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Case Report

Custom Fabricated Endodontic Implant

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***ABSTRACT*:**
Endodontic implants have an advantage of totally intraosseous without communicating with the oral cavity and have the additional advantage of maintaining the periodontal membrane attachment of the remaining tooth. With proper case selection, it has shown long term success. Endodontic implants and their contemporary use are quite limited in modern dentistry because of the advances in implant technology and techniques. Extraction and subsequent replacement with osseointegrated implants should only be considered after all other means of retaining the natural tooth have been fully explored. A case report is present with custom made endodontic implant for retaining the maxillary central incisor with improper crown-root ratio.

Keywords: Endodontic implant, osseointegrated implants.

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INTRODUCTION:

Preservation of the natural dentition and restoration of the oral cavity to a normal functional state is a primary goal of modern dentistry. A tooth with grossly impaired crown-root ratio can be saved to some extent using an endodontic stabilizer also known as endodontic endosseous implants.

Endodontic implants are artificial metallic extension, which can safely extend out through the apex of the tooth into sound bone.[1] Endodontic implants increases the root to the crown ratio and stabilizes a tooth with weakened support. It serves the patient well and avoid replacement for many years.[1] Frank (2) have listed several indications and contraindications for endodontic implants.

The indications for endodontic implants are:

1. Abutment teeth in which inadequate root length is present.
2. Horizontal root fractures where the removal of the apical fragment is indicated, thereby reducing the crown-root ratio.
3. Fixed prosthodontic patients in whom removal and replacement of an isolated, periodontally involved tooth would involve a considerable restorative effort.
4. Severe internal resorption with an associated external perforation requiring removal of the involved portion of the root.
5. Apicoectomies in which a large portion of the root is lost.
6. Periodontally involved incisors where the adjacent teeth would not serve as satisfactory abutments.
7. Primary molars with no permanent successor.
8. Teeth which have been avulsed, reimplanted, and are still excessively mobile.
9. Hemisectioned teeth which are excessively mobile.

Contraindications for the use of endodontic implants are:

1. Debilitating systemic conditions.
2. Previous radiation or bone infection in the region.
3. Periodontal pockets which communicate with the apex of the tooth

4. Teeth in which previous endodontic therapy has failed.
5. Less than 7 mm of vertical bone beyond the apex of the tooth.
6. Anatomical structures such as the maxillary sinus, nasal vestibulum, inferior alveolar canal, or mental foramen which would be violated.
7. Roots with excessive curvature or severe angulation.

This article describes the successful use of custom fabricated endodontic implant for the management of maxillary central incisor.

CASE REPORT:

A 23 yr. old male patient reported to the Department of Conservative dentistry and Endodontics of Sri Guru Ram Das Institute of Dental Sciences and Research, Sri Amritsar with dislodged post and core restoration with respect to maxillary right central incisor (Figure 2). Restoration got dislodged one day ago from the day of reporting. On radiographic examination, the root length was inadequate for the retention of crown (Figure 3). Hence endodontic implant was planned for the case.

After thorough debridement of the canal, calcium hydroxide dressing was placed for the period of 2 weeks. Crown lengthening was also done with electrocautery (figure 4). On second recall visit, calcium hydroxide dressing was removed followed by preparation of canal to receive endodontic implant. A bone channel was prepared with 25 mm reamers under local infiltration anaesthesia (figure 5). A direct pattern was made with inlay casting wax. The pattern includes: (a) part of sprue that was protruding to the bone channel and that forms the implant itself; (b) a wax impression of the root canal, which forms the post; and (c) the core build-up. The access cavity was then sealed with temporary restoration.

The casting of the pattern was then done with chrome-cobalt alloy. The implant part of the casting was fired with two layers of ceramic opaquer in a porcelain furnace and the customised implant was prepared (figure 6). At next appointment, with a reamer, granulation tissue inside the prepared bone channel was removed under local anaesthesia.

The channel was then flushed thoroughly for the cessation of bleeding followed by cementation of implant with GIC (GC Gold Label 2) (figure 7). Impression was then made for the fabrication of PFM restoration which was then luted on next recalled visit. (figure 8, 9)

One year follow up of the patient showed no clinical mobility, 1.5mm periodontal probing and normal radiographic finding. (figure 10)

Figure 1 : Preoperative Photograph

Figure 2: Dislodged post and core restoration

Figure 3: Preoperative radiograph

Figure 4: Electrocautery done for crown lengthening

Figure 5 : Bone channel prepared using reamer file

Figure 6: custom fabricated endodontic implant with ceramic coating

Figure 7: Luted endodontic impalnt

Figure 8: Radiograph after coronal restoration

Figure 9: Post operaive photograph

Figure 10: One-year postoperative radiograph showing good tissue tolerance

DISCUSSION:

Endodontic implants can be used in a variety of situations to maintain teeth that may otherwise have to be extracted. Teeth with endodontic implants can be maintained for long periods of time. The prognosis for endodontic implants after 5-year follow-up was reported as 91 %.[3] Orlay have been among the first to use endodontic implants.[4] Frank is credited however with standardizing the technique, developing proper instruments and matching implants.[2]

Patient selection is the most important consideration for implantation recommendations. Endodontic implants are not appropriate for all teeth that are mobile, nor will their placement resolve advance periodontal disease. For some patients, however, endodontic implants may

enable maintenance of the natural dentition. [5] Various endodontic implant designs and materials have been advocated in various case reports. [6,7,8]

It has been emphasised that intraosseous canal enlargement for stabilizers must be performed with reamers, using a reaming action. However, the preparation never achieves a truly round cross-sectional shape even with careful use of reaming action. The prefabricated implants are round which may lead to discrepancy between the preparation and the implant causing an inadequate apical seal and endodontic failure. [9] Thus, a custom fabricated ceramic-coated chrome-cobalt alloys endodontic implant was utilized in this case. The rationale for a ceramic coating is that it is more biocompatible. Similar technique was advocated in one of the previous case reports also. [10]

A major advantage of the endodontic implant, in comparison with the prosthetic implant, is that it provides a closed environment that does not communicate with the oral cavity. Complete separation from the oral environment reduce the complications of periodontal breakdown often responsible for implant failures. Although the use of the Endodontic implant is seldom chosen, it should not be eliminated from the scope of endodontic procedures. Considering the newer biocompatible materials available, chances of osseointegration may enhance for the Endodontic implant and should be investigated.

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