

Richmond crown for anterior and posterior teeth: A report of 2 cases

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Citation of this Article: Dr. Garima Garima, Tushar Kohli, Namrata Mehta, Deepti Sreen, Alpa Gupta, “Richmond crown for anterior and posterior teeth: A report of 2 cases”, IJDSIR- August - 2021, Vol. – 4, Issue - 4, P. No. 323 – 326.

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Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Root canal treated teeth with grossly destructed crowns, severely fractured teeth involving more than two-third of crown structure requires additional retentive measures from root canal for crown restoration. For such cases, post and core has been advised. Restoration becomes more complicated with deep bite and minimum overjet. Richmond crown has been advised as an alternative modality to be placed in such teeth for restoration. The present case report showcases placement of Richmond crown in a maxillary central incisor and mandibular second molar.

Keywords: Root Canal, Overjet, Endodontic

Introduction

The goal of restorative dentistry and endodontics is to not only retain the natural dentition but also ensure maximum functional efficiency with aesthetics. (1) Successful restoration of a compromised tooth with pulpal disease depends on the root canal therapy followed by good prosthetic reconstruction of the tooth. (2)

Such challenging cases require additional retentive support from the canal with the help of post and core

restoration. The primary purpose of a post is to retain a core in a tooth that has lost its coronal structure extensively. (3)

The major concern with the post and core procedure is fracture of post or root, dislodgement of post–core assembly, loss of the restorative seal, and injury to the periodontium. The situation may be further worsening in patient with deep bite, which leads to maximum oblique forces. (4,5)

In such cases, there should be adequate core reduction, so that the required thickness for metal ceramic crown can be obtained for better esthetics.

The “Richmond crown” is a single-piece customized cast able post-retained crown system recommended for such cases. This design has advantages such as they are custom-fitted to the root configuration, there was little or no stress at the cervical margin, and also they provide high strength and considerable space for ceramic firing with enough incisal clearance. (6) The current case report showcases 2 cases of Richmond crown in anterior and posterior region.

Case 1

A 19-year-old girl reported with a fractured maxillary central incisor. Clinical and radiographic examination revealed Ellis Class III fracture with respect to left maxillary central incisor. The tooth was not tender on percussion but the periapical radiograph revealed widening of periodontal ligament. The diagnosis was asymptomatic apical periodontitis.

Root canal treatment was planned followed by post and core restoration.

Endodontic treatment was completed (figure 1) followed by post space preparation (figure 2). Due to extensive overjet- Richmond crown was recommended because of lack of occlusal clearance.

For making final impression, canal was coated with light body impression material and then a small piece of orthodontic wire, coated with light body was placed in the canal. Later light body was injected around the prepared tooth, putty impression material was loaded in a stock tray and final impression was made. This was used to fabricate Richmond crown.

(Figure 3) Cementation was done using resin cement.

(Figure 4)

Case 2

A 25-year-old patient reported with pain in lower right back tooth region. Examination revealed deep carious lesion in mandibular right second molar.

Diagnosis was symptomatic irreversible pulpitis. Root canal treatment was planned.

Vertucii type I (single root, single canal) configuration was found during the treatment and for prosthetic restorative consideration, a Richmond crown was suggested because of lack of occlusal clearance and extensive loss of coronal tooth structure due to caries.

Obturation was completed and post space was prepared (figure 5) followed by final impression fabrication using a

method similar to the one mentioned in the case above. (Figure 6)

A wax pattern was fabricated on the die prepared by the final impression (Figure 7) and Richmond crown was prepared. Cementation was done using resin cement (figure 8)

Discussion

Design includes casting of post and crown coping as single unit over which ceramic is fired and cemented inside canal and over prepared crown structure having same path of insertion. Ferrule collar is incorporated to increase mechanical resistance, retention apart from providing anti-rotational effect. (7,8)

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 (9)

