Usefulness of Elastin For Ligament-Bone Junction Healing In Rabbits

Naoya Ito¹, Masahiro Hasegawa¹, Hironori Unno¹, Yoshiaki Suzuki¹, Yoshihiro Miura¹, Yuriyo Matsui¹, Keiichi Miyamoto², Akihiro Sudo¹

¹Department of Orthopaedic Surgery, Mie University Graduate School of Medicine
²Department of Chemistry for Materials, Mie University Graduate School of Engineering

Introduction: Stronger connection in ligament-bone junction (LBJ) is important for ligament reconstruction. Elastin is associated with ligament healing and ossification and improve strength of LBJ. We examined the effect of elastin for artificial LBJ healing in rabbits.

Methods: Twenty four 12-week-old rabbits were used. With animals under general anesthesia, we created two bone tunnels (2.4mm in diameter) on bilateral tibia. Twelve animals under general anesthesia we created two bone tunnels (2.4mm in diameter) on bilateral tibia. Twelve 3-0PDS inserted artificial ligament made of three fold 3-0 PDS coated with elastin in bone tunnels as elastin group. Another 12 rabbits were operated using artificial ligament without elastin coating as control group. We performed biomechanical test for breaking strength and elongation and assessed histologically by H-E and safranine-O staining after 6 and 12 weeks. The Mann-Whitney U-test was used. A p-value <0.05 was considered significant.

Result: The breaking strength of elastin group (25.2±10.22N) was stronger than those of control group (11.0±6.99N) after 6 weeks. There were no significant differences in the elongation between elastin group (3.99±1.51N) and control group (3.74±2.00N). We couldn’t get effective data about biomechanical test because of decline in strength by PDS absorption at 12 weeks. Histologically, we found cartilage and bone formation around bone tunnels stained with H-E in elastin group.

Conclusion: Elastin could improve bone tunnel healing and might be useful for promoting LBJ healing.

Key words: ligament reconstruction, elastin, ligament-bone junction