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# Original Research

## Mineral trioxide aggregate (MTA) as pulp dressing agent in deciduous molars

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***ABSTRACT:***
**Background:** Pulpotomized teeth help in maintaining arch integrity by allowing preservation of the teeth that would otherwise be destined for extraction. The present study was conducted to assess efficacy of MTA in primary molars. **Materials & Methods:** 60 children with carious deciduous molar were randomly assigned to either control (formocresol) (group I) or experimental (MTA) (group II) group of 30 teeth each. **Results:** There were 38 males and 22 females in group I and 26 males and 34 females in group II. In group I pain was present in 1 patient at 24 hours only, swelling in 1 patient at 24 hours and change in color in 24 hours in 10 patients. The difference was significant (P<0.05). In group II pain was present in 1 patient at 24 hours only, mobility in 1 patient at 24 hours and change in color in 24 hours in 5 patients. The difference was significant (P<0.05). **Conclusion:** Both formocresol and MTA were excellent agent in primary molars. MTA may be effectively used as pulpotomy agent with superior results in deciduous molar.
**Key words:** Deciduous teeth, formocresol, MTA.

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### INTRODUCTION

Pulpotomized teeth help in maintaining arcth integrity by allowing preservation of the teeth that would otherwise be destined for extraction.[1]The current recommendation supersedes the previous pulp therapy guideline2 on the vital pulp therapies in primary teeth with deep caries lesions and does not cover non-vital pulp therapies, pulp therapy for immature permanent teeth, or pulp therapy for primary teeth with traumatic injuries. This clinical practice guideline adheres to the Appraisal of Guidelines Research and Evaluation (AGREE) reporting checklist.[2]

Formocresol has been critically evaluated for its toxic effects on pulp tissue. For decades formocresol has been a popular pulpotomy medicament. Concerns have been raised about the toxicity and potential carcinogenicity of formocresol in humans, and alternatives have been proposed to maintain partial pulp vitality.[3]

MTA have excellent proprieties such as sterility, radiopacity, resistance to moisture, good sealability against bacterial microleakage, and bioinduction. Due these proprieties, it stimulates mechanisms responsible for the bioremineralization and resolute of periapical disease that can improve treatment outcomes.[4] MTA, with an excellent long term prognosis, relative ease at which it can be used and with its numerous exciting clinical applications promises to be one of the most versatile materials of this century in the field of dentistry. When the

physical and chemical properties of MTA, were described it was found to be biocompatible and its sealing ability was better than zinc oxide eugenol.[5] The present study was conducted to assess efficacy of MTA in primary molars.

## MATERIALS & METHODS

The present study was conducted among 60 children with carious deciduous molar need pulpotomy of both genders. Parents' consent was obtained before starting the study.

Data such as name, age, gender etc. was recorded. Teeth were randomly assigned to either control (formocresol) (group I) or experimental (MTA) (group II) group of 30 teeth each. Following pulpotomy all the 50 teeth were restored with stainless steel crown after 24 hours. Finally, the patients were recalled after 1 month, 3 months and 6 months respectively and evaluated clinically. Results thus obtained were subjected to statistical analysis. P value les than 0.05 was considered significant.

## RESULTS

**Table I Distribution of patients**

| Groups | Group I | Group II |
|---|---|---|
| Method | Formocresol | MTA |
| M:F | 38:22 | 26:34 |

Table I shows that there were 38 males and 22 females in group I and 26 males and 34 females in group II.

**Graph I Distribution of patients**

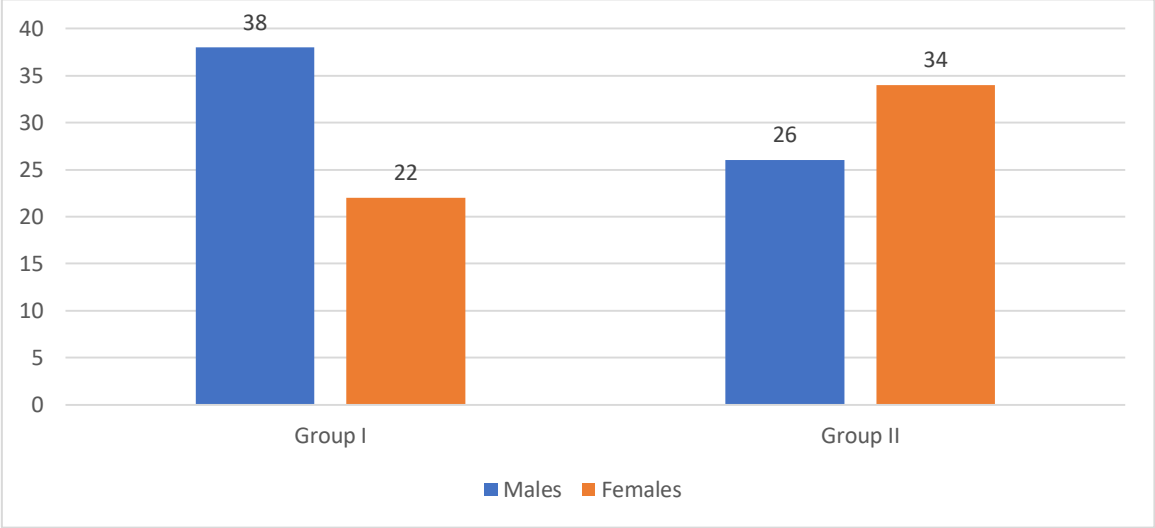


**Table II Comparison of clinical parameters in group I**

| Parameters | 24 hours | 1 month | 3 months | 6 months | P value |
|---|---|---|---|---|---|
| Pain | 1 | 0 | 0 | 0 | 0.15 |
| Mobility | 0 | 0 | 0 | 0 | - |
| Swelling | 1 | 0 | 0 | 0 | 0.15 |
| Sinus | 0 | 0 | 0 | 0 | - |
| Change in color | 10 | 0 | 0 | 0 | 0.01 |

