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RESEARCH ARTICLE

MANAGEMENT OF IATROGENIC ROOT PERFORATION IN TOOTH WITH OBLITERATED PULP CANAL- A CASE REPORT.

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Abstract

Pulp canal obliteration is defined as a deposition of hard tissue within the root canal. The cause of PCO is unknown but is believed to be related to damage to the neurovascular supply of the pulp at the time of injury. Complications of PCO may include pulp necrosis, tenderness on percussion, discoloration, periapical radiolucency in some cases. The endodontic treatment performed under these circumstances poses risk of root perforation, a complication which affects the long-term prognosis of the tooth. This report presents the successful management of an iatrogenic root perforation in a tooth with radiographic evidence of pulp canal obliteration.

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Introduction:-

Pulp canal obliteration (PCO) is a condition of teeth where hard tissue is deposited along the walls of the root canal and fills most of the pulp lumen leaving it narrowed or completely obliterated. Signs and symptoms of obliteration may include Yellow tooth discoloration, Lack or response to pulp sensibility test.⁽¹⁾ Pulp necrosis has also been reported as a complication with ranges varying from 1% to 16%⁽²⁾. Periapical lesion develops in a range of 7.3% to 24% in these cases up to 4 years after initial traumatic injury, especially in completely calcified teeth⁽²⁾. If root canal treatment is attempted it can be difficult or impossible on a tooth with pulp canal obliteration.⁽¹⁾ The present case report illustrates the successful management of an iatrogenic perforation with Biodentine (Septodont, St. MaurdesFossés, France) at a level just apical to the cementoenamel junction on the labial aspect of an upper right central incisor with radiographic evidence of pulp canal obliteration.

Case report:-

A 25 year old male presented to us with chief complaint of pain, redness and laceration in gingiva in relation to the front tooth since 2 month. Dental history included root canal tretment of tooth#11 by a general dentist 2 month ago. Clinical examination revealed discoloration, breach in gingiva (Fig.1a), tenderness on percussion in relation to tooth#11. 4mm of probing depth was measured on labial aspect of tooth#11. Periapical radiograph showed partially filled pulp canal with evidence of pulp canal obliteration and widening of pdl in relation to tooth#11 (Fig1b). It was decided first to negotiate the canal conservatively through the access cavity, followed by biomechanical preparation and obturation. As orthograde retrieval of previously filled material was difficult so after root canal treatment , flap surgery was planned to expose the perforated site and to repair it with biodentine. Detailed explanation about the treatment plan was given to patient and written informed consent was taken.



Fig.1:- (a)Pre-op photograph showing discolored tooth #11 with breach over gingiva, Fig.1(b) showing Pre-op radiograph.

Tooth #11 was carefully accessed under rubber dam with C+ file (Dentsply, Maillefer, Tulsa, USA) and DG 16 explorer. To ensure the insertion of the file in the correct position, centered and angulated periapical radiographs were taken and working length was confirmed (Fig.2a,2b,2c). Biomechanical preparation of canal was done with K files (Dentsply, Maillefer, Tulsa, USA) and copious irrigation was performed with 5% sodium hypochlorite & 17% EDTA. Finally canal was obturated using lateral condensation technique and temporarily sealed with Cavitemp (Ammdent, Mohali, India). After 1 week, access preparation was restored with light cured composite (Tetric N Ceram, Ivoclar, Vivadent) (Fig.2d).

