

ASSESSMENT OF MINERAL TRIOXIDE AGGREGATE AND FORMOCRESOL IN DECIDUOUS TEETH

*Dr. Rishi Aggarwal **Dr. Ravi agarwal

*MDS, Endodontist, Private Consultant, Punjab

**MDS, Pedodontist, Private Consultant, Surat

Abstract

Background: Maintaining the pulpally involved deciduous teeth in a healthy state until the time of normal exfoliation remains to be one of the challenges for pedodontics. The present study was conducted to compare formocresol and mineral trioxide aggregate in deciduous teeth.

Materials & Methods: 30 deciduous molar of children aged 3- 8 years of age were divided into 2 groups of 15 each. In group I, pulpotomy was done with formocresol and in group II, pulpotomy was done with MTA.

Results: Group I had 10 males and 5 females and group II had 8 males and 7 females. There was comparatively less pain, fistula formation, abscess and mobility in group II as compared to group I recorded at 3 months and 6 months ($P < 0.05$).

Conclusion: Mineral trioxide aggregate better as compared to formocresol in terms of pain, fistula formation, abscess and mobility.

Key words: Formocresol, Mineral Trioxide Aggregate, Children

Introduction

Maintaining the pulpally involved deciduous teeth in a healthy state until the time of normal exfoliation remains to be one of the challenges for pedodontics. Several materials have become popular as pulpotomy medicaments.¹ The first time formaldehyde containing medicaments were used was in 1874, Formocresol (FC) (a mixture of equal parts of tricresol and formalin) has been used as the most common capping material for pulp fixation for many years. Success rate of FC pulpotomy has been 70-97% in the last decades. Concerns have been raised about the toxicity, potential carcinogenicity, cytotoxicity, allergenicity, systemic disturbances, and the possibility of affecting the permanent successors.²

Pulpotomy in primary dentition is developed by devitalization by destroying the vital tissue such as formocresol and electrosurgery etc. Other method is by regeneration - stimulation of dentine bridge with mineral trioxide aggregate (MTA).³

Formocresol is a compound consisting of 48.5% formaldehyde, 48.5% cresol, 3% glycerine used in vital pulpotomy of primary teeth and as a temporary intracanal medicament during root canal therapy.⁴ Due to high toxicity and availability of alternative solutions and intracanal medicaments, formocresol is

considered obsolete in dentistry. Mineral trioxide aggregate contains tricalcium silicate, tricalcium aluminate, tricalcium oxide and silicon di-oxide.⁵ The present study was conducted to compare formocresol and mineral trioxide aggregate in deciduous teeth.

Materials & Methods

The present study was conducted among 30 deciduous molar of children aged 3- 8 years of age of both genders. A written consent was obtained from parents of children.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 15 each. In group I, pulpotomy was done with formocresol and in group II, pulpotomy was done with MTA. Teeth were compared clinically at 3 months and 6 months intervals. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table I Distribution of patients

Groups	Group I	Group II
Agent	Formocresol	Mineral trioxide aggregate
M:F	10:5	8:7

