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MANAGEMENT OF IMMATURE NON VITAL TOOTH BY REVASCULARIZATION INDUCED PRE

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INTRODUCTION

In young children, anterior teeth by virtue of their position in the dental arch are prone to trauma. In cases of complicated tooth fracture with the loss of pulp vitality, cessation of root development with an open apex is a serious sequel. Management of such immature, non-vital teeth is a challenge. Until date, treatment protocols mentioned were surgery and retrograde sealing, apical barrier formation with calcium hydroxide^[1] or mineral trioxide aggregate(MTA)^[2] and customized or thermoplasticized gutta-percha obturation technique.

Recently, there has been a paradigm shift in the management of such teeth based on the “regenerative concept.” Case series/reports have documented the efficacy of revascularization.



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This involves intentional induction of bleeding from the peri-apex and formation of an intra-canal blood clot, which acts as a scaffold. Until date only few case reports on the use of PRF in the revascularization are cited in the literature.^[5] This case comparatively evaluates the outcome of revascularization with PRF in non-vital, immature, anterior teeth in terms of periapical healing (PAH), apical closure (AC), lateral dentinal wall thickening and root lengthening (RL). The aim of the article is to successively close the root apex using revascularization procedure with PRF placement in maxillary permanent right central incisor .

CASE REPORT

A 20 year old male patient reported to department of conservative dentistry and endodontics, SDM college of dental sciences Dharwad Karnataka came with a chief complaint of pain and fracture upper front teeth .

HISTORY

There was history of trauma 8 years ago and patient gave a history of previously undergone dental treatment in upper front teeth two years back .No relevant medical history was found and no known drug allergies were noted.

CLINICAL EXAMINATION

Ellis class 4 fracture with 11,21 with no discoloration seen



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Mild tenderness on percussion with 11

Electric pulp testing gave no response with 11 whereas positive response was obtained with 12

Periodontal probing around tooth was under physiologic limits

Preoperative radiograph revealed obturated canal with 21, open apex with periapical radiolucency with 11.

DIAGNOSIS AND TREATMENT PLAN

Based on clinical and radiographic examination diagnosis of immature open apex with Ellis class IV fracture was made with 11.

Based on the above findings present case reports was decided at non surgical management of symptomatic tooth with immature apex and periapical radiolucency using revascularization with PRF placement to promote root closure and periapical healing.

PROCEDURE

Tooth was isolated under rubber dam and accessed with a round diamond and an endo-Z bur (DentsplyMaillefer, Tulsa, OK). Purulent discharge was observed in tooth . The canal were copiously irrigated with normal saline and open dressing was given and patient was recalled after 24 hours for evaluation and no purulent discharge as noticed which followed by closed dressing . Next appointment 25 # paper point (DentsplyMaillefer, Tulsa, OK) was used to confirm the canal was dry and working length was determined and confirmed radiographically by placing a 30 #K file in the canal. Minimal mechanical instrumentation with an ISO 60#K-file (DentsplyMaillefer, Tulsa, OK) and saline irrigation with 10 ml with needle gauge of 21 and size of 0.80x38mm , 10 ml of 3% sodium hypochlorite (NaOCl, HMD India) with size 0.55x25mm



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with 24 gauge needle was performed. Irrigation was done keeping 2mm away the needle from the apex. The canal was dried with paper points and an inter-appointment medication of double antibiotic paste was prepared by using 1:1 ratio metronidazole (400mg cipla manufacturer) and ciprofloxacin (500mg cipla manufacturer) by making a paste by using motor and pestle using saline as a diluent medium and applied with a sterile 30 # hand lentulo spiral (DentsplyMaillefer, Tulsa, OK). Tooth was temporarily restored. Patient was recalled after 3-week. Tooth was re-accessed under rubber dam and revascularization with PRF were randomly induced in upper right central incisor.

