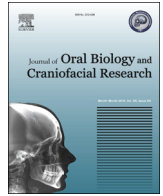




Contents lists available at ScienceDirect

Journal of Oral Biology and Craniofacial Research

journal homepage: www.elsevier.com/locate/jobcr



Original Article

Assessment of primary stability of the implant placed in prepared infected extraction sockets

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ARTICLE INFO

Article history:

Received 31 July 2016

Accepted 5 October 2016

Available online xxx

Keywords:

Immediate implants

Infected sockets

Debridement

ABSTRACT

Background: Dental conditions like periodontal, periapical pathologies and failed endodontically treated teeth are one of the commonest reasons for tooth removal. These conditions also contraindicate replacement of such teeth with immediate implant procedures.

Aim: This study aimed to evaluate the clinical and radiological fate of immediately placed dental implants in debrided infected dentoalveolar sockets.

Materials and methods: A total of 24 implants were immediately placed into prepared infected sockets. The pathology at the receptacle sockets included subacute periodontal infection, perio-endo infection, chronic periapical infection, periodontal cyst and traumatic infected teeth. The treatment protocol emphasized on meticulous debridement of the infected sockets under pre- and post-surgical antibiotic therapy. Follow up of at least 24 months was done to evaluate the survival of implants.

Results: At the end of follow up time period of 24 months, all 24 implants were stable with no signs of clinical mobility and infection. However, on radiological examination, crestal bone loss was observed during the osseointegration periods which settled at the level of first thread.

Conclusion: Survival of immediately placed implants in infected sockets is predictable and depends on the meticulous debridement of dentoalveolar sockets along with adequate pre- and post-operative antibiotic coverage.

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1. Introduction

Over the last 4 decades with the advent of implant dentistry, ideas about tooth replacement therapies have changed remarkably. Branemark discovered that rehabilitation of fully edentulous patients could be done using machined screws of commercially pure titanium which osseointegrate to jaw bone thus enabling the attachment of a fixed prosthesis.^{1,2} Since then, endosseous dental implants of various shapes and surface textures have been used in partially edentulous patients, achieving a success rate of 96.7%.³ To achieve this safe, predictable and cost effective mechanism of rehabilitation, Branemark and co-workers developed a list of recommendations regarding the treatment protocol. According to

one of these recommendations, a waiting time of 12 months following tooth extraction is necessary to allow resolution of any hard and soft tissue pathology in a proposed recipient site before an endosseous dental implant could be installed.⁴

Several investigators have evaluated the undesirable effects of tooth extraction on dimensional changes in hard and soft tissues like post-extraction resorption, by means of cephalometric analysis, study cast measurements and subtraction radiography.^{5,6} Keeping in view that this post-extraction resorption could adversely affect the availability of bone for implant placement, clinicians started inserting dental implants immediately following tooth extraction. The first case was reported in 1976 by Schulte who used polycrystalline aluminum surface and since then numerous clinical reports have been published.

However, one of the clinical requirements that needs to be fulfilled for success of immediate implant therapy is absence of infection at the recipient site, which limits the use of this technique

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for replacement of only those teeth which have healthy alveolus.⁷ This implies that the teeth that require extraction due to unresolved periapical pathology or chronic periodontal infections/inflammation of periodontium cannot be restored by immediate implant placement, hence, a delayed implant placement procedure is recommended.

There are studies in orthopedic literature concerning the treatment of severe vertebral osteomyelitis with titanium cages which show clinically and radiologically that the titanium cages fuse well when meticulous debridement is done under proper antibiotic cover.⁸ These observations encouraged us to apply the same principle for immediate placement of dental implants in debrided infected dentoalveolar sockets which reduces the need of hard and soft tissue grafting procedures, shortens the treatment time, reduces cost and helps achieve superior esthetic results.⁹

We assessed the primary stability of the implant in the extraction socket and radiographically observed the appearance of healthy bone immediately adjacent and surrounding the implant at post-operative 3rd and 6th month.

2. Materials and methods

Among the cases which reported to the Department of Oral and Maxillofacial Surgery at K.L.E.V.K. Institute of Dental Sciences from 2007 to 2010, 15 patients presenting with traumatic teeth having secondary infection, periapical/periodontal pathology and requiring extraction were selected for immediate placement of dental implants.

The inclusion criteria included (a) patients aged above 18 years needing single/multiple extractions because of subacute periodontal infection, perio-endo lesion and chronic periapical infection, (b) failed endodontic treatment of traumatic teeth with secondary infection and mobility (Fig. 1A) and (c) presence of adequate bone in periapex region within anatomical limits to establish primary stability of implant. Implants were not placed for replacements of malposed teeth, 3rd molars and in patients with medically compromised status.

