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CASE STUDY

REGENERATIVE ENDODONTIC TREATMENT PROCEDURE FOR A TRAUMATIZED IMMATURE PERMANENT MAXILLARY CENTRAL INCISOR

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ABSTRACT

Any trauma to immature permanent tooth can cause a interruption in dentin deposition and root formation may cease. The endodontic treatment of such teeth will often become complicated with an uncertain prognosis. This case report describes successful endodontic treatment of an immature maxillary central incisor 4 years after trauma. A maxillary right central incisor was treated for periapical abscess in a 14-year-old boy who had met with trauma 4 years back. Considering the age and incomplete root development of the patient regenerative endodontics was performed and PRP and MTA were used to induce root end completion. After 8 months, the tooth was asymptomatic clinically and radiographically, roots continued to develop and the periapical radiolucency showed signs of healing. Considering the continued root development and resolution of the periapical radiolucency it can be concluded that regenerative endodontics is an appropriate treatment method in treating an immature permanent necrotic tooth.

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INTRODUCTION

Any trauma to teeth may result in development of pulpal and periapical disease. The age group of 7-10 is highly prone and most of the dental trauma occur in this age group and causes interruption in root end development (Andreasen and Ravn, 1972; Bastone *et al*., 2000). Complicated crown fracture that involve enamel dentin and pulp occur in 0.9-13% of all dental injuries (Canakci *et al*., 2003; Tapias *et al*., 2003). When the pulpal vitality of a traumatized tooth is lost, the treatment poses a challenge in endodontics. It is difficult to obtain an appropriate apical seal in such teeth by traditional methods, also the thinned-out root canal walls make the teeth susceptible to fracture (Waterhouse *et al*., 2011). The outcomes of arrested root development are thinned out root walls, short roots and an open apex with an increased risk of root fracture (Cvek, 1992). Several different clinical methods have been described to treat these teeth, such as long-term calcium hydroxide apexification and one-visit apexification (with MTA and Biodentine). Recently, regenerative endodontic procedures have drawn much attention. The advantage of this treatment modality over apexification is that it allows root maturation to continue by generating vital tissue (Yamauchi *et al*., 2011). This case report presented regenerative therapy of a traumatized immature maxillary central incisor with apical abscess using MTA and PRP.

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Case Report

A 14-year-old boy was referred to the Department of Endodontics with chief complaint of pain on chewing and localized swelling in the anterior region of maxilla and a history of trauma to the region 4 years back. His medical history was non- contributory. Clinically the right maxillary central incisor was fractured, sensitivity to percussion and palpation and a localized swelling on the buccal mucosa of right maxillary central incisor was also observed. Radiographic examination revealed that the fractured teeth had immature apex along with a radiolucent periapical lesion. Based on the clinical and radiological examinations, a definitive diagnosis of symptomatic apical abscess in the right central incisor was established. Considering the immaturity of the tooth, along with the age of the patient regenerative endodontic treatment procedure was planned for the patient. Endodontic access cavity was prepared under rubber dam isolation and drainage was established. The canal was then irrigated thoroughly with normal saline and remnants of pulpal tissues were removed. Working length was determined with #60 k-file and the canal was then instrumented with #80 file, the canal was again irrigated with normal saline and two calcium hydroxide dressings were given for a period of 7 days each. On the third visit, patient's blood was drawn and PRP using a centrifuge machine PRP was obtained after through irrigation with saline, that was injected in the canal using an insulin syringe. After injecting insulin a MTA plug was formed from coronal to

middle third of the root canal. A wet cotton and temporary was placed over MTA to aid in the setting of MTA and the patient was recalled for the next day. During the next visit the endodontic access was sealed permanently using composites. Recall radiographs were taken at the interval of 3 weeks, 3 months, and 9 months. At nine months the radiographs revealed thickening of the dentinal walls along with increase in the length of the root canal space indicating a continued root dentin deposition.

DISCUSSION

This case report illustrates the repair potential of a tooth with incomplete root formation. The capacity for continued root development was preserved after traumatic injury and treatment complications. The common method traditionally used for the treatment of necrotic open apex teeth has been apexification. However, apexification procedure using calcium hydroxide has several disadvantages, such as lengthy treatment period, increased susceptibility to fracture and coronal microleakage during the treatment period (Trope *et al*., 2008; Andreasen *et al*., 2002; Holden *et al*., 2008). Revascularization and regenerative procedures have been considered a viable alternative treatment modality. If the root canal of a necrotic infected tooth is well disinfected, regeneration should occur in the presence of a suitable scaffold. (Ding *et al*., 2009) PRP has been used in the field of dentistry for regenerative procedures (Hargreaves *et al*., 2008; Ding *et al*., 2009). It contains growth factors, stimulates collagen production, recruits other cells to the site of injury, produces anti-inflammatory agents, initiates vascular ingrowth, induces cell differentiation, and improves soft and hard tissue wound healing potential (Hiremath *et al*., 2008). In this case PRP was used as a 3-dimensional physical scaffold to support cell growth and differentiation of vital tissues in the canal after disinfection. It has also been suggested that PRP increases the concentrated delivery of various growth factor (Hiremath *et al*., 2008). Other methods to induce regenerative potential of apical papilla cells include the induction of root end blood clot. However various studies have compared its efficacy with PRP.

