

## Non Functional Loading of Immediate Implants in the Maxillary Premolar Extraction Sockets-A Case Report

Zainab Khanum<sup>1\*</sup> and Shobha ES<sup>2</sup>

<sup>1</sup>Consultant Periodontist & Implantologist, Arak Dental Polyclinic, Doha Qatar

<sup>2</sup>Professor of Oral & Maxillofacial Surgery, Dayananda College of Dental Sciences, Bangalore India

\*Corresponding Author: Zaera Le Gal Ramiro, Consultant Periodontist & Implantologist, Arak Dental Polyclinic, Doha Qatar.

Received: April 08, 2020; Published: May 14, 2020

### Abstract

**Background:** The case report explains the rehabilitation of the maxillary first and second premolar extraction socket with immediate implants and provisionalization by bonded restorations.

**Materials and Methods:** The root stumps in the region of maxillary premolars were atraumatically extracted. The osteotome was prepared to the required depth and tapered threaded Dental implants were selected for initial stability and rapid osseous adaptation. Biocare Implants were placed, with graft material and collagen membrane. The healing abutment was placed following which a nonfunctional immediate restoration was delivered.

**Results:** The immediate implant surgery and nonfunctional loading in the region of the extraction sockets resulted in preservation of tissues i.e. both hard and soft tissues showing no significant complications. Moreover, the patient exhibited a healthy gingival architecture with no radiological complications after loading.

**Conclusion:** The dental Implant placement and the prosthesis or provisional restoration provided the patient with fulfilled esthetic needs, satisfactory function, efficacy of mastication and most importantly, preservation of hard and soft tissues.

**Keywords:** Occlusal Loading; Osseointegration; Invasive; Nonfunctional Restoration

### Introduction

In the recent times Dental implant rehabilitation has been in preference for replacement of missing teeth. Restoration of form and function being of prime concern implant rehabilitation has taken a new dimension in management of edentulous ridges. Evidence-based implant dentistry has evolved with treatment modalities that give satisfactory results within the shortest time frame and minimal post-surgical complications.

Originally Dental implants were placed in sockets filled with mature alveolar bone making it mandatory for a waiting period of 3 to 6 months post extraction [1]. Owing to the lack of acceptance and co-operation by patients in this regard immediate implants came into being to shorten the treatment period [2]. Immediate implant placement in an extraction socket was first described by Schulte and Heimke in 1976 Apart from the shortened waiting period, advantages of immediate implants include lesser number of surgical interventions, improved implant survival rates, superior aesthetic outcomes with regard to the maintenance of gingival form as well as interdental papillae preservation in the post-surgical phase with minimal changes occurring in ridge morphology making immediate implants more acceptable compared to Delayed

implants [4]. However, the small osseous defects seen around implants placed in extraction sockets can be grafted with autogenous and alloplastic graft materials.

Success of dental implants depends on bone quantity as well as bone quality and the implant bone interface being crucial for a satisfactory osseointegration. According to literature root form implants showed superior results with respect to osseointegration in a one stage implant procedure also known as non-submerged implant procedure thus eliminating the need of second stage surgery [6-8].

Misch., *et al.* [9] suggested a terminology for Immediate restoration and/or occlusal loading.

Immediate occlusal loading implant surgery is categorically an immediate insertion of implant prosthesis within 2 weeks of implant placement which may be functional or nonfunctional. This eliminates the need to fabricate a removable temporary prosthesis which would be opted for in staged/delayed occlusal loading. The Biomechanical considerations to increase surface area and decrease force application to immediate implant restorations is thought to be the reason for its increased survival rate.

The case report discusses the methodology as well as management of both hard and soft tissues in immediate implant placement.

### Armamentarium

Disposable needle and syringe, local anesthesia, extraction forceps, periostomes, probe, implant kit, implant, bone graft material, collagen membrane, suture 5.0 vicryl, tooth colored self-cure acrylic resin



**Figure 1:** Pre-Operative Radiograph exhibits root stumps and marginal bone loss in the mandibular posterior region; loss of molars in the 3rd and 4th region.

