixed prosthesis supported by dental implants. The remaining maxillary teeth were deemed to be hopeless or not valuable to a new maxillary restoration. Missing mandibular posterior teeth were also to be replaced with implant-supported restorations. Caries in remaining mandibular teeth were to be treated with appropriate operative and prosthodontic procedures. Other treatment goals included avoiding a removable prosthesis during treatment and minimizing the amount of treatment time and dental appointments due to severe anxiety.

After clinical and radiographic evaluation (Figures 1 and 2), it was determined that he had adequate bone available anterior to the maxillary molars to permit immediate loading of an adequate number of implants to support a full arch provisional restoration. Further, it was determined that with appropriate modification of his vertical dimension, a therapeutic

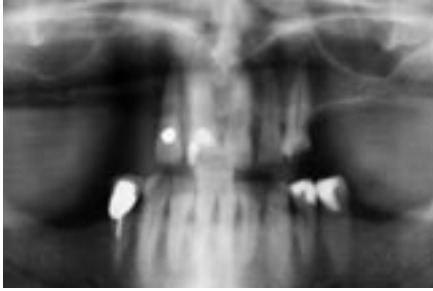


Figure 1 Radiograph shows adequate bone available anterior to the maxillary molars.



Figure 2 Pre-operative facial view showing anterior flaring, loss of occlusal vertical dimension, and bone loss.

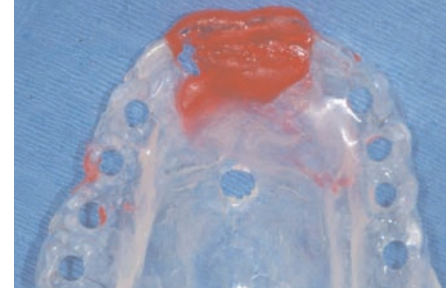


Figure 3 A clear acrylic occlusal registration device is fabricated then verified and modified intraorally with additional acrylic.



Figure 4 Vertical dimension of occlusion is recorded extraorally with the registration device in place.



Figure 5 Teeth are extracted, leaving central incisors in place, and 8 Straumann implants are placed.



Figure 6 Prior to suturing, impression copings and synOcta® positioning cylinders are snapped onto the implants to be loaded.

occlusion would be obtained against the existing mandibular teeth.

Pre-operative prosthetic preparation included analysis of mounted diagnostic models and fabrication of a clear acrylic occlusal registration device that was verified and modified intraorally with additional acrylic (Figure 3). The device was constructed to have positive tissue contact on the tuberosities and palate at the desired new vertical dimension. It was also constructed to have positive occlusal contact with the opposing dentition at the correct vertical dimension. It was further modified to serve as a rudimentary surgical guide to assist in implant positioning and orientation during surgery.

At the time of surgery, vertical

dimension of occlusion was recorded extraorally by marking and measuring the distance between the nose and chin with the registration device in place (Figure 4). Appropriate surgical techniques were used to extract teeth and place 8 Straumann implants, leaving the central incisors in place (Figure 5). Standard, threaded implants were selected to maximize the length and width of the implants seated in available bone. No attempt was made to place the implants parallel. Instead, implants were positioned with the goal of placing them with optimal stability, often resulting in palatal inclination of the apices of the implants. Insertion torque was measured for all implants using the ratchet and torque control device during implant insertion. The objective was to obtain a minimum of 35 Ncm torque resistance for all implants to be immediately loaded.

The distal-most implants were placed in conjunction with osteotome sinus augmentation procedures using autogenous bone recovered from the osteotomy sites. These implants were

sealed with appropriate closure screws and allowed to heal without prosthetic loading.

Prior to suturing, impression copings and synOcta® positioning cylinders were snapped onto the implants to be loaded (Figure 6). A polyvinylsiloxane (PVS) impression was taken, capturing the impression assemblies. synOcta® angled abutments were tried in the mouth with the objective of creating a parallel path of insertion between the divergent implants. Abutments can be selected either by using the Straumann® prosthetic planning kit with plastic planning parts or by sequentially trying in actual abutments in the mouth. In this case, "A" and "B" types of angled abutments as well as straight abutments were sequentially tried until a reasonably parallel insertion path was created (Figure 7). Once selected and hand-tightened in the implants, the abutments were notched at their facial-occlusal surfaces for future repositioning in the analog models (Figure 8).



