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Rehabilitation of grossly damaged molar tooth: A case report

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Abstract
Successful treatment of a badly broken tooth with pulpal disease depends not only on endodontic therapy but also on good prosthetic rehabilitation of the tooth following endodontic therapy. Post endodontic restoration of endodontically treated tooth with little or no clinical crown is challenging. In such cases, additional retention and support of the restoration are difficult to achieve. The Richmond crown can be a good treatment alternative for the restoration of such teeth. This case report discusses Richmond crown as a post endodontic restoration of a badly mutilated maxillary first molar tooth.

Keywords: post endodontic restoration, richmond crown

Introduction
The rehabilitation of extensively damaged molars is still an important challenge for dentists. Post-endodontic restoration should preserve and protect the existing tooth structure and restore esthetics, form, and function. The goal is to achieve minimally invasive preparations with maximal tissue conservation is the primary goal for restoring endodontically treated teeth [1].
"Richmond crown," was introduced late 19th century as a single piece post-retained crown with a porcelain facing. Richmond crown is not a post and core system but it is a customized, castable post and crown system as both are single unit and casted together [2].
In this case report, Richmond crown as a post endodontic restoration modality has been discussed.

Case Report
A 14-year-old female patient was referred from the Department of Orthodontics for rehabilitation of grossly decayed 26 before orthodontic correction of malaligned teeth. The tooth presented with extensive coronal tooth structure loss, thin remaining walls, and reduced crown height on the buccal and palatal aspects (Figure 1). On electric pulp testing, the tooth showed no response. The medical history was non-contributory. The patient had acceptable oral hygiene and had posterior open bite. On radiographic examination, coronal radiolucency involving enamel, dentin, and pulp, and peri apically discontinuous lamina dura was present. Based on the clinical and radiographic examination the diagnosis was made as pulp necrosis with asymptomatic apical periodontitis. The treatment plan was root canal treatment followed by surgical crown lengthening and restoring the maxillary first molar with a Richmond crown
The complete procedure was explained and written consent was taken from the patient.

Procedure
After administration of local anaesthesia, root canal treatment was completed in multiple visits. Due to the insufficient crown height on the buccal and lingual aspect of the crown surgical crown lengthening was performed. (Figure 2). Gutta-percha was removed and post space was prepared in the palatal canal of the tooth with Peeso reamer. After the completion of tooth preparation, (Figure 3) an impression was taken using polyvinyl siloxane silicone impression material. Metal try-in was done before ceramic build up and finally, the prosthesis (Figure 4, 5) was cemented on the tooth using luting Glass ionomer cement. (Figure 6, 7, 8)

Fig 1

Fig 2

Fig 3

Fig 4

Fig 5

Fig 6

Fig 7

Fig 8

Discussion

A proper obturation and a good post endodontic restoration to integrate the pulp less tooth with the masticatory apparatus are necessary for a successful endodontic treatment [3]. Endodontically treated molar teeth should receive cuspal coverage, but in most cases, they do not require a post. When a post is required as a result of extensive loss of the natural tooth substance, as in the case discussed above, it should be placed in the largest and straightest canal to avoid weakening the root, during post space preparation and root perforation in curved canals. As the palatal root canal of the maxillary molar was the largest and straightest, it was used for post placement [4, 5].

The Richmond crown is a castable customized single-unit post and crown system with a ceramic layer over the crown coping [6]. To increase the mechanical resistance and retention, a ferrule collar is incorporated which provides the antirotational effect [7]. 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 occlusal clearance [8].

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