A consent and approval from the Institute's Ethical committee was obtained for the study. Also, a written informed consent for the procedure was obtained from all the patients enrolled for the study. All patients underwent the required routine laboratory investigations and radiological examination with Intraoral Periapical Radiographs and Orthopantomograph, prior to the surgery.

Antibiotic prophylaxis with daily dose of 1.5 g of amoxicillin or 0.9 g clindamycin in penicillin sensitive patients was given 4 days prior to the surgical procedure and 7 days post operatively. Routine aseptic techniques were used. 2% lidocaine with 1:200,000 adrenaline was administered to achieve local anesthesia for the extraction and immediate implant placement. A full thickness mucoperiosteal flap was reflected at the surgical site and the involved tooth/teeth were extracted with minimal trauma to the cortical plates. The extraction socket was meticulously debrided and curetted to remove all detectable granulation and infected tissue (Fig. 1B). In such sockets, a moderate peripheral intrasocket osteotomy of the alveolar bone was accomplished using an oval bur to ensure complete elimination of all contaminated soft and hard tissue (Fig. 1C). The procedure was concluded with vigorous irrigations of the surgical sites using a sterile saline solution.

The resultant socket was then prepared with drill under controlled torque and speed with coolant irrigation, to receive the implant (Grade II Titanium machined (Biomicron; Italy) self-taping; tapered implants of 9–13 mm length and 3.75–5.2 mm diameter) which was extended 2–4 mm apically within the anatomical limits to achieve primary stability for the implant (Fig. 1D). Residual defect of more than 2 mm between the implant surface and the bone was filled with Freeze Dried Bone Graft (Tata Memorial Hospital, Tissue Bank, Mumbai). A release incision was placed on the mucoperiosteal flap and the flap was advanced for primary closure of the surgical site.

The post-operative assessment was carried out at post-operative 0, 3, 6, 12, 18, 24 months and included evaluation of implant position and crestal bone level both clinically and radiographically.

The clinical parameters included absence of clinical mobility of the immediately placed implant with no pain or sign of infection. For radiological parameters, intraoral periapical radiographs (IOPAR) were taken to evaluate the crestal bone level and for appearance of bone adjacent and surrounding the placed implant.

3. Results

A total of 24 implants were placed immediately following extraction or avulsion of tooth/teeth. Out of the 24 implants, 18 implants were placed in maxillary incisal and premolar region and the remaining 6 implants were placed in mandibular incisal, premolar and molar regions (Table 1).

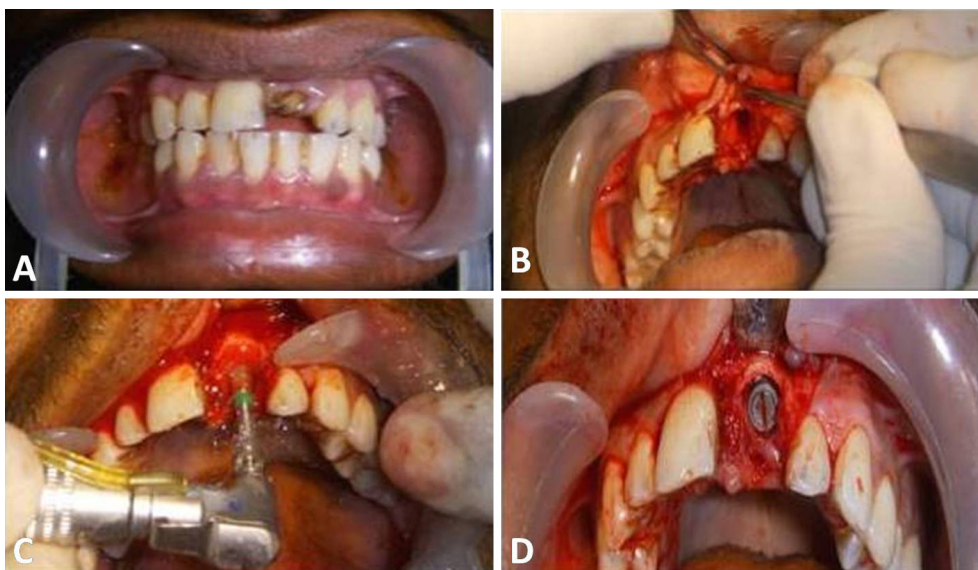


Fig. 1. Clinical photograph showing (A) surgical protocol; (B) atraumatic tooth extraction and debridement; (C) intrasocket osteotomy; (D) immediate implant placement.

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