Figure 7 “A” and “B” type angled abutments and straight abutments are tried in until a reasonably parallel insertion path is created.

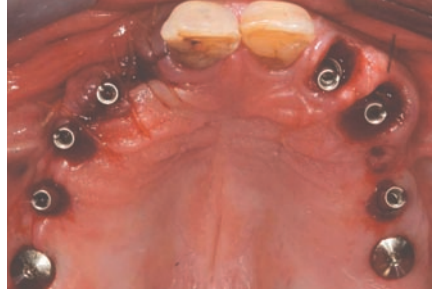


Figure 8 The abutments are notched at their facial-occlusal surfaces for future repositioning.



Figure 9 The occlusal registration device is repositioned in the mouth.



Figure 10 PVS impression material is loaded into the occlusal and tissue sides of the registration device and the patient is guided into full occlusion.

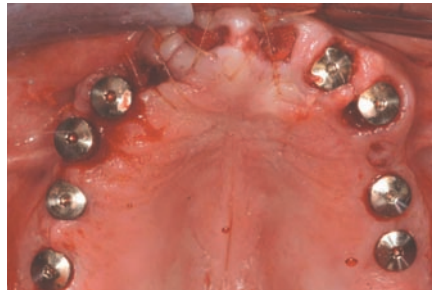


Figure 11 Following occlusal registration, the central incisors are extracted, abutments are removed, and tall closure screws are placed.



Figure 12 The occlusal registration is used to mount the models on an articulator.



Figure 13 A heat-cured acrylic provisional restoration with an embedded metal “strengthener” is used to prevent separation of segments in the event of material fracture.



Figure 14 The morning after surgery, the patient returns for the placement of the provisional restoration.



Figure 15 Healing caps of the anterior 6 implants are removed, and the abutments are transferred from the laboratory models to the patient's mouth.

The occlusal registration device was repositioned in the mouth, engaging the remaining central incisors and other soft tissue contact areas (Figure 9). PVS material was loaded into the tissue side of the registration device, and the patient was instructed to lightly occlude until it set (Figure 10). Following completion of the occlusal registration, the central incisors were extracted and the abutments were removed and labeled so that they could be replaced and accurately repositioned at the time of provisional

placement the following day. The implants were sealed with tall closure screws using light pressure (Figure 11). The PVS analog impression, occlusal registration, stone model of the opposing mandibular arch, and appropriate shade were delivered to the dental laboratory for the fabrication of the provisional. After pouring the analog model in die stone, the technician repositioned the appropriate abutments in the synOcta® analogs, and then used the occlusal registration to mount the models on an articulator

(Figure 12). Once set, he ground the central incisors from the model and proceeded to create a heat-cured acrylic provisional restoration with an embedded metal “strengthener” to prevent separation of segments in the event of material fracture (Figure 13).

The morning following surgery, the patient returned for the placement of the provisional restoration (Figure 14). Healing caps of the 6 anterior implants were removed, and the abutments were transferred from the laboratory



Figure 16 The provisional restoration is secured in place using a small amount of permanent cement in the coronal aspects of the provisional.

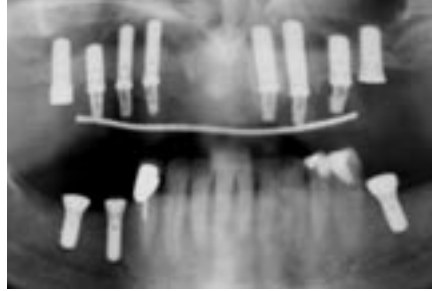


Figure 17 An orthopantomogram is taken in order to inspect for excess cement and serve as a baseline for future evaluations.



