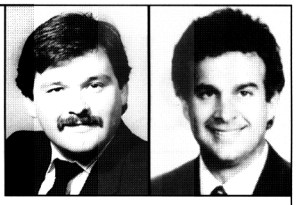
The Team Approach to Implant Dentistry



A CASE REPORT

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Introduction

State of the art implant dentistry demands restorations of optimal esthetics as well as function. While osseointegration remains the basis for success, our patient's increasing expectations place a new meaning on our definition of success and failure. It is imperative that all the members of the implant team (restorative dentist, surgical dentist, laboratory technician, and patient) effectively communicate and work harmoniously in order to consistently achieve optimal results.

A case report is presented that demonstrates the restoration of the maxilla. In consultation with all team members the following summarizes the treatment plan sequence utilized for this patient:

1. Fabrication and insertion of the interim prosthesis retained by maxillary cuspids and second molars.
2. Fabrication of a surgical placement guide based on the patient approved interim prosthetic setup.
3. Surgical implant placement.
4. Verification of osseointegration and placement of healing perimucosal components.
5. Extraction of the cuspids and second molars followed by immediate insertion of a fixed interim prosthesis.
6. Final prostheses fabrication and insertion.
7. Supportive care.

Case Presentation

A 50 year old female patient presented with a full maxillary restoration fabricated in 3 sections. These prostheses were failing due to periodontal, mobility and prosthodontic issues. Over the next four years, both posterior bridge segments failed leaving only the second molars and a mobile anterior fixed partial denture. Both right and left cuspids were endodontically treated and restored but had poor long term prognosis. After consultation with the patient, treatment was initiated that would ultimately involve implant support for the complete maxillary reconstruction.

Figure 1. An implant placement guide has been fabricated that shows suggested implant position and angulation. The guide is supported by the remaining natural teeth to ensure its stability during use.

After making diagnostic casts and radiographs, an interim removable prosthesis was fabricated. It was inserted at the time of pontic removal. This device evaluated future esthetic needs. After patient approval of esthetics and tooth position, an implant placement guide was fabricated based on the interim removable prosthesis (fig. 1). The guide suggested implant positions and angulation for fixtures to be placed in the pontic regions.

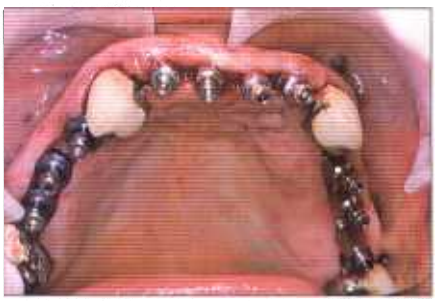
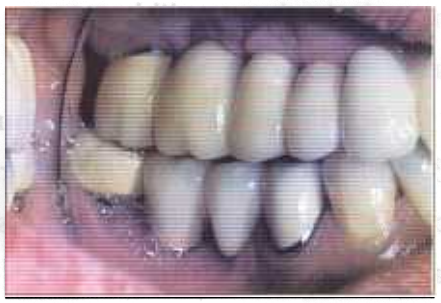


Figure 2. Ten implants (shown with fixture mounts) have been positioned using the placement guide.

The four remaining teeth were kept temporarily to support the interim

IMPLANT POSITION	COMPANY	LENGTH (mm)	DIAMETER (mm)	SURFACE	SITE DESCRIPTION
1.6	Steri-oss	10	5.0	Acid etched titanium	Fair bone density
1.5	Steri-oss	12	3.25	Acid etched titanium alloy	Fair bone density, narrow ridge
1.4	Steri-oss	16	3.25	Acid etched titanium alloy	Fair bone density, narrow ridge
1.2	Steri-oss	14	3.25	Acid etched titanium alloy	Good bone density, narrow ridge
1.1	Steri-oss	14	3.25	Acid etched titanium alloy	Good bone density, narrow ridge
2.1	Steri-oss	16	3.25	Acid etched titanium alloy	Good home density, narrow ridge
2.2	Steri-oss	16	3.25	Acid etched titanium alloy	Good bone density, narrow ridge
2.4	Implant Innovations	15	3.75	Selective surface Osseotite	Poor bone density
2.5	Implant Innovations	15	3.75	Selective surface Osseotite	Poor bone density
2.6	Implant Innovations	13	3.75	Selective surface Osseotite	Poor bone density

restoration during healing. A total of ten implants (Table 1) were placed using the conventional technique (fig. 2). After an uneventful healing period of 6 months, all ten implants were uncovered and per-mucosal healing abutments were placed. After a soft tissue healing period of 4 weeks, an implant level impression was made and 3 interim fixed prostheses were made to restore the implants. The interim restorations were fabricated from heat cured acrylic (BIOLON) with fiber (RIBBOND) reinforcement. These materials were attached to the manufacturers cylinders using C&B METABOND as a bonding agent between the titanium cylinder and the acrylic restoration. At the time of delivery of these restorations, the remaining teeth were extracted and the prostheses were installed. The extraction sites were then allowed to heal for three months before final impressions were made for fabrication of the definitive restoration. The contour, esthetics and size of the definitive restoration was based on the interim restoration. The definitive restoration was also made in sections (fig. 3a & 3b) and was made in a direct manner fitting onto the implant surface without intervening abutments (fig. 4). The screw retained porcelain fused to metal prostheses were secured and access obturated and cotton pellets and composite resin (fig.5).



