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Partial extraction therapy: A case of interproximal shield in Posterior region

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Abstract

Immediate implant placement in the posterior regions offers inherent challenges owing to the anatomy of the region. This includes loss of inter-radicular bone, increased jumping distance, lack of primary stability etc. These limitations often force the clinician to opt delayed implant placement. To overcome these shortcomings the concept of partial extraction therapy has been utilised in the present case scenarios of immediate implant placement in posterior region. The clinical outcome seems to suggest the predictability and feasibility of this method in the rehabilitation of non-restorable tooth.

Keywords: Immediate implant, partial extraction therapy, interproximal shield, posterior regions

Introduction

Over the past few decades vast advancements have been achieved in rehabilitation of edentulous patients making delayed implant supported fixed prosthesis a highly predictable and feasible treatment option. Bone volume and height decreases by active resorption after extraction, if teeth are not replaced immediately^[1]. Within first six months of tooth extraction, alveolar bone loss of around 1.5-2 mm vertically and 3.8 mm horizontally ensues^[2]. Around 60% of total alveolar ridge volume can be lost in first three years, if no treatment is provided^[3]. Hence to counteract such devastating changes, immediate placement of implant in extraction sockets of anterior region has become a well-established treatment option since its inception in 1989^[4]. In such clinical scenarios an innovative technique known as partial extraction therapy (PET) has been first described and classified by Gluckman, *et al.* in 2016 which involves utilising the tooth itself to maintain the alveolar ridge dimensions^[5]. However, this procedure has been widely advocated in the maxillary anterior regions to prevent the collapse of buccopalatal segment.

Achieving adequate primary stability of implant with the apical and/or lateral bone is considered as an essential criterion for successful immediate implant placement. However in the molar extraction sockets one of the major challenges faced by a clinician during immediate implant placement is the width of the alveolar socket, poor bone quality, dimensions of inter-radicular bone and anatomical limitations like apical third of the root portion which is mostly distally angulated, maxillary sinus, inferior alveolar nerve and interdental crest particularly susceptible to surgical trauma and resorption. Therefore, in most cases the implants are placed within the molar extraction socket itself. It often leads to lack of primary stability at the desired depth of alveolar bone and increase in the jumping distance. In such situations the prevailing concept advocates use of artificial bone grafts to compensate for the jumping distance. Nevertheless it has its own drawbacks in terms of survival of functionally loaded implants.

The present article proposes the wise use of PET in the posterior regions to counteract these shortcomings.

Case report

A middle aged male patient reported with the complaint of fractured left upper posterior tooth with pain present since 6 months. A detailed history was taken and on clinical examination root stumps were noted in previously root canal treated #26, which was non-restorable

Radiographic examination revealed intact periodontium with an absence of any peri-apical pathology in relation to the concerned tooth. However, distal curvature of the apical 1/3rd of the mesial root was noted [Fig.1]. Extraction was advised as treatment, followed by prosthetic rehabilitation. On discussion with the patient, single stage implant placement following extraction was planned due to time constraints. To avoid complications at the time of extraction and to preserve the inter-radicular as well as interdental crestal bone, partial extraction therapy (PET) technique was advocated in the mesial root of #26 with complete extraction of the distal and palatal roots.

Surgical Protocol

- An informed consent was taken from the patient prior to the surgery.
- Following injection of local anaesthetic (Lignocaine hydrochloride with 2 % epinephrine 1: 200,000) the distal and palatal roots of #26 was extracted atraumatically using periosteal and luxators, preserving the inter-radicular bone.
- The mesial root was then sectioned through-and-through bucco-palatally and the distal root segment was removed [Fig.2].
- Curettage of the socket was done to remove any pathology present at the roots' apex.
- The mesial segment of the mesial root was prepared to assume a concave cross-section along the bony crest, making it as thin as possible and 1mm coronal to the bone crest [Fig.3].
- Subsequently, implant osteotomy was done at the inter-radicular bone and implant was placed (DENTIUM NR Line, 4.3mm diameter, 11mm length) distally to the remaining mesial root portion [Fig.4]. A primary stability of 25 Ncm was achieved.
- A healing abutment of 5.5mm width and 3.5mm collar height was placed with absorbable gelatin sponge (ABGEL) in the socket, stabilized with simple interrupted suture [Fig. 5].

Post-operatively, the patient was advised cold or lukewarm semi-solid food on the day of the procedure. Intermittent application of ice-packs was advised extra-orally. Patient was prescribed antibiotics (Amoxicillin, 500mg TDS) for 5 days.

Results

Three months follow-up showed adequate peri-implant soft tissue healing with a well formed gingival cuff [Fig.6]. Implant level impression was taken and was subsequently loaded with a screw-retained prosthesis [Fig.7]. The volume of interdental crest can be maintained with these techniques without the need to fill the gap with bone grafts. Hence giving the gingiva a healthy and natural appearance.