Table II shows that in group I pain was present in 1 patient at 24 hours only, swelling in 1 patient at 24 hours and change in color in 24 hours in 10 patients. The difference was significant (P<0.05).

**Table III Comparison of clinical parameters in group II**

| Parameters | 24 hours | 1 month | 3 months | 6 months | P value |
|---|---|---|---|---|---|
| Pain | 1 | 0 | 0 | 0 | 0.15 |
| Mobility | 1 | 0 | 0 | 0 | - |
| Swelling | 0 | 0 | 0 | 0 | 0.15 |
| Sinus | 0 | 0 | 0 | 0 | - |
| Change in color | 5 | 0 | 0 | 0 | 0.01 |

Table III shows that in group II pain was present in 1 patient at 24 hours only, mobility in 1 patient at 24 hours and change in color in 24 hours in 5 patients. The difference was significant (P<0.05).

## DISCUSSION

The dentist is faced to a challenge to choose the right treatment in case of retained deciduous molars with missing second premolar because of the multiplicity of etiological factors: the age, the development stage of adjacent teeth, and the root resorption and infraocclusion of the primary predecessor.[6] There is a variety of treatment options such as maintaining the primary tooth or extract it to be replace with an implant or prothesis.

If extraction of the second primary molar is indicated, the timing is imperative because of its harmful effects on dental arches such as arch-length reduction, malalignment of adjacent teeth, alveolar bone resorption, and extrusion of the antagonist tooth.[7] So future malocclusion can be prevented by maintaining it. Hence, if we decide to retain the deciduous tooth, we indicate pulpotomy or pulpectomy depending on pulp status. Kettering et al[8] in his case chose maintaining the mandibular left second primary molar with missing successor premolar as long as possible before extraction and replace it with an implant. This choice was based on the young age of the patient, absence of any malocclusion, or arch-length deficiency. Hence, a conventional pulpectomy, gutta-percha obturation, and reconstruction of the crown were done. Regular follow-up appointments were planned to re-evaluate pulpal pathology, ankylosis, and infraocclusion. Six-month follow-up showed a complete resorption of the roots, and gutta-percha cones were fixed in the bone.[9] The present study was conducted to assess efficacy of MTA in primary molars.

In present study we found that there were 28 males and 22 females in group I and 26 males and 24 females in group II. Naik et al[10] of the 50 teeth selected, 3 were not available for further follow-up after 1 month. The follow up after 1 month, 3 months and 6 months did not reveal any clinical or radiographic pathological findings in the rest of the 47 teeth. Hence, no statistical analysis was performed regarding the success of the treatment. The only significant findings were the discoloration of 60% of the teeth where MTA was used as a medicament after 24 hours, but which was later masked by restoring with a stainless steel crown.

We observed that in group I pain was present in 1 patient at 24 hours only, swelling in 1 patient at 24 hours and change in color in 24 hours in 10 patients. We observed that in group II pain was present in 1 patient at 24 hours only, mobility in 1 patient at 24 hours and change in color in 24 hours in 5 patients. Tebbeb et al[11] found that physiological root resorption is a known phenomenon for deciduous teeth with uncertain etiologic factors. The initiation of root resorption could be due to the injury or the infection of the pulp. The physiological, esthetic, and functional consequences of treating primary teeth without permanent successors make it a unique challenge. The present study present the treatment, and long-term follow-up of a case in mineral trioxide aggregate (MTA) was used in the pulpectomy of a nonvital primary molar with no permanent successor in a 14-year-old child. The treatment was root canal treatment and total obturation using MTA. Follow-up examinations were done and showed a radiographic healing of the periapical radiolucency and resorption of mesial root. Furthermore, the tooth was asymptomatic and clinically functional.

Mortazavi et al[12] in their study 27 children were included in this clinical investigation. The number of the treated teeth were 29 1st primary and 26 2nd primary molars (Table 1). Of the 55 original patients participated for treatment, 51 returned for follow up. The remaining 4 patients had either moved from the area or changed their address and contacts. Therefore, the information presented here relates to the 51 patients (teeth) who attended the follow-up appointments. Based on the recorded data, in 12 and 24 months follow up stages there was a no case with any of the failure criteria such as pain, fistula, abnormal mobility or swelling (100%). Radiographic evaluation was also confirming that treated cases were intact with no radiographic evidence of any pathosis after 12 and 24 months follow up (100%). In terms of the patients response rate, the number of missing was 4 (8%) and attended 51 (92%) which were available for follow up examinations, indicating a high rate of compliance.

The limitation of the study is small sample size.

## CONCLUSION

Authors found that both formocresol and MTA were excellent agent in primary molars. MTA may be effectively used as pulpotomy agent with superior results in deciduous molar.

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