

The Evaluation of Cytotoxic and Regenerative Effects of Recently Used Pulpotomy Materials; at Cellular Level

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Objective: To compare osteo/odontogenic differentiation (regeneration) capacities of a new amputation material named as Biodentine TM and the Pro-ROOT MTA and cytotoxic effects of Biodentine TM, Pro-ROOT MTA, Formokreazol (FK), Ferric Sulphate (FS) and Calcium Hydroxide (Ca(OH)₂) on mesenchymal stem cells derived from dental pulp of 50 primary teeth with completed root resorption.

Method: Cell cultures were prepared. On the 1st, 3rd and 7th day, cytotoxicity of MTA, Biodentine TM, FK, FS, and Ca(OH)₂ were analysed with 3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium (MTS) assay. To compare the regenerative effect of MTA and Biodentine TM, MTS assay, type I collagen, alkalinephosphatase (ALP) and osteonectin analysis with real-Time PCR (RT-PCR) and Confocal imaging of Dentin sialophosphoprotein (DSPP) and type I Collagen were taken and osteocalcin, Von Kossa and ALP tests were done on the 1st, 3rd and 21th days.

Results: MTA was found the most biocompatible material. Biocompatibility of Biodentine TM, FK, FS and Ca(OH)₂ showed statistically no significant difference ($p>0.05$) and biocompatibility of MTA and Biodentine TM was not found significantly different ($p>0.05$). According to RT-PCR results on 1st, 7th and 21st days of ALP, osteonectin and collagen type I, imaging of collagen type I, DSPP and osteocalcin activity of Biodentine TM was superior to MTA. Biodentine TM was found better in osteo/odontogenic differentiation to MTA whereas MTA found less cytotoxic than Biodentine TM.

Conclusion: Currently available evidence on osteo/odontogenic differentiation capacity of dental pulp MSCs, Biodentine TM can be considered as an alternative material for regenerative endodontics.

Key words: Biodentine, MTA, pulpotomy, regenerative endodontics, stem cell