Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Efficacy of revascularization procedures for the management of immature, non-vital, infected permanent teeth

Kumar Shresth Gami[1], Siddharth Shahi[2], Shresth Kumar Bhagat[3], Mrigank Shekhar Jha[4], Abhishek Siddhartha[5], Karn Singh[6]

[1]Senior lecturer, Department of Conservative Dentistry and Endodontics, Sarjug dental college and hospital, Darbhanga, Bihar;
[2]Reader, Department of Conservative Dentistry and Endodontics, Sarjug dental college and hospital, Darbhanga, Bihar;
[3]Reader, Department of Conservative Dentistry and Endodontics, Sarjug dental college and hospital, Darbhanga, Bihar;
[4]Senior lecturer, Department of Orthodontics, Sarjug dental college and hospital, Darbhanga, Bihar;
[5]Reader, Department of Conservative Dentistry and Endodontics, DR. B.R. Ambedkar Dental College, Patna, Bihar;
[6]Senior Resident, Department of Dentistry Darbhanga Medical College and Hospital, Darbhanga, Bihar

ABSTRACT:
Background: The present study was conducted evaluate the efficacy of revascularization procedures for the management of traumatized immature, nonvital, infected permanent teeth. **Materials & Methods:** The present study was conducted on 40 immature, nonvital maxillary anterior teeth presenting with or without signs and/or symptoms of periapical pathology. In all teeth, endodontic treatment was initiated, and after infection control, revascularization was performed. The access cavity was sealed with glass ionomer cement. The cases were followed up at regular intervals of 3 months. **Results:** Out of 40 patients, males were 22 and females were 18. Narrowing of the wide apical opening was evident in 38 (94.7%). Thickening of apical dentinal walls was seen in 6 (15%) and lateral dentinal walls was evident in 45% (12) of cases. Increased root length was observed in 70% (28) of cases. Healing of periapical lesions was seen in 34 (85%). None of the cases presented with pain. **Conclusion:** Authors found that revascularization procedures in immature nonvital, infected permanent teeth found to be effective.
Key words: revascularization, Non vital, periapical pathology.

Received: September 22, 2020 Accepted: October 20, 2020

Corresponding author: Dr. Kumar Shresth Gami, Senior lecturer, Department of Conservative Dentistry and Endodontics, Sarjug dental college and hospital, Darbhanga, Bihar, India

This article may be cited as: Gami KS, Shahi S, Bhagat SK, Jha MS, Siddhartha A, Singh K. Efficacy of revascularization procedures for the management of immature, non-vital, infected permanent teeth. J Adv Med Dent Scie Res 2020;8(11):156-158.

INTRODUCTION

Trauma to the anterior teeth, commonly found among young children, accounts for one third of all traumatic injuries in boys and one fourth of all injuries in girls.[1] Tooth fracture constitutes 4%–5% and luxation injuries 30%–44% of all dental trauma injuries. Because of their position, the anterior teeth tend to bear the brunt of many impact injuries. The injuries vary from avulsion to intrusion, lateral displacement, fracture, or just a concussion.[2] In many cases, the injury causes cessation of tooth development. Because the root development takes place for almost 2 years after the tooth has erupted into the oral cavity, an incompletely formed apex is one of the most common features seen in traumatized teeth.[3] Management of immature non vital teeth poses a great challenge to the clinician. Most of the clinicians rely on traditional calcium hydroxide apexification.[4] Calcium hydroxide induced apexification has its own limitations such as long term therapy for barrier formation; and,

strengthening or reinforcing of the thin fragile blunderbuss canals is not achieved. Instead, its long term therapy has shown to make the tooth brittle due to its hygroscopic and proteolytic properties. Even after apexification procedure, the clinician has to go for conventional root canal obturation as the barrier formed is often porous and not continuous.[5]

Obturation of wide canal systems requires precise fabrication of a customized gutta-percha cone, and there is danger of splitting of the root during lateral condensation. Many blunderbuss canals with flaring walls cannot be obturated and sealed by orthograde methods and might require apical surgery and retrograde sealing of the canal. Endodontic management of such teeth includes surgery and retrograde sealing, calcium hydroxide–induced apical closure (apexification), and, more recently, placement of an apical plug of mineral trioxide aggregate (MTA) and gutta-percha obturation.[6] The present study was conducted evaluate the efficacy of revascularization procedures for the management of traumatized immature, nonvital, infected permanent teeth.

