

4th International Conference on **Nanotek & Expo**

December 01-03, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

Tissue engineering for immature teeth with apical periodontitis in dogs

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Introduction: Injury to an immature permanent tooth result in cessation of root maturation leaving thin dentinal walls prone to fracture. Regenerative endodontic procedures aim to regenerate the pulp dentin complex utilizing dental stem cells, growth factors and scaffold matrix.

Aim: The aim of this study is the evaluation of clinical trial of tissue engineering technology to implant or re-grow pulp like tissues in canals of immature non-vital permanent teeth in canines.

Methods: Twenty four immature upper permanent incisors teeth, in 6 dogs of 6 month old, were selected and divided into 2 groups. Group (A), 12 teeth for dental pulp stem cells transplantation and group (B) 12 teeth for sealing with MTA paste only. Another 12 teeth, Group (C), for isolation of the dental pulp stem cells were grouped. Apical periodontitis were induced in groups (A) and (B). After disinfection, teeth were re-entered and mixture of antibiotic paste was applied for two weeks. Dental pulp stem cells were isolated from group (C) teeth of the same dog, prepared for transplantation, mixed with growth factors and transplanted in group (A) teeth while MTA was applied for group (B) teeth. Both groups (A) and (B) teeth were monitored radiographically for periradicular healing and root wall thickening and/or lengthening.

Results: Chi-square test analysis of radiographic results showed no statistically significant differences (p 1.000) between group (A) and group (B) regarding healing of radiolucencies, while for radicular thickening there was statistically significant difference (p 0.004) between group (A) and group (B). Also group (A) showed significantly more apical closure than group (B) (p 0.004).

Conclusion: Dental pulp stem cells can regenerate dentine-pulp-like tissue and help in complete root maturation of non-vital immature permanent teeth.

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