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Case Report

A noval autogenous pulp capping material: A case report

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ABSTRACT

Vital pulp therapy for cariously exposed permanent teeth remains one of the most controversial areas in dentistry. Because a vital pulp is capable of initiating several defence mechanisms to protect the tooth from bacterial invasion, hence it is beneficial to preserve the vitality and health of an exposed pulp rather than replace it with artificial material following pulp exposure. There is no consensus on the survival rate of formerly cariously exposed pulps.

Observation time, diagnostic criteria, pulpotomy/pulp capping technique and most importantly, pulpal status at the time of treatment, vary to a great extent amongst studies. In mature teeth, a pulp exposed by caries is usually removed and the root canals are cleaned, shaped and filled. Amongst the methods for preservation of a cariously exposed pulp, direct pulp capping has yielded a markedly high success rate in young teeth. The lack of predictability and long-term success greatly influence decision-making. The decision-making itself is unreliable primarily due to the difficulty of accurately diagnosing the ability of the pulp to repair. While there are various direct pulp capping materials like calcium hydroxide, MTA, Biodentin are considered to be expensive.

PRF known to be bodies own tissue being autogenous graft aids in biological healing kinetics. present clinical procedure utilize PRF as direct pulp capping agent which will probably help pulp for repair and regeneration and also considered to be as clinically feasible procedure .

1. Introduction

Platelet rich fibrin is considered to be a boom for dentistry in many a way. It has been proved to be ideal scaffold for different application in dentistry.Presence of growth factors made its advantage over different treatment protocol. PRF consider to be an autogenous graft scaffold which can be used in operative dentistry to promote healing and for regenerative purpose. Also, this innovative technique made promising procedure for preserving vitality of tooth. Most challenging clinical procedure in operative dentistry is to maintain the vitality of teeth without compromising tooth structure. There are different factors affecting the success rate of the operative procedures. That includes rate of progression of caries, microorganism virulence, self-cleaning aids by patient and aseptic condition taken care during the excavation of caries. Calcium hydroxide was considered to be a gold standard for deep caries management. Various recent therapeutic material are introduced like MTA and biodentine was proven as expensive materials.[1]

Platelet rich fibrin can be used to accelerate soft and hard tissue healing. Platelet rich fibrin is cost effective chairside procedure used in a resorbable fibrin matrix enriched with platelets and leucocytes.[2]

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Platelet rich fibrin procedure a rich serve of growth factors including Platelet derived growth factors, transforming growth factors, vascular endothelial derived growth factors and Interleukin derived growth factor which helps in regeneration of the tissue in physiological manner and can maintain the vitality of the tooth structure.[3]

The following case report explain the PRF application and its benefits in operative procedure.

2. Case Report

A 22-year-old patient came to department of conservative dentistry and endodontics complaining of mild to moderate discomfort in lower right back tooth region since from past few weeks. On clinical examination occlusal caries extending on buccal surface of tooth with food lodgment was seen. History reveals pain on biting hard object. Radiographically caries extending on to the dentinal surface approximating pulp chamber.

2.1. Inclusion criteria

Case selection based on clinical & radio graphical assessment to substantiate the health of pulp is critical for success. Decision to undertake the indication for deep carious management procedure should be based on following findings

1. History
   (a) Mild discomfort from chemical & thermal stimulus.
   (b) Absence of spontaneous pain.
2. Clinical examination
   (a) Large carious lesion.
   (b) Absence of lymphadenopathy.
   (c) Normal appearance of adjacent gingiva.
3. Radiographic examination
   (a) Normal lamina dura.
   (b) Normal periodontal ligament space.
   (c) No periapical radiolucency.

2.2. Exclusion criteria

To deep carious management Includes

1. History of spontaneous pain.
2. Excessive tooth mobility.
3. Radiographic evidence of periradicular degeneration.
4. Purulent discharge from exudate exposure.

Entire treatment option was discussed and informed to patient. Vitality test carried out both thermal and EPT showed normal response when compare with adjacent tooth. Case selection of deep caries management is very important for success of clinical procedure. Present case to be acute reversible pulpitis. No pain on percussion observed. Informed consent was taken from patient. Treatment was carried out under aseptic condition. Pre procedural oral rinsing with 0.2% Chlorhexidine solution was asked to carried out. This is in order to control the number of microorganisms in oral environment.