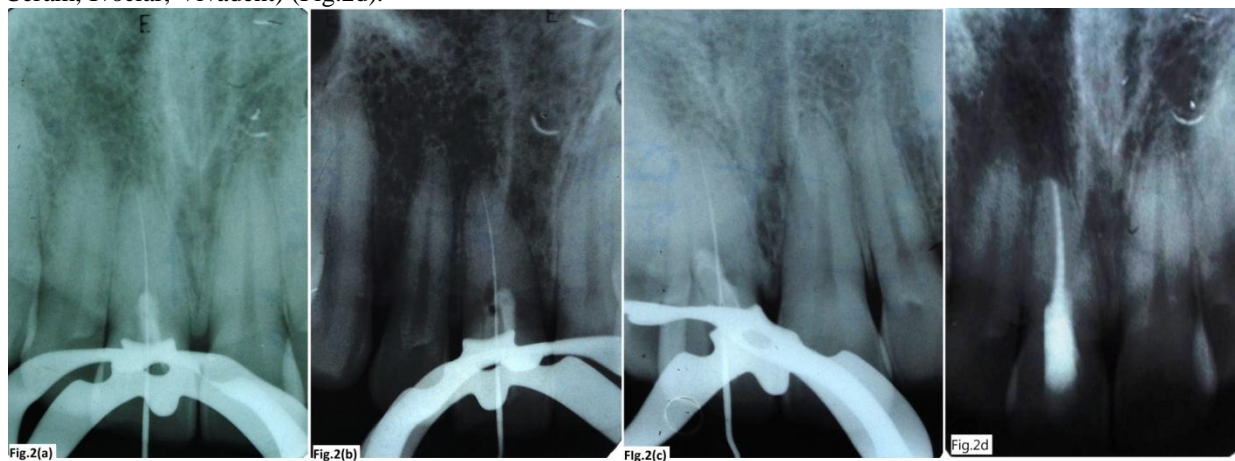


Fig. 2:- Radiographs showing working length determination from centered and angulated direction(2a,2b,2c) while figure 2d showing obturation.

In followup visits, Tooth #11 became nontender on percussion but the breach present in gingiva remained the same. As filling material appeared as a bulge from the breach, a triangular flap was raised to expose the defect. The defect was located on the root just apically to the CEJ superior to the alveolar crest bone (Fig.3a). Filling material was removed with the help of an inverted cone bur up to 2mm in depth (Fig.3b) and the cavity was filled with bioactive cement (Biodentine) to promote healing and attachment of gingiva to the root surface (Fig.3c). The flap was sutured back in its original position. The patient was called after 1 week for removal of sutures. After 2 months, probing depth was reduced to 2mm and the tooth was permanently restored with full crown restoration. At followup visit after 6 months, the patient was asymptomatic with favourable healing of periradicular tissues (Fig.3d).

