

Summary of: Pulpotomy of human primary molars with MTA and Portland cement: a randomised controlled trial

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FULL PAPER DETAILS

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VERIFIABLE CPD PAPER

Objective This study compared the clinical and radiographic effectiveness of mineral trioxide aggregate (MTA) and Portland cement (PC) as pulp dressing agents in carious primary teeth. **Methodology** Thirty carious primary mandibular molars of children aged 5–9 years old were randomly assigned to MTA or PC groups, and treated by a conventional pulpotomy technique. The teeth were restored with resin modified glass ionomer cement. Clinical and radiographic successes and failures were recorded at 6, 12, 18 and 24-month follow-up. **Results** All pulpotomised teeth were clinically and radiographically successful at all follow-up appointments. Six out of 15 teeth in the PC group and five out of 14 teeth in the MTA group exfoliated throughout the follow-up period. No statistically significant difference regarding dentine bridge formation was found between both groups throughout the follow-up period. As far as pulp canal obliteration is concerned, a statistically significant difference was detected at 6-month follow-up ($p < 0.05$), since the beginning of mineralised material deposition could be radiographically detected in 100% and 57.14% of the teeth treated with PC and MTA, respectively. **Conclusions** PC may serve as an effective and less expensive MTA substitute in primary molar pulpotomies. Further studies and longer follow-up assessments are needed.

EDITOR'S SUMMARY

This paper starts from the laudable standpoint of attempting to reduce our reliance on materials for primary tooth pulpotomies that may have noxious biological effects. A wide range of these has been advocated and used over a number of years, often in formulas that seem to rely more on word of mouth and alchemy than on scientific rigour. Controversies surrounding these materials and techniques have been highlighted in the *BDJ* in recent times and mineral trioxide aggregate (MTA) has been proposed as a possible biologically inert alternative. Therefore, although the sample size here is small, it was felt important to give this area of research an airing to bring alternative materials some exposure (and I suppose the pun on exposure has to be intended here!)

There are several other matters surrounding this subject that bring the

treatment of primary molars into debate. Professor Duggal in his commentary raises the point of the additional benefits that might accrue for the patient by using a stainless steel crown when restoring these teeth. This serves to highlight the considerable array of options and possible solutions that can be applied to this physically small area of pulpal therapy. In many ways this tiny biological microcosm has created a greater battleground of opinion, counter-opinion and non evidence-based therapy than arguably any other in paediatric dentistry, and possibly dentistry in general.

As the authors state, the hope is that further research will establish a best practice route for primary molar pulpal care, in addition to which the advent of possible solutions through pulpal tissue engineering is of greater excitement and potential benefit still. However, beneath all of this remains the

fact that the prevention of caries in the primary dentition, whose pulpal tissues are so relatively close to the outside world, is by far the best option for which to strive.

The full paper can be accessed from the *BDJ* website (www.bdj.co.uk), under 'Research' in the table of contents for Volume 207 issue 3.

Stephen Hancocks,
Editor-in-Chief

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IN BRIEF

- Portland cement (PC) may serve as a substitute for MTA in pulpotomy of primary teeth.
- Besides the similar clinical and radiographic effectiveness of PC and MTA as pulpotomy dressing agents, PC has the advantage of being an inexpensive material.
- Before unlimited clinical use of PC, further studies with large samples and long follow-up assessments are needed.

COMMENT

This generally well conducted prospective clinical study addressed a clearly focused question comparing the use of Portland cement and mineral trioxide aggregate (MTA) as materials to be placed after the amputation of the coronal pulp in primary molars. Both the materials showed a high, and a similar outcome in terms of clinical and radiographic success.

There has been a resurgence in interest in pulp therapy for primary molars, with a range of medicaments and materials being proposed as alternatives to formocresol, the use of which has become difficult to justify. MTA has been shown to be efficacious in previous studies,¹ however its high cost is prohibitive, which is why the authors of the current study chose to compare its use with Portland cement, a similar but a significantly cheaper alternative.

This study follows all the principles of a good study design, with one exception: the sample size is very small, and possibly inadequate for the conclusions the authors make. Six out of 15 teeth in the PC group and five out of 14 teeth in the MTA group exfoliated through the follow-up period, which really meant that nine teeth from each group were available for follow-up at the end of two years. This number is woefully inadequate and the only negative point in this otherwise well conducted study. Discoloration of the crown was observed with both materials and has been previously documented for MTA, but would be inconsequential if

stainless steel crowns had been used for the coronal restoration.

There are now a number of medicaments and materials that have been shown to have good outcomes for pulp therapy, MTA being one of them. However, the key element that influences the success of pulp therapy in children is the diagnosis of the state of pulp inflammation. In primary molars pulp inflammation sets in early, especially for proximal caries, and precedes the exposure of the pulp.² A recent publication also revealed that the likelihood of severe pulp inflammation being present was four times higher for proximal caries when compared with occlusal caries of the same depth.³ Correct diagnosis rather than the medicament used seems to be the most important factor that dictates the outcomes in primary molars.

M. Duggal,
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AUTHOR QUESTIONS AND ANSWERS

1. Why did you undertake this research?

Our group has been working on the search for effective and nontoxic materials to be employed in pulpotomy treatment of primary teeth in order to replace the use of formocresol due to its reported toxic, mutagenic and carcinogenic properties. Recently we showed that mineral trioxide aggregate (MTA) was more successful than calcium hydroxide and equally effective as formocresol for pulpotomies in primary molars, thus supporting the suggestion that MTA is a suitable replacement for formocresol in primary molar pulpotomies. However, taking into account the low cost and apparently similar properties of Portland cement in comparison with MTA, and due to the lack of *in vivo* studies comparing both materials, it seemed reasonable for us to undertake this research.

2. What would you like to do next in this area to follow on from this work?

In order to investigate the suitability of Portland cement for pulpotomy of primary teeth, we intend to increase the number of subjects and the follow-up period in our research, which will be valuable to determine the long-term clinical and radiographic success of this material for endodontic purposes. Additionally, we plan to perform histological analysis of teeth treated with Portland cement, and compare the results with those of MTA and formocresol. As a long-term goal, besides the research with biocompatible materials, we would like to study regenerative procedures to be employed in pulp tissue engineering.