MATERIALS & METHODS

The present study was conducted in the department of Endodontics from November 2019 to October 2020. It comprised of 40 immature, non-vital maxillary anterior teeth presenting with or without signs and/or symptoms of periapical pathology. The study was approved from institutional ethical committee. All patients were informed regarding the study and their consent was obtained.

Demographic profile such as name, age, gender etc. was recorded. In all teeth, endodontic treatment was initiated, and after infection control, revascularization was performed. The access cavity was sealed with glass ionomer cement. The cases were followed up at regular intervals of 3 months. An intraoral radiograph was taken for a baseline record to be compared with follow- up radiographs to be taken at intervals of every 6 months. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 40		
Gender	**Males**	**Females**
Number	22	18

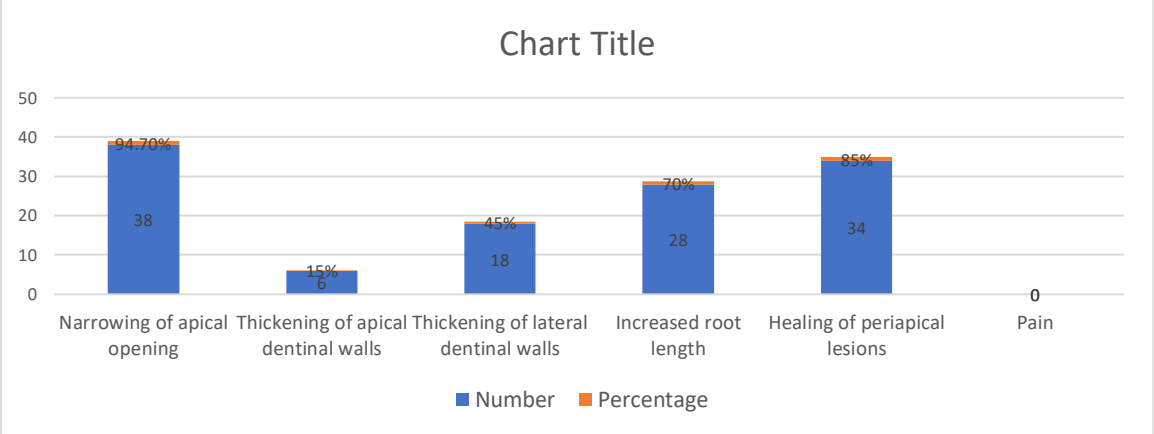
Table I shows that out of 40 patients, males were 22 and females were 18.

Table II Assessment of parameters

Parameters	Number	Percentage
Narrowing of apical opening	38	94.7%
Thickening of apical dentinal walls	6	15%
Thickening of lateral dentinal walls	18	45%
Increased root length	28	70%
Healing of periapical lesions	34	85%
Pain	0	0

Table II, graph I shows that narrowing of the wide apical opening was evident in 38 (94.7%). Thickening of apical dentinal walls was seen in 6 (15%) and lateral dentinal walls was evident in 45% (12) of cases. Increased root length was observed in 70% (28) of cases. Healing of periapical lesions was seen in 34 (85%). None of the cases presented with pain.

Graph I Assessment of parameters



DISCUSSION

The concept of pulp regeneration was first noted in traumatic avulsed and replanted immature teeth. Rule documented root development and apical barrier formation in cases of pulpal necrosis.[7] The authors emphasized on the importance of sterile blood clot and granulomatous tissue within the pulpal cavity. Various possible explanations have been given to explain why apexogenesis/maturogenesis can occur in these infected immature permanent teeth.[8] These include the presence of mesenchymal stem cells residing in the apical papilla, also known as stem cells of apical papilla (SCAP), which are the multi-potent dental pulp stem cells, and resistant to necrosis/infection. The exact etiology, pathogenesis or histo-pathological events that occur in this regenerative process are still not known.[9] The present study was conducted evaluate the efficacy of revascularization procedures for the management of traumatized immature, nonvital, infected permanent teeth.