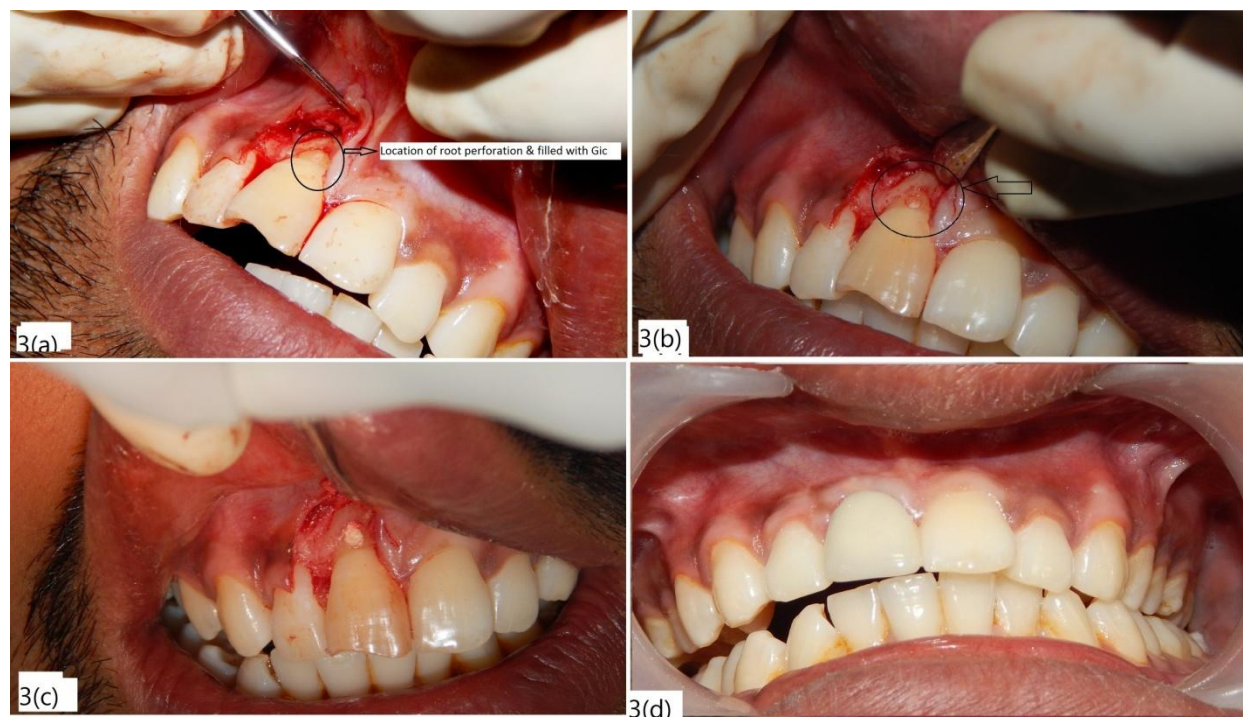


Fig. 3:- Showing location of root perforation(3a), Prepared cavity up to 2mm in depth(3b), Cavity filled with biodentin(3c) and Postoperative photograph after 6 month(3d).

Discussion:-

Exact mechanism of Pulp canal obliteration (PCO) is unknown but believed that it occurs commonly following traumatic injuries to teeth. Approximately 4–24% of traumatized teeth develop varying degrees of pulpal obliteration that is characterized by the apparent loss of the pulp space radiographically and a yellow discoloration of the clinical crown.⁽¹⁾ In literature, various school of thoughts exists regarding optimum treatment of tooth showing pulp canal obliteration.

Smith recommended delaying treatment until there were symptoms or radiographic signs of periapical disease.⁽³⁾ It may be due to because many tooth with PCO remain asymptomatic. If root canal treatment is selected as a routine procedure, most would be unnecessary as the majority of teeth with PCO will never suffer pulpal necrosis and periapical disease. Oginni et al recommended that root canal treatment should be initiated in teeth with tenderness to percussion, PAI scores ≥ 3 (The PAI quantifies periapical inflammation/disease and scores 2–5 represent disease) and a negative response to sensibility testing⁽⁴⁾. However, elective or intentional root canal procedure can be considered in case of aesthetic concerns or when tooth is unresponsive to vital bleaching techniques⁽⁵⁾.

In this case, tooth was discolored with tenderness on percussion and laceration of gingiva. The case was managed first endodontically followed by surgical repair of perforation with biodentine at a level just apical to the cemento-enamel junction on the labial aspect tooth #11. Perforation in cervical part of root affects long term prognosis of tooth because of its proximity to junctional epithelial attachment. The appropriate selection of a repair material is critical because marginal sealing ability biocompatibility are reported to have an effect on the prognosis of perforation closure⁽⁶⁾. So, Material used for sealing of such perforations should be biocompatible, short setting time and good handling properties. In past decades many materials have been used for this purpose, including amalgam, Cavit, IRM, Super-EBA, glass ionomer cements and resins. Among them, the use of Mineral Trioxide Aggregate has been clearly suggested by most clinicians due to its sealing ability marginal adaptation and biocompatibility⁽⁷⁾. However, MTA exhibits the disadvantages of extended initial setting time (3 - 4 hours)⁽⁸⁾, high cost. In order to overcome these disadvantages, a new material, Biodentine, has been recently introduced and comparatively newer than other materials used for treating perforation. According to its manufacturer⁽⁹⁾ it seems to have similar physiochemical, mechanical, biological properties to MTA but shorter setting time (9 - 12 minutes) without any aluminate or calcium sulfate in its composition. Biodentine showed good results and can be considered

as a well tolerated endodontic material with stimulatory bioactive properties for root perforation repair in regarding cell survival and proliferation particularly of PDL cells⁽¹⁰⁾.

Conclusion:-

Endodontic treatment in tooth with obliterated pulp canal poses lot of challenges for clinicians and that might end up in an accident such as root perforation. Crestal root perforations compromise the long term prognosis of the affected teeth due to its proximity to epithelial attachment. Biodentine, due to its ease of handling, faster setting kinetics, good sealability and bioactive properties, seems to be a good alternative other materials that has been used previously for managing such conditions.

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