

## Prosthetic and Endodontic Retreatment of Maxillary Premolars: A case report.

Partha Sarathi Adhya<sup>1</sup>, Niranjan Kumar Chugh<sup>2</sup>, Irfan Islam<sup>3</sup>

<sup>1</sup>Consultant Prosthodontist, Daharpur, Tamluk, Purba Medinipur.

<sup>2</sup>Associate Professor, Gauri Devi Medical College and Hospital, Durgapur.

<sup>3</sup>Consultant and Practitioner, Kolkata.

### Abstract

Endodontic in combination with prosthetic treatments are often done to restore the form and function of carious teeth. But such treatment does fail because of various reasons. If diagnosed properly such cases can be treated by endodontic and prosthetic retreatment. The following case report discuss regarding the treatment protocol of endodontic and prosthetic retreatment of maxillary premolars.

**Key words:** - Endodontic Failure, Prosthetic Failure, Endodontic Retreatment, Prosthetic Retreatment, Post and Core, Crown Lengthening.

**Address of correspondence:** Dr. Partha Sarathi Adhya, Daharpur, Tamluk, Purba Medinipur

**Email address:** [dr.psadhya@gmail.com](mailto:dr.psadhya@gmail.com) **Phone no:** 9932847894. **DOI:** 10.5281/zenodo.5796287

**Submitted:** 10-Nov-2021 **Revised:** 12-Nov-2021 **Accepted:** 29-Nov-2021 **Published:** 15-Dec-2021

**Bibliographic details:** Journal of Orofacial Rehabilitation Vol. 1(3), Dec 2021, pp. 13-18.

### Introduction

Dental caries is considered as one of the most of the common oral diseases. Around 36% (2.43 billion) world population is suffering from dental caries.<sup>[1]</sup> Dental caries not only destroy hard tissue structure by releasing acidic bi products but also causes peri apical infection. While peri apical infection can be treated by endodontic treatment, the teeth structure can be restored by prosthetic rehabilitation like post and core or crown fabrication. But cases treated with such treatment protocol often fail because of endodontic or prosthetic reasons. The frequency of endodontic failure is high in maxillary posterior teeth. The percentage of failure of endodontic treatment in maxillary molars, premolars are 44.4%, and 15.5% respectively.<sup>[2]</sup> The cause of such failures includes improper bio-mechanical preparation, improper obturation, over filling, missed canal, leaked canal, persistence of bacteria (intra-canal and extra-canal).<sup>[3]</sup> Similar to the endodontic treatment the success and functionality of prosthetic treatment also depends upon several factors.<sup>[4]</sup> The reasons for failure of

prosthesis may be divided into biological failures, mechanical failures, and esthetic failures. While mechanical failures are more directly under the influence of the clinician. Biological problems are less easily controlled and, in some instances, may be unrelated to the treatment or prosthesis. Factors like marginal integrity, retention of prosthesis, aesthetic of the prosthesis are being evaluated to determine the success and functionality of the prosthetic treatment.<sup>[5]</sup>

Such failure can be managed by non-surgical endodontic re-treatment and prosthetic retreatment. The goals of nonsurgical retreatment are to remove materials from the root canal space and if present, address deficiencies or repair defects that are pathologic or iatrogenic in origin. Cases like mechanical failures (e.g., short obturation, improper bio- mechanical preparation, over obturation), previously missed canals or radicular subcrestal fractures can be easily treated by non-surgical endodontic re-treatment.<sup>[6]</sup> The aim of the prosthetic re-treatment is to establish proper form and function and of the prosthesis. The following

case report deals with endodontic and prosthetic re-treatment maxillary premolars.