### Case Report

A 50-year-old female visited the clinic with the chief complaint of broken teeth in upper right posterior region and requested for an immediate solution. Clinical and radiographical examination revealed root stumps in relation to tooth number 14, 15, adequate alveolar bone, absence of periapical pathology and missing teeth numbers 36, 37, 46, 47. The patient had a thin gingival biotype and a periodontal evaluation resulted in Chronic marginal gingivitis. Patient was explained in detail about the present clinical situation, proposed treatment plan of immediate implant placement and early loading as well as alternate treatment options.

Pre surgical radiographical evaluations were performed by taking Orthopantomogram (OPG), Intra Oral Periapical Radiograph (IOPAR) and Cone Beam Computed Topography (CBCT) using CS 3D Imaging dental software for appropriate treatment planning. In the CBCT, diameter of the socket 1 mm apical to the crestal bone was mm and the length of the socket was 11 mm. The bone height and width in the region of extraction and implants placement was

visualized with a digital radiovisiograph. Extraction with immediate endosseous implant placement with a provisional restoration was planned to preserve bone in the region and achieve a satisfactory emergence profile. Diagnostic impression was taken using alginate hydrocolloid impression material and a Study cast model was prepared. Subgingival scaling and root planning were done in all the quadrants and patient was reviewed after 4 weeks, Re-evaluation of phase I therapy was done which include evaluation of gingival condition and periodontal status.

### Surgical phase

The first surgical stage involved extraction and Implant placement. Surgery was carried out under Local Anaesthesia (Lignocaine 2% with Adrenaline under a strict aseptic protocol. Root fragments were luxated in an Atraumatic manner. Periostomes were used to preserve the alveolar bone and precautions were taken to have minimal expansion of the alveolar socket. Socket was thoroughly debrided and irrigated before preparing the osteotomy site. Implant osteotomy site was prepared with specific sequential drilling and the socket was prepared for receiving the implant as per the protocol at 800 rpm.

The Replace Select surgical kit (Nobel Biocare), which features color-coded surgical drills, implants and prosthetic components to coordinate the selection of the tooling and implants, was used to perform step-by-step drilling. Angulation of the implants is determined by use of a surgical stent. This provides a guide for the emergence profile of the final crowns. Depth of the first osteotomy preparation was planned and assessed with a 2 mm diameter pilot drill which was used with the appropriate angulation. Paralleling pins were used to ensure orientation of the drill and subsequent implant positions. A 2.7-mm-diameter intermediate depth drill was next used to the predetermined depth, which was referenced by lines on the drill. The appropriate diameter tapered-depth drill was used to enlarge the implant site to the final diameter. Implants were driven 3 - 5 mm beyond the apex of the socket into the prepared osteotomy site and primary stability was achieved. Bone graft material was packed in the alveolar bone defects around the implants using BIO-OSS bone graft material (Figure 2 and 3). Suturing was done around the prepared machined abutments (Figure 5 and 6). The composite temporary bridge was cemented using Temp Bond which allows for easy clean up and removal when necessary. The maxillary implants were 3.5-mm-diameter by 11-mm-length, mirroring the natural root contours. Figure 7 shows implants in place.



Figure 2: Pre-clinical occlusal view of the extraction site.



Figure 3: Atraumatic extraction and Implant placement (Nobel Replace™).



Figure 4: BIO-Oss Bone graft material to encourage new bone to form.



Figure 5: BIO-Oss Bone graft material to encourage new bone to form.



Figure 6: Suture (5.0 vicryl)



Figure 7: Healing abutment.



Figure 8: Post Operative Radiograph showing the implants in place.

**Post-operative care**

Chlorhexidine mouth rinses were advised with Post-Operative Antibiotic and Analgesics. Amoxicillin 500 mg, 1 tablet every 8 hours for 5 days and Ibuprofen 400 mg, 1 tablet every 8 hours for 5 days was prescribed post-operatively. Soft diet was advised for the first 10 days. Suture removal was done at 7 days post op. Patient was advised to avoid excessive masticatory load on the provisional prosthesis.

