



Management of Severely Supra-Erupted Teeth with Endocrown: Case Report

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Received: July 14, 2018; **Published:** August 07, 2018

Abstract

Supraeruption or over eruption of tooth/teeth is defined as movement of a tooth or teeth above the normal occlusal plane (GPT 8). Supra erupted teeth cause many problems. Occlusal plane disruption can result in improper distribution of occlusal force resulting in trauma from occlusion due to inevitable occlusal prematurities that exist in dentition. Food lodgement and eventual proximal caries is also noted. Smooth mandibular movements are disturbed resulting in temporomandibular joint disorders. Hence it is important to restore the supra erupted teeth back to the optimal occlusal plane. Many treatments have been proposed to correct the supra eruption of teeth. Treatment modalities vary depending on the amount of supra eruption. Treatment options like orthodontic intrusion and coronoplasty of the supra erupted teeth is more often used for teeth with minimal supra eruption. Intentional endodontic treatment of the severely supra erupted teeth is indicated to restore the tooth back to the optimal occlusal plane. With the advent of newer all ceramic technology and adhesive techniques, the approach to restoring endodontically treated teeth is changing.

This article describes application of endocrown, (bonded one piece all ceramic restoration), advantages disadvantages in managing a severely supra erupted molar using a case report.

Keywords: Endocrown; Supraeruption; CAD-CAM; Ceramic Crowns

Introduction

Supraeruption or over eruption of tooth/teeth is defined as movement of a tooth or teeth above the normal occlusal plane (GPT 8). According to Glossary of prosthodontic terms, occlusal plane refers to the average plane established by the incisal and occlusal surfaces of the teeth. Generally, it is not a plane but represents the planar mean of the curvature of these surfaces. Supra eruption occurs when opposing teeth in occlusion is lost and space is left unrestored. The main positional change to be expected in unopposed teeth, retained root stump and carious teeth is over eruption. Kiliaridis, *et al.* [1] identified that over eruption > 2 mm occurred in 24% of unopposed teeth, with 18% having no demonstrable over eruption at all [2]. In other words, 82% demonstrated some over eruption [3].

Supra erupted teeth cause many problems. Occlusal plane disruption can result in improper distribution of occlusal force resulting in trauma from occlusion due to inevitable occlusal prematurities that exist in dentition. Food lodgement and eventual proximal caries is also noted. Smooth mandibular movements are disturbed resulting in temporomandibular joint disorders.

Hence it is important to restore the supra erupted teeth back to the optimal occlusal plane. Many treatments have been proposed to correct the supra eruption of teeth. Treatment modalities vary depending on the amount of supra eruption. Treatment options like orthodontic intrusion and coronoplasty of the supra erupted teeth is more often used for teeth with minimal supra eruption.

Intentional endodontic treatment of the severely supra erupted teeth is indicated to restore the tooth back to the optimal occlusal plane. Such endodontically treated teeth are prone for biomechanical failures like fracture of the teeth if not covered with full coverage restorations. The fact that loss of tooth structure due to endodontic access opening and loss of moisture of dentin resulting from loss of vital pulp tissue making the tooth brittle and prone to fracture cannot be ruled out. Studies have shown that full coverage restorations have increased fracture resistance of the endodontically treated teeth.

Endodontically treated teeth are compromised structurally and are prone for biomechanical failures than vital teeth. Traditionally post system to retain the core has been the treatment of choice for endodontically treated teeth. The core is shaped to provide required retentive and resistance qualities for full coverage crowns.

But post and core systems do not strengthen the tooth and have resulted in root fractures [4]. Post and core procedures are also not indicated when roots show atypical anatomy. A post and core procedure requires good dexterity to successfully execute the procedure.

With the advent of newer all ceramic technology and adhesive techniques, the approach to restoring endodontically treated teeth is changing.

Endocrown was first described in by Bindle and Mormann as adhesive endodontic crowns and characterized as total porcelain crowns fixed to endodontically treated posterior teeth [2]. Endocrowns are described as a monolithic (one-piece) ceramic bonded construction characterized by a supra-cervical butt joint, retaining maximum enamel to improve adhesion. Endocrowns are anchored to internal portion of pulp chamber and in the cavity margins. Macromechanical retention is provided by pulpal walls and micromechanical retention is obtained by use of adhesive cementation [5].

Advantages of endocrowns include ease of preparation which reduces chair side time, using Cerec CAD-CAM technology fabricating endocrowns is a single visit procedure. It is minimal invasive in nature compared to post and core systems. High fracture resistance because of its monobloc effect. Excellent aesthetics and biocompatibility [2,4,6,7].

This paper describes application of endocrown, (bonded one piece all ceramic restoration), advantages disadvantages in managing a severely supra erupted molar using a case report.

Case Presentation

27 year female patient was reported to prosthodontic department, Ibn sina national college for medical studies, Jeddah, Saudi Arabia, for replacement of her missing teeth. Clinical examination revealed supraeruption associated with tooth number 16 and 17. This supraeruption resulted in disturbed the occlusal plane and also encroaching upon the inter ridge space needed for replacing missing teeth in the opposing arch (Figure 1).