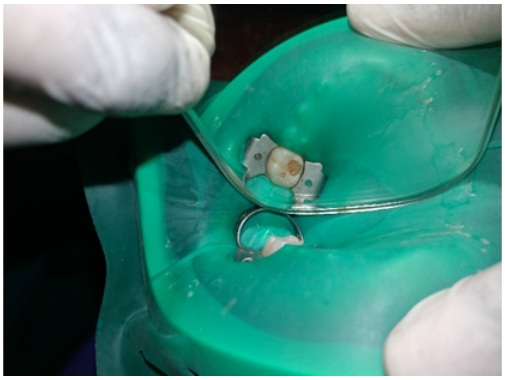

Fig. 1: Pulpal exposure

Fig. 2: PRF + calcium hydroxide

Fig. 3: Post-operative

After complete isolation with rubber dam application. Sterile round bur and spoon excavator is used to remove

caries structure according to the marzouk.

Wide range of various artificial material are used in application in deep carious management among them biodentine and MTA which is considered to be very expensive. Infected dentin to be involved in cavity preparation. Affected dentine is left remain for the further clinical procedure.

After complete excavation of caries cavity was disinfected with saline and sodium hypochlorite for few seconds. Final removal of infected dentin was carried out with spoon excavator. Accidental exposure of pulpal tissue occurs during the procedure was treated with direct pulp capping.

2.3. Fabrication of platelet rich fibrin

5ml venous blood was drawn from the patient median cubital vein and collected in tubes without anti-coagulants. Blood was immediately centrifuged for 3000 RPM for 10-15 min. 3 layers will be formed in tubes. Middle portion was taken Composed of fibrin membrane using a membrane processing box

In present case report PRF autogeneous graft has been placed as a barrier between exposed pulpal tissue and calcium hydroxide material for better healing. And tooth was temporized with glass ionomer cement for 4 weeks. Post-operative evaluation was carried out redio, palpty EPT peeve and patient was asymptomatic for vitality test. Finally temporary restoration was replaced with Composite restoration.

3. Discussion

For many decades since 1928 calcium hydroxide has been standard material for maintaining the vitality of pulp. Since it is capable of stimulating tertiary dentin formation. However, it has some drawbacks poor bonding to dentin and strength of the material.[4,5]

Mineral trioxide aggregate introduced by torabinojed M. in 1990 is used as a material of choice for all dental defects due to their biocompatibility and ability induce calcium precipitate. However, it also has some drawbacks like slow setting and handling properties.[6]

Recently new material like biodentine has introduced to overcome problem associated with MTA by mark hargrevia et al (2011). Biodentin is known as “dentin in capsule”. Which includes good physical properties and ability to stimulate tissue regeneration as good as pulpal response.[7]

In deep caries management calcium hydroxide application over pulpal exposure site could able to induce necrosis at the site of contact of material. Later it try to induce osteodentin over period of time because of its alkaloid PH. Dentinal bridge formed during application has shown poor strength and porous in nature.[8,9]

So, MTA has been proposed as a potential medicament for deep caries management because of its excellent tissue compatibility. Application of MTA has shown no inflammatory reaction and necrosis at the site of placement of material.[10,11]

To overcome problem associated with previous materials biodentine was introduced as pulp capping agent where it provides growth factors (TGF 1 Alfa) for pulpal cells to encourage pulp healing and stimulating dentine bridge formation.[12]

Since we relied on artificial material like MTA and biodentine for deep caries management which is very expensive and difficult handling properties.[10] Present case report has shown an alternative to artificial material were PRF can be used directly on exposed site of pulpal tissue. PRF was widely used in dentistry as an autogenous graft material because of its rich growth factors (TGF 1 BETA, VEGF, PDGF) can provide favourable environment for repair and regeneration of dentinal tissue with better physical and mechanical properties.[13] Placement of calcium hydroxide over this material can provide excellent outcome when compare with calcium hydroxide alone.

Yet there are considerable gaps in our knowledge of the defence and repair mechanisms of the dentine-pulp complex that future research should address.[14] Further histopathological studies Has to be conducted for proper understanding of repair in damaged tissue. Therefor we conclude that within the limitation of study PRF application in operative dentistry considered as an inexpensive alternative to recent available materials in pulp capping treatment during vital pulp therapy.

4. Conclusion

Contemporary management of biological restoration of deep caries management is reliable on proper aseptic condition and excavation of caries. On the other hand, modern restorative dentistry provides opportunity for maintaining vitality of natural tooth for normal form biological function. Present clinical case report gives an intrusion for regeneration oral response of mild to moderate infected tooth. In future PRF can uphold different treatment modalities in operative procedure.

5. Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient gave their consent for their images and clinical information to be reported in the journal. The patient understands that their names and initials will not be published and that due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

6. Conflict of Interest

None.

7. Source of Funding

None.

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