

# Preparation Of Dental Implant Site By Interim Endodontic Therapy: A Case Report

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***Abstract: The placement of immediate implants in the fresh extraction sockets of infected teeth with periradicular/ periapical lesions is contraindicated because of the infection with subsequent loss of bone essential for implant placement. A 47-year-old female patient reported to the clinic with multiple carious and missing teeth. The patients also had numerous faulty restorations. Tooth # 14 showed a sizeable periapical defect which would compromise the success of the implant. Hence, it was decided to prepare the implant site by interim endodontic therapy. The implant site healed post-endodontic treatment, and an immediate implant was placed. The provisional treatment improved for the most part prognosis of the patient's dental care. When treated, the hopeless teeth can serve many preventive, biologic, and aesthetic functions. The reported case has clinically demonstrated that interim endodontic implant site preparation, when performed correctly can eliminate the hopeless tooth infection, regenerate bone and facilitate satisfactory immediate implant placement. Hence, this approach can be used as an alternative to hopeless tooth extraction and limiting the disadvantages associated with tissue regeneration procedures.***

***Keywords: Hopeless tooth, immediate implant, interim endodontics, tissue regeneration***

## 1. INTRODUCTION

Placement of Immediate implant in the socket of a fresh extraction hopeless tooth has recently gained popularity. The therapy is widely accepted by the patients due to reduction in time as compared to delayed implant placement. However, infection-free, anatomically intact extraction socket is a pre-requisite for the procedure.<sup>1-4</sup> The presence of periradicular lesions further bargains the implant stability affecting osseointegration owing to the bone loss with compromised bone quality.<sup>4,5</sup> Furthermore, the extraction of such teeth also lead to large anatomic and esthetic defects. Hence, infected socket becomes a contra-indication for immediate implant therapy.

Currently, several techniques are followed for implant therapy that replaces infected teeth with periapical/peri-radicular defects. These are a) delayed implant placement, b) bone-tissue regeneration followed by delayed implant placement, c) debridement and immediate implant placement and d) bone and tissue regeneration followed by immediate implant placement. However, tissue regeneration procedures require advanced surgical skills, are time-consuming and can lead to complications. Also, delayed implant placement has inherent disadvantages of prolonged therapy time, patient acceptability and cooperation. Conversely, implant site debridement does not provide a comprehensive elimination of the infection<sup>1-5</sup>. Thus, the serviceable techniques limit itself as a replacement of hopeless teeth.

The provisional/interim endodontic implant area construction is an in between, surgical/nonsurgical endodontic treatment for regeneration of bone defects (by infected teeth) thereby preparing the site for implant placement. Thus, the approach is an alternative therapy for implant site preparation compared to other procedures requiring advanced skills like Guided Tissue Regeneration (GTR) and Guided Bone Regeneration (GBR). However, as a primary approach the therapy needs evaluation per case to demonstrate effectiveness. Thus,

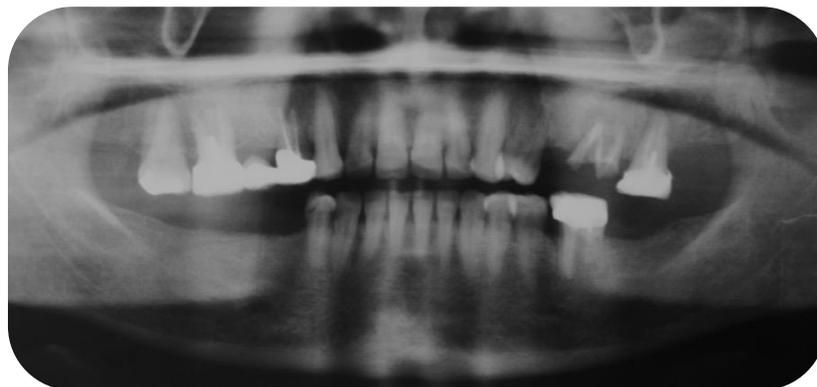
the present case report utilises interim endodontic implant site preparation, which encompasses in between endodontic treatment protocol for alveolar bone defects regeneration of infected tooth programmed for extraction followed by replacement by an immediate implant

## 2. CASE REPORT

A 47-year-old female patient reported to the clinic with multiple carious and missing teeth. The patient desired to get replacement for missing and severely destructed caries-affected teeth. The patient highly determined and cooperative to undergo comprehensive and esthetic dental treatment. The patient had a history of extensive restorations and extractions done years ago. Intraoral examination revealed multiple carious teeth, defective restorations and missing tooth #18,25,28,37,38,45,46,47,48. The patient had poor oral hygiene which was corroborated by a history of irregular tooth-brushing.

