In vivo evalution of chitosan/ collagen composite barrier for guided tissue regeneration

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Abstract

In this in vivo study, we examined the histological changes of an implanted novel chitosan/collagen composite barrier in order to confirm its clinical feasibility. Four other commercial GTR (guided tissue regeneration) membranes were chosen for comparison. Among the resorbable GTR membranes, BioMend Extend(superscript TM) and Peri-Aid(superscript ®) are collagen-based, GORE OSSEOQUEST is a synthetic membrane, and GORE-TEX(superscript®) e-PTFE is a synthetic but non-resorbable. Beagles were used as the animal model. The tested GTR barriers were implanted in critical bone defect areas. Histological and histometric evaluations at 1, 2, 4, and 12 weeks were respectively performed postoperatively to determine the healing response of each treatment modality. Like all resorbable GTR membranes, the chitosan/collagen composite barrier enhanced the cementum regeneration by 1.16 mm on average after a 28-day implantation. After 3 months, an average cementum height of 2.6 mm was observed for the chitosan/collagen composite barrier group. In our study, inhibiting epithelial migration and encouraging formation of new connective tissue attachment to rod surface provided evidence of positive results of the chitosan/collagen composite barrier placement. It also promoted blood clot aggregation and maturation early in wound-healing process and decreased wound infection.