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Nano-hydroxyapatite and calcium-enriched mixture for pulp capping of sound primary teeth: A randomized clinical trial

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Introduction: Nano-hydroxyapatite (NHA) has been used for regeneration of osseous defects. Calcium-enriched mixture (CEM) cement is also used for various dental treatments. This trial compared the efficacy of NHA and CEM cement for direct pulp capping (DPC) of sound primary teeth.

Methods: In this randomized clinical trial with split-mouth design, after attaining informed consent, 20 sound primary canines scheduled for orthodontic extraction, were selected. After mechanical pulp exposure, the exposed site was capped with either NHA or CEM cement and then immediately restored with glass-ionomer and resin composite. The teeth were extracted after two months and examined histologically. Parameters of hard tissue bridge (HTB) formation, its type and quality as well as pulpal inflammation scores were compared between the two experimental groups. The data were analyzed using the Mann Whitney U and Fisher's exact test. The level of significance was set at 0.001.

Results: All CEM specimens showed inflammation score of 0 (less than 10%). However, in NHA group, inflammation scores of 0 (less than 10%), 1 (10%-30%) and 2 (30%-50%) were observed in 2 (20%), 4 (40%) and 4 (40%) specimens, respectively ($P<0.001$). HTB was formed in all CEM specimens while it was developed in 2 specimens of NHA (20%; $P<0.001$). All CEM specimens showed normal pulp; only two cases in NHA group (20%) demonstrated uninflamed normal pulp.

Conclusions: CEM cement was superior to NHA as a DPC agent in terms of HTB formation and pulp inflammation scores. It is a suitable material for the DPC of primary teeth.

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