### Case report

A 25 years old male patient visited our clinic with chief complaints of pain and sensitivity in the right upper back teeth region. Patient gave the history of endodontic treatment of the teeth 2 years back followed by fabrication of prosthesis. On examination there was gingival swelling in relation to the right maxillary first premolar. Joint crowns which were present i.r.t right maxillary first and second premolars were poorly adapted to the underline crown margins. There was also ceramic fracture present in the occlusal portion of the joint PFM crowns (Fig. 1 and Fig. 2). Peri-apical radiolucency was present in the radiograph involving both first and second molar. Obturation of the first premolar was 4 mm short of the radiographic apex (Fig. 3). Patient was briefed about the failed endodontic and prosthetic treatment and was explained about the endodontic and prosthetic re-treatment. Tungsten carbide crown cutting bur (Coltene Whaledent Pvt Ltd, India) was used to break the junction of the joint PFM crown and to make vertical cut across the margin of the crowns. Sliding hammer type crown remover with angle tip C4 (GDC Automatic Crown Remover Standard, GDC Fine Crafted Dental Pvt. Ltd; India) was used to remove the crowns.

The impression of the maxillary arch was taken using alginate impression material (Hydrogum Soft Alginate Powder, Zhermack SpA, Italy). Impression was poured and model was fabricated. On the cast the anticipated gingival margin of the new prosthesis was marked and the area is scraped off. Wax mock up for the new prosthesis was made and it was shown to the patient. No. 2 round bur (Mani Inc, Japan) was used to remove access cavity filling material from right first premolar. Small amount of gutta

percha solvent (Neosol, Orikam Health care; India) was taken and injected in the canal orifice. After 5 minutes 30H file (Mani Inc, Japan) was used to remove the gutta percha. After removing gutta percha canal was irrigated with 3% sodium hypochlorite (Parcan, Septodent; United Kingdom). No.2 round bur (Mani Inc, Japan) is used to create the access cavity in the maxillary second premolar. Apex locator (I Pex II, NAKANISHI INC.; Japan) was used to determine the working length. The canals were then filled with non-setting CaOH (Calcipulp, Specialites Septodont, Saint-Maur, France) with the help of small hand files and the tooth was restored with a temporary filling material (Cavit, ESPE, Seefeld, Germany).

After 1 week patient was recalled and bio mechanical preparation was done with the Protaper nickel-titanium rotary instruments (Dentsply-Maillefer, Ballaigues, Switzerland) and RC-Prep (Hawe Neos Dental, Bioggio, Switzerland). Copious irrigation with 5% sodium hypochlorite was performed during shaping and cleaning procedure. Again, the canals were filled non-setting CaOH paste (Calcipulp, Specialites Septodont, Saint-Maur, France). On the next appointment canal was irrigated with 2% Chlorhexidine Gluconate Solution (Anabond Stedman Pharma Research Pvt Ltd; India) and 17% EDTA (DPI; India). The canals were dried with paper points, coated with Sealapex (Kerr Manufacturing Co.) and obturated using Obtura II system (Obtura Spartan, USA) (Fig. 4).

On the next appointment transgingival probing was done around the intended tooth under local anesthesia. It was found that 2 mm of soft tissue present above the alveolar crest. Pointed instrument was used to create the bleeding spots which would act as level of incision. Using a no. 15 Bard-Parker blade, the internal bevel incision was performed 2

mm above the gingival margin both on bucal and palatal aspect. Piezo electric surgical tip (Ultrasurgery x, woodpacker;China) US1L was used at 25000 Hz with controlled flow of sterile saline (Flow rate - 80 ml/min) in the Piezotome to remove the bone. The flap was repositioned and single interrupted suture was given (Fig. 5).

On the same day gutta-percha was removed from first premolar by No. 4 peeso-reamers (MANI,INC. Japan) leaving 4 mm GP apically. Stainless steel post (Coltene ParaPost Stainless Steel, 0.90mm) was selected and inserted in the canal to check the fit. Dual cure cement (RelyX U200, 3M India Limited) was used for post cementation. The catalyst and base components of the material were mixed and applied following manufacturer's instruction. The post was seated and excess material removed before light curing (Picture-1D). Core build up was done with composite (Filtek Z350 Xt, 3M India Limited). Gingival finish line was prepared in both teeth (Fig. 6). Temporary crown was fabricated from wax mock up and it was cemented with temporary cement. Patient was recalled after 14 days and sutures were removed (Fig. 7). Maxillary and mandibular elastomeric Impression was taken and crown was fabricated (Fig. 8).