Narang *et al*. (2015) also concluded that blood clots and PRP show comparable results in terms of apical closure, root lengthening, dentinal wall thickening, and periapical healing. In another study by Jadhav *et al*. (2012) PRP was more effective than blood clots in revascularization, and the authors ascribed the success of PRP to stimulation of collagen production; sustained release of growth factors; and enhanced recruitment, retention, and proliferation of undifferentiated mesenchymal and endothelial cells from the periapical area. In the presented case, thickening of the root wall and healing of the related lesion occurred within 12 months, which suggests that PRP may have a potential role in regenerative endodontics. On the basis of the results of this case, PRP appears to be a promising physical scaffold delivering signaling molecules for the management of immature teeth with open apices and necrotic pulp tissue.

Conclusion

Regenerative endodontic procedures have the potential for regenerating both pulp and the dental hard tissues and therefore may offer a viable treatment option for immature teeth with a necrotic pulp. PRP is potentially a suitable scaffold for this procedure.

REFERENCES

Andreasen JO. and Ravn JJ. 1972. Epidemiology of traumatic dental injuries to primary and permanent teeth in a Danish population sample. *Int J Oral Surg*., 1:235–239.

Bastone EB, Freer TJ. and McNamara JR. 2000. Epidemiology of dental trauma: a review of the literature. *Aust Dent J*., 45:2–9

Canakci V, Akgül HM, Akgül N. and Canakci CF. 2003. Prevalence and handedness correlates of traumatic injuries to the permanent incisors in 13-17-year-old adolescents in Erzurum, Turkey. *Dent Traumatol*., 19:248–254.

Clinical outcomes of artificial root-end barriers with mineral trioxide aggregate in teeth with immature apices.Holden DT, Schwartz SA, Kirkpatrick TC, Schindler WG J Endod. 2008 Jul; 34(7):812-7.

Cvek, M. 1992. Prognosis of luxated non-vital maxillary incisors treated with calcium hydroxide and filled with gutta-percha. A retrospective clinical study. *Endodontics and Dental Traumatology*, 8, 45–55.

Ding, R.Y., G.S. Cheung, J. Chen, X.Z. Yin, Q.Q. Wang, C.F. Zhang, 2009. Pulp revascularization of immature teeth with apical periodontitis: a clinical study *J Endod*., 35, pp. 745

Hiremath H, Gada N, Kini Y, *et al*. 2008. Single-step apical barrier placement in immature teeth using mineral trioxide aggregate and management of periapical inflammatory lesion using platelet-rich plasma and hydroxyapatite. *J Endod*., 34: 1020–1024.

J Endod. 2008 Jul;34(7 Suppl):S51-6. Regeneration potential of the young permanent tooth: what does the future hold? Hargreaves KM1, Giesler T, Henry M, Wang Y.

Jadhav G, Shah N. and Logani A. 2012. Revascularization with and without platelet-rich plasma in nonvital, immature, anterior teeth: a pilot clinical study. *J Endod*., 38: 1581–1587.

Long-term calcium hydroxide as a root canal dressing may increase risk of root fracture. Andreasen JO, Farik B, Munksgaard EC Dent Traumatol. 2002 Jun; 18(3):134-7

Narang I, Mittal N. and Mishra N. 2015. A comparative evaluation of the blood clot, platelet-rich plasma, and platelet-rich fibrin in regeneration of necrotic immature permanent teeth: a clinical study. *Contemp Clin Dent*., 6: 63–68

Pulp revascularization of immature teeth with apical periodontitis: a clinical study. Ding RY, Cheung GS, Chen J, Yin XZ, Wang QQ, Zhang CF J Endod. 2009 May; 35(5):745-9.

Tapias MA, Jiménez-García R, Lamas F. and Gil AA. 2003. Prevalence of traumatic crown fractures to permanent incisors in a childhood population: Móstoles, Spain. *Dent Traumatol*., 19:119–122.

Trope M. Chapter 36, Endodontic considerations in dental trauma. In: Ingle JI, Bakland LK, Baumgartner JC, editors. Ingle's Endodontics. 6th ed. Hamilton: BC Decker Inc; 2008. pp. 1330–1357.

Waterhouse PJ, Whitworth JM, Camp JH, Fuks AB. Chapter 23, Pediatric endodontics: endodontic treatment for the primary and young permanent dentition. In: Hargreaves KM, Cohen S, editors. Cohen's Pathways of the pulp. 10th ed. St Louis: Mosby Elsevier; 2011. pp. 808–857.

Yamauchi N, Yamauchi S, Nagaoka H, Duggan D, Zhong S, Lee SM, Teixeira FB. and Yamauchi M. 2011. Tissue engineering strategies for immature teeth with apical periodontitis. *J Endod*., 37:390–397.

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