However, there are certain disadvantages including that it is time consuming, require multiple appointments, high cost, high modulus of elasticity than dentin, less retentive than parallel-sided posts, and acts as a wedge during occlusal load transfer and if the ceramic part fractures, then it is difficult to retrieve which can finally lead to tooth fracture. (10,11)

In a post and core system, flexion of the post under functional forces stresses the post core interface, resulting in separation of core due to permanent deformation of post. Breakdown of core eventually results in caries or dislodgement of crown. (12)

Therefore, it is desirable to unite the post, core and crown in one material for long term stability. By decreasing the number of interfaces between components, the single unit restoration helps to achieve a “monoblock effect”(13)

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Legends Figure



Figure 1: Root canal treatment completed

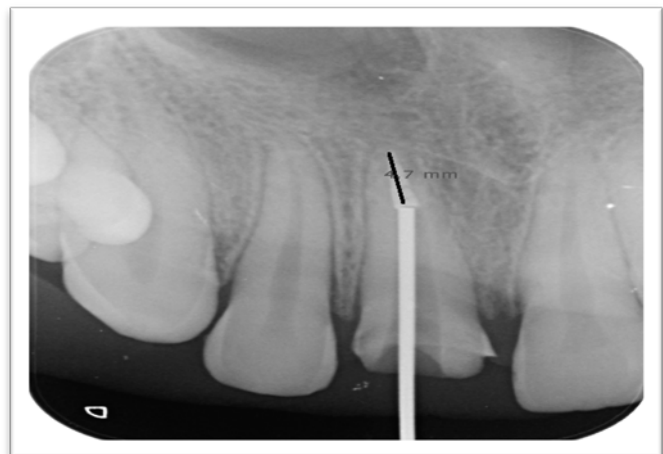


Figure 2: Post space preparation

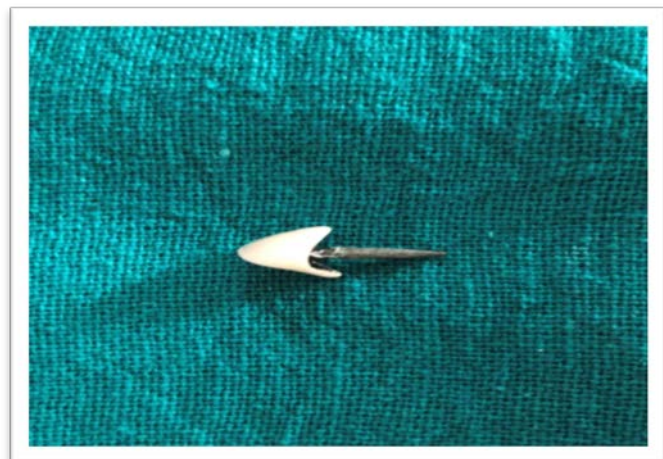


Figure 3: Fabricated Richmond crown



Figure 4: Cemented Richmond crown



Figure 7: Fabricated wax pattern

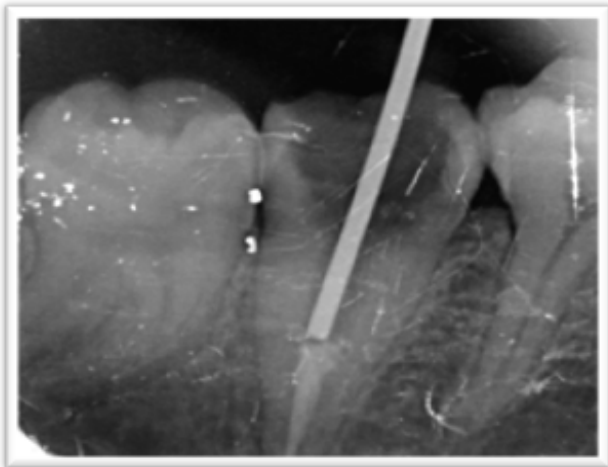


Figure 5: post space preparation in mandibular second molar



Figure 8: Cemented Richmond crown



Figure 6: Final impression