Graph I Distribution of patients

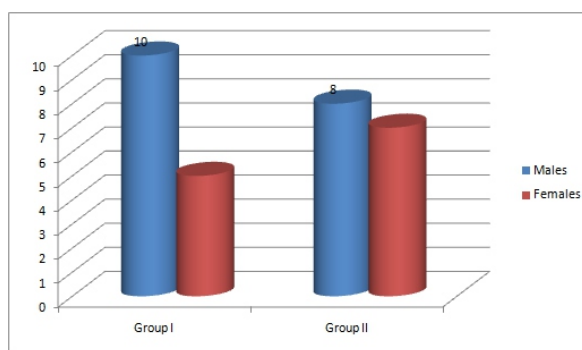
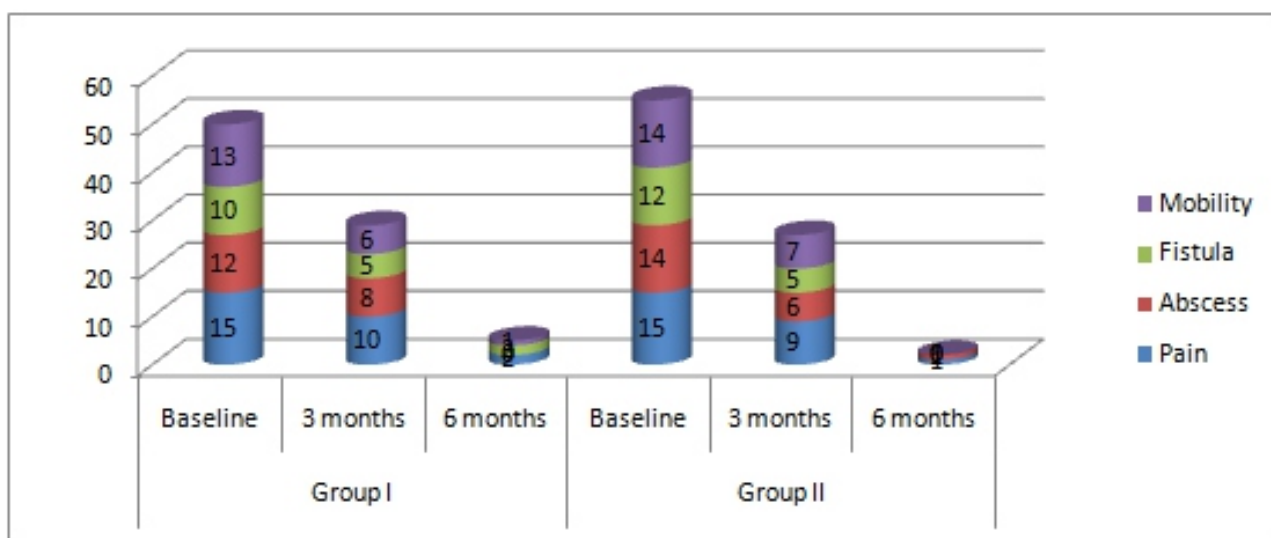


Table II Assessment of clinical findings

Clinical findings	Group I			Group II		
	Baseline	3 months	6 months	Baseline	3 months	6 months
Pain	15	10	2	15	9	1
Abscess	12	8	0	14	6	1
Fistula	10	5	2	12	5	0
Mobility	13	6	1	14	7	0

Table II shows that there was comparatively less pain, fistula formation, abscess and mobility in group II as compared to group I recorded at 3 months and 6 months ($P < 0.05$).

Graph I Assessment of clinical findings



Discussion

Several regenerative materials like tricalcium phosphate, hydroxy-apatite, mineral trioxide

aggregate (MTA), bone morphogenetic protein and several others have been formulated, studied and used over years.⁶ These studies have only

produced varying and inconsequential results. Recently MTA is being widely discussed because of its excellent bioactive properties and ability to induce hard tissue formation.⁷ Search of scientific literature regarding MTA have confirmed its unique biological properties. MTA is a biocompatible material which has been proposed as a potential medicaments for pulpotomy in primary teeth.⁸ In many studies, the qualities of the results are affected by lack of adequate samples, poor design and inappropriate case selection. This makes the studies unreliable and introduces limitation to the results. Naik et al⁹ advocated that the powder water ratio for MTA should be 3:1(P: W). Mixing can be done on paper pad or on a glass slab using a plastic or metal spatula to achieve putty like paste consistency. This mix should be cover with moistened cotton pellet to prevent dehydration of mix. The present study was conducted to compare formocresol and mineral trioxide aggregate in deciduous teeth.

In present study, group I had 10 males and 5 females and group II had 8 males and 7 females. Aeinehchi et al¹⁰ in their study found significant difference in mobility, periodontal ligament widening and inter -radicular radiolucency between two groups at the end of 12 months. Histologically, in MTA group, a layer of new dentine formation with less dentinal tubules at the pulpotomized site was found. In formocresol group, increased inflammatory cells, a zone of atrophy, were noted in radicular portion of pulp.