### Discussion-

The purpose of root-canal treatment (RCT) is thorough mechanical and chemical debridement of an infected root-canal system, followed by its complete obturation with an appropriate filling material.<sup>[7]</sup> Though endodontic treatment is quite popular and considered as highly successful treatment option, it is not absolute treatment protocol. While teeth with vital pulp shows 99.4% success rate, teeth with necrotic pulp shows 98.6% success rate after endodontic treatment.<sup>[8]</sup> The major factors responsible for endodontic treatment failure are the persistent microbial infection in the root

canal system and peri-radicular tissue which is caused by many factors like improper cleaning and shaping, missed canals, unfilled or over filled canals.<sup>[9]</sup> Among all these factors underfilled and unfilled canals are most common cause of endodontic failure with an incidence rate of 33.3% and 17.7% respectively.<sup>[2]</sup> The cause of endodontic failure in this case report was underfilled canal in maxillary first premolar which again has the higher incidence of endodontic failure.<sup>[10]</sup> Nonsurgical endodontic treatment in such cases can be useful to save the teeth with a success rate of 82%-86% for endodontic re-treatment.<sup>[11]</sup>

That is why this case was treated with non-surgical endodontic retreatment. As obturation was short of the radiographic apex, apex locator was used to determine the working length. To reduce the chance of future endodontic failure and to remove the smear layer completely 2% Chlorhexidine Gluconate Solution and 17% EDTA was used as final irrigating solution.<sup>[12,13]</sup>

Rehabilitation through fixed prosthesis is one of the most common method of treatment for missing or fractured or endodontically missing teeth. The success of such treatment is evaluated by patients' satisfaction, and comfort and the longevity of the prosthesis. Various factors play like retention, marginal adaptation, aesthetics, periodontal health, functional efficiency plays crucial role in determination of the success of the prosthesis.<sup>[14]</sup> According to Goodacre CJ et al (2003) the incidence of complications regarding single fixed prosthesis were 11%. These includes caries, periodontal problem, crown fracture, loss of retention, porcelain fracture, and need for endodontic treatment. The incidence of loss of retention, porcelain fracture and need for endodontic treatment are 3%,3% and 2% respectively.<sup>[5]</sup> In this case all these three problems were identified. Inadequate preparation of teeth, absence of finish line in crown margin leads to the

failure of previous prosthesis. This failure can be classified as class IV failure of the prosthesis which not only needs replacement of prosthesis but also needs reconstruction of teeth and supporting structure.<sup>[15]</sup>

To reconstruct the damaged teeth structure post and core was fabricated in maxillary right first premolar. In this case screw shaped post was used. The parallel shape and screw shaped design make such post more retentive than tapered shaped post. Also, custom made post can be placed easily with reduction of the clinical timing.<sup>[16]</sup> Clinical crown lengthening was performed to gain to proper crown height for the prosthesis. One of the main factors that should be considered in clinical crown lengthening is the maintenance of the crown root ratio which was determined by radiograph in this case. The amount of keratinized gingiva present in this case was 4 mm. This amount was satisfactory as minimum of 3 mm of space between restorative margins and alveolar bone would be adequate for periodontal health, allowing for 2 mm of biological width space and 1 mm for sulcus depth.<sup>[17]</sup> Piezo surgical tip was used in this case to remove the bone. The advantage of this technique over the tradition bone removal technique is that; it is less invasive, more precise, faster healing, less chance of bleeding and trauma.<sup>[18]</sup>

From the above discussion it is evident that, selection of proper clinical techniques and materials are crucial for the success of endodontic and prosthetic re treatment.

### Conclusion

Proper case selection and clinical methods are important to avoid the failure of endodontic and prosthetic treatment. However, endodontic and prosthetic re-treatment can be useful to treat such failure cases.