Figure 18 Immediate post-operative view of the patient with his provisional restoration cemented in place.

models to the patient's mouth and tightened with strong finger pressure (Figure 15). All access holes in the abutments were sealed with a cotton pellet and sealer. The provisional restoration was seated in the mouth without anesthetic and adjusted to ensure a passive and accurate fit. Occlusion was carefully adjusted to ensure even contact on all implants in centric closure and to minimize vertical rise in lateral movements. Posterior working and non-working contacts were removed, and the cantilever pontics were completely relieved from contact.

Once occlusion adjustment was completed, the provisional was removed from the mouth, the embrasures and gingival contours were finished, and the restoration was polished. Cementation was accomplished with a small amount of permanent cement delivered to the coronal aspects of the provisional in order to minimize the amount of excess cement extravasated into the peri-implant tissue (Figure 16). An orthopantomogram was taken in order to inspect for excess cement and to serve as a baseline for future evaluations (Figure 17). The patient was instructed to refrain from eating food requiring excessive mastication, particularly chewy, crunchy, or densely textured foods for 6 weeks. He was also given routine post-operative instructions for oral hygiene and pain management.

The patient returned for post-operative care and occlusal adjustment after 1

week, 3 weeks, and 6 weeks. Subsequent radiographs and clinical evaluation confirmed integration of all implants. Final restoration was delayed for 16 weeks to allow adequate healing time for the implants placed with osteotome sinus augmentation (Figure 18).

Summary

Traditionally, the maxillary arch presented anatomical, morphological, and technical challenges for implant reconstructive procedures. These factors tend to be even more exaggerated when considering immediately loaded prostheses where the requirement of excellent immediate implant stability is paramount. Overcoming some of these obstacles by 3-dimensional anatomical analysis causes surgeons to position implants in locations with angulations that are not close to parallel. Implants in these positions often cannot be restored with cement-retained prostheses on solid abutments, which is the preferred technique.

The case demonstrates a method to immediately and predictably replace a failing or failed maxillary dentition with an immediately loaded implant restoration. Correctly using the Straumann synOcta® prosthetic system in conjunction with previously published techniques allows implants to be placed with the greatest amount of initial stability without significant consideration to implant angulation while retaining the benefits and

flexibility of cement-retained restorations. It must be appreciated that immediately loaded maxillary cases are among the most difficult, challenging, and precise procedures in implant dentistry. These types of prostheses create the greatest need for a completely integrated therapeutic team including the restorative dentist, dental technician, and surgeon. *In particular, as the demands on the skills of each professional and the patient's physiology increase, the opportunities for failure become amplified.* Meticulous attention to concepts and details can translate to enormous patient gratitude and benefits.

References

1. Ganeles J, Rosenberg MM, Holt RL, Reichman LH. **Immediate loading of implants with fixed restorations for the fully edentulous mandible: report of 27 cases from a private practice.** *International J Oral and Max Implants* 2001;16:418-26.

Factors in Implant Supported Mandibular Overdenture Designs

David Todd, DMD, MD

The importance of keratinized tissue around osseointegrated implants has been debated for some time. Many clinicians believe long term success is at least partly dependent upon a band of stable keratinized tissue in the perimplant soft tissue environment. This brief review will address this concern with regard to mandibular overdentures.

The continuous bone loss that results from conventional removable denture use is well known and may make fabrication of a functional mandibular prosthesis difficult. Implants provide retention for a lower denture and help stop the progression of alveolar bone loss. In many cases, loss of vestibular depth and soft tissue changes accompany the aforementioned alveolar loss.

I. Diagnostic Considerations in Case Design

Two broad categories of mandibular overdentures are implant retained, tissue supported prostheses and implant supported and implant retained prostheses. An implant retained, tissue supported overdenture is one in which 2 or 3 implants are placed in the anterior mandible. While various attachments such as retentive

anchors, Locator attachments or bars are utilized for retention, the prosthesis is tissue supported. An implant supported and implant retained prosthesis requires 4 implants of adequate length or 5 shorter implants. A variety of superstructures can be fabricated which permit the prosthesis to be primarily implant supported, with the only area of tissue support located in the retromolar pad area.

