

## 去乙醯幾丁聚醣/膠原蛋白組織再生膜片之活體評估

### Collagen-Chitosan Composite Barrier For Guided Tissue Regeneration

#### 中文摘要

本研究之目的在評估與工研院生醫中心合作發展出可吸收性去乙醯幾丁聚醣/膠原蛋白複合之組織導引再生膜片，並選擇與可吸收性之 BioMend Extend™ 及 Peri-Aid® 膠原蛋白膜片，和 GORE-TEX® OSSEOQUEST 合成高分子膜片，及不可吸收之 GORE-TEX® e-PTFE 合成高分子膜片，等其他四種市售商品材料共同對照評估，應用 8 隻年齡為 12 個月的雄性小獵犬(Beagle dogs)，均分 4 組 (分別為 7 天、14 天、28 天、3 個月)，為動物活體評估模式，在實驗犬之左、右下顎第一、二小白齒及大白齒的頰側區製造骨缺損後，分別植入組織導引再生膜片，依實驗設定時間將小獵犬犧牲，取下缺損區骨頭，以光學顯微鏡觀察量測其牙齦質再生高度與齒槽骨再生高度之變化，以探討其組織再生模式及評估新膜片在臨床應用之適用性。結果顯示，去乙醯幾丁聚醣/膠原蛋白膜片在手術後第 4 週牙齦質再生高度平均為 0.9 mm，效果上與市售膠原蛋白膜片 (2.6 mm)相近。術後第 3 個月時，牙齦質再生高度可達 2.6 mm，明顯優於 e-PTFE 膜片 (2.32 mm)；在新生骨之生成方面，膜片植入後三個月後，可發現槽骨再生高度平均可達 1.16 mm，與市售可吸收性膜片(1.0 mm)類似，但明顯優於 e-PTFE 膜片 (0.74 mm)。綜合以上觀察，在防止上皮細胞向牙根尖部生長，及促使牙周結締組織生長於牙根表面上，所開發之去乙醯幾丁聚醣/膠原蛋白膜片較市售膜片有相似或更佳之功能，同時在癒合初期能促進血塊凝結與減少感染的機率，而有助於傷口之穩定。

關鍵字：去乙醯幾丁聚醣，膠原蛋白，引導組織再生術，牙齦質再生高度，齒槽骨再生高度

#### 英文摘要

##### Abstract

This in vivo study was to examine the histological changes of implanted novel chitosan/collagen composite barrier for confirming the clinical feasibility. Four other commercial GTR (Guided Tissue Regeneration) membranes were chosen for comparison. Among the resorbable GTR membranes, BioMend Extend™ and Peri-Aid® are collagen base, and GORE-TEX® OSSEOQUEST is synthesized membrane, while GORE-TEX® e-PTFE (Expanded polytetrafluoroethylene) is synthesized but non-resorbable. Beagle dogs were used as animal model. Buccal mucoperiosteal flaps were reflected in the bilateral mandibular premolar and molar areas. Buccal alveolar bone was reduced on 1st、2nd premolar and molar to a level

5 mm apical to the cemento-enamel junction (CEJ). Root surface was denuded of periodontal ligament and cementum, and notches were placed at the bone level of each root. The tested GTR barriers were implanted in critical bone defect areas. Flaps were coronally positioned and sutured. Two beagle dogs were sacrificed each time as the designed time period after surgery. Histological and histometric evaluation at 7 days · 14 days · 28 days · 3 months were performed post-operatively to determine the healing response of each treatment modality. Both the cementum height and bone height were measured as the index of tissue occlusion effect. Like all resorbable GTR membrane, the chitosan/collagen composite barrier enhanced the cementum regeneration of 1.16 mm averagely after 28-day implantation. After 3 months, average cementum height of 2.6 mm was observed for chitosan/collagen composite barrier group. On the contrast, cementum height of 0.9 mm was observed in e-PTFE group. Meanwhile bone regeneration also observed and bone height was measured average 1.0 mm for all test membrane group except the control group without GTR membrane implanted reveal no bone formation. In our study, inhibiting epithelial migration and encouraging formation of new connective tissue attachment to root surface evidenced positive results of chitosan/collagen composite barrier placement. It also promoted blood clot aggregation and maturation in early wound healing process and decreased wound infection.

Key word : chitosan, collagen, guided tissue regeneration, cementum height, alveolar bone regeneration.