ISAKOS

International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine

9th Biennial ISAKOS Congress • May 12-16, 2013 • Toronto, Canada

Paper #25

Early Passive Motion is Harmless to Shoulder Rotator Cuff Healing in Rabbit

Shurong Zhang, MD, JAPAN
Yun Xia Li, MD, CHINA
Hong Li, MD, CHINA
Hong Yun Li, CHINA
Shiyi Chen, MD, PhD, CHINA

Sports Medicine Center, Huashan Hospital
Shanghai, CHINA

Summary:
This study reinforced that postoperative immobilization resulted better tendon-bone healing, and further under the immobilization, early passive from two-week postoperatively was harmless to the rotator cuff healing.

Abstract:
Background: Postoperative passive motion is the most widely accepted rehabilitation protocol however the rotator cuff retear remains frequent surgical failure. Clinical outcomes indicated early passive motion is harmless to rotator cuff healing but no evidence from laboratory supporting this finding.

Hypothesis: (1) Immediately postoperative immobilization improves rotator cuff healing. (2) Early passive motion under continuous immobilization does not harm the rotator cuff healing.

Study Design: Controlled Laboratory Study

Method: Supraspinatus injury was created and repaired in 90 New Zealand rabbits, afterwards they were randomly separated into three groups: (1) Non-immobilization (NI, n=30), (2) Continuous immobilization (IM, n=30), and (3) Immobilization concomitant with passive motion (IP, n=30). At the time point of 3, 6, 12 weeks postoperatively, five rabbits of each group were sacrificed to the histological evaluation, biomechanical tests and magnetic resonance imaging (MRI) scanning.

Results: The histology demonstrated that better postoperative healing existed in IM group and IP group by cluster of chondrocytes accumulating at the tendon bone conjunction. MR scanning illustrated the tendon bone conjunction was intact in IM group and IP group, and the Signal/Noise Quotient (SNQ) showed that non-immobilization group was not significantly higher than immobilization groups at 3 week (p=0.232) and 6 week (p=0.117), but significant difference was found at 12 week (p=0.006,p=0.009). At 12 week, the failure load was significantly higher in IM and IP group than NI group (p=0.002, p=0.002), but no difference between IM and IP group (p=0.599).
Conclusion: In this study, we found immediately postoperative immobilization lead to better tendon bone healing than immediate postoperative mobilization. And under the immobilization, early passive motion is harmless to tendon bone healing. These results may play an important role in rotator cuff postoperative rehabilitation protocol.

Key words: rotator cuff healing, passive motion, biomechanical testing, magnetic resonance imaging, signal intensity