Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Case Report

Post endodontic restoration of grossly attrited tooth using Endocrown: A case report

Dr. Syed Manzoor ul haq Bukhari[1], Dr. Syed Faidan Nazir Bukhari[2], Dr. Krishna Prasada L[3]

[1]Department of conservative and endodontics, KVG dental college, Kurungibagh, Sullia, Dakshin kannad, Karnataka state, India;
[2]Postgraduate student, Dept of Periodontics, Institute of Dental Studies and Technologies, Modinagar, Ghaziabad, Uttar Pradesh, PIN: 201204, Uttar pradesh, India;
[3]MDS, DNB, MBA, Head of department, KVG dental college, Kurungibagh, Sullia, Dakshin kannad, Karnataka state, India

ABSTRACT:
Endodontically treated teeth with extensive loss of tooth structure is a challenging task for a dentist to restore. Restoration via direct or indirect technique increases the mechanical strength as well as provides a stabilizing effect on the remaining tooth structure. The number of remaining walls, occlusal height, as well as total remaining girth of the walls available have been used as a guide to choose the treatment option after root canal treatment. Extensive loss of tooth structure warrants a full-coverage restoration which can be given over a core supported by a post. Endocrown is a one-piece restoration, usually indicated in cases with decreased crown height. This treatment option maintains the biological health of soft tissue and prevents interferences with periodontal tissues as due to the presence of supragingival position of the margins. Endocrown uses the surface area presented by the internal walls of the pulp chamber to obtain micromechanical bonding to the tooth surface. In this case study, a badly mutilated mandibular molar was rehabilitated using a monolithic ceramic restoration. Endocrown is minimally invasive and a suitable alternative to post and core wherever indicated.
Keywords: Post endodontic restoration, endodontically treated tooth, Endocrown.

Received: 23/08/2020 Modified: 26/09/2020 Accepted: 28/09/2020

Corresponding Author: Dr. Syed Manzoor ul haq Bukhari, Department of conservative and endodontics, KVG dental college, Kurungibagh, Sullia, Dakshin kannad, Karnataka state, India

This article may be cited as: Bukhari SM, Bukhari SFN, L Prasada K. Post endodontic restoration of grossly attrited tooth using Endocrown: A case report. J Adv Med Dent Scie Res 2020;8(10):58-61.

INTRODUCTION

Coronal destruction of tooth structure is a commonly encountered restorative challenge especially in a tooth which have undergone endodontic treatment. Endodontically treated tooth is considered weak due change in physical characteristics of dentine as a result of dehydration and loss of water content as well as factors associated with caries, trauma and extensive caries preparation.[1] Restoration via direct or indirect technique increases the mechanical strength as well as provides a stabilizing effect on the remaining tooth structure.[2] Number of remaining walls, occlusal height, as well as total remaining girth of the walls available have been used as a guide to choose the post endodontic restoration after root canal treatment. Extensive loss of tooth structure warrants a full-coverage restoration which can be given over a core supported by a post.[3, 4] Since post and core encroaches in the critical area around pericervical dentine,[5] a more conservative approach to treat tooth with extensive loss of tooth structure have been proposed by Bindl and Mormann, which they referred to as endocrown.[6]

Endocrown is a restoration which is anchored by the internal walls of the pulp chamber and retained via

micromechanical and micromechanical means. Adhesive luting cement and the internal walls of the pulpal chamber provide retention between the tooth and the restoration. The purpose of this paper is to evaluate a clinical case with a short clinical crown restored with conservative restoration via endocrown.

