

In vivo evaluation of dentin-pulp complex response after direct capping-pulp with Bioceramic/Poly(glycolic)-poly(lactic acid) composite.

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Introduction: The capping-pulp for preservation of pulp tissue and induction of tertiary dentine has been principles of a more conservative dentistry. The last generations of bioceramics, like bifasic macro and micro porous β -tricalcium phosphate (β TCP) and of hydroxyapatite (HA) have been used for tissue regeneration of bone because of its biocompatibility.

The objective of this study was to evaluate the response of a composite bioceramic:poly(glycolic)-poly(lactic-acid) (BC-PLGA) in direct pulp capping of rat teeth after 60 days.

Methods: The composite was prepared with 75% of bioceramic (β -tricalcium phosphate and Hydroxyapatite) and 25% of Poly(glycolic)-poly(lactic acid) microspheres with fluoresceine to identified the biomaterial degradation in pulp tissue. The tested groups were: 1. Bioceramic/Microspheres of PLGA; 2. Calcium hydroxide and 3. Distilled water. The direct pulp capping was done in the upper first molars of the healthy rats (*Norvergicus wistar*) that weighted 250g. After 30 days the animals were sacrificed and the maxillary was dissected, fixed in 10% neutral-buffered formaline and demineralized with 10% EDTA solution. The criteria's for evaluation were inflammation and absence or presence of tertiary dentine after 60 days.

Results: On the 60th day, Partial obstruction was found and necrosis of the connective tissue was observed in the exposure site, inflammatory infiltration chronic moderate composed of mononuclear cells, plasma cells and enlarged capillaries.

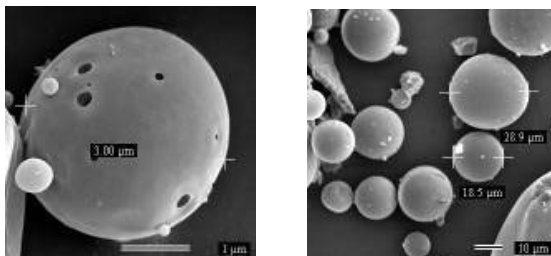


Fig 1. SEM of the microspheres of PLGA with fluorescein (magnification 1000x and 5000x, respectively).

Throughout the whole dental pulp was observed presence of dentine tertiary and finally it was observed that the flesh was in root activity, suggesting a good prognosis of vitality.

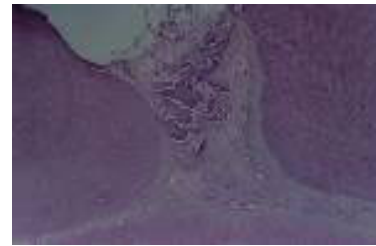


Figure 2. Histological slide after pulp capping with Bioceramic/PLGA composite: complete calcification bridge (10X), H&E, after 60 days.

Polymers:bioceramic composite have been studied because of their important effects in improving bone growth. The present study identified the dentine tertiary formation in teeth treated with BC/ PLGA group. This result could be explained by the microspheres PLGA degradation process and the presence of BC. The soluble phase of BC can be related to the activation of growth factors. The insoluble phase of BC can be related the deposition of mineral tissue and induce the production of tertiary dentine.

Conclusions: the bioceramic-PLGA composite was capable to stimulate the repair of pulp tissue, inducing the formation of tertiary dentin. However, further studies should be developed to assure that this biomaterial could be used as an agent for direct capping-pulp.

References:

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