Several factors need to be considered when determining whether an implant retained tissue supported prosthesis or implant supported and implant retained prosthesis will be designed. General considerations include age of the patient, the opposing dentition (upper denture versus natural teeth), patient oral hygiene ability, tissue biotype and patient finances. An implant supported prosthesis should be utilized when possible for patients 65 years of age or younger, due to its higher long term success rate. Although each patient must be evaluated individually, patients in their 70's and 80's will usually not require the same degree of long-term success.

Patients with an opposing complete upper denture will not generate as high a level of functional force as those with a natural dentition and

will require less overdenture stability. These patients often function well with a tissue supported overdenture supported by 2 or 3 implants with attachments.

A patient's ability and willingness to perform oral hygiene must be taken into account when designing the final restoration. Bar superstructures require more manual dexterity and commitment to hygiene efforts than Locator or retentive anchor attachments.

Certain patient tissue types may present with continual denture sores in the denture bearing area. These patients should be restored with implant supported prostheses to help eliminate tissue irritation from the prosthesis.

Patient finances must also be taken into account. Retentive anchors and Locator attachments require considerably less lab work and chair time and, entail a lesser fee than bar restorations.

In addition, in many cases of moderate to severe ridge atrophy, there is loss of both attached tissue and vestibular depth, which prevents fabrication of a functional implant retained prosthesis.



Figure 1 Lack of an adequate labial vestibule and attached tissue is evident. The heads of 2 of the transitional implants are evident.



Figure 2 Split thickness dissection is performed to re-establish the vestibule.



Figure 3 A free gingival graft is sutured into position.



Figure 4 The last 2 transitional implants are removed and 2 Straumann implants are placed.



Figure 5 A view of the final result 3 months after delivery of the overdenture.



Figure 6 A lack of attached tissue and inadequate vestibule are evident.

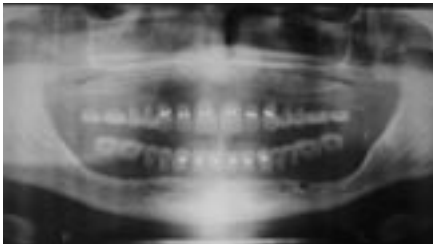


Figure 7 A pre-operative panorex demonstrates moderate alveolar resorption.



Figure 8 A partial thickness dissection has been performed.

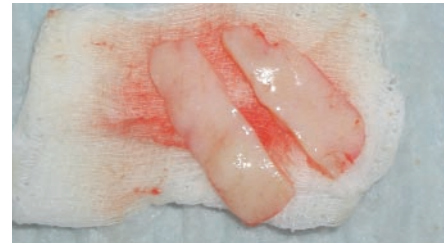


Figure 9 A palatal graft has been harvested.



Figure 10 A free gingival graft is sutured into position.

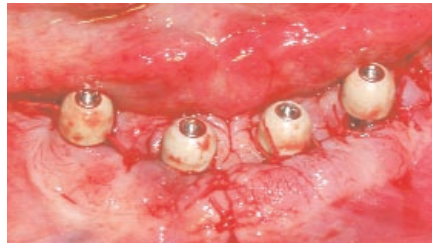


Figure 11 The keratinized tissue was split and rotated lingually at the time of implant placement.

II. The Role of Keratinized Tissue and Vestibular Depth

In order to prepare patients with moderate to severe mandibular ridge atrophy for implant therapy the amount of attached keratinized tissue on the residual ridge should be assessed. Ideally, at least 3-4 mm of attached tissue should be present on the labial and lingual aspects of the implants. If the residual band of attached tissue is less than 5-6 mm in width, soft tissue grafting is indicated. Lesser widths of residual tissue should not be "split" and repositioned at the time of implant placement, as this repositioned tissue may be lost, or the procedure may not result in adequate keratinized tissue following healing.

The depth of the vestibule should also be evaluated and corrected as necessary at the time of soft tissue grafting. The extent of the vestibule which can be re-established is proportional to the size of the residual mandible and is limited in cases of more severe ridge atrophy. There should be a 6 week healing period between a vestibuloplasty and gingival graft procedures and implant placement.

