International Journal Dental and Medical Sciences Research
Volume 6, Issue 5, Sep-Oct 2024 pp 123-126 www.ijdmsrjournal.com ISSN: 2582-6018

Endodontic implant as a tooth stabilizer: A case report

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Submitted: 20-09-2024 Accepted: 30-09-2024

ABSTRACT
Endodontic implants also referred to by the name endodontic stabilizer, were introduced in early in 1960s. They are artificial metallic extension, which can safely extend out through the apex of the tooth into sound bone. Though they have enjoyed good success, failures also have been reported. Hence proper case selection plays a very important role in success of the implant. Endodontic implants have been used for cases with reduced root to crown ratios, horizontal root fractures where apical part has to be removed, teeth with mobility and apical root resorption. Various treatment modalities have been advised for treatment of teeth with apical resorption. Endodontic implant best serves the purpose to stabilise tooth by increasing root to crown ratio in cases of apical resorption. It serves the patient well and avoid replacement for many years. The present case report shows the use of endodontic H-file, as an endodontic implant to stabilise the tooth with apical root resorption.

Key Words: Endodontic implant, root to crown ratio, root resorption, stabilise, endodontic file.

I. INTRODUCTION

[1]. Endodontic implants also known as diodontic implants, are artificial metallic object that extend safely through the apex into sound bone. They stabilize tooth by increasing root to crown ratio.
Orlay was the first to introduce endodontic implants, however Frank was credited for standardizing the technique, developing proper instruments and matching implants. Frank and Abrams showed that properly placed endodontic implant was well accepted by apical tissues and a band of tissue similar to periodontal ligament was formed around implant and separated it from alveolar bone.
[2]. The endodontic implant is the most successful of all of the endosteal implants, with a 91% success rate after 5 yr. The high success rate of endodontic implant has been attributed to its functioning in closed cavity as it doesn't come in contact with oral epithelium.
[3]. Various treatment modalities have been advised for treatment of teeth with apical resorption. Endodontic implant best serves the purpose to stabilise tooth by increasing root to crown ratio in cases of apical resorption.
[4]. Endodontic implant act as stabilisers, which serves to stabilise mobile teeth by increasing root length, altering root to crown ratio, supporting roots for overdentures, immobilising fractured or resorbed roots and periodontally compromised teeth.
[5]. The indications for endodontic implants are: 1. Abutment teeth with inadequate root length. 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. Hemi sectioned 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.

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3. Periodontal pockets which communicate with the apex of the tooth.

II. CASE REPORT

This case report has been written according to Preferred Reporting Items for case reports in Endodontics (PRICE) 2020 guidelines. The present article is a case report of a 36-year-old female patient who presented with a chief complaint of mobility in lower front tooth region. Patient had no relevant medical history and gave history of root canal treatment 2 years back. Clinical examination revealed crown in 41 (Figure 1), with grade II mobility. Cold pulp sensibility test with Endo frost showed non responsive teeth irt 31,42. Periapical radiograph showed root resorption in apical 3rd in 41 and radiolucency involving 31,42(Figure 2). From clinical and radiographic examination, diagnosis of pulpal necrosis was made for 31,42 and chronic apical abscess with apical root resorption for 41. Patient was keen on saving her tooth and hence, root canal treatment followed by crowns were planned for 31,42 and re-rct followed by endodontic implant placement was planned for 41.

After obtaining an informed consent from the patient, teeth were isolated with rubber dam, access was gained through the crown into the root canal of 41, gutta percha was removed with Protaper re treatment files IN 41(Dentsply) and irrigation was done with 3 % sodium hypochlorite and normal saline. Access opening was done with no 2-access opening bur irt 31,42. Working length was established with 15k file and confirmatory periapical radiograph was taken. Cleaning and shaping was done till 30 4 % file (Ni Ti Rainbow rotary files) with 5.25% sodium hypochlorite and 17 % EDTA as irritants in 31,42. Final irrigation was done with normal saline.

Double antibiotic paste was used as intracanal medication in 31,41 and 42. Teeth were then temporised with Cavit W. After a month, access was reopened, intracanal medicament was removed by irrigating with normal saline and canals were dried with paper points. 31, 42 were obturated with 30 4% gutta percha cone and bio ceramic sealer. 50 H file coated with bio ceramic sealer was extended about 4mm beyond apex irt 41 to engage sound bone (Figure 3), and checked radiographically to ensure proper placement of the endodontic implant. No bleeding was encountered when H file was placed beyond apex to engage sound dentin. Trans metal bur was used to shear the file to orifice level. The access was sealed with GIC in 32,41,42. At 10 month follow up (Figure 4), no mobility was observed in 41 and peri-apical radiograph revealed preapical bone formation and evidence of periodontal ligament formation around the resorbed root.

III. DISSCUSSION

Different treatment modalities have been proposed in literature for treatment resorption of roots and apical and middle 1/3rd root fractures where apical fragment has to be removed. Such instances lead to reduced root to crown ratio. Endodontic implants increase the root to the crown ratio and stabilizes a tooth with weakened support. It serves the patient well and avoid replacement for many years.

