

ENDOCROWN A NEW MODALITY OF TREATMENT: MANAGEMENT OF THREE CASES

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Case Report

Conflict of Interest: None

Abstract :

Background: Endodontically treated teeth usually require special techniques to be restored and regain function. Nowadays endodontically treated teeth are treated on method of adhesion rather than mechanical retention. Endocrown is the new method to restore endodontically treated teeth with good retention and high success rate. Endocrown are adhesive restoration it result in minimal microleakage. Hence it can lead to high success rate.

Case presentation : In case I - A 23 -years -old female patient visited with a chief complaint of pain in the lower right back region of the jaw. On clinical evaluation, grossly carious 46 was seen. So root canal treatment was done with 46. Then full ceramic endocrown post endodontic restoration was planned. In case II- A 50-year-old male patient visited with a chief complaint of pain in the lower right back region of the jaw. When examined clinically, grossly carious 46 was observed. Root canal treatment with 46 was planned. Then full ceramic endocrown post endodontic restoration was planned. In case III- A 20-year-old female patient visited with a chief complaint of pain in the upper left back region of the jaw. On clinical evaluation, grossly carious 26 was observed. Root canal treatment with 26 was planned. Then metal - ceramic endocrown post endodontic restoration was planned. In all the

three cases in second visit glass ionomer cement was used to block the orifices and obtain even surface without any undercuts in pulp chamber. Then endocrown preparation was done. The finished line appeared as a regular line with a sharp edge. A 1-mm gutta-percha was removed from the canals using a heated plugger. After the completion of tooth preparation impression was made with polyvinyl siloxane silicone of light and putty consistency using a double-mix single-stage technique. Master cast was prepared and endocrown was fabricated in laboratory. In third visit endocrown trial was done in all the three cases and cementation was done and post cementation IOPA was taken.

Conclusion: Endocrown is the new treatment modality for grossly destructed endodontically treated teeth. Both metal-ceramic and zirconia endocrowns provides better retention and stability with minimal loss of tooth structure.

Key words: Endocrown, meta-ceramic, all ceramic, endodontically treated teeth.

Introduction:

Endodontically treated teeth usually require special techniques to be restored and regain function. Different treatment options are available depends upon whether cuspal coverage is needed or not. Now a days endodontically treated teeth are treated on method of adhesion rather than mechanical retention(1). Caries and trauma lead to loss of structural integrity. It will ultimately lead to reducing stiffness and fracture resistance. Moisture content also lost make the tooth more brittle. Status and function of the residual dental composition should be conserved. Because it provide strength to the restoration. Occlusal cavity preparations reduce the stiffness by 20%. Mesio/disto occlusal cavity preparations reduce the stiffness by 45%. And MOD cavity preparation reduce stiffness by 63%. Endocrowns can be considered as a prosthetic treatment modality for premolars and molars with considerable loss of tooth structure(2). "Pissis was the predecessor of the endocrown technique who named it as the 'mono-block porcelain technique'". "In 1999, the endocrown was first introduced by Bindle and Mörmann as adhesive endodontic crowns. It was specified as entire ceramic crowns stabilised to endodontically treated posterior teeth (3). As Endocrown are adhesive restoration it result in minimal microleakage(4). Hence it can lead to high success rate. So present article discuss the three cases of grossly carious tooth managed by endocrown.

Case report 1: Zirconia Endocrown

A 23- years- old female patient visited with a chief complaint of pain in the lower right back region of the jaw. On clinical evaluation, grossly carious 46 was seen. Radiographic evaluation shows caries involving pulp. Pulp vitality test was done using electric pulp testing. No response seen with 46 suggestive of nonvital teeth. So diagnosis was chronic irreversible pulpitis with 46. Root canal treatment was planned followed by endocrown.

Procedure:

Step I:

Endodontic treatment was finalized in single visit with 46. Access opening, BMP and obturation was done with 46. As crown height was less i.e 3mm. So full ceramic endocrown was planned.