Case 1

A woman in her late 80's had 4 transitional implants placed in her anterior mandible. The patient had been unable to wear her temporary prosthesis. She presented to her general dentist with inflamed,

hyperplastic mucosa and was referred to the surgeon for improvement of her soft tissues prior to restoration. Initial examination demonstrated a lack of labial vestibule and an absence of attached tissue. The 2 midline implants were placed too far labially to be utilized (Figure 1). Severe mandibular resorption and a strong mentalis muscle were evident. It was recommended that the current implants be removed, but the patient refused. Therefore, a vestibuloplasty and gingival grafting procedure from the palate were performed. A partial thickness dissection was carried out along the labial aspect of the mandible with care not to extend the incisions into the mental nerve region, which may exit along the crest of the ridge in a severely resorbed mandible (Figure 2).

Overcorrection of the anticipated vestibule was required, as relapse in the case of a severely resorbed mandible may be significant due to the force of the mentalis muscle.

The tissue surrounding the implants was excised and trimmed in a supraperiosteal fashion. A free gingival graft was harvested in the

conventional manner from the left hard palate, and the graft was soaked in platelet rich plasma and sutured into position (Figure 3).

A new temporary denture, which had been fabricated by the general dentist, was relined with a soft tissue liner to help maintain the depth of the newly created vestibule and inserted.

During the healing period one of the transitional implants became mobile and was removed. Another midline implant had persistent peri-implant inflammation, most likely due to its labial position. The patient consented to have the remaining transitional implants removed. Two Straumann implants of 10 mm length were placed without further flap reflection, utilizing a tissue punch technique (Figure 4). After 2 months of healing, a Locator overdenture was fabricated. Figure 5 demonstrates the clinical result 3 months after delivery of the overdenture. The attached tissues and labial vestibule have been re-established and appear stable.

Case 2

A middle aged male presented having worn conventional upper and lower dentures for many years with increasing difficulty as time progressed. Clinical and radiographic evaluation revealed moderate alveolar resorption of the maxilla and mandible, mobile labial soft tissue extending to the crest of the residual ridge, and a paucity of attached tissue (Figures 6 and 7). A vestibuloplasty and free gingival graft were performed to re-establish the labial vestibule and attain keratinized tissue, as previously described (Figures 8, 9, 10).

Following healing of the augmented keratinized tissue, an incision was made bisecting the keratinized tissue at the crest of the ridge to effect implant placement (Figure 11). The significant band of keratinized tissue which had been created prior to implant placement will now afford a more stable peri implant soft tissue.

Conclusion

Mandibular overdentures offer numerous advantages to patients. Relieving a patient from the discomfort and disability of a mobile conventional lower denture through the fabrication of an implant supported, retentive and stable conventional lower denture is a satisfying experience for both the patient and the practitioner. Proper treatment planning and addressing of hard and soft tissue concerns, together with implant placement, enhance long term success and comfort.

Literature Review: Root Resection Versus the Dental Implant: A Diagnostic Dilemma

Philip R. Melnick, DMD; Paulo M. Camargo, DDS, MS

Carnevale G, Di Febo G, Tonelli MP, Marin C, Fuzzi MA. **A Retrospective Analysis of the Periodontal-Prosthetic Treatment of Molars with Interradicular Lesions.** *Int J Periodont Rest Dent* 1991; 11:189-205.

Fugazzotto PA. **A Comparison of the Success of Root Resected Molars and Molar Position Implants in Function in a Private Practice: Results up to 15-Plus Years.** *J Periodontol* 2001;72:1113-1123.

Kinsel RP, Lamb RE, Ho D. **The Treatment Dilemma of the Furcated Molar: Root Resection Versus Single Tooth Implant Restoration. A Literature Review.** *Int J Oral and Maxillofac Implants* 1998;13:322-332.

Soon after the introduction of the root-form implant and the phenomenon of osseointegration, there was much speculation about the therapeutic future of root resections as a viable modality for the treatment of the furcated molar. A number of papers dealing with the success of root-resected teeth were published before the advent of predictable dental implant therapy, thus eliminating implant dentistry from the diagnostic decision tree. In an effort to more properly address the issue of root resection vs. implant placement, this literature review includes three papers written since the advent of "modern" implant dentistry, two case series and one review article.