CASE REPORT

A 52-year-old female patient reported to KVG dental college with a complaint of loss tooth structure in relation to lower back tooth region of the jaw with no associated sign and symptoms. The patient gave a history of areca nut chewing, on clinical examination a single attrited tooth was seen in relation to 37 was observed, covering the whole occlusal surface. The tooth presented with a reduction in coronal height with glazed appearance, the interocclusal distance was reduced between the opposing tooth (Figure 1). On electric pulp testing, tooth showed no response. On radiographic examination pulpal roof was in close relation to outer remaining dentine, pulp chamber showed calcific deposits visible as diffuse radiopacity and periodontal ligament showed thickening (Figure 2). Based on clinical and radiographic examination diagnosis was made as necrotic pulp. The treatment plan was planned as root canal treatment followed by surgical crown lengthening and restoring the lost tooth structure with all ceramic endocrown. The written consent was obtained after the explaining patient about the possible treatment options and suggesting endocrown as the final restoration.

PROCEDURE

The tooth was anaesthetized using 2% lidocaine with 1:100000 epinephrine (Warren, Lignox, India) by inferior alveolar nerve block. The rubber dam was applied and access opening was done using endo access bur (Dentsply, India). Refinement of the access cavity was done using Endo Z bur (Dentsply, India). Glide path was established using #8, #10 K -files. Working length was determined using apex locator (Root ZX, Morita, Tokyo, Japan) and confirmed using intraoral periapical radiograph at 0.5 mm from apical foramen. Root canal instrumentation was done using ProTaper gold system (Dentsply, Maillefer, Ballaigues, Switzerland) in the crown down manner. Slow speed engine-driven motor (X Smart, Dentsply, Maillefer, Ballaigues, Switzerland) was used in continuous rotation at torque and speed recommended by the manufacturer. While preparing canals the instruments were checked for any defect and cleaning with gauge was performed with each insertion of the instrument into the canal to prevent clogging of debris. Instruments were aided with continuous irrigation of 2.5% sodium hypochlorite and final irrigation of 17% EDTA was done before obturation. AH Plus sealer (Dentsply, Maillefer, Ballaigues, Switzerland) along with Gutta-percha cones were used to seal the root canal space (Figure 4).

After initial endodontic treatment surgical crown lengthening was done with an external bevel incision at an angle of 45°, using a No. 15 bard parker blade along the bleeding points. A cervical “sidewalk” preparation was carried out by providing an occlusal reduction of 2mm, undercuts were removed from the access cavity by preparing the walls using a tapered fissure bur, creating an occlusal divergence. The dept of access cavity was kept at a minimum of 3 mm (figure 3) and a saddle like anatomy of pulpal floor was obtained by removing the gutta-percha from the orifice of the root canal, resin-modified glass ionomer cement was used to seal the orifice A non-uniform ferrule was obtained with a length of 1.5 mm on the buccal side of the tooth, the margins of the tooth were kept as supragingival.

