ISAKOS

International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine

10th Biennial ISAKOS Congress • June 7-11, 2015 • Lyon, France

Paper #214

Clinical Outcomes of Arthroscopic Superior Capsule Reconstruction for Irreparable Rotator Cuff Tears Without Severe Osteoarthritis in the Glenohumeral Joint

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Summary:
Arthroscopic superior capsule reconstruction restored superior glenohumeral stability and function of the shoulder joint, suggesting that this reconstruction technique is a reliable and useful alternative treatment for irreparable rotator cuff tears without severe osteoarthritis in the glenohumeral joint.

Abstract:
OBJECTIVE
Chronic rotator cuff tears are challenging to repair completely because of the development of tendon retraction with inelasticity, muscle atrophy, and fatty infiltration. A recent anatomical study has shown that the superior shoulder capsule is attached to a substantial area (30% to 61%) of the greater tuberosity, suggesting that the superior shoulder capsule is an important component of the glenohumeral joint. Also a recent biomechanical study has showed that the superior shoulder capsule plays an important role in passive stability of the glenohumeral joint. Therefore, we developed a new surgical treatment, “arthroscopic superior capsule reconstruction” to restore superior stability of shoulder joint without repairing supraspinatus and infraspinatus tendon tears. The objective of this study was to investigate the clinical outcome and radiographic findings after arthroscopic superior capsule reconstruction on irreparable rotator cuff tears.

METHODS
From 2007 to 2013, 72 shoulders in 70 consecutive patients (mean age 65.5 years; range, 43–82) with irreparable rotator cuff tears were included. For arthroscopic superior capsule reconstruction, a graft 6 to 10 mm thick was made by folding the fascia lata twice or thrice and inserted into the subacromial space via the lateral portal. The medial side of the fascia lata was then attached to the superior glenoid by using two suture anchors. The lateral side of the fascia lata was attached to the rotator cuff footprint on the greater tuberosity by using the suture bridge technique at 30-45° shoulder abduction. Finally, side-to-side sutures were added between the graft and residual tendons to improve force coupling in the shoulder joint. Physical examination, radiography, and magnetic resonance imaging were performed before surgery; at 3, 6, and 12 months after surgery; and yearly thereafter.

RESULTS
The average preoperative scores were 31.3 points by ASES (range, 3.3 to 63.3 points) and 50.6 points by JOA (26.5 to 68.5 points). Both clinical outcome scores improved significantly after arthroscopic superior capsule reconstruction at the final follow-up (mean; 30.5 months, range; 12 to 76 months after surgery; ASES, 92.8 points; JOA, 93.8 points) ($P<0.00001$). The shoulder active range of motion improved significantly after arthroscopic superior capsule

reconstruction at the final follow-up: by 55.6° (97.1° to 152.7°) for elevation (P<0.001), by 14.9° (28.2° to 43.0°) for external rotation (P<0.01), and by three vertebral bodies (L4 to L1) for internal rotation (P<0.01).

The acromiohumeral distance significantly increased from 4.5 ± 2.1 mm to 9.5 ± 2.7 mm (P<0.00001) after surgery. Sixty-seven of 72 shoulders (93.0%) had no graft tear or no re-tear of the repaired rotator cuff tendon during the follow-up period. Three patients (4.1%) with severe fatty degeneration of the infraspinatus tendon had re-tear of the repaired infraspinatus tendon at 3 months after surgery. Two patients (2.7%) suffered a postoperative graft tear at 3months and 12 months after surgery.

CONCLUSION
Arthroscopic superior capsule reconstruction restored superior glenohumeral stability and function of the shoulder joint. Our results suggest that this reconstruction technique is a reliable and useful alternative treatment for irreparable rotator cuff tears without severe osteoarthritis in the glenohumeral joint.