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A Case Report On Prosthetic Rehabilitation of Severely Mutilated Tooth and Reduced Interarch Space Using Richmond Crown

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Abstract

Tooth with crown structure less than 50% in the posterior region and less than 25% in the anterior region is indicated for post and core followed by crown to restore normal anatomy, function and esthetics. Patients with reduced interocclusal clearance and having very steep incisal guidance are most difficult to manage with conventional post and core. Richmond crown is a feasible approach for such cases that can be performed with very less incisal clearance to accommodate post, core and crown thickness.[1]

Keywords: Post and Core, Richmond Crown, Post Endodontic Restoration.

Introduction

Present era of dentistry is focusing mainly on conservation of natural tooth and endodontic dentistry is playing major role in restoring tooth function and after which prosthetic dentistry brings its function and esthetics back. Wherever remaining crown structure is insufficient to retain full coverage crown then post and core is required to increase retention and resistance form of tooth.[2]

The treatment of a tooth with structural weaknesses may be complicated by fracture, loss of the restorative seal, displacement of the crown, and periodontal injury to biological width invasion during marginal preparation. To properly restore such a tooth, various procedures are available. The Richmond crown is one of the tried-and-

true methods for handling such instances. Teeth that were extracted without hesitations were now successfully treated with predictable endodontic therapy; and a satisfactory restorative solution was necessary.[3]

This case report discusses the role of the Richmond crown in the management of posterior teeth with reduced structural integrity and interocclusal space.

Case Report

A 24 year old male patient named Jobin George; OP NO: 265338 reported to the Department of Prosthodontics of St Gregorios Dental College, Chelad for prosthetic rehabilitation of endodontically treated tooth in the lower left back tooth region.

Medical History

Patient was under medication for asthma earlier and has discontinued its use at present.

Clinical Diagnosis

Extra Oral Examination

The extra oral findings included face which was ovoid and symmetric with normal forehead and normal-set ears, and straight profile.

Intra Oral Examination

During intraoral clinical examination Grade II attrition was appreciated on 46 and 16. Intraorally, the patient exhibited well-shaped arches with multiple class 1 (Black classification) dental caries on 37, 47, 17 and 27 respectively and Class I malocclusion. Fractured temporary restoration on 36 which needs to be prosthetically rehabilitated was noted.

Imaging Techniques

Radiographic examination (IOPAR) of 36 reveals endodontically treated tooth on 36 with condensed obturation of all canals extending 0.5mm short of the radiographic apex.

Figure 1

Diagnosis

Based on history and clinical evaluation a provisional diagnosis of fractured endodontically restored tooth on 36 with reduced interocclusal space was made.

Treatment Plan

An occlusal model analysis was done to assess the amount of space available for the post endodontic restoration to restore the tooth to function and found very less interocclusal space to restore tooth esthetically so Richmond Crown was planned for this case.

Prosthetic Treatment Approach

Pre-operative photographs were recorded

Figure 2

Figure 3

Post space preparation:

Post space was prepared with Peeso reamer on the distal canal to remove guttapercha upto one third of roots length (care was taken not to disturb apical seal). Post length was dictated by the remaining bone support, root anatomy, root curvature, the apex obturation etc. Post space was prepared till peeso reamer size 02. Care was taken not to break 5mm of the apical seal.

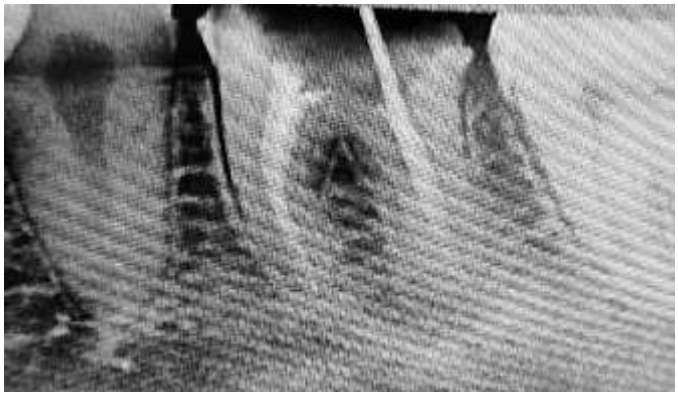

Figure 4

After which Tooth preparation was done for receiving PFM crown on 36 using flat end tapered diamond bur.

Figure 5

For impression making, a full arch Putty-Light body double mix single impression technique was used. The distal canal was filled with light body impression material. A piece of orthodontic wire (22gauge) bend to the shape of 'J' was coated with light body impression material and placed into the canal. Following this, additional light body was injected around the preparation. Stock tray was then loaded with putty impression material & light body impression material and final impression was made. Irrigation was done using saline and cotton placed followed by temporary restoration using ZOE cement.

Impression of maxillary arch was made using alginate impression material and cast was poured using Type 3 dental stone.

Figure 6

Figure 7

The impression was poured with Die stone and fabrication of wax pattern was done. Casting procedures

were then carried out & final casting composed of post – core and crown as a single unit (Richmond crown) was obtained.

Figure 8

Figure 9

Patient was then recalled and Fit & occlusion of the Richmond crown was checked on 36. Occlusal interferences on CR, PR & LR were checked. Patient was satisfied with esthetics and occlusion.

Figure 10

Figure 11

Richmond crown on 36 was luted using GIC Luting material. Post operative instructions were given.

Figure 12

Discussion

Endodontic treatment has been in practice since ages with high success rate but restorative part was not much understood previously. Whenever, a considerable amount of tooth structure is lost because of fracture/caries/secondary decay around previous restorations/during endodontic treatment, then remaining crown structure is not sufficient enough to retain large prosthetic crown. In such cases special procedures are needed with objective to increase remaining crown length so that it manages arc of rotation under oblique forces (function) and there is crown lengthening (either surgically or by orthodontic extrusion) or post placement with core build-up. The primary goal of retaining the

treated tooth must be planned strategically as per the present condition of the tooth for best and long-term results4(Assif et al., 1993).

This design's benefits are that it can be customized to the root configuration, it has low or no stress at the cervical margin, and excellent strength. The operator should weigh the benefits and drawbacks of each type of post and core system, as well as the Richmond crown treatment modality, before deciding on a technique that will meet the case's objectives while causing the least amount of stress and maximal retention. Richmond crown preparation needs a single path of insertion and withdrawal. However, Richmond crowns were strongly suggested in situations when the maximum amount of tooth structure had been lost and further tooth preparation was not necessary. Even though there are a variety of post designs that can be employed in a clinical setting, the success of the post depends on how much of the tooth's natural structure is still present following endodontic therapy.[5]

The disadvantages with the Richmond crown are as follows: they are time-consuming, so more appointments are needed for the patient; cost is more and their modulus of elasticity is higher than dentine; and in the case of ceramic fractures, it is very difficult to retrieve and may lead to tooth fracture.[6]

Conclusion

This case report highlights the importance of post and core system in restoring tooth with reduced interocclusal space to be prosthodontically rehabilitated in spite the massive popularity of implants nowadays as it is less time consuming and cost effective. Richmond crown is very much indicated in situations with very less interocclusal space to accommodate core+cement+crown thickness.

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