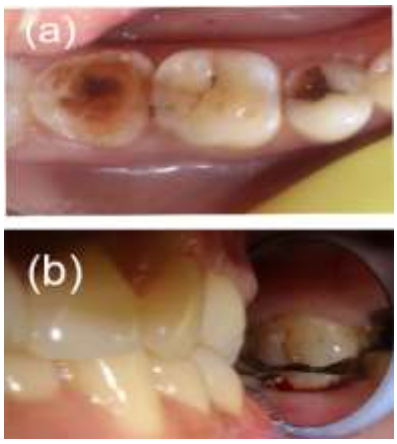

Figure 1. preoperative view (a) occlusal view (b) buccal view

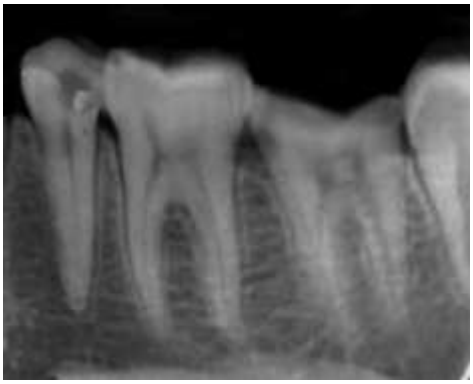

Figure 2. Preoperative radiograph

Figure 3. Tooth preparation for Endocrown

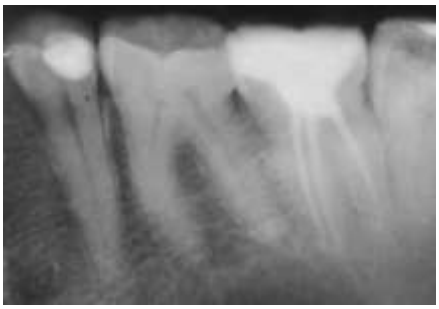

Figure 4. Postoperative radiograph

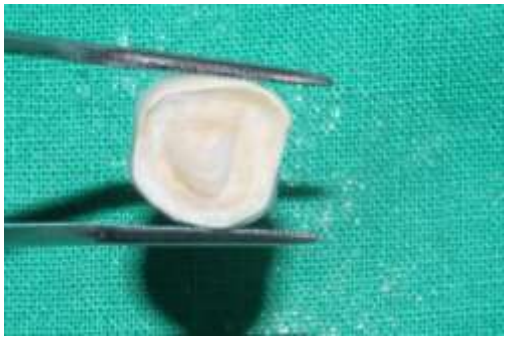

Figure 5. Etched endocrown with 5% HF acid

Figure 6. Final cementation

After completion of tooth preparation, an impression was obtained using reline technique with polyvinyl siloxane silicone rubber impression material. After lab procedure, a monolithic CAD-CAM lithium disilicate endocrown was obtained. Surface treatment of the endocrown was done with 5% hydrofluoric acid (HF) for 20 seconds (figure 5), followed by thorough removal of acid under water, a silane coupling agent was used to enhance bonding with adhesive luting material. Simultaneously tooth was etched with 37% phosphoric acid and primed with the bonding agent. Adhesive dual-cure luting agent was used to bond the endocrown with tooth structure (Figure 6).

DISCUSSION

Tissue conservation is one of the primary advantages of minimally invasive tooth preparation for endocrown.[7] The features of ceramic monolithic endocrown include supragingival butt joint and a retentive cavity, formed by internal walls of the pulp chamber in which endocrown is anchored. [8] Since enamel bonding is more predictable while using ceramic restoration, conservation of enamel becomes the primary goal. In the posterior region of the jaw compressive load is encountered which is best resisted by cervical sidewalk preparation, which provides a wide, stable and steady surface to resist these forces. Pulpal floor is made saddle-shaped which provides further stability to the restoration.[9, 10] A study comparing stresses in molars restored with endocrown and posts and cores during simulation using finite element analysis revealed that teeth restored by endocrown are potentially more resistant to failure.[11] Tribst et al. [12] measured the impact of a restorative material type on endocrown restorations biomechanical activity and concluded that leucite offers a better distribution of stress and can be a viable alternative to lithium disilicate for endocrown restoration development, lithium disilicate has been used in this case study.

Even though endocrown was described in 1999[6] it showed a renewed interest among dentist because of advances in adhesive dentistry, besides it being a conservative treatment and a feasible treatment alternative to post and core. Endocrown are advantageous as it requires less time and is easier to prepare as the number of clinical steps are reduced.[6, 13] Root strength is maintained and the preparation is conducted according to the anatomical shape of the pulp chamber. Forces acting on the tooth are spread over the cervical butt joint (compression), the axial walls (shear force), and facilitate the load on the floor of the pulp.[14] This adhesive luting reduce the film thickness and prevents the infiltration of microorganism from the coronal to the apical portion if the tooth, thereby improving the clinical success of endodontic therapy.[15]

An in vitro analysis was undertaken by Taha et al to test the impact of nature of the margins on the fracture resistance of endodontically treated teeth, results suggested that endocrown with axial reduction with shoulder finish line had higher mean fracture resistance values as compared with a butt finish line, the butt finish line was found to be more resistant to compressive strength.[16] In another study stresses in endocrown teeth relative to full coverage prosthetic crown were found to be lesser. Mandibular molars are subject to higher biting forces, which leads to undesirable stresses on the tooth.[17] Thus, a restoration with the higher compressive strength as endocrown is desirable and hence an acceptable choice in this present case.

