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Modified Cast Dowel Core for Treatment of Mutilated Crowns -Case Reports

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Abstract

Dislodgement of crown is not uncommon in routine clinical practice. Inadequate support for the core is the most common reason for such failures. With the advent of fibre posts and resin cements, core build up has become more effective. But sin certain conditions with severe deep bite, supra-eruption and mutilation, cast metal dowel core offer greater advantage compared to non-metallic posts and composite core. This paper presents two case reports in which modified cast dowel cores were used to restore severely mutilated teeth one with a buccal defect and other with severe deep bite and supra-eruption.

Index terms— modified dowel, crown dislodgement.

1 Introduction

ost endodontic restoration is a very important phase in root canal treatment. Recurrent caries and fractured restorations in an endodontically treated tooth can lead to dislodgement of crowns, retreatment of which can be a real challenge to a restorative dentist. Patients often turn up late for treatment due to lack of confidence in the dentist and the procedure. In due time the remaining crown structure will be severely mutilated and weak. Supraeruption and migration of adjacent teeth may also limit the treatment options. In some cases lack of inter arch space and severe proclination may necessitate a modification of the core. In such extensive loss of coronal structure a post is used to retain the core1. This paper presents two different cases which were treated using modified cast post and core designed to suite specific conditions. (A) A grooved cast post and core fabricated on a severely mutilated tooth ,modified to avoid an iatrogenically created defect on the mid buccal finish line.(B)A wrapped cast post and core modified on a grossly decayed canine with severe deep bite and supra-eruption.

2 II.

Case Report (1) A 45 year old female patient reported with a dislodged crown in relation to 46.On examination it was found that 45, 47 and 48 were missing and 46 tooth structure was grossly destroyed with a perforation on Author ? ? ? ?: Kanannur Dental College, Aj Institute of Dental Science, Yenepoya University. e-mai: draksmds@gmail.com defect as well as torestore the crown. The remaining carious dentinal structure was removed and post preparation was done with gates glidden bur and peso reamers.Primary post space preparation was done in the distal canal while two short secondary post preparations were done in the mesial canals to provide support to the core.

Auto polymerizing resin (DPI-India) was packed into the canal with a thin resin sprue after lubricating the canal with petrolatum. When the resin was tough and doughy the pattern was inserted in and out of the canal to ensure that it did not lock into any undercuts in the canal2. After retrieving it from the canal, the resin core was modified along the buccal aspect to form a groove which helped to avoid the iatrogenically created buccal defect. The incorporation of a groove also helped to create a narrow occlusal table there by reducing the occlusal forces and greater retention for the crown. A narrow longitudinal groove was cut in side of the distal post to create a cement escape channel. It is desirable to complete reduction and contouring in resin, because it is both difficult and time consuming to shape the metal after the dowel core has been cast2.

The resin post and core was then casted [fig. **??**]. A small knob of the sprue was left attached to the casting and a dental floss was tied to it to act as a safety line2.The cast post and core was tried and tooth preparation was completed for 44 to receive a metal ceramic fixed partial denture in relation to 44, 45 and 46. Necessary modifications were done to obtain parallelism. The buccal groove was well defined to avoid the defect so that the final prosthesis can be contoured accordingly. Finally the occlusal preparation was completed and the dowel was ready for cementation.

Glass ionomer cement (GC-Fugi) was mixed and inserted into the canal using a lentulospiral.The dowel core was slowly inserted so that the excess cement may escape allowing it to seat completely (fig3). Impression was made with polyvinyl Siloxane, one stage putty wash technique. (Aquasil, Dentsply) Metal ceramic fixed partial denture was cemented with Ploy Carboxylate cement (Poly-F, Dentsply) (fig. **??**).

3 P

4 Case Report (2)

A 55 year old female patient reported with dislodged crown in relation to 13.On examination it was found that 14, 15 and 44 were missing while 16, 43 and 45 were severely supra-erupted (fig **??**). IOPA radiograph revealed that 13 was root canal treated. To correct the occlusal discrepancy 45 required extraction while 16 needed intentional root canal treatment followed by crown lengthening procedures. Due to the severe deep bite caused by 43 on 13 a wrapped cast core covering the labial surface of the canine was planned. After the extraction of 45 and intentional root canal treatment of 16, 13 was modified to receive the cast post and core (fig 6 **??** fig 7). As discussed in case report (1), resin pattern using direct technique was used in this case also. Crown lengthening was done on 16 and the tooth was prepared to receive a metal ceramic fixed partial denture (fig **??**).A removable partial denture was planned after healing of the lower ridge.

5 IV.

6 Discussion

Endodontically treated tooth should be properly restored to receive a crown. Dislodgement of the crown occurs when they are not properly supported or the abutment is weak due to secondary caries. Any remnant caries should be removed completely during the initial stages of root canal treatment. Radicular support is required when the abutment is weak. The principles of crown preparation should be followed rather than depending on the adhesiveness of the restorative cements2.Cements leach out in due time which may cause accumulation of plaque and food debris between crown margins leading to secondary caries. Composite material is the most popular core material. But it shrinks during polymerization, causing gap formation in the areas in which the adhesive is weakest. It absorbs water after polymerization, causing it to swell3 and undergoes plastic deformation under repeated loads4, 5.Its adhesion to dentine on the pulpal floor is generally not as strong or reliable as to coronal dentine6. Fibre posts are a better choice as post material because its flexibility. A post that flexes together with the tooth during function should result in better stress distribution and fewer fractures7. But a flexible post allows movement of the core, resulting in increased microleakage under the crown. This is more important when there is minimal remaining coronal tooth structure. Because the post is considerably thinner than the tooth, it may be necessary that the post have a higher modulus of elasticity (greater stiffness) to compensate for the smaller diameter8. A cast metal post and core was preferred for case(A) because it was a severely mutilated molar and patient did not want to extract the tooth. In case(B) wrapped cast post and core was the only choice due to the severe supra-eruption. Cast post and cores can be fabricated either by direct or indirect technique2.Direct technique with resin pattern was used in both cases. One major advantage of using direct technique with resin pattern is that the restorative dentist can modify the core to suite specific situations. Cast dowel cores are very rarely done on molars, because they have divergent canals that require elaborate castings2. Post should be placed in the largest straight canal. Rarely if ever is more than one post required in a molar8.Placement of a post also may increase the chance of root fracture9. Post length should be more or equal to the crown length to reduce fractures and minimum 4-5mm of gutta-percha should remain apically to maintain an adequate seal10, 11, and 12. Taking into consideration all the above factors, a modified cast dowel core was the right choice for these patients.

V.

7 Conclusion

Cast post and cores modified for specific situations offer a definite and economical solution. In the anterior region aesthetic core should be given when all ceramic crowns are planned. But in posteriors metal post and cores are effective in giving support to severely mutilated crowns. The rigidity of the cast post and core is a cause of concern because of possible fracture of roots if the post is not properly extended or if occlusal load is heavy. While selecting cases for treatment of severely mutilated crowns all these factors should be taken into consideration. [1]

Figure 1:

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