### Radiographic Report

Tooth #14,16, 26, 27, 36 revealed previous endodontic therapy (**Figure 1**) and were diagnosed as asymptomatic apical periodontitis (AAP).<sup>6</sup> Periapical osseous defects were visible on tooth #14 and 16. Also, there was a complete loss of crown structure of tooth #26.



**Figure 1: Pre-operative OPG**

### Endodontic consultation

Tooth #14 revealed compromised crown to root ratio with external root resorption, hence, was considered restoratively and structurally hopeless (**Figure 2A**). Consequently, the tooth was planned for interim root canal re-treatment before extraction and implant placement.



### **Figure 2A: Tooth no. 14 with external root resorption**

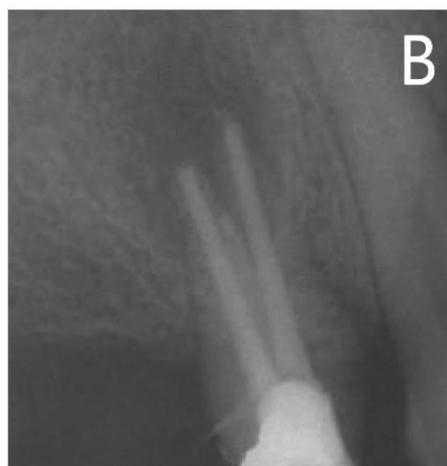
#### **Patient consent**

An informed written consent was obtained from the patient after explaining the condition of the tooth and the rationale behind the treatment procedure in the local language. A patient information sheet was given to the patient that detailed the procedure. The patient was also informed about the other treatment options available, the risks and benefits of the procedure. Once the patient was convinced with the suggested treatment, the procedure was planned. Patient was confirmed that the choice of alternative treatment would not compromise the given quality of service neither delay the priority.

#### **Interim endodontic treatment**

The patient received oral prophylaxis one week before surgery. The maxillary right quadrant was anaesthetised with Xylociane using a greater palatine nerve block and buccal and lingual infiltrations. An composite build-up was done for tooth #14 by using a visible-light activated composite resin restoration with reported excellent strength and low wear (Filtek One Bulk Fill, 3M ESPE, Saint Paul, Minnesota, USA). A full-thickness mucoperiosteal flap on the buccal and palatal surface was elevated on tooth #12, 13, 14. The incision was made using BP handle and scalpel 15 (HuFriedy, Chicago, USA). Free gingival elevation was done using a microsurgical curette and periosteal elevation was done using a periosteal elevator. A large defect involving palatal tissue related to tooth #14 was seen after flap elevation. The palatal defect was debrided after which all granulation tissue was removed thereby denuding the palatal root. The removed tissue was sent for biopsy.

Examination of buccal roots were done. The furcal region was examined for undercuts or furcal spurs and if present, were eliminated. Osseous contouring on buccal roots of tooth #12 and 14 were done for a proper flap closure. A 4-0 vicryl was used to complete the suturing. Following which an analgesic and an antibiotic was prescribed for 5 days. The patient was given standard postoperative and oral hygiene instructions. The patient was recalled after 1 week for suture removal. A temporary cantilever FPD was made two months after surgery from the buccal roots of tooth #14–16. The provisional FPD was cemented for six months (**Figure 2B**).