Discussion

To preserve the interdental papilla in between implants a modified socket shield technique (SST) was utilised by Kan and Rungcharassaeng [6] and later Cherel and Etienne [7]. The study and review by Gluckman, *et al.* concluded that PETs should be considered by clinicians as a conservative strategy to maintain bone crest in oral rehabilitation [8].

More recently, a study summarized that modified PET appears to be a successful procedure combined with immediate implants as the root surface does not interfere with Osseointegration [9]. The palatal root socket in the maxilla is

often considered a good site for immediate implant placement. However, the orientation of the palatal root may cause the implant to be angled too far palatally, with screw access hole emerging through buccal surface of prosthesis. This might also result in a crown that is partially cantilevered, making day to day oral hygiene difficult. Also the sockets of the buccal roots of maxillary molars are advocated to be grafted to help reduce ridge remodelling and to achieve better aesthetics and prosthetic contours. In addition in terms of vertical positioning, many maxillary molar sockets have little septal bone beneath the sinus, thereby compromising the primary implant stability. In type C sockets (average buccolingual width of a mandibular second molar, the most common site for a type C socket, is 9 mm) [10], where no septal bone exists, immediate implant placement following the proposed surgical protocol could be made feasible. The proposed technique involves utilising the established concept of partial extraction therapy in the posterior regions to overcome such difficulties.

Figures



Fig 1: Previously root canal treated non-restorable #26.



Fig 2: Sectioned mesial root through-and-through bucco-palatally.

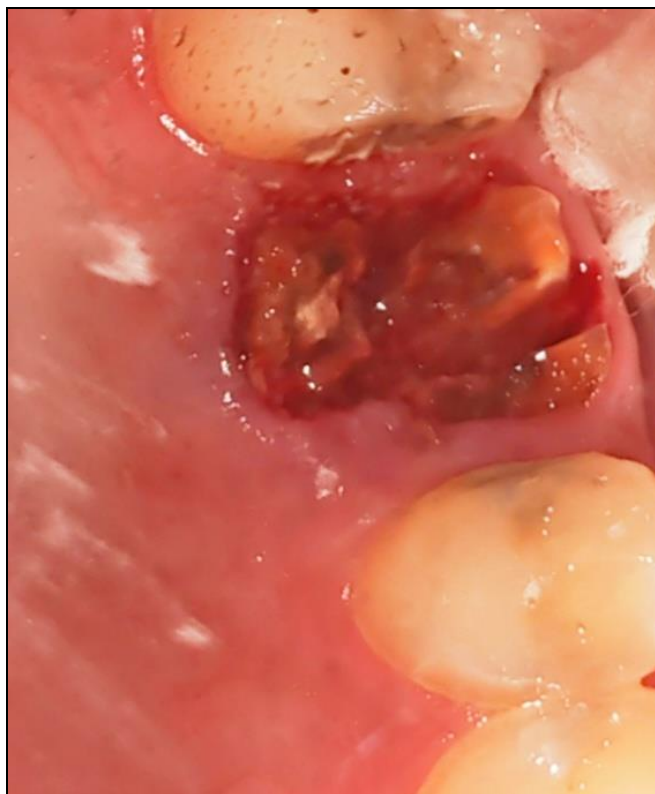


Fig 3: Concave cross-section of mesial root along the bony crest.



Fig 4: Implant placement distally to the remaining mesial root portion.



Fig 5: Placement of healing abutment of 5.5mm width and 3.5mm collar height.



Fig 6: Three months follow-up showing adequate peri-implant soft tissue healing with a well formed gingival cuff.

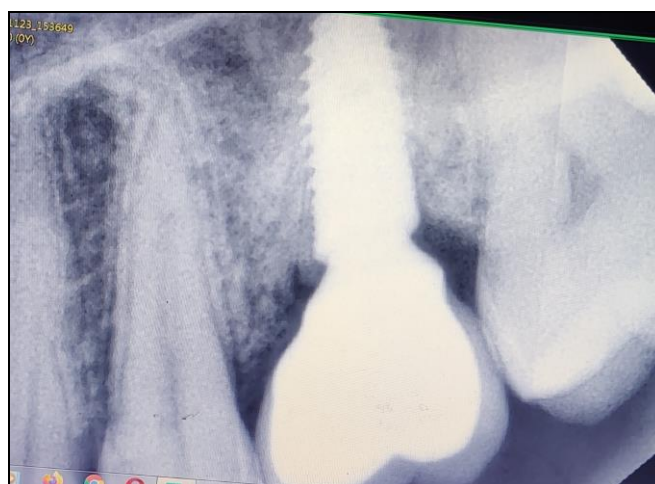


Fig 7: Implant loaded with a screw-retained prosthesis

Conclusion

It can be concluded that partial extraction techniques should be considered in oral rehabilitation in selected cases. PET is a novel treatment alternative that requires one surgical procedure thus reducing patient morbidity, as well as, reducing overall treatment time, stress and cost associated with treatment.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Conflict of Interest

Not available

Financial Support

Not available

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