Local anesthetic solution without adrenaline (LOX 2% Neon Lab, India) was infiltrated around the apex of upper right central incisor. A sterile endodontic file with a rubber stopper set at 2 mm beyond the established working length was taken. With sharp, fine strokes, the file was pushed past the confines of the canal into the periapical tissue. When frank bleeding was evident, a dry cotton pellet was inserted 3-4 mm into the canal and held there for 5-7 min to allow blood clot formation in the apical third.

PRF preparation was carried out in a simple, table top laboratory centrifugation machine (Remi model no. — R-8C, India). A total volume of 8.5 mL of whole blood was drawn by venipuncture of antecubital vein. It was then collected in a 10-mL sterile glass tube. Whole blood was centrifuged (soft spin at 2400 rpm for 10 min) to separate PRF. It was introduced into the root canal of maxillary right central incisor with cotton pliers and carried to the middle third with a size 30 finger plugger.

Access opening was restored with biodentine plug followed by placement of GIC and composite restoration was done. Patients recalled was done at 6,12 month. Root thickening was seen at 12 months and root lengthening of about 1.23mm at 18 months was noticed in Radiovisiography with no discolouration clinically but however the vitality was still not regained, but further future calls up are essential to check the tooth vitality.



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According to this case study it can be inferred that using this revascularization induced PRF method is effective in formation of root apex in immature tooth and also discoloration was not seen due to the use of double antibiotic paste and biodentineplug .

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DISCUSSION

The present case series compared the clinical and radiographic treatment outcome of revascularization with PRF in immature, non-vital anterior teeth. Revascularization can be achieved successfully if a suitable matrix is provided in a disinfected root canal for tissue in-growth and a coronal bacteria-tight seal is provided.

Mechanical instrumentation of the immature teeth with blunderbuss canal is difficult as it often leads to fracture of thin, lateral dentinal walls.^[6] Therefore, minimal mechanical instrumentation is recommended for the disinfection of such teeth. Chemical disinfection with various concentrations of sodium hypochlorite (NaOCl) and intracanal placement of triple antibiotic paste has been proposed.^[7,8] In this study, to avoid discoloration a double antibiotic paste containing equal proportions of bactericidal metronidazole ciprofloxacin components were ground and mixed with distilled water to a thick paste consistency.

In revascularization, the in-growth of new tissue from the periapical area needs a matrix for its support. A matrix of blood clot provides not only a base for stem cell adhesion, but also for its growth, differentiation and migration. Thus, in the revascularization if an intra-canal matrix is provided, undifferentiated mesenchymal cells can proliferate and differentiate under the organizing influence of Hertwig's epithelial root sheath, thus re-establishing the pulp vitality. These cells can be recruited from the apical pulp tissue remnants,^[9,10] periodontal ligaments,^[11,12] apical papilla or the bone marrow.^[13,14] Till date, blood clot has been used commonly as a matrix.⁵



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However, formation of an intracanal blood clot is not always predictable. Bleeding may be reduced when an interappointment medication of calcium hydroxide is given, as it can cause periapical coagulation necrosis. Clot formation may be compromised if vasoconstrictor (adrenaline) containing local anesthetic is used. The concentration of growth factors in the blood clot is unpredictable and limited. Furthermore, after clot formation, erythrocytes undergo necrosis, affecting the properties of the matrix.^[3]

However Platelets can play a crucial role in periodontal regeneration as they are reservoir of growth factors and cytokines which are key factors for regeneration of bone and maturation of the soft tissue. Evidence from literature suggests the potential role of PRF in periodontal regeneration and tissue engineering.

Because of following advantages in this case we have followed revascularization induced PRF technique to close the root apex with non surgical intervention.

CONCLUSION

Hence I would like to conclude by saying that Revascularization induced PRF is an effective method for inducing maturogenesis in non-vital, immature teeth. Supplementations with PRF can potentially improve and hasten the desired biological outcome of this regenerative technique.

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