Carnevale G, Di Febo G, Tonelli MP, Marin C, Fuzzi MA. **A Retrospective Analysis of the Periodontal-Prosthetic Treatment of Molars with Interradicular Lesions.** *Int J Periodont Rest Dent* 1991; 11:189-205.

This retrospective study was undertaken to report on the success/failure of root resection therapy of 500 teeth over a period of 3 to 11 years. Root amputation or hemisection was performed on 407 grade II or III furcated teeth, 81 teeth presenting with deep osseous defects, 11 teeth with endodontic lesions and one carious tooth. Teeth included were maxillary (174) and mandibular (140) first molars,

maxillary (101) and mandibular (72) second molars, maxillary (4) and mandibular (6) thirds molars and maxillary first premolars (3). All 500 teeth were restored: 309 terminal abutments, 127 intermediate abutments, and 64 as single crowns. All patients were recalled for periodontal maintenance and re-examination, at 1 month (1%), 3 month (95.5%), or 6 month (3.5%) basis. Treatment failures included: loss of cementation, root fracture, abutment fracture, progressive prosthesis mobility or solder-joint failure, probing depth >5 mm, untreatable endodontic failure, and caries.

488 teeth were evaluated (12 were unavailable). 303 were followed for 3-6 years, and 185 for 7 to 11 years. The overall failure rate was 5.7%. The 3 to 6 year group showed a 6.9% failure rate and the 7 to 11 year group a 3.8% failure rate. When compared to other teeth selected as controls, differences in probing depths were not significantly different; plaque index and gingival indices were low for both, but statistically better in the control group.

Due to the retrospective nature of this study, it is impossible to make general conclusions about all furcated teeth, as some may have been strategically removed early in treatment, and there is no true control group. However,

within the limitations of this study, root resection therapy seems to be an effective means of treating certain periodontal, endodontic, and caries lesions. They pointed out that most of the teeth in this study were treated because of periodontal breakdown (97.6%), and only three teeth (0.6%) showed probing depths beyond 5 mm after treatment. The majority of the failures were of non-periodontal etiology: caries, root fracture, cement washout, and untreatable endodontic problems. These findings underscore the technique-sensitivity of root resection and the importance of proper execution of all phases of treatment, optimal oral hygiene, and maintenance therapy.

Fugazzotto PA. **A Comparison of the Success of Root Resected Molars and Molar Position Implants in Function in a Private practice: Results up to 15-Plus Years.** *J Periodontol* 2001;72:1113-1123.

This retrospective case series study was undertaken to assess the long-term results of root resection and subsequent restoration or molar implant placement and subsequent restoration in a single private practice setting. The treatment groups included 701 root-resected molars and 1,472 molar implants evaluated after 15 and 13 years respectively. All surgical and maintenance therapies (for at least 5 years postoperatively)

were completed in the author's practice.

Cumulative success rates were 96.8% for root-resected molars and 97.0% for molar implants. Treatment success in both groups was statistically related to other clinical issues, such as position of the tooth or implant in the arch, splinted versus non-splinted restorations, and occlusal forces. Lowest success rates in each category were, for resected teeth, distal root of mandibular molar (75%), and for the implants the lone standing implant in the second molar position (85%). Lone standing terminal abutments in both groups showed the highest failure: 30.4% (7 of 23) for resected teeth and 37.8% (17 of 45) for implants. The author attributed the higher failure rate to untreated parafunction. First molars did better than second molars with maxillary second molars showing the lowest success rates at 92.9% and maxillary first molars the highest success rate at 97.6%.

The author suggested that root resection be undertaken only after carefully analyzing all clinical parameters involved in treatment: periodontal, endodontic, restorative, and occlusal. He concluded that high success rates can be achieved when there is adequate remaining tooth structure, protection within an intact arch or as part of a splinted prosthesis, and when occlusal forces are controlled.

The success of molar implants ranged from 84% in the mandibular second molar location to 98.4% in the mandibular first molar position. This significant difference was attributed to possible trauma at insertion or parafunctional forces. Consequently, control of these factors and minimal bacterial contamination would improve the expectation of long-term success.