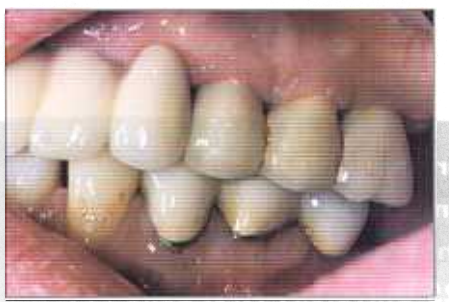


Figure 3a & 3b Right and left lateral views of the posterior restorations showing proper emergence profile.

Figure 4. Radiograph shows direct contact of the prosthesis with the implant. No abutments were used in the prosthetic restoration of the ten implants.

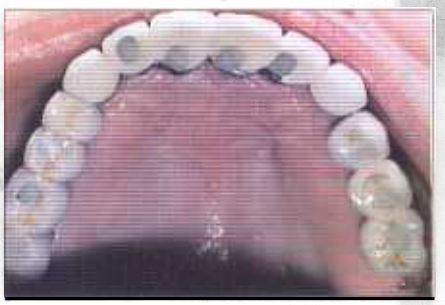


Figure 5. Occlusal view ofthe maxilla showing the three prostheses in place. The anterior prosthesis restores the six anterior teeth. Composite resin has been used to obturate the screw access holes.

Discussion

This case presentation illustrates the interdisciplinary communication and treatment of a patient. Initial planning of the implant site was done by restorative and technical specialists. This information was conveyed to the surgical specialist by using a placement guide. Pre-surgical consultation as to implant type, manufacturer, length and diameter prepared all members of the implant team for the possible multiple implant types to be used for this patient.

Ten implants were ultimately placed. They were of different manufacturers, diameter, length and surface characteristic. The diameter of the selected implants were chosen based on the available bone ridge width. A minimum of 1 mm of bone was left remaining circumferentially around the prepared implant site thus avoiding the need for osseous ridge augmentation procedures. While the literature has described augmentation techniques, the most predictable recipient site is the patient's pristine bone. If ridge augmentation procedures can be avoided, the morbidity, time and cost to the patient is reduced. In this case, the narrow diameter implants (3.25 mm) were manufactured from titanium alloy and were splinted together with neighbouring implants in the final prosthesis.

The length of the selected implants were chosen to be as long as possible without violating the anatomic structures. Some research has questioned if an osseointegrated implant needs to be longer that 10-12 mm. At the initial placement however, the initial stability of the implant, which is critical to achieve osseointegration, can be maximized by increasing the total surface area of the implant placed (i.e. maximum length and diameter).

Osseointegration is attainable not only with machined Grade 1 commercially pure titanium but also with acid etched titanium, titanium alloy, titanium plasma spray and hydroxylapatite coated implants. Processes such as blasting, etching and plasma spraying can increase the surface area available for osseointegration and accelerate the osseointegration process. Studies have indicated that rougher surfaced implants may achieve higher early success rates especially in poor density bone. Most manufactures produce implants that incorporate a machined (relatively smooth surface) along the full length of the implant. Newer designs (Osseotite - Implant Innovations) include a machined surface at the coronal aspect of the implant with a rougher surface in the apical portion of the implant. This has been done in order to try to incorporate the best attributes of both surface types while potentially minimizing the long term complication of periimplantitis.

In the case presented in this article, acid etched machined titanium implants were used where the bone quality was of fair to good density. In the 2.4, 2.5, and 2.6 area' the bone was of poor density and the Osseotite selective surface etched implant was chosen. The Osseotite implant surface may allow for a more favourable outcome in poor density bone.

Once healing had taken place, the interim prostheses not only established esthetics, phonetics and function, but also tested the osseointegration of the implants and the oral hygiene abilites of the patient. The interim prostheses were used as the basis for the final restoration. The patient had little difficulty adjusting from the interim restoration to the final restoration and continues to do well to date. The patient is seen on a six month basis for prosthodontic as well as periodontal follow up. Radiographs are made to evaluate bone changes and clinical examination evaluates periodontal indices, occlusion and prosthesis integrity and function.