In this study, out of 40 patients, males were 22 and females were 18. Shah et al[10] evaluated the efficacy of revascularization in 14 cases of infected, immature teeth. Endodontic treatment was initiated, and after infection control, revascularization was performed. The access cavity was sealed with glass ionomer cement. The cases were followed up at regular intervals of 3 months; the range in follow-up was 0.5–3.5 years. The outcomes were as follows. Radiographic resolution of periradicular radiolucencies was judged to be good to excellent in 93% (13 of 14) of the cases. In the majority of cases, a narrowing of the wide apical opening was evident. In 3 cases, thickening of apical dentinal walls and increased root length were observed. The striking finding was complete resolution of clinical signs and symptoms and appreciable healing of periapical lesions in 78% (11 of 14) of cases. Thickening of lateral dentinal walls was evident in 57% (8/14) of cases, and increased root length was observed in 71% (10/14) of cases. None of the cases presented with pain, reinfection, or radiographic enlargement of preexisting apical pathology.

We found that narrowing of the wide apical opening was evident in 38 (94.7%). Thickening of apical dentinal walls was seen in 6 (15%) and lateral dentinal walls was evident in 45% (12) of cases. Increased root length was observed in 70% (28) of cases. Healing of periapical lesions was seen in 34 (85%). None of the cases presented with pain. Frank[11] popularized calcium hydroxide apexification by using a mixture of camphorated monochlorophenol (CMCP) and calcium hydrovide [Ca (OH) $_2$]. Hiethersay[12] discarded CMCP because of its toxic effects, and used only Ca (OH) $_2$ to treat 21 necrotic, immature teeth. Majority of cases showed appreciable healing. One of the teeth was extracted because of root fracture and was histologically examined. Histopathological sections revealed new tissue formation consisting of pulp, interglogular dentin, and cementum and periodontal ligament (PDL) fibers. This led to the belief that regeneration of dental tissues was possible. Since then various clinical studies had demonstrated the efficacy of Ca (OH) $_2$ in apexification. However, all the case reports and studies have documented only apical closure. There was no root elongation or maturation and all cases required subsequent root canal obturation. Ca (OH) $_2$ therapy was also shown to pose a threat of root fracture in 77% of immature teeth.

CONCLUSION

Authors found that revascularization procedures in immature nonvital, infected permanent teeth found to be effective.

REFERENCES

1. Aggarwal V, Miglani S, Singla M. Conventional apexification and revascularization induced maturogenesis of two non-vital, immature teeth in same patient: 24 months follow up of a case. J Conserv Dent 2012;15:68-72.
2. Nevins AJ, Wrobel W, Valachovic R, Finkelstein F. Induction of hard tissue into pulpless open-apex teeth using collagen-calcium phosphate gel. J Endod 1978;4:76.
3. Tittle KW, Farley J, Linkhardt T, et al. Apical closure induction using bone growth factors and mineral trioxide aggregate (abstract). J Endod 1996;22:198.
4. Shabahang S, Torabinejad M, Boyne PP, Abedi H, McMillan P. A comparative study of root-end induction using osteogenic protein-I, calcium hydroxide and mineral trioxide aggregate in dogs. J Endod 1999;25:1–5.
5. Kleier DJ, Barr ES. A study of endodontically apexified teeth. Endod Dent Traumatol 1991;7:112.
6. Andreasen JO, Farik B, Munksgaard EC. Long-term calcium hydroxide as a root canal dressing may increase the risk of root fracture. Dent Traumatol 2002;18:134 – 7.
7. Spanberg L. Instruments, materials and devices. In: Cohen S, Burns RC, eds. Pathways of the pulp. 8th ed. St Louis, MO: Mosby, 2002:548.
8. Andreasen M, Lund A, Andreasen JO, Andreasen FM. In vitro solubility of human pulp tissue in calcium hydroxide and sodium hypochorite. Endo Dent Traumatol 1992;8:104–8.
9. Nevin A, Wrobel W, Valachovic R, Finkelstein F. Hard tissue induction into pulpless open-apex teeth using collagen-calcium phosphate gel. J Endod 1977;3:431–3.
10. Shah N, Logani A, Bhaskar U, Aggarwal V. Efficacy of revascularization to induce apexification/apexogensis in infected, nonvital, immature teeth: a pilot clinical study. Journal of endodontics. 2008 Aug 1;34(8):919-25.
11. Frank AL. Therapy for the divergent pulpless tooth by continued apical formation. J Am Dent Assoc 1966;72:87.
12. Heithersay GS. Stimulation of root formation in incompletely developed pulpless teeth. Oral Surg Oral Med Oral Pathol 1970;29:620 –30.