The author concluded that while both modalities show comparable success rates, they are not necessarily interchangeable. Many factors must

be considered in the treatment selection as they relate to general patient considerations (e.g. general health, plaque control, psychological), and site-specific issues (e.g. caries rate, dental morphology, prior bone loss, endodontic feasibility). These are to be viewed in the context of a comprehensive diagnosis and treatment plan, with an eye on long-term predictability, cost-effectiveness, and preventive care.

Kinsel RP, Lamb RE, Ho D. The Treatment Dilemma of the Furcated Molar: Root Resection Versus Single Tooth Implant Restoration. A Literature Review. *Int J Oral and Maxillofac Implants* 1998; 13:322-332.

There is substantial evidence that molar teeth have a predilection for periodontal breakdown. Interradicular anatomy has been implicated as both secondarily etiologic to the disease process and a complicating factor to its treatment. Treatment options, non-surgical and surgical, have met with various levels of success. With the exception of one study, all others reviewed herein describe continuing attachment loss over time. This paper highlights the treatment of the furcated molar with root resection therapy and the molar implant.

Indications for root resection included: 1) severe vertical bone loss involving one root, 2) furcation bone loss in a maxillary molar inaccessible to plaque control 3) root proximity which interferes with maintenance of Class I or II furcation invasions, 4) furcation compromised by bone loss or caries which cannot be properly restored and maintained, 5) fixed partial denture abutments or piers with negative prognosis due to periodontal breakdown, 6) individual root fracture, 7) endodontically involved teeth not amenable to conventional or surgical endodontic therapy.

The authors reported a wide disparity in long-term outcomes resulting from root resection, with failure/complication rates ranging from 11.8% to 38%. At the time of publication, there were

limited studies on single, independent implant restorations. Single molar tooth implants reviewed were reported to have a failure rate ranging from 0 to 10%.

The authors attempted to answer the question "when should a furcated molar be extracted, and when should a root resection be employed?" They proposed a number of negative factors to be considered in root resection prognosis: decreased bone support for all roots, combined with reversed crown to root ratio, deep vertical defects combined with a Class II or III furcation invasion, fused roots, untreatable endodontic problem, poor remaining root anatomy, poor plaque control ability, tooth unrestorability, and tooth hypermobility. Situations favoring implant placement would include: sufficient bone quality, height and width to support anticipated occlusal forces, adequate interdental and interarch distance, absence of medical contraindications, or personal habits, and adequacy of oral hygiene.

When deciding on a treatment modality the prognosis will be determined by a number of factors, including: root anatomy, endodontic predictability, occlusal forces, initial mobility, skills of the therapist, and patient compliance. The authors suggest that if these factors are less than optimal, the long-term retention of furcated molars via root resection is questionable. On the other hand, evidence seems to indicate that successful placement and restoration of dental implants are less reliant on the experience or skill of the therapist, and may be the treatment of choice in compromised situations.

Conclusion

All three papers discussed agree that root resection can be a successful and predictable treatment for the furcated molar in certain situations. However, high levels of diagnostic, treatment planning and therapeutic skill seem to be required. Whereas, the potential for success with root resection seems to be much more

narrowly defined, the data presented suggest that dental implants in the molar positions are a predictable and perhaps less technically demanding procedure. Nevertheless, care must be exercised in the decision-making process to be sure that whichever treatment is undertaken it is part of a well thought out, patient and site specific treatment plan.

Upcoming events

2004 Courses

Comprehensive Implant Prosthetics and Predictable Anterior Esthetics

September 17 • Ft. Collins, CO
September 18 • Colorado Springs, CO
October 9 • Newport Beach, CA
November 19 • Newport Beach, CA
Dr. Robert Vogel

Esthetic Solutions for Fully and Partially Edentulous Patients

September 10 • Newport Beach, CA
November 12 • Newport Beach, CA
Dr. Gary Solnit

Dental Assistant Training: Restorative

September 15 • Newport Beach, CA
November 4 • Newport Beach, CA
Pascale Hartmann, RDH Swiss

