Oral Surgery, Oral Medicine, Oral Radiology, 2014, Vol. 2, No. 2, 25-27
Available online at http://pubs.sciepub.com/oral/2/2/6

DOI:10.12691/oral-2-2-6

Replacement of A Mandibular Molar with Implant Retained Single Crown

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Received December 21, 2014; Revised December 27, 2014; Accepted December 31, 2014

Abstract Among various challenges to restore a single tooth implant in the posterior region of the oral cavity is the creation of harmonious gingival contour beneath the restoration and near the abutment –gingiva interface so as not to allow plaque accumulation within this inaccessible zone. Deficiencies in the soft or hard tissue in the edentulous space are usually the most common obstacles to achieve a gingival symmetry around the proposed restoration, besides the factors like accessibility of cleansing aids to the area. This article describes a novel approach to eliminate the ridge or soft tissue deficiencies by over contouring and undermining soft tissue around the healing abutment at the second stage implant surgery.

Keywords: *abutment, implant, cement, implant surgery, single crown*

Cite This Article: Manas Singh, Khurshid A Mattoo, and Shailesh Jain, "Replacement of A Mandibular Molar with Implant Retained Single Crown." *Oral Surgery, Oral Medicine, Oral Radiology*, vol. 2, no. 2 (2014): 25-27. doi: 10.12691/oral-2-2-6.

1. Introduction

Treatment modalities for posterior tooth replacement have truly evolved from ancient transplant to modern day implants. They have more or less revolutionized the dental practice since the inspired work done by Branemark et al. [1] However, the precise role of single-tooth implants in the management of patients with compromised teeth has remained uncertain, controversial, and the subject of considerable debate. [2-7] This is mainly due to the criteria that have been set for the success of an implant system. [8,9] Marginal bone loss around the implant restoration is one criteria that determine the final outcome. Other factors that influence success rate are quantity and quality of bone, the presence or absence of keratinized tissue around the implant, the reason for tooth loss, the type of microflora present in the sulci/pockets of the natural teeth and implants, the patient's plaque control, and the quality of professional maintenance, including the type of instruments used to clean the implants. [10-16].

The junction of the soft tissue and the implant has received considerable attention that is focused largely to recontouring of the gingiva to enhance aesthetics through the use of surgical or non-surgical means. [17,18] This article in the form of a clinical case report describes the use of the same principle to allow more favorable growth of soft tissue around posterior implant that enhances protection to the implant soft tissue junction from overlying ingress of food.

2. Case Report

An elderly male patient aged 42 years, visited the department of Prosthodontics for an opinion regarding the possibility of implant supported prosthesis for his missing mandibular first molar that had been extracted due to caries about 3 years back. Patient's medical history was non-contributory and dental history included wearing a treatment partial denture since last 3 months. Social and drug history were non influential. No significant adverse habits of the patient came to light. No significant extra and intra oral findings were observed. After routine biochemical and radiographic investigations (Figure 1A), the patient was presented with an option of implant supported single molar restoration in relation to missing mandibular molar. After obtaining his consent, diagnostic impressions were made using Irreversible hydrocolloid (Thixotropic, Zhermach, Italy) following which diagnostic casts were mounted on a semi adjustable articulator (Whip Mix series 3000; Elite Dental Services, Inc, Orlando, Fla). A diagnostic cum radiographic splint was fabricated of clear acrylic auto polymerizing resin (Fortex; Lucite Intl, Durham) that would assist the placement of cement retained single implant fixture (Bio horizons Implant Systems, Inc.). After fabrication of a radiographic/ diagnostic splint patient was referred to having a Dentascan (Figure 1 B and C) that helped in determining the accuracy of the radiographic splint as well as the amount of available bone along with various other obvious advantages. The technique used in this report is

for a two stage, two piece implant system. At the first stage of the surgery the surgical splint was placed after surgical exposure of the area (Figure 2A). This was followed by placement of an implant fixture after slow drilling of the bone with the reciprocal size of the implant fixture (Figure 2B).

A paralleling pin to indicate the correct alignment of the implant fixture was placed before screwing the implant fixture in place (Figure 2B). After debriding the surrounding area (Figure 2C, D), a cover screw was placed onto the implant fixture and the area was sutured (Figure 2E). The patient was given instructions regarding maintenance and care and the patient was followed up till stage 2 surgery. Before stage 2 surgery, radiographs were taken to evaluate successful Osseointegration of the implant fixture (Figure 2F). Stage 2 surgery was initiated by exposing the cover screw (Figure 3A) that was placed over the implant fixture. A healing abutment (Figure 3B) was then attached to the implant fixture and the area was closed.

