

The effect of Tisseel[®] on bone healing of ash in rat

Chul-Min Park, Su-Gwan Kim

Oral and Maxillofacial Sugery, College of Dentistry, Chosun University

Abstract

Purpose: The present study examined the early bone healing pattern of grafted bone and the degree of new bone formation to determine the effect of the Tisseel[®] after grafting with a particulate dentin and plaster of Paris mixture in rat.

Material and Method: Eight-mm-diameter calvarial critical-size defects were created in rats. A critical-size defect is defined as the smallest intraosseous wound in a particular bone and species of animal that will not heal during the lifetime of the animal.

Forty-eight rats were randomly assigned to four groups, and each group was further divided into two subgroups: 2-, 4-, and 8 weeks after implantation. The defect was filled in different manners: Group 1, non-graft group; Group 2, tooth ash-plaster graft group; Group 3, Tisseel[®] and tooth ash-plaster graft group; and Group 4, Tisseel[®] graft group. Histologic sections were obtained for histomorphometric analysis of the defects at 2-, 4-, and 8 weeks after surgery.

Result: When the comparison was done according to each week in 2-week group, new bone formation was significantly different($p=0.005$) in overall. It was significantly different between groups 1 and 2 ($p=0.009$) and Group 1 and Group 3 ($p=0.006$). In the case of 4-week group, it was significantly different ($p=0.000$) in overall all. A significant difference was seen between groups 1 and 2 ($p=0.004$), groups 1 and 3 ($p=0.004$), groups 1 and 4 ($p=0.004$), groups 2 and 4 ($p=0.004$), and groups 3 and 4 ($p=0.010$). Also in the case of 8-week group, new bone formation was also significantly different ($p=0.001$) in overall. A significant difference seen between groups 1 and 2 ($p=0.004$), groups 1 and 3 ($p=0.006$), groups 1 and 4 ($p=0.006$), and groups 2 and 4 ($p=0.016$).

Conclusion: To restore a bony defect severe than the critical defect, a graft is needed to induce new bone formation. An effective bone formation can be ex-

pected using ash, Tisseel[®], and ash- Tisseel[®] combined. Ash is especially effect, followed by ash- Tisseel[®] combination and Tisseel[®], Thus, Tisseel[®] can substitute for ash and would yield a better result when used combined with ash.

References

1. Carmagnola D, Berglundh T, Lindhe J: The effect of a fibrin glue on the integration of Bio-Oss[®] with bone tissue. An experimental study in labrador dogs. *J Clin Periodontol* 2002; 29: 377-383.
2. Albrektsson, T., Bach, A., Edshage, S & Jonsson, A.: Fibrin adhesive system(FAS) influence on bone healing rate. A microradiographical evaluation using the bone growth chamber. *Acta Orthopeda Scandinava* 1982; 53: 757-763.
3. Carmagnola, D. Berglundh T., Araujo M., Albrektsson T & Lindhe J: Bone healing around implants placed in a jaw defect augmented with Bio-Oss[®]. An experimental study in dogs. *Journal of Clinical Periodontology* 2000; 27: 799-805.
4. Kania R. E., Meunier, A., Hamadouche, M., Sedel, L. & Petite, H. Addition of fibrin sealant to ceramic promotes bone repair: long-term study in rabbit femoral defect model. *Journal of Biomedical Materials Research* 1988; 43: 38-45.
5. Kalebo P, Buch F & Albrektsson T: Bone formation rate in osseointegrated titanium implants, Influence of locally applied hemostasis, peripheral blood, autologous bone marrow and fibrin adhesive system. *Scandinavian Journal of Plastic and reconstructive surgery and hand surgery* 22,53-60.
6. Mats B, Eva SJ, Anders L: Influence of fibrin sealant (Tisseel[®]) on osteochondral defect repair in the rabbit knee.