Step II :

In next visit glass ionomer cement was used to block the orifices and obtain even surface without any undercuts in pulp chamber. Then holding wheel bur parallel to the occlusal surface, occlusal reduction was done. This ensured a flat surface and also determined the precise position of cervical margin. Axial preparation with tapered bur help to remove the undercut from the access cavity. Cervical band was polished with polishing bur to produce flat and polished surface, thereby providing a cervical butt angle joint. The finished line appeared as a regular line with a sharp edge. A 1- mm gutta- percha was removed from the canals using a heated plugger.

After the completion of tooth preparation impression was made with polyvinyl siloxane silicone of light and putty consistency using a double- mix single- stage technique. For Full ceramic endocrown, shade was selected which was B2. Endocrown was fabricated using CAD-CAM technology.

Step III: Try in of endocrown was done to check occlusal and proximal contacts. After complete adjustment finishing and polishing was done by sending endocrown to the laboratory.

The finished and polished endocrown was seated onto the master cast to verify its marginal fit and accuracy before luting intraorally. Then inner layer of the endocrown was etched with hydrofluoric acid. Then washed out with water, and air dried with three way syringe. Then silane coupling agent was coated and air dried. Phosphoric acid was coated on to the tooth surface for 20 seconds. Then it was washed and dried. Then adhesive was applied and cured for 20 sec.

A fine coating of a dual polymerizing resin(Callibra) was put on to the endocrown and then was placed into the tooth. Cured for 30 sec. Post cementation radiographic view showed appropriate seating of the crown. Follow- up visits were scheduled at 1, 3 and 6 months intervals.

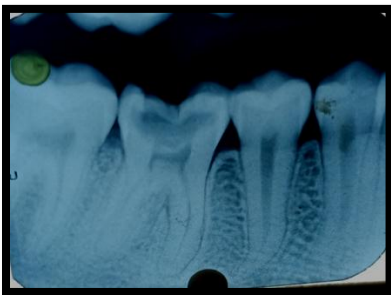


Fig- a- preoperative IOPA with 46 Fig b- GIC in pulpal chamber Fig - c Polyvinyl siloxane impression

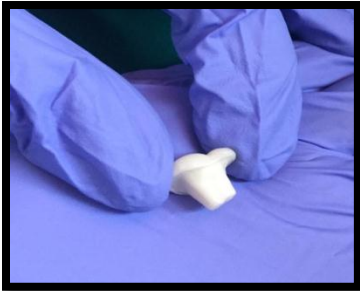


Fig -d - ENDOCROWN



Fig - e Endocrown on cast



Fig - f OCCLUSION

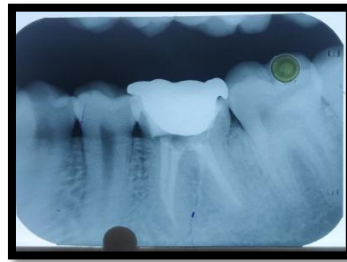
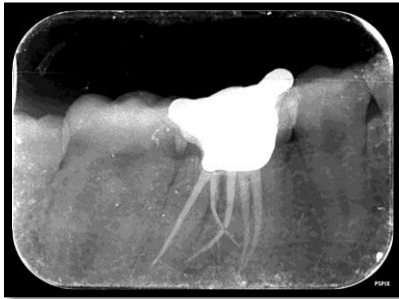


Fig- g – Digital radiograph after endocrown cementation Fig h- 6 month follow up

Case report 2: Zirconia Endocrown

A 50- year- old male patient visited with a chief complaint of pain in the lower right back region of the jaw. When examined clinically, grossly carious 46 was observed. Also history of night pain. Radiographic evaluation shows caries involving pulp. Pulp vitality test was done using electric pulp testing. So diagnosis was chronic irreversible pulpitis with 46. Root canal treatment was planned followed by endocrown.

