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MANAGEMENT OF ELLIS CLASS II FRACTURE BY INDIRECT PULP CAPPING USING BIODENTINE - A CASE REPORT

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ABSTRACT
Traumatic injuries to anterior teeth are one of the common problems faced by young children and adolescents. Recent management strategies of traumatic injuries recommend the use of minimal invasive techniques, which can prevent pulp exposure, remineralize the surrounding dentin and maintain pulp vitality. Vital pulp therapies aim to preserve the vitality of the pulp by preventing the progression of inflammation through to pulpal necrosis, avoiding the need for complex RCT. Indirect pulp capping, one of the main processes of vital pulp therapy, in prevents pulp exposure by preserving the dentin bordering the pulp and sealing the pulp with a biocompatible material. Biodentine, a biceramic material proved to be a major breakthrough as dentin substitute. It appears to offer a promising therapeutic material for preservation of pulp vitality in cases of traumatic injuries approximating pulp. This case report describes management of Ellis Class II fracture by indirect pulp capping using Biodentine followed by direct Composite Resin.

KEYWORDS: Traumatic Injuries, Vital pulp therapy, Indirect pulp capping, Biodentine, Composite resin.

INTRODUCTION
Strategies to management of traumatic injuries are continuing to evolve, as the evidence accumulates for the use of minimal invasive techniques, which can prevent pulp exposure, remineralise the surrounding dentin and maintain pulp vitality in the longer term, while also offering a predictable restorative solution.[1] Vital pulp therapies (VPTs) aim to preserve the vitality of the pulp by preventing the progression of inflammation through to pulpal necrosis, avoiding the need for complex RCT. Indirect pulp capping (IPC) is one of the main processes of vital pulp therapy, which pulp exposure is prevented by preserving the dentin bordering the pulp and sealing the pulp with a biocompatible material.[1] Several studies in recent times have shown that there is a huge success in preservation of vitality of permanent teeth after carrying out IPC with an average success rate around 90%.[2,3]

Conventionally, the most commonly used material in IPC is calcium hydroxide. This has been due to the alkaline pH of calcium hydroxide and its biocompatible nature that signals remineralization at the junction of pulp and dentine. However, many disadvantages were reported with its use over time including poor seal, lack of chemical and mechanical adhesion, poor strength, long-term solubility, enhanced disintegration after acid etching, and tunnel defects in the dentin bridge.[4] In order to overcome these limitations, several materials were introduced, of which a bioceramic material. Biodentine proved to be a major breakthrough as an artificial dentin substitute. This material has several additional features like resistance to microleakage in restoration of large carious tooth resulting in minimal sensitivity observed postoperatively. Biodentine also helps in increasing the mineral deposition and the density of bridge between pulp and dentine. It was observed that biodentine is no less than glass ionomer cements in terms

of sealing property. But it has added advantage that there is no need for dentin conditioning as observed in the case of GIC treated cases.[1]

This case report describes management of Ellis Class II fracture by indirect pulp capping using Biodentine followed by direct Composite Resin.

CASE REPORT

A 20year male reported to the Department of Conservative dentistry and Endodontics with the chief complaint of fractured upper front tooth since 2 days. Fracture occurred after a fall and had sensitivity. On clinical examination, horizontal tooth fracture with loss of incisal one third was observed in relation to 21. Tooth was giving response within normal limits on sensitivity tests. On radiographic examination, fracture was approximating pulp. Combining the history, clinical and radiographic examination the case was diagnosed as Ellis class II fracture in 21. Indirect pulp capping with biodentine followed by direct composite restoration was planned.

Rubber Dam isolation was done. Shade selection was performed. The tooth was cleansed with prophylactic paste. This was followed by tooth preparation to receive permanent restorative material. The liquid of Biodentine was added to powder of capsule according to the manufacturers' instructions. The mixture obtained after trituration was then placed on the pulpal region of the tooth. After this, there was a proper placement of liner of GIC onto the region. Finally, the tooth was restored with composite in increments (Filtek Z350 XT, Shade A2, 3M ESPE). Patient was reviewed for 3, 6 & 12 months and is asymptomatic. **(Fig 1-Fig 9)**

Fig 1. Post Operative View.

Fig 2. Rubber Dam Isolation.

Fig 3. Cleansing with Prophylactic Paste.

Fig 4. Tooth Preparation.

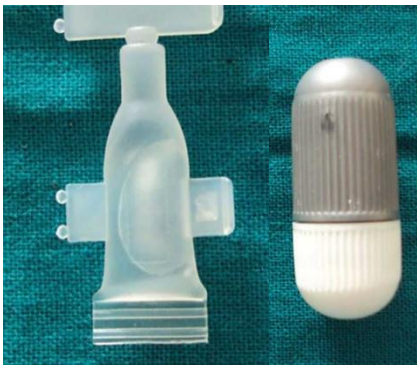

Fig 5. Biodentine.

Fig 6. Indirect Pulp Capping with Biodentine.

Fig 7. Pre-Oerative & Post Operative View.

Fig 8: 12 Months – Review.

Fig 9: 12 Months -Review X Ray.

DISCUSSION

Management of traumatic injuries is one of the most controversial dilemmas in endodontics. The preservation of pulp vitality after a trauma to permanent teeth is of great importance since dental injuries are common. In dental traumatic injuries, there are different levels of fracture. If the fracture segment is available, reattachment is the best option. If it is missing it can be esthetically restored with composite. If the fracture is approximating the pulp and the tooth is giving response within normal limits to sensitivity test, indirect pulp capping and esthetic restoration with composite resin can be performed.[5]

Accurate determination of the status of the pulp becomes a challenging factor for vital pulp therapy. Indirect pulp capping was performed in the present case since there was no history of spontaneous pain, the tooth was giving response within normal limits on sensitivity tests and radiographs did not show any evidence of apical lesion which indicated a vital pulp.

Another crucial factor determining the success of vital pulp therapy is a suitable pulp capping material. Biodentine™ (Septodont Ltd., Saint Maur des Faussex's, France), a new tricalcium silicate (Ca3 SiO5)-based cement, advertised as “bioactive dentine substitute,” has drawn attention in recent years and has been advocated to be used in pulp capping procedures. The results have shown that Biodentine encourages hard tissue regeneration and provoke no signs of pulp. It has been noticed that biodentine forms hydroxyapatite crystals at the margins due to which it provides better integrity of the margins and provides excellent sealing.[6]

In the present case, placement of a permanent restoration was done at the same appointment. This one-stage procedure helps to prevent the chance of failure as well as restores the esthetics of the tooth. However, when opting for this approach, it is important to wait for Biodentine™ to set (about 12–15 min after mixing) before proceeding with the restorative treatment. Studies have found that Biodentine performs well without any conditioning treatment as a dentine substitute.[7,8] Hence, etching of Biodentine is not recommended, and it is directly bonded to the resin composite. Odabaş et al. compared the shear bond strength of different adhesive systems to Biodentine and found no statistically significant difference between 1-step self-etch, 2-step self-etch adhesives, and etch–and-rinse adhesive systems.[9] In this case, a total etch adhesive system was used for bonding composite resin.

CONCLUSION

This case of Ellis Class II fracture was successfully management by indirect pulp capping using Biodentine followed by direct composite resin. Biodentine appears to offer a promising therapeutic material for preservation of pulp vitality in cases of traumatic injuries approximating pulp. The ability of Biodentine to achieve biomimetic mineralization has great potential to revolutionize the management of traumatized teeth in the field of conservative dentistry and endodontics.

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