Endocrown is suitable for posterior restoration where sufficient depth of pulp chamber is present and in cases where there is reduced interocclusal space as well as canals where calcification and narrowing is present.[3] A contraindication can be cases where a reliable adhesion cannot be obtained and sufficient pulpal depth is not present and cases where the cervical margin is not of sufficient width. Endocrown is biologically suitable as it is prepared using supragingival margins and serves as a restoration appropriate for posterior root canal treated teeth.[18]

CONCLUSION

Endocrown is treatment indicated where minimal crown height is encountered and the supporting tissue around the tooth is healthy. All enamel margin is desirable for the integrity of the restoration to have a long-lasting adhesive seal. Endocrown are minimally invasive and a suitable alternative to post and core wherever indicated

REFERENCES

1. CHRISTENSEN GJJTJotADA. Posts: necessary or unnecessary? 1996;127(10):1522-6.
2. Robbins JWJDCoNA. Restoration of the endodontically treated tooth. 2002;46(2):367-84.
3. Biacchi GR, Mello B, Basting RTJJoE, Dentistry R. The endocrown: an alternative approach for restoring extensively damaged molars. 2013;25(6):383-90.
4. Rosenstiel SF, Land MF. Contemporary Fixed Prosthodontics-E-Book: Elsevier Health Sciences; 2015.
5. Clark D, Khademi JAJDC. Case studies in modern molar endodontic access and directed dentin conservation. 2010;54(2):275-89.
6. Bindl A, Mormann WHJJoAD. Clinical evaluation of adhesively placed Cerec endo-crowns after 2 years-preliminary results. 1999;1:255-66.
7. Van Meerbeek B, Perdigao J, Lambrechts P, Vanherle GJJod. The clinical performance of adhesives. 1998;26(1):1-20.
8. Fages M, Bennasar BJJCDA. The endocrown: a different type of all-ceramic reconstruction for molars. 2013;79:d140.
9. Dogui H, Abdelmalek F, Amor A, Douki NJCrid. Endocrown: an alternative approach for restoring endodontically treated molars with large coronal destruction. 2018;2018.
10. Debbabi I, Nouira Z, Saafi J, Harzallah B, Cherif MJTCRAD, Health O. ENDOCROWN": A Reliable Alternative to Restorate RCT Molar. 2018;9(5):555774.
11. Dejak B, Młotkowski AJDM. 3D-Finite element analysis of molars restored with endocrowns and posts during masticatory simulation. 2013;29(12):e309-e17.
12. Tribst JPM, Dal Piva AMdO, Madruga CFL, Valera MC, Borges ALS, Bresciani E, et al. Endocrown restorations: Influence of dental remnant and restorative material on stress distribution. 2018;34(10):1466-73.
13. Göhring TN, Peters OAJAjod. Restoration of endodontically treated teeth without posts. 2003;16(5):313-7.
14. Al-Obaida MIJEDJ. Minimally invasive endodontics and permanent restorations of endodontically treated teeth: literature review. 2020;66(1-January (Fixed Prosthodontics, Dental Materials, Conservative Dentistry & Endodontics)):365-78.
15. Toman M, Toksavul S, Artunc C, Türkün M, Schmage P, Nergiz IJJoAD. Influence of luting agent on the microleakage of all-ceramic crowns. 2007;9(1).
16. Taha D, Spintzyk S, Schille C, Sabet A, Wahsh M, Salah T, et al. Fracture resistance and failure modes of polymer infiltrated ceramic endocrown restorations with variations in margin design and occlusal thickness. 2018;62(3):293-7.
17. Burke FJJoD. Tooth fracture in vivo and in vitro. 1992;20(3):131-9.
18. Veselinović V, Todorović A, Lisjak D, Lazić VJSGS. Restoring endodontically treated teeth with all-ceramic endo-crowns: case report. 2008;55(1):54-64.