Procedure :Same procedure was followed as in Case 1



Fig 1- Access opening with 46



Fig 2- After Obturation



Fig 3- After crown preparation



Fig 4- Lateral view after preparation



Fig 5- Rubber base Impression



Fig 6- Master cast



Fig 7- Endocrown



Fig 8- Occlusal view after cementation



Fig 9- Lateral view



Fig 10 Digital radiograph after cementation

Case report 3: Metal-Ceramic Endocrown

A 20-year-old female patient visited with a chief complaint of pain in the upper left back region of the jaw. On clinical evaluation, grossly carious 26 was observed. Also history of night pain. Radiographic evaluation shows caries involving pulp. Pulp vitality test was done using electric pulp testing. So diagnosis was chronic irreversible pulpitis with 46. Root canal treatment was planned followed by endocrown.

Procedure: Same procedure was followed as in case 1 and case 2. Only difference was that in this case, gingivectomy was done as palatal height was too less for retention of endocrown. In this case Porcelain fused metal endocrown was given to the patient.

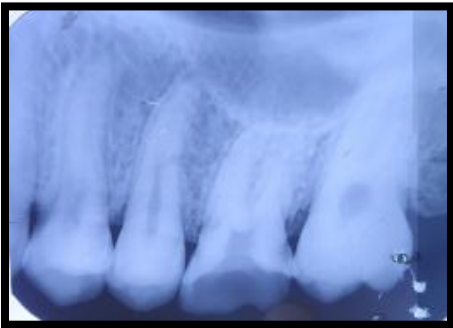


Fig 1 – Preoperative radiograph with 26



Fig 2-occlusal photograph



Fig 3- 1 mm gutta percha removed and condensed with heated plugger.



Fig 4- Gic placed & gingival retraction cord placed



Fig 5- Impression



Fig 6- Master cast



Fig 7- PFM endocrown



Fig 8- Endocrown cementation –
Occlusal view



Fig 9- Lateral view



Fig 10- Radiograph after cementation

Discussion-

Restoration of molars with large amount of coronal tissue loss is a for dental personnel. It require careful treatment planning. Therefore dentist should decide best treatment option for increasing the life of restored molars(5,6,7). Endo crown has several advantages compared to posts and cores and crowns. They are easy to prepare and easy to apply , require less chair side time , less visits. Esthetic properties are also excellent(3).They are indicated in endodontically treated teeth with low crown height with suitable pulpal chamber depth. Also indicated in case of narrow or calcified canals where post are contraindicated.(3) Earlier endocrown was made using alumina or silica based ceramic.. Because they provide the advantage like surface modification. It become achieved with the use of hydrofluoric acid or air-abrasion.It also help to improve their adhesion to dental tissue. According to the studies glass ceramics reinforced with leucite or lithium disilicate is the better choice for preparing the endocrown. As it possess more flexural strength than feldspathic glass ceramics and resin composite. They are capable to resist the masticatory load.(6)

The endocrown are suitable for all molars, specially in those with minimal crown height. But it is not recommended if the pulpal chamber depth is less than 3mm(6). Also not given in cases where cervical margin is less than 2mm.The main aim of the preparation is to achieve broad stable surface which resists to the compressive forces created more in molars(8,9,10).The preparation of crown surface is long axis to the occlusal plane. It is to provide stress resistance along the major axis of the tooth(6). The stress generated with endocrowns were lesser compared to prosthetic crowns .

Due to the evolution of adhesive cementation system, necessity of mechanical preparation with retentive feature given in the crowns has reduced . The pulpal chamber cavity also gives retention and stability. They are trapezoidal shape in mandibular molars. Whereas triangular shape in maxillary molars. It will provide stability (3). “In 2018, Dartora et al. have studied the biomechanical behavior of endodontically treated teeth restored using various extensions of endocrowns within the pulp chamber”; it has demonstrated that larger extension of endocrowns exhibit good mechanical performance(4). Study carry out by “Skalskyi et al 2018 Compared the fracture resistance of various restorative materials used in endocrown restorations”. It has concluded that the mechanical property of the restorative materials in the tooth restorations

changed(4). If zirconium dioxide endocrowns were cracked, it will cause crack within tooth. It has been stated that use of metal porcelain endocrown may provide the minimal risk of failure and better fractural resistance strength(4).

Conclusion:

Endocrown is the new treatment modality for grossly destructed endodontically treated teeth. Both metal-ceramic and zirconia endocrowns provides better retention and stability with minimal loss of tooth structure.

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