Figure 1

After thorough evaluation of diagnostic cast and diagnostic wax up, it was decided to plan for intentional endodontic treatment for tooth no. 16 and 17. The objective was to correct the occlusal plane and regain inter-arch space for the prosthesis. Orthodontic intrusion was ruled out as patient refused orthodontic procedures and also considering the time factor required to achieve desired results.

After the endodontic treatment, occlusal reduction was done to restore the occlusal plane and regain inter-arch space. This resulted in short clinical crowns with tooth number 16 and 17 making it difficult to achieve proper retention and resistance form in preparations for full coverage restorations (Figure 2). In this case surgical crown lengthening procedure were ruled out for periodontal reasons.



Figure 2

Considering the all findings it was decided to plan for endocrowns for both 16 and 17. In this case slight modifications in the preparation for endocrown was done. Preparation was extended on external axial walls of the tooth with shoulder finish line ending supragingivally. This would increase the surface area for secured bonding of the all ceramic endocrown (Figure 3).



Figure 3

Impressions were made using custom tray with additional poly-vinyl siloxane elastomeric material. Die cast was generated using die stone and dies were prepared. The prepared dies were scanned and design for the endocrown was made using CAD/CAM technology. Cerec CAD/CAM all ceramic endocrown was fabricated and finished and polished (Figure 4). Endocrowns showed acceptable fit on the die and as well as in mouth. (Figure 5). Endocrowns were cemented using resin bonded cement Relyx Unicem cement (3M).



Figure 4

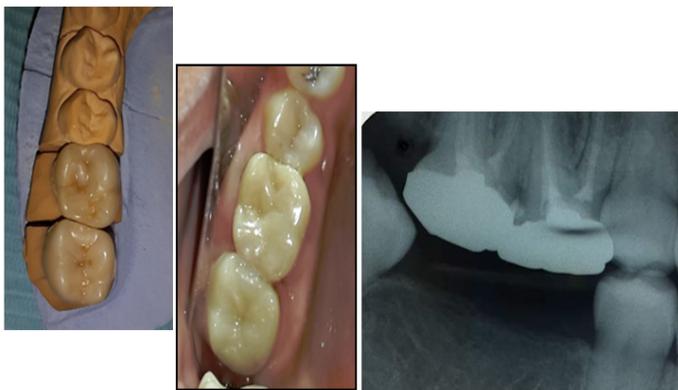


Figure 5: Follow up after 1 week and 1 month showed good gingival health around the crowns.

Discussion

Reducing the supra erupted to the occlusal plane can result in significantly short crown. Restoring short crown with full coverage restorations poses challenge to dentist because of lack of retentive and resistant features inherent in the preparations due to short crown height. Surgical crown lengthening procedures are proposed to increase the crown height. Surgical crown lengthen-

ing procedures in supra erupted teeth can result in furcation area involvement and further affect the periodontal health of the teeth. For these reasons bonded all ceramic restoration renders itself as best choice in such situations.

Development of ceramic materials especially dental CAD-CAM computer aided designing and manufacturing systems have revitalized the possibility to produce single unit restorations. Ceramic processing techniques like CAD-CAM (Cerec 3D) and molding ceramic material under pressure (Emax, Empress II) are used in fabrication of endocrowns. Newer ceramic materials like lithium disilicate, zirconia and leucite and fluorapatite ceramic material which can be milled as well as be used with press technology are ideal material for endocrown.

Minimally invasive preparation with maximal tissue conservation is now considered the gold standard for restoring endodontically treated teeth [8]. Use of endocrown not only minimizes the use of post and core and its related complications; it also improves the fracture resistance [9] of the tooth as the radicular anatomy is unaffected. It provides monobloc effect as it is a single piece restoration [10] bonded to the remaining tooth structure.

Preparation for endocrown usually involves butt joint preparation at cavosurface with cavity extending in pulp chamber. The recommended preparation features are depth of the cavity should be at least 3 mm, thickness of the axial wall should be at least 2 mm and minimum 2 mm of occlusal reduction. Enamel walls less than 2 mm thick should be removed [7]. In this case the preparation was extended on the external axial surfaces of the tooth with shoulder margin ending supragingivally. Care was taken to maintain 2mm of axial wall thickness. This provided addition tooth surface area which will ensure secured bonding of the crown.

Resin bonded cements are used to cement all ceramic crowns because of its mechanical and aesthetic properties. Eugenol based root canal sealers may inhibit the complete polymerization of the cement. Hence thorough cleaning and debridement of the internal walls of the pulp chamber and acid etching is recommended prior to cementation.

Short clinical crowns and supra erupted tooth which are reduced to correct the occlusal plane also pose challenge to the dentist to get proper retention and resistance form in their preparations to receive full coverage restorations. Endocrown by virtue of its preparation technique and adhesive technique renders itself as best treatment options for endodontically treated teeth [11].

Conclusion

Endocrowns provides as a good treatment option to restore endodontically treated supra erupted molars and premolars. Its use can also be justified specially in endodontically treated teeth with short clinical crowns, and in teeth where radicular anatomy precludes the use of post and core. The newer enhanced bonding mechanism and advances in ceramic technology has made endocrown more predictable as treatment option.

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Volume 2 Issue 9 September 2018

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