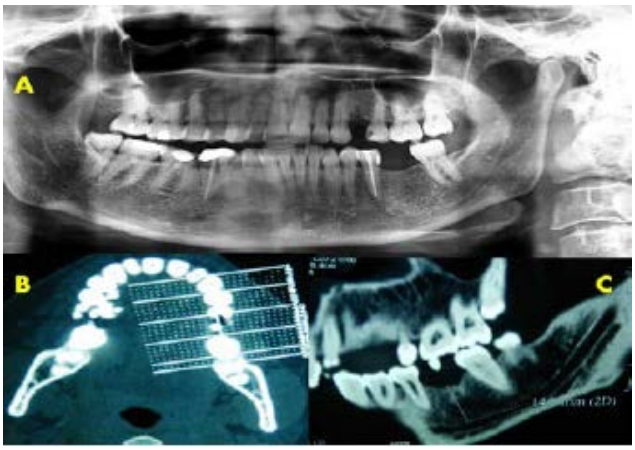

Figure 1. (A) Orthopantomograph shows the relation of edentulous space with adjacent teeth. Dentascan with radiographic splint showing the future position of the implant (B) Superior view (C) Lateral view

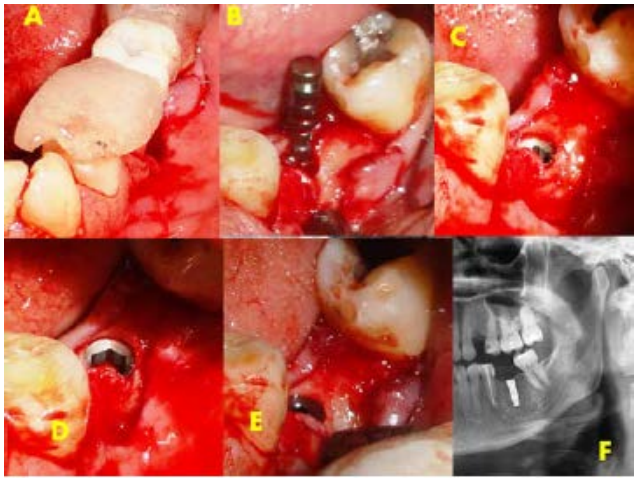

Figure 2. (A) Surgical splint in place (B) Paralleling pin to indicate alignment (C) Implant fixture in place (D) Implant placed with surrounding area debrided (E) Cover screw placement (F) OPG showing successful Osseointegration

At this stage the soft tissue that would overlap the abutment was surgically modified by undermining the tissue 1 mm below the margins. An internal bevel was placed that would remove the soft tissue underneath and leave epithelial and some amount of connective tissue above. Following a healing period of a few days the healing abutment was removed and definitive abutment was placed (Figure 3C and D). Final abutment was then prepared and final impressions were made using addition polyvinyl siloxane material (Reprosil, Dentsply/Caulk; Milford, DE, USA). Porcelain fused to metal complete crown was fabricated in which an implant protected occlusion was incorporated. The crown was cemented (Figure 3E) using zinc phosphate cement (Harvard, Germany). The patient was demonstrated oral hygiene measures that would be necessary for maintenance of implant supported single crown. The patient was followed up regularly for a period of one year during which the patient did not report any complaint of food accumulation or halitosis in or around the implant supported crown.

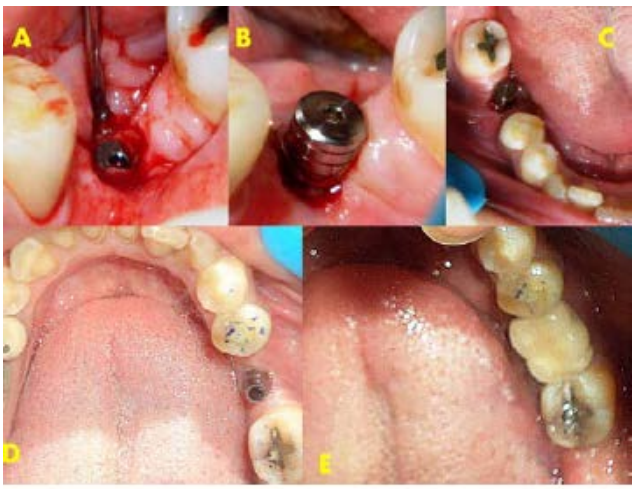

Figure 3. (A) Implant fixture exposed (B) Healing abutment placed (C) Healing abutment in place (D) Final abutment placed on the fixture (E) Single crown cemented in place

3. Discussion

Prosthetic reconstruction involving endosseous implants can involve screw-retained or cement retained restorations or both. [19,20] The choice of cementation versus screw retention seems to be based on mainly the clinician's preference. [21] With advantages like elimination of the unaesthetic screw access hole, greater resistance to porcelain, better occlusion, cost and accessibility the cement retained single implant restorations provide alternate options with proven success. Creating an emergence profile to enhance aesthetics is focussed largely on manipulation of the soft tissues around the abutment that is placed on the implant fixture. The same principle has been used in this case to create soft tissue contour around the surface of the abutment that would aid in maintaining oral hygiene. An internal bevel incision on the gingiva leaves the margins overhanging at the time of the surgical procedure. While healing takes place, the area is replaced by soft tissue that pushes the overlying soft tissue coronally resulting in the growth of soft tissue around the neck of the abutment that is at a higher level than the tissue on and around the bone. The raised tissue at the surface of the abutment does not allow plaque to move in the implant gingiva crevice. Care though, has to be taken that only adequate amount of

cement is used while cementing the crown otherwise the cement will flow into the crevice and would do more harm than good.

4. Conclusion

Within the scope and limitation of the surgical technique mentioned a careful approach is necessary to accomplish the advantages that can be obtained from the procedure. Further studies are advised regarding the viability of the technique.

Acknowledgements

The authors would like to acknowledge the staff and postgraduate students of the department of oral surgery, Periodontology and Prosthodontics for shaping the study in its present context.

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