**Figure 2B - After endodontic treatment**

#### **Implant Placement Procedure**

After six months, clinical and radiographic examination showed healthy area for placement of an implant (**Figure 2C**). The patient was symptomless and was satisfied. The area was

anaesthetised with Xylociane. The FPD was removed, leaving a full coverage restoration on tooth #16. A full-thickness mucoperiosteal flap on the buccal and palatal surface was elevated on tooth #12, 13, The incision was made using BP handle and scalpel 15 (HuFriedy, Chicago, USA). A microsurgical curette and periosteal elevator was used periosteal elevation The tooth #14 was extracted. Preparation for Implant procedures were completed for tooth # 13 and 14. Before implant placement, the site was clinically examined for the presence of pathology and sinus communication. Two implants (Legacy 3 Implant Direct; platform and diameter: 4.2mmD; length: 13mm and (Legacy 3 Implant Direct; platform and diameter: 4.2mmD; Length: 13mm,) were place one at the site of palatal root and another at the site of tooth no. 13. After placing the healing collars on the implants repositioning and suturing of the flap was performed (**Figure 2D** ). Following treatment, an antiobotic and analgesic for five days was prescribed. The implants were restored after 56 months (**Figure 3**)



**Figure 2 C and D: C - Six months after endodontic treatment; and D - At 8<sup>th</sup> month of interim endodontic/extraction with immediate implant placement**



**Figure 3 : Six months follow-up post implant placement.**

### **3. DISCUSSION**

The present case report makes use of interim endodontic implant area preparation, which envelops interim endodontic treatment for regeneration of the alveolar bone defects of infected tooth scheduled for extraction and an immediate replacement with an implant. The advantage of an immediate implant placement include less number of surgical interventions, a short treatment time, three-dimensional implant positioning, alveolar bone preservation at the side of the tooth extraction and soft tissue aesthetics.<sup>7</sup>Primary stability seems to be the most important determining factor on immediate implant loading. An immediate placement in an infected extraction socket of an implants with periradicular/ periapical lesions is

contraindicated because of infection and the absence of bone support required for proper implant placement.<sup>8</sup>

Similarly, interim endodontics for treatment of hopeless infected teeth has other advantages too. The endodontic therapy is an effective treatment for pulpal and periapical pathologies. Secondly, it does not require special skills like tissue regeneration and is a part of the existing skill set of a general dental practitioner. It has been reported that use of GBR and GTR have many complications such as infection of maxillary sinus, paresthesia of chin, or spread of infection to the adjacent tissue causing rejection of the graft and implant.<sup>4</sup> Also, it has been reported that endodontic treatment leads to bone regeneration with more appropriate osteointegration for implants when compared to after GBT and GTR procedures.<sup>3,9,10</sup>

Considerable success has been achieved by this procedure by other clinicians. Rass in 2010 presented a case series managing five patients using variations of interim endodontic therapy for hopeless teeth before implant placement. He also advocated that when appropriately treated, hopeless teeth may serve many preventive, biologic, and aesthetic functions.<sup>3</sup> Similar claims were made by DeVore *et al.*<sup>11</sup> and Machtei *et al.*<sup>12</sup> who advocate the retention of hopeless teeth to serve biologic and preventive functions.

Time required to complete treatment is always an area of concern with the patients and clinicians. In this case, bone regeneration was seen after six months of endodontic therapy. The time taken to complete the final treatment of placing implants was one year. The prognosis was predicted to be good provided the patient adhered to the treatment objectives and maintain good oral hygiene, diet control and regular attendance to recall appointments.

The technique reported in the current case explores the possibility of utilizing an infected tooth, otherwise deemed hopeless, to serve regenerative purpose. It can be utilized in other clinical situations where extraction of teeth may lead to unpredictable outcomes thereby compromising the prognosis. The clinician must always evaluate each treatment option in terms of risks and benefits, and select the treatment approach that minimizes risks, and maximizes treatment success.

Further research for interim endodontic treatment protocol is much warranted. The technique needs to be further explored by randomized clinical trials. A long-term follow-up of > 2 years will provide satisfactory evidence to advocate the procedure to the clinicians. However, based on the success reported in the present case, the clinicians can utilize the technique in their clinical practice but with caution on per case advantages and disadvantages. The risk of inevitable complications should thereby be explored by short/long-term clinical trials. Although, limited to the existing evidence, the case hereby provides a comprehensive outcome and might emerge as a future alternative to the complicated tissue regeneration procedures.

#### 4. CONCLUSION

The present case clinically demonstrates that interim endodontic therapy, when appropriately performed on infected hopeless teeth with periapical and periradicular osseous defects, led to the elimination of infection, alleviation of patient symptoms, bone regeneration, and easy implant placement eliminating the need of tissue regeneration procedures.

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