**Results**

The patient was recalled after 4 months for the prosthetic procedures and was given Zirconia crown over the implant. Patient was recalled for regular follow-up as per the protocol. The clinical and radiographic appearances at 1.5 years show good esthetics, osseointegration and maintenance of bone and gingival architecture

around the implant.

### Discussion

In the recent times rehabilitation with dental implants has been challenging and the prime focus being preservation of the alveolar anatomy and Alveolar crest architecture as well as shorter time interval between extraction and implant placement and/or loading the implant. The original protocol of placement of dental implants has a waiting period of 3 - 6 months for osseointegration to take place. The extended treatment period was overcome by immediate implants with advantages of alveolar bone preservation without compromising with the quality and outcome of treatment. However immediate implant placement in chronic infections is not a contraindication as the socket can be curetted and debrided before the implant placement.

Some of the factors which indicate good prognosis for immediate implant placement are primary stability, number of remaining bony walls after extraction, gap between socket walls and implant. Immediate implant placement was initially favorable due to its result in preserving the alveolar bone. However, this is controversial since morphological changes of the post-extraction site may occur despite early placement. Chronic infection is not an absolute contraindication, though requiring debridement of the alveolus should be made. For immediately placed implants, the success rate in maxilla has been stated as 66 - 95.5%, in mandible 90 - 100% [5].

In the present case the upper premolars were extracted for immediate implant placement. The case was carefully evaluated for both the surgical and prosthetic phase. Considering the advantages of soft and hard tissue preservation in esthetic zone as well as the preference of the patient for a shorter treatment period immediate implant surgery was planned.

### Conclusion



**Figure 9:** Cement retained with non-occlusal.



**Figure 10:** 1 year Follow up after permanent restoration prosthesis. Patient exhibits healthy gingival architecture.

Immediate Implant Placement is a reliable technique and has a good success rate of 94 - 100% [4], comparable to those obtained by the conventional method. Some of the major advantages include reduction in the treatment time, preservation of the gingival architecture, and optimum function. This procedure has some limitations but when planned meticulously this protocol provides predictable and better treatment satisfaction and outcome.

### Bibliography

1. Branemark P-I, Zarb G, Albrektsson T. Introduction to osseointegration: Osseointegration in clinical dentistry. Chicago, Berlin: Quintessence Publishing Co., 1985:11-76.
2. Flanagan D. Immediate placement of multiple mini dental implants into fresh extraction sites: A case report. *Journal of Oral Implantol.* 2008;34(2):107-110.
3. Esposito MA, Koukouloupoulou A, Coulthard P, Worthington HV. Interventions for replacing missing teeth: Dental implants. *International Journal of Scientific and Research Publications.* 2015;5.
4. Lazzara RM. Immediate implant placement into extraction sites. Surgical and restorative advantages. *Int J Periodontics Restorative Den.* 1989;9(5):333-343.
5. Schwartz AD, Chashu G. The ways and wherefores of immediate placement of implants into fresh extraction sites: A literature review. *J Periodontol.* 1997;68(10):915-923.
6. Gotfredsen K, Hjorting-Hansen E. Histologic and histomorphometric evaluation of submerged titanium implants. *Tissue integration in Oral, orthopedic and maxillofacial construction'* Chicago, Quintessence, 1990.

7. Schroeduer A, Mwglen B, Sutter. Hohlzylinderimplantat: Typ-F zur Prothesen-retention bei zahnlosen Kafer. SSO Schweiz Monatsschr Zahnheilkd. 1983;93:720-733.
8. Buser D, Weber HP, Bragge U, Balsiger C. Tissue integration of one stage ITI Implants: 3 year results of a longitudinal study with hallow cylinder and hollow screw implants. Int J Oral Maxillofac Implant. 1991;6(4):405-412.
9. Misch CE, Wang HL, Misch CM, Sharawy M, Lemons J, Judy KW. Rationale for the application of immediate load in Implant Dentistry. Implant Dent. 2004;13(4):207-215.

**Volume 3 Issue 6 June 2020**

**© All rights are reserved by Zainab Khanum and Shobha ES.**