### References

1. Veiga NJ, Aires D, Douglas F, Pereira M, Vaz A, Rama L, Silva M, Miranda V, Pereira F, Vidal B, Plaza J. Dental caries: A review. *Journal of Dental and Oral Health*. 2016 Aug 16;2(5):1-3.
2. Iqbal A. The factors responsible for endodontic treatment failure in the permanent dentitions of the patients reported to the college of dentistry, the University of Aljouf, Kingdom of Saudi Arabia. *Journal of clinical and diagnostic research: JCDR*. 2016 May;10(5):146.
3. Tabassum S, Khan FR. Failure of endodontic treatment: The usual suspects. *European journal of dentistry*. 2016 Jan;10(01):144-7.
4. Goodacre CJ, Bernal G, Rungcharassaeng K, Kan JY. Clinical complications in fixed prosthodontics. *The Journal of prosthetic dentistry*. 2003 Jul 1;90(1):31-41.
5. Chandranaik MB, Thippanna RK. Fixed partial denture failures: a clinical survey for evaluation of the factors responsible. *CODS J Dent*. 2017;9(2):41-5.
6. Ruddle CJ. Nonsurgical endodontic retreatment. *CDA JOURNAL*. 2004; 8(1) 31-7.
7. Vertucci FJ. Root canal anatomy of the human permanent teeth. *Oral Surg Oral Med Oral Pathol*. 1984;58:589-99.
8. Santos-Junior AO, Pinto LD, Mateo-Castillo JF, Pinheiro CR. Success or failure of endodontic treatments: A retrospective study. *Journal of conservative dentistry: JCD*. 2019 Mar;22(2):129.
9. Sundqvist G, Figdor D, Persson S, Sjogren U. Microbiologic analysis of teeth with failed endodontic treatment and the outcome of conservative re-treatment. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 1998;85:86-93.

10. Giuseppe C, Elio B, Arnaldo C. Missed anatomy: frequency and clinical impact. *Endodontic Topics*. 2009;15:3-31.
11. Chércoles-Ruiz A, Sanchez-Torres A, Gay-Escoda C. Endodontics, endodontic retreatment, and apical surgery versus tooth extraction and implant placement: a systematic review. *Journal of endodontics*. 2017 May 1;43(5):679-86.
12. Ahir B, Parekh V, Katyayan MK, Katyayan PA. Smear layer removal efficacy of different irrigating solutions: A comparative scanning electron microscope evaluation. *Indian Journal of Dental Research*. 2014 Sep 1;25(5):617.
13. Ruqshan Anjum MG, Sujatha I, Sharath Chandra SM. Antimicrobial efficacy of various irrigating solutions on *E. faecalis* in root canals: an in-vitro study. *International Journal of Applied Dental Sciences*. 2015;1(4):94-7.
14. Zavanelli AC, Mazaro JV, Nóbrega PI, Falcón-Antenucc RM, Zavanelli RA. Data collection about failures in fixed partial dentures: 1-year monitoring. *RGO-Revista Gaúcha de Odontologia*. 2018 Jul;66:250-6.
15. Ozcan M, Niedermeier W. Clinical study on the reasons for and location of failures of metal-ceramic restorations and survival of repairs. *Int J Prosthodont*. 2002;15(3):299-302.
16. Schwartz RS, Robbins JW. Post placement and restoration of endodontically treated teeth: a literature review. *Journal of endodontics*. 2004 May 1;30(5):289-301.
17. Nevins M. The intracrevicular restorative margin, the biologic width, and the maintenance of the gingival margin. *Int J Periodont Rest Dent*. 1984;4:31.
18. Rahnema M, Czupkałło Ł, Czajkowski L, Graszka J, Wallner J. The use of piezosurgery as an alternative method of minimally invasive surgery in the authors' experience. *Videosurgery and Other Miniinvasive Techniques*. 2013 Dec;8(4):321.

**FIGURES:**



**Fig. 1**



**Fig. 2**



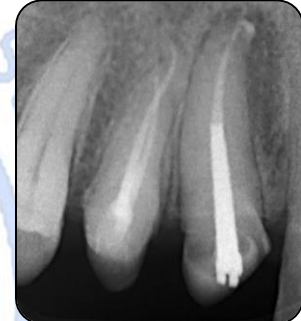
**Fig. 3**



**Fig. 4**



**Fig. 5**



**Fig. 6**



**Fig. 7**



**Fig. 8**