Basic Restorative Procedures for Dental Implants

September 17 • Malvern, PA
October 2 • New Brunswick, NJ
Dr. David Felton

Immediate Placement and Advanced Surgical Techniques

September 17 - 18 • Newport Beach, CA (SOLD OUT)
October 15 - 16 • Newport Beach, CA
Dr. Jay Beagle

Advanced Surgical Techniques for Immediate Placement

September 17 - 18 • Newport Beach, CA (SOLD OUT)
October 14 - 15 • Newport Beach, CA
Dr. Jay Beagle

Multiple Posterior Implant Placement and Sinus Grafting

September 24 - 25 • Newport Beach, CA (SOLD OUT)
December 3 - 4 • Newport Beach, CA
Dr. Jay Beagle

Immediate Loading on Partially and Fully Edentulous Patients

October 1 • Newport Beach, CA
Dr. Robert Jaffin

Dental Hygiene Course

October 8 • Newport Beach, CA
Pascale Hartmann, RDH Swiss

Clinical Realities of Periodontal Regenerative and Root Coverage Procedures: A Live Surgical Course

October 15 • Milton, MA
Dr. Paul Fugazzotto
617/696 7257

US ITI Congress 2004

October 23 - 24 • Chicago, IL

Clinical Realities of Ridge and Sinus Augmentation: A Live Surgical Course

October 27 • Milton, MA
December 8 • Milton, MA
Dr. Paul Fugazzotto
617/696 7257

Clinical Realities of Immediate Loading

October 28 • Milton, MA
December 9 • Milton, MA
Dr. Paul Fugazzotto, Dr. Richard Baker, and Mr. Ira Dickerman
617/696 7257

Simplifying Esthetic and Implant Dentistry

December 3 - 4 • Las Vegas, NV
Drs. James Ruskin, Dean Morton, and Will Martin



ITI World Symposium

June 18–20, 2005



ICM International Congress Center Munich, Germany

«25 Years of ITI – Changing the Paradigms in Implant Dentistry.»

Share the latest scientific and clinical knowledge in implant dentistry

Featuring more than 80 world-renowned clinicians and researchers, the ITI World Symposium offers you a great opportunity to share the latest knowledge about implant dentistry therapy and current research. The program covers a broad range of topics, ranging from state-of-the-art diagnostic, surgical and prosthetic considerations to materials science. Experience innovative techniques of master clinicians in the eight limited attendance sessions. A special focus will be on esthetics as well as the basics and clinical applications of the new modified SLA surface.

And last but not least, don't miss the opportunity to share the community spirit of the ITI, spend time with old and new friends, and visit the beautiful city of Munich. Once again, the ITI is leading the way in implant dentistry thanks to its dedication to the highest standards in research, education and patient care.

The ITI is a unique network of clinicians and researchers in implant dentistry and related tissue generation worldwide:

www.iti.ch

They are committed to bringing together top-class sessions and speakers

Program Committee

Chairmen:

Prof. Dr. Daniel Buser, Bern (Switzerland),
Prof. Dr. Dr. Dieter Weingart, Stuttgart (Germany)

Members:

Prof. Thomas Taylor, ITI President, Farmington CT (USA)
Prof. Dr. Gerhard Wahl, Bonn (Germany)
Prof. Dr. Urs Belser, Geneva (Switzerland)
Prof. Dr. Dr. Wilfried Wagner, Mainz (Germany)
Prof. Dr. Hubertus Spiekermann, Aachen (Germany)
Prof. David Cochran, San Antonio TX (USA)
Prof. H.P. Weber, Boston MA (USA)
Prof. Kanichi Seto, Yokohama (Japan)

Registration

A detailed program brochure will be available from January 2005, and all information including a link for online registrations will be published on the ITI website (www.iti.ch).

Sponsors

Institut Straumann AG, Waldenburg, Switzerland,
www.straumann.com
Quintessence Publishing Group, www.quintpub.com

Organizing Team

ITI International Team for Implantology, ITI Center,
CH-1052 Basel, Switzerland
Tel. +41 (0)61 270 83 83, Fax +41 (0)61 270 83 84,
iticenter@iticenter.ch

Implant Realities

© August 2004
Printed in USA
IR 204