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Restoration of Endodontically Submerged Root – A Case Report

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ABSTRACT: The utilization of endodontically treated submerged root as an abutment primarily presents with the advantage of preservation of underlying bone and preventing the psychological trauma, fear and anxiety that a young patient undergoes due to extraction. This case report discusses a case where an endodontically treated root has been used as an abutment for placement of acrylic crown.

Key words: Abutment; Acrylic; Crowns; Endodontic; Gingivectomy; Post & Core

INTRODUCTION

During the years, many studies showed that roots which are fractured and left behind during extractions are retained into the alveolar bone with no evidence of pathosis.[1] Such circumstances can be employed to clinical advantage as preservation of the tooth structure prevents the underlying bone resorption in addition to saving the patient from the psychological trauma of extraction.[2]

The concept of use of endodontically submerged root has been used regularly with success for overdenture treatment options and the same concept has been applied in this case.

If the coronal structures are largely intact and loading is favourable as on anterior teeth that are farther removed from the fulcrum, a simple filling can be placed in the access cavity. However, if a substantial amount of coronal structure is missing, a cast post-and-core is indicated instead.[2]

A CASE REPORT

An 12 year old female patient reported to the Department of Pediatric and Preventive Dentistry, Rama Dental College-Hospital and Research Centre, Kanpur, with the chief complaint of missing tooth in the upper right front region of the jaw since past 3 months. The patient gave history of trauma 3 months back. On examination it was found that an edentulous area was present in relation to the upper left central incisor. (Figure 1) IOPA radiograph was advised.

On radiographic evaluation, it was found that, there was still root portion of the left central incisor left (Figure 4). After discussing with the patient, it was decided to surgically expose the central incisor, followed by root canal treatment followed by a post and core and acrylic crown. Gingivectomy was done to expose the root (Figure 2 & Figure 3). Access cavity was modified irt 21, pulp was removed, working length was determined (14mm), BMP done along with irrigation with sodium hypochlorite and saline and finally obturation was done with gutta-percha using

lateral and vertical condensation (Figure 4). Gutta percha was removed using Peso reamers, leaving behind an apical seal of 4mm.[3] The canal was shaped with Paeso reamers (Dentsply) to a final diameter of 1.25 mm and a depth of 10 mm from the prepared coronal surface.

The fabrication of custom made inlay wax post was done using wooden tooth-picks (Figure 5) The tooth pick was shaped with the help of a scalpel and inserted into the canal upto the calculated length; it was made sure that it snugly fit into the canal. After coating the canal with the petroleum gelly, inlay wax was added on the tooth pick. The post was inserted into the canal while the material was still soft. Core build up was also done with the inlay wax.

The post was sprued and invested. On reaching the burnout temperature, the casting was carried out. The casting was retrieved and was tried in the patient's mouth. The finalised post was cemented using the glass ionomer cement (Figure 6) The final impression was made for the patient using alginate impression material. Acrylic crown was fabricated. The final cementation of the acrylic crown was done and the patient was satisfied with the esthetic outcome. (Figure 7 & Figure 8)

Fig 1: Pre-Treatment Photograph

Fig 2: Gingivectomy

Fig 3: Post Gingivectomy

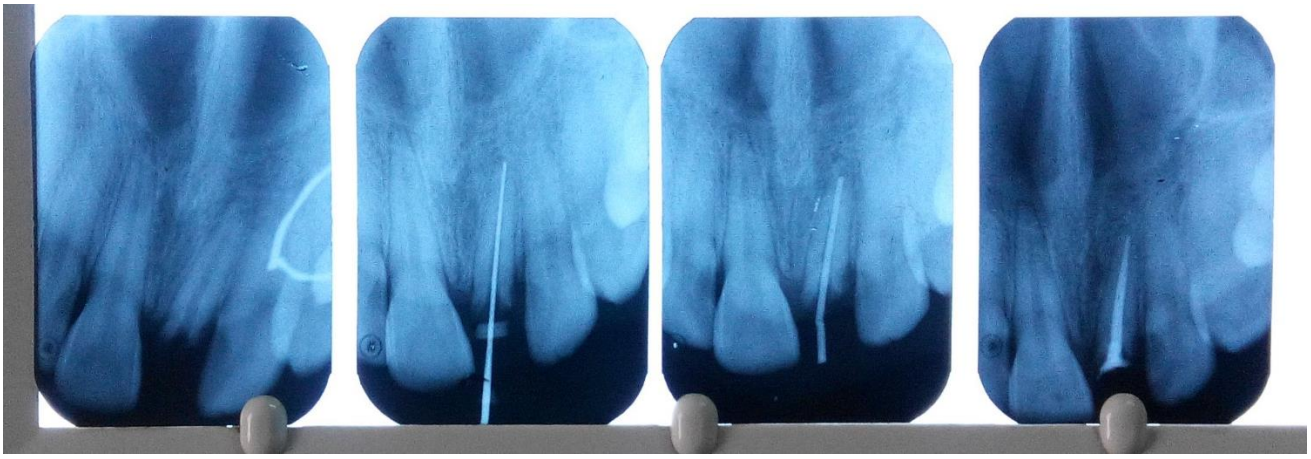

Fig 4: Preop IOPAR, Working Length IOPAR, Master Cone IOPAR, Post-Obturation IOPAR respectively

