

R-16. The Effect of Newly Fabricated Calcium Phosphate Block Bone Graft and Chitosan Membrane on the Healing of Alveolar Bone in the One Wall Intrabony Defects in the Beagle Dogs

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Background

This study evaluates periodontal repair and biomaterial reaction following implantation of a newly fabricated calcium phosphate block bone with chitosan membrane on the regeneration of one wall intrabony defects in the beagle dogs.

Materials and Methods

One wall intrabony periodontal defects were created at the mesial aspect of the mandibular second and fourth premolars and at the distal aspect of the mandibular second premolars in either right or left jaw quadrants in 6 Beagle dogs. The surgical control group received a flap operation only, while the experimental group I was treated with a chitosan nonwoven membrane only and the experimental group II was treated with a chitosan nonwoven membrane and a calcium phosphate block bone. The subjects were sacrificed 12 weeks after surgery and a comparative histometric analysis was done.

Results

The amount of junctional epithelium migration was $44.51 \pm 14.46\%$ in the surgical control group, $58.56 \pm 13.07\%$ in the experimental group I and $33.23 \pm 13.20\%$ in the experimental group II. No significant differences were observed between the surgical control group and two experimental groups ($P < 0.05$). The amount of connective tissue adhesion was $28.57 \pm 13.93\%$, $10.73 \pm 5.10\%$ and $11.42 \pm 5.08\%$ in the surgical control

group, the experimental group I and experimental group II respectively. Significant differences were observed between the surgical control group and two experimental groups ($P < 0.05$). The amount of new cementum regeneration was $26.91 \pm 13.90\%$, $30.70 \pm 14.57\%$, and $55.34 \pm 14.31\%$ in the surgical control group, the experimental group I and the experimental group II respectively. Significant differences were observed between the surgical control group and the experimental group II ($P < 0.05$). The amount of alveolar bone regeneration was $30.37 \pm 4.13\%$, $28.29 \pm 14.82\%$ and $52.32 \pm 14.34\%$ in the surgical control group, the experimental group I and experimental group II respectively. Significant differences were observed between the surgical control group and experimental group II ($P < 0.05$).

Conclusion

These results demonstrate the beneficial effects of the newly fabricated block bone and the chitosan nonwoven membrane to one wall intrabony defects of beagle dogs. The calcium phosphate block bone successfully functioned as an osteoconductive scaffold for invading cells of the host. The chitosan nonwoven membrane lacked the ability to adequately provide or maintain space for guided tissue regeneration in one wall intrabony periodontal defects of the beagle dogs, resulting in limited cementum and bone regeneration.

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