

PR-II-8. Effects of Chitosan-Hydroxyapatite Membrane on Bone Formation in a Rat Calvarial Defect Model

Jung-a Shin^{1*}, Jung-yoo Choi¹, Gyung-Joon Chae¹, Ui-Won Chung¹,
Chang-Sung Kim¹, Kyoo-Sung Cho¹, Jung-Kiu Chai¹, Yong-Keun Lee²,
Chong-Kwan Kim¹, Seong-Ho Choi¹

1 Department of Periodontology, Research Institute for Periodontal Regeneration, College of Dentistry, Yonsei University

2 Department of Research Institute of Dental Biomaterials and Bioengineering, College of Dentistry, Yonsei University

Background

Chitosan has been known as a wound healing agent. Hydroxyapatite enhances formation of bone-like tissue. To improve the bioactivity of chitosan, hydroxyapatite was added to chitosan membrane. The purpose of this study was to evaluate the biocompatibility and guided bone regenerative effect of chitosan-hydroxyapatite membranes in rat calvarial defect.

Materials and Methods

Calvarial, 8mm diameter, critical-size osteotomy defects were created in 50 male Sprague-Dawley rats. 5 groups of 10 animals each received either 1) chitosan 70% / HAp 30% membrane, 2) chitosan 60% / HAp 40% membrane, 3) chitosan 50% / HAp 50% membrane, 4) chitosan 100% membrane 5) a sham - surgery control.

The amount of newly formed bone from the surface of the rat calvarial defects was measured by histomorphometry and radiomorphometry following 2- or 8- weeks healing interval.

Results

The results are as follows: When chitosan-HAp membranes are implanted, inflammatory reaction was observed at 2 weeks but subsided 8 weeks after surgery. Chitosan-HAp membrane groups were more radiopaque than other groups and new bone was evident at the defect surfaces at both 2 and 8 weeks.

The results demonstrate that the use of chitosan-hydroxyapatite membrane on the calvarial defects in rats has beneficial effect on the regeneration of bone tissue in itself.

Conclusions

As further researches are fulfilled, chitosan– hydroxyapatite can be used as a bone regenerative material.