

### A-3. Effect of Chitosan on the Periodontal Healing of One-Wall Intrabony Defects in Beagle Dogs

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The ultimate goal of periodontal therapy for destructive periodontal disease is the regeneration of the attachment apparatus. Various procedures for regeneration have been developed, including guided tissue regeneration, bone graft, and the use of a growth factor, but all of them have their limitations.

Consequently, researchers have recently paid more and more attention to new alternatives, particularly biodegradable materials. Among them, the most representative are natural biopolymers especially dextrin, mucopolysaccharide, and chitin. Chitin and its extract, chitosan (poly-N-acetyl glucosaminoglycan) in particular are attracting most interests.

The present study was conducted in order to evaluate the periodontal tissue regenerative effects of chitosan/collagen sponge applied to the preclinical 1-wall defects surgically created in beagle dogs. 4 × 4 mm 1-wall defects were created in bilateral maxillary second and fourth and mandibular first and third premolars. The surgical control group received flap operation only, while the buffer control group were treated afterwards with phosphate-buffered saline/ collagen sponge and the chitosan group, with chitosan/collagen sponge. The subjects were sacrificed at 8 weeks after operation, and the comparative histological examination of their healing results yielded the following conclusion.

1. Junctional epithelium migration amounted to  $2.30 \pm 1.24$  mm in the surgical control group,  $1.49 \pm 1.25$  mm in the buffer control group, and  $0.26 \pm 0.59$  mm in the chitosan group. A significant difference showed only between the surgical control and the chitosan group ( $P < 0.05$ ).
2. Connective tissue adhesion amounted to  $0.68 \pm 0.60$  mm,  $1.07 \pm 0.91$  mm, and  $0.41 \pm 0.42$  mm respectively in the surgical control, buffer control, and chitosan group, without significant difference between the groups.
3. Cementum regeneration amounted to  $1.42 \pm 0.49$  mm,  $1.60 \pm 0.41$  mm, and  $3.46 \pm 0.78$  mm respectively in the surgical control, buffer control, and chitosan group. A significant difference was seen between the chitosan group and the rest ( $P < 0.01$ ).
4. The alveolar bone regeneration amounted to  $1.00 \pm 0.77$  mm,  $1.52 \pm 0.37$  mm, and  $2.43 \pm 0.44$  mm respectively in the surgical control, buffer control, and chitosan group. A significant difference was observed between the chitosan group and the rest ( $P < 0.05$ ).

The above results demonstrate the beneficial effect of chitosan/collagen sponge to the 1-wall defects of beagle dogs. The inhibited apical migration of epithelium and the increase in new bone and new cementum suggest the potency of chitosan in inducing periodontal tissue regeneration.