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RESEARCH ARTICLE

RICHMOND CROWN

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ABSTRACT

The success of endodontically treated teeth is remarkably increased due to continuing development made in the field of endodontic therapy and restorative procedures. Teeth with fractured coronal third when left unattended for a long period may result in supra-eruption, rotation tipping or drifting. These cases are challenging for dentists due to reduced interocclusal space or reduced overjet. These type of cases are indicated for Richmond crown (post and core along with crown as a single unit).

Key words: Endodontically treated, Challenging for dentists.

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INTRODUCTION

Today dentists are focusing on preserving natural tooth and restoring tooth function and esthetics with the combined help of endodontic and prosthetic dentistry. Whenever tooth structure is insufficient to retain crown, post and core is advised in order to enhance the retention and resistance (Rosenstiel *et al.*, 2001). Richmond Crown is a type of fixed denture which includes a post and core and a full coverage crown.

Richmond Crown is mainly indicated in two cases

- Tooth which has been badly damaged and reduced interocclusal space
- Cases of incisal inclination repair

Case report

A 22 year old male patient reported to my clinic with chief complain of pain in upper front tooth region. He revealed history of trauma 6 month ago in respect to maxillary right lateral incisor. On inspection, tooth was Ellis Class IV fractured along with mild pain and tender on percussion. Radiographic examination revealed straight single root canal with periapical radiolucency around 12 (fig. 1). Upper and lower arch impressions were made and cast were poured for model analysis to assess the amount of space available for crown. Results revealed a very less overjet and reduced interocclusal space which concluded the treatment modality towards Richmond Crown.

Root Canal Treatment was started and following steps were carried out after the final obturation

- Post Space Preparation- post space was prepared with Peaso reamer to remove remaining cement and unsupported dentin. Undercut areas within the canal were blocked using GIC. A slot was prepared near the orifice in order to include anti rotational feature. A ferrule collar was incorporated for better seating and retention of the prosthesis.
- Crown structure Preparation - Remaining crown structure was prepared circumferentially for metal ceramic crown with shoulder finish line buccally and chamfer on palatally.
- Post and core fabrication (Indirect method): Impression of the post space and crown structure space was taken with light body elastomeric material. Cast was poured with gypsum type IV stone and die cutting was done. Petrolatum jelly was applied all over the post space .Blue inlay wax was used to build up the crown structure (Fig 2,)
- Crown- complete post and core prepared assembly was taken for casting. Metal trial was done for evaluation of fitting (fig. 3). After trial ceramic was fired and glazed. Assembly was cemented with luting resin modified glass ionomer cement. (fig. 4,5,6)

DISCUSSION

Post & core treatment modality shows the high success rate for the tooth structure which has been lost due to caries ,trauma or endodontic treatment. Hence, the remaining tooth structure may not be able to retain large prosthetic crown (Assif *et al.*, 1993).

In such situation special procedures are undertaken to maintain the arc of rotation to resist oblique forces (Bartlett, 1968).



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4



Fig. 5.



Fig. 6.

In order to optimise the forces we can either go for surgical crown lengthening, orthodontic extrusion or post and core build up which is one of the most common methods used in such cases (Fernandes and Dessai, 2001). In 1878 a single post retained crown was introduced and was named Richmond crown. Richmond crown is not post and core system but it is customized, castable post and crown system as both are single unit and casted together. Few indications for Richmond crown are grossly decayed or badly broken single tooth where remaining crown height is very less and in cases with steep incisal guidance (deep bite and very less overjet). The advantages of this design are custom fitting to the root configuration, little or no stress at cervical margin, high strength, availability of considerable space for ceramic firing and incisal clearance, eliminate cement layer between core and crown so reduces chances of cement failure (Anil Kumar *et al.*, 2016). In present time "one-visit" pre fabricated posts are commonly used but custom posts have their own advantage. Richmond crown is not merely post and core build up followed by crown; it is customized, castable post casted along with crown to form a single unit.

Conclusion

Though implants are the best treatment modality for replacing a tooth yet post and core along with the crown or Richmond Crown has its own importance in replacing the tooth with much cheaper, faster and aesthetically. Richmond Crown has advantage over normal post and core and crown prosthesis as it is indicated in cases even with very less incisal clearance.

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