Patient reported to the hospital, with mobility in lower front tooth region. Post clinical examination and radiographic evaluation, patient was explained about the need for root canal treatment irt 31,42. Patient was made aware of the present condition of 42 and was explained that tooth either requires extraction followed by implant or re-rct followed by endodontic implant to stabilise the tooth. As the patient was very keen on saving the tooth, endodontic implant was chosen as the treatment of choice.

[3]. A major advantage of the endodontic implant, in comparison with the prosthetic implant, is that it provides a closed environment reducing the complication of periodontal breakdown. The mechanical principle is simple: by pushing a rigid-post through the tooth deep into the bone and cementing the intra dental part to the root canal walls, the fulcrum of the movement of a loose tooth is moved deeper into the jaw, and the support in the bone is increased and the mobility of the tooth is lessened.

[7]. Here the patient presented with root resorption upto middle 3rd in 41 due to periapical inflammation. The various causes for periapical root resorption include trauma, orthodontic therapy, periapical or periodontal inflammation, tumors, cysts, occlusal stresses, impacted teeth, systemic conditions etc. Apical root resorption leads to reduced root to crown ratio. In such cases endodontic implant, serves to stabilize the tooth by increasing root to crown ratio.

[8]. A study by Omar E. Abusteit etal onoutcome of endodontic treatment through existing Full Coverage Restorations (FCR), the percentage of healed cases following the American Association of Endodontists outcome criteria adopted in 2004 with intact retained FCR was 95.3% and it also showed favourable outcomes for nonsurgical endodontic treatment through full coverage restoration.In the present case as the full coverage restoration (FCR) was intact and had

good marginal adaptation, and as the tooth was mobile and the patient wasn't keen on removing the crown, access to root canal was planned through existing FCR to avoid unnecessary trauma to the tooth.

[9]. H file was used as endodontic implant as the circular cross section and the flute design helps in better engaging of the file to the bone. Also, files are easily available, autoclavable, and cost effective. The placement of H file 4mm beyond apex to engage the bone was successful as it showed reduced mobility and radiographs revealed better periapical healing.

[10]. Most of the endodontic implant failures occurs in teeth with eccentrically located apical foramen, thus, forming a tear drop shaped opening.[9] It is difficult to provide apical seal in such cases, so in the present case MTA sealer was used to minimise failure due to apical leakage. MTA also has constant release of calcium ions and maintains pH which provide antibacterial activity and stimulates periapical bone healing.

At 10 month followed patient expressed her satisfaction toward the outcome of the treatment.

IV. CONCLUSION

Though endodontic implants are not widely practised, due to advent of titanium implants and 3-D printing, it is still a go-to choice in cases of apical root resorptions, horizontal root fractures, reduced root to crown ratios. The endodontic implants have shown success of 91% when placed for ideal case and with precautions. Although further research is needed to evaluate the outcome of endodontic implants.

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FIGURE LEGENDS

Fig 1: Pre-operative
Fig 2: Preoperative radiograph of 31,41,42.
Fig 3: Immediate postoperative radiograph
Fig 4: 10 month follow up radiograph

Fig 1

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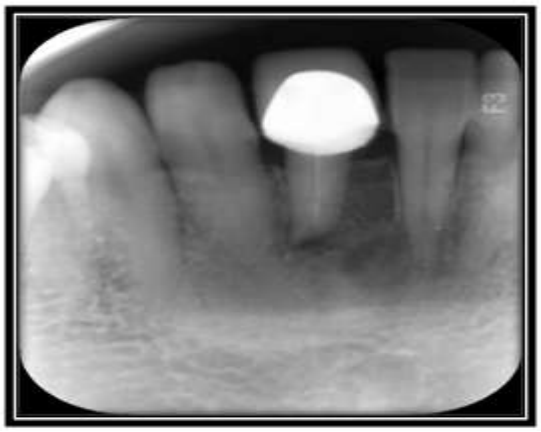

Fig 2

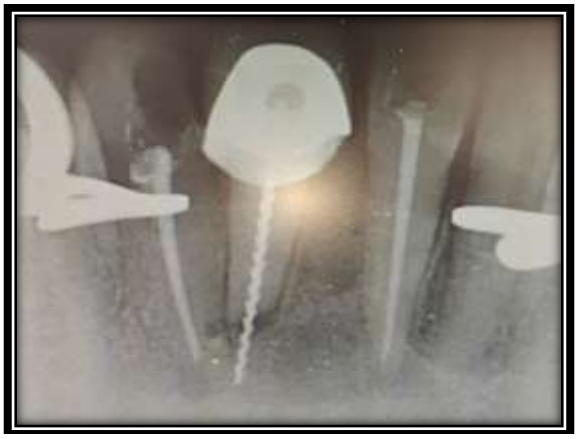

Fig 3

Fig 4