CASE REPORT

A multidisciplinary approach in managing a case of inadequate clinical crown height: A case report

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Abstract

A 62 year old male patient reported to the Department of Prosthodontics with a dislodged crown. It was observed that the coronal structure was inadequate and thus could have resulted in failure. Hence a multidisciplinary approach was planned to salvage the tooth and use it as an abutment for a fixed partial denture. This case report discusses about the crown lengthening procedure and the technique for fabrication of custom cast post and core. A bridge was fabricated and thus the missing teeth were replaced.

Keywords: Custom post and core, ferrule, dislodged crown, crown lengthening, multi disciplinary.

Introduction

It has been observed that endodontically treated teeth with crowns have failed because of inadequate tooth height and structure. It is, therefore, important to plan correctly when there is inadequate coronal structure. The prosthodontic rehabilitation of the endodontically treated tooth is determined by the amount of coronal tooth structure left and the anatomic position of the tooth. It is still debatable about the prognosis of an endodontically treated tooth as an abutment since it is subjected to occlusal forces. When the remaining tooth structure is not sufficient to retain a crown, a post is indicated to provide retention and to improve the distribution of functional loads to the root.[1,2] The two important factors to prevent failures in pulless teeth are post retention and core stability. Teeth that have been treated endodontically are more prone to biomechanical failures if proper principles are not followed. Posts are broadly classified as: (a) Pre-fabricated and (b) Custom post. They are also classified as (a) Active and (b) Passive posts. The longevity of a restored tooth thus depends on the amount of remaining tooth structure and on the efficiency of the restorative procedure used to replace lost structural integrity.[3,4] The posts do not actually strengthen the root, but rather serves to improve retention of the core.[5,6] Cast post and core are commonly advocated for teeth with little remaining coronal structure.[7,8] Libman and Nicholls stated that the marginal area of a crown should extend onto the tooth structure 1.5-2 mm beyond the core material to produce an adequate “ferrule.”[9] The “ferrule effect” is defined as 360° metal crown collar surrounding parallel walls of abutment dentin and extending coronal to the shoulder of the preparation.

It has been reported that the presence of a 2 mm crown ferrule surrounding remaining tooth structure enhanced fracture resistance, which were restored with cast post and core and metal ceramic crown.[9,11] It is very important that if there is a short clinical crown left, then in order to have an adequate crown root ratio, we either do the crown lengthening procedure or orthodontic extrusion of the crown. This case report advocates crown lengthening procedure and a cast post for an endodontically treated inadequate coronal structure.

Case Report

A 62-year age old male patient reported to the Department of Prosthodontics, crown and bridge complaining about dislodged crown in the upper left posterior region. A detailed history revealed that the patient was hypertensive and he is on medication for the same. The patient was also on Aspirin, which was a blood thinning agent. Past dental history revealed that the patient had got his RCT and crown in 27 about 6 months back in a private clinic. On examination, the height of the crown was inadequate...
and hence could have resulted in looseness [Figure 1]. It was also seen that the palatal cusp was fractured and the fracture line was at the level of the gingival margin. Intraoral periapical (IOPA) radiograph revealed that distobuccal canal was not instrumented, and the canal was patent. There was a missing 26 and that needed replacement. Hence, a treatment plan was thought out and was explained to the patient. The patient then referred to the Department of Conservative and Endodontics for obturation of distobuccal canal. Once the canal was obturated, a crown lengthening procedure was planned. After radiographic and clinical evaluation, transgingival circumferential probing was done around 27 to establish the biologic width. Insufficient crown height was noted on palatal and distal aspect of the tooth. The distance between marginal gingiva and crest of the bone was 5 mm, surgical crown lengthening was planned by gingivectomy method. After the blood investigations and discontinuing of aspirin-100 mg drug for 7 days,[12] surgery was performed with Bard Parker blade no 12, an inverse bevel incision was placed 2 mm from marginal gingiva starting from mesial aspect of 27 to distal surface making sure 3 mm of distance was maintained from marginal gingiva and bone[13,14] without altering the biologic width [Figure 2].[15] The excess tissue was removed after giving crevicular and interdental incision [Figure 3]. The area was isolated and a periodontal dressing was placed.[16] (Coe Pak TM Regular set GC America, Inc.).

The patient reported after a week, the periodontal dressing was removed and the palatal canal was prepared to receive a post. The gutta-percha was removed using a Peeso reamer and the post space was prepared until size 4, keeping 5 mm of apical seal intact [Figures 4-6]. The post space length in the palatal root was about 8 mm. An indirect technique for fabrication of the cast post and core was adopted for this patient as access was difficult. Impression of the post space was made with Addition silicone impression material (3M espe) and the cast poured with die stone [Figures 7 and 8].

A die separator was applied to the cast and inlay wax was adapted into the canal and core build-up was done. The wax pattern was sprued and invested with phosphate bonded investment (Wirovest, Bego, Germany) [Figure 9]. The invested
pattern was kept in the burnout furnace till temp of 950° was reached and the then casting was done by the induction casting machine (Bego, Germany). The casting was removed, cleaned by sandblasting it and trimmed to fit the cast [Figure 10]. The cast post was tried in the patient’s mouth and when the fit was satisfactory, it was cemented with resin cement (Rely-x, 3M
espe). An IOPA radiograph with the post in position was taken [Figures 11 and 12]. Crown preparation was done in relation to 25 and 27 with margins as shoulder and chamfer, respectively. The retainer of choice was PFM for 25 and 26 and a full metal crown for 27 [Figure 13]. Impression of the prepared tooth was made with addition silicone elastomer material. The bite of the patient was registered with putty of the addition silicone. A temporary bridge was cemented till the permanent prosthesis was fabricated.

The patient was recalled after 4 days and the bridge was tried in the mouth for fit and occlusion and finally luted with glass ionomer cement (D-tech, China).

**Discussion**

Post and core treatment is a viable choice for a clinician when there is little or no coronal tooth structure present. In this case, the tooth has undergone fracture where the line of fracture extended at the level of the gingiva and hence a crown lengthening procedure was indicated. The crown lengthening in this case also allowed the margins to be placed in sound tooth structure. According to a study done by Gegari [17], a 2 mm ferrule obtained by crown lengthening resulted in a reduction of static load fracture. The factors that determine the success of the post depends on the type of post selected, the amount of remaining tooth structure, the post length, and the amount of apical seal left. According to Heydecke et al., the choice of an appropriate restoration for endodontically treated teeth is guided by strength and esthetics. A rigid cast metal dowel and core have been advocated by some clinicians as the prostodontic rehabilitation method for endodontically treated teeth. A cast metal post was selected over a prefabricated post as it exhibited greater strength and esthetics was not a factor as it was a second molar. A metal cast post was also the choice as the retainer on 27 was a full metal crown. A study done by Natercia Rezende da Silva suggested that a cast post and a metal crown restoration with no ferrule showed better biomechanical performances than a glass fiber post. Martinez et al. showed that cast post had higher fracture threshold when compared with carbon fiber posts and even concluded by saying that cast post and core exhibited fracture of tooth in response to loads that are rarely seen in vivo.

In this case, since there was an edentulous space present because of missing 26, and the patient would not tolerate a removable prosthesis nor could afford an implant a fixed partial denture with the support of 25 and 27 was planned and fabricated. Endodontically restored post and core as an abutment for fixed prosthesis is questionable, but if a correct treatment plan is followed and all the criteria are satisfied then there seems no reason as to why the prosthesis will not last the distance.

**References**

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