We observed that there was comparatively less pain, fistula formation, abscess and mobility in group II as compared to group I recorded at 3 months and 6 months ($P < 0.05$). Jayam et al¹¹ in their study a total of 100 teeth were selected for pulpotomy; of which 50 teeth underwent FC pulpotomy and 50 teeth underwent pulpotomy with white MTA. Out of 100 treated teeth, 82 teeth (42 FC and 40 MTA teeth) were available at the end of 24 months for evaluation. 4 failures were found in FC group at 1 st month evaluation and no failures were found in white MTA group. A statistical analysis was performed to evaluate the overall success rate of study and individual success rates of medicaments. Overall success rate of the study was 95%, success rate of FC group was 90.48% and success rate of MTA group was 100%. MTA produced better results as pulpotomy

medicament in comparison to FC. The superior success obtained in the present study was matching other studies mentioned in the literature.

Mineral trioxide aggregate (MTA) is a fine hydrophilic powder available in single use sachets of 1 gram. Some companies also provide premeasured water sachets for ease of use. Some of the commercially available MTA are ProRoot MTA (Dentsply), White ProRoot MTA (Dentsply), MTA- Angelus (Solucos Odontologicas), MTA- Angelus Blanco (Solucos Odontologicas), MTA Bio (Solucos Odontologicas).¹²

Conclusion

Authors found mineral trioxide aggregate better as compared to formocresol in terms of pain, fistula formation, abscess and mobility.

References

1. Kogan P, He J, Glickman GN, Watanabe I. The effects of various additives on setting properties of MTA. *J Endod* 2006; 32: 569–572.
2. Danesh G, Dammaschke T, Gerth HUV, Zandbiglari T, Schafer E. A Comparative study of selected properties of ProRoot mineral trioxide aggregate and two Portland cements. *Int Endod J* 2006; 39: 213–219.
3. Walker MP, Dilberto A, Lee C. Effect of setting conditions on mineral trioxide aggregate flexural strength. *J Endod* 2006; 32: 334–336.
4. Torabinejad M, Pitt Ford TR, Abedi HR, Kariyawasam SP, Tang HM. Tissue reaction to implanted Root End filling materials in the Tibia and Mandible of Guinea Pigs. *J Endod*, 1998; 24: 468–471.
5. Srinivasan D, Jayanthi M. Comparative evaluation of formocresol and mineral trioxide aggregate as pulpotomy agents in deciduous teeth. *Indian J Dent Res* 2011; 22: 385–90.
6. S Naik, Amitha M Hegde. Mineral trioxide aggregate as a pulpotomy agent in primary molars, An in vivo study. *Jn. Indian Soc Pedod Prev Dent* 2005; 23: 13–16.
7. Kahl J, Easton J, Johnson G, Zuk J, Wilson S, Galinkin J. Formocresol blood levels in children receiving dental treatment under general anesthesia. *Pediatr Dent* 2008; 30: 393–9.
8. Patchett CL, Srinivasan V, Waterhouse PJ. Is there life after Buckley's formocresol? Part II - Development of a protocol for the management of extensive caries in the primary molar. *Int J Paediatr Dent* 2006; 16: 199–206.
9. Yoshida K, Yoshida N, Iwaku M. Histological observations of hard tissue barrier formation in amputated dental pulp capped with alpha-tricalcium phosphate containing calcium hydroxide. *Endod Dent Traumatol* 1994; 10: 113–20.
10. Aeinehchi M, Dadvand S, Fayazi S, Bayat-Movahed S. Randomized controlled trial of mineral trioxide aggregate and formocresol for pulpotomy in primary molar teeth. *Int Endod J* 2007; 40: 261–7.

11. Jayam C, Mitra M, Mishra J, Bhattacharya B, Jana B. Evaluation and comparison of white mineral trioxide aggregate and formocresol medicaments in primary tooth pulpotomy: Clinical and radiographic study. *J Indian Soc PedodPrev Dent* 2014;32:13-8.
12. Ford TR, Torabinejad M, Abedi HR, Bakland LK, Kariyawasam SP. Using mineral trioxide aggregate as a pulp-capping material. *J Am Dent Assoc* 1996;127: 1491–1494.