Fig 5: Post and Core Build up with Inlay Wax

Fig 6: IOPA Radiograph after cast metal Post cementation with GIC

Fig 7: Post Operative Photograph with acrylic crown cementation

Fig 8: Patient with a happy and confident smile

Discussion

Endodontically treated teeth not necessarily require crowns. If enough coronal tooth structure is present than there is no need for dowel. A dowel is placed to provide the retention for a crown that ordinarily would have been gained from coronal tooth structure. The use of a dowel requires that canals be obturated with gutta percha.

If a dowel is used, its extension into the root must at least equal the length of crown for optimum stress distribution and maximum retention, or the dowel should be two-thirds the length of the root, whichever is greater.[4]

A minimum length of 4.0 mm of gutta percha and more if possible should remain at the apex to prevent dislodgement and subsequent leakage. The longer the dowel, the greater its retention.[5,6,7]

There are several types of post and core systems available, each with its own advantage and disadvantage.

The currently available systems are amalgam, glass ionomer, composite resin, custom cast post and core, wire post and core, tapered prefabricated post, parallel sided prefabricated post, threaded post, carbon fiber post, zirconia ceramic posts and glass fiber posts. [8]

Endodontic posts can be either prefabricated or custom made.

The prefabricated posts can be classified as tapered smooth posts, tapered serrated posts, tapered threaded posts, parallel sided smooth posts, parallel sided serrated posts and parallel sided threaded posts. [8]

Prefabricated systems can be used if the dowel does not have to be incorporated into the crown.[3]

Custom-made or cast dental posts have been considered the gold standard for the rehabilitation of devitalised teeth with severe coronal structure loss for some years now. Custom-made dental posts have a shape that is more similar to the actual anatomy of the root canal and provide optimum retention and support for the coronal prosthesis.[9] Dental posts are therefore used to restore devitalised teeth and provide mechanical support for the subsequent prosthetic restoration.[10]

The other possible treatment options for this particular case could have been to leave the edentulous area as it is and fabricate a RPD for the patient. Apart from this, extraction of the root could have been done followed by Rpd. It is not a very great option for a 12 year old girl when advantage of the non-vital submerged root can be taken and prosthesis can be given. The final cementation for the acrylic crown was done with luting glass ionomer cement. Acrylic crown was given to this patient since the intercanine width in maxilla does not establish by this age.

REFERENCES

1. Shankar YR, Srinivas K, Surapaneni H, Reddy SV. Prosthodontic treatment using vital and non vital submerged roots-two case reports. J Clin Diagn Res. 2013 Oct;7(10):2396-9

2. Dwivedi K, Mehrotra A, Sangur R, Mahajan T, Chawla PS. Restoration of Endodontically Submerged Root – A Case Report. . J Dent Res Updates 2014 Dec;1(1):42-45

3. Shillingburg HT, Fundamentals of fixed prosthodontics, 3rd edition, New Delhi, Quintessence publishing co, 2002.

4.Standlee JP, Caputo AA, Collard EW, Pollack MH. Analysis of stress distribution by endodontic posts. Oral Surg 1972;33:952-960.

5. Colley IT, Hampson EL, Lehman ML. Retention of post crowns: An assessment of the relative efficiency of posts in different shapes and sizes. Br Dent J 1968;124:63-69.

6. Krupp JD, Caputo AA, Trabert KC, Standlee JP. Dowel retention with glass ionomer cement. J Prosthet Dent 1979;41:163-166.

7. Johnson JK, Sakmura JS. Dowel form and tensile force. J Prosthet Dent 1978;40:645-649.

8. Rosensteil SF, Contemporary fixed prosthodontics, 4th edition, New Delhi, Mosby, 2013.

9. Ravanshad S, Ghoreeshi N. An in vitro study of coronal microleakage in endodontically-treated teeth restored with posts. Aust Endod J 2003;29: 128-33.

10. Durmus G, Oyar P. Effects of post core materials on stress distribution in the restoration of mandibular second premolars: a finite element analysis. J Prosthet Dent 2014;112:547-54