



Predictive factors associated with failure of nonoperative treatment of superior labrum anterior-posterior tears



Suk-Hwan Jang, MD^{a,*}, Jeong-Gook Seo, MD^a, Ho-Su Jang, MD^a,
Jae-Eun Jung, MS^b, Jin-Goo Kim, MD, PhD^c

^aDepartment of Orthopedic Surgery, Inje University, Seoul Paik Hospital, Seoul, Republic of Korea

^bSports Medical Center, Inje University, Seoul Paik Hospital, Seoul, Republic of Korea

^cDepartment of Orthopedic Surgery, Konkuk University Hospital, Seoul, Republic of Korea

Background: Uncertainty remains in the natural course of superior labrum anterior-posterior (SLAP) tears treated conservatively with rehabilitation and activity modification. Our purpose was to evaluate clinical outcomes after nonoperative treatment of type II SLAP tear in young active patients and to identify factors related to negative outcomes.

Methods: We retrospectively reviewed 63 patients who initially underwent nonoperative treatment for isolated type II SLAP tear. Assessments were made at baseline and at 6 months, and telephone survey was used to evaluate the final outcome. All included patients underwent a consistent nonoperative treatment protocol, and patient-specific data on the outcome were assessed. Failure was defined as abandonment of nonoperative management for surgery at any time points, <20-point improvement in American Shoulder and Elbow Surgeons score at final follow-up, or inability to return to activities.

Results: At the average follow-up of 21 months, pain relief and function improved significantly (American Shoulder and Elbow Surgeons score, 54.2-86.4; Visual Analog Scale score, 4.6-1.7; $P < .05$) in 45 patients (71.4%) with successful nonoperative treatment. Eighteen patients (28.5%) were either dissatisfied with treatment or had arthroscopic surgery and were considered a failure group. Multivariate analysis showed that failure of nonoperative treatment is strongly linked with history of trauma, positive compression-rotation test result, and participation in overhead activities ($P < .05$).

Conclusions: An initial trial of nonoperative management may be considered in young active patients with isolated SLAP tear. Patients with history of trauma, mechanical symptoms, and demand for overhead activities are less likely to succeed.

Level of evidence: Level III, Retrospective Cohort Study, Treatment Study.

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Keywords: Shoulder; superior labrum anterior-posterior (SLAP) tear; nonoperative treatment; physical test; overhead activity; predictive factors

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*Reprint requests: Suk-Hwan Jang, MD, Department of Orthopedic Surgery, Inje University, Seoul Paik Hospital, Mareunnae-ro 9, Jung-gu, Seoul, Republic of Korea.

E-mail address: orthopodjang@gmail.com (S.-H. Jang).

Superior labrum anterior-posterior (SLAP) tears are a frequent source of shoulder pain, particularly in athletes and the working population. SLAP tears were first recognized by Andrews et al¹ and later classified by Snyder et al²⁸ into 4 main types, with type II being the most common and amenable to arthroscopic repair. With evolving technology, including magnetic resonance imaging (MRI) as well as arthroscopic instruments and techniques, the ability to perform arthroscopic SLAP repairs has increased. In addition, the number of arthroscopic SLAP repairs continues to increase each year.^{23,31} Although our understanding of surgical techniques has improved, the optimal management method of SLAP lesions has become controversial because of a lack of consensus about its diagnosis and treatment in the current literature.¹⁴

Various studies have reported successful outcomes after arthroscopic repair of SLAP tears.^{3,5,9,10} However, few studies to date have discussed nonoperative management of SLAP tears, which typically focuses on posterior capsular stretching and improvement of periscapular strength and stability.^{4,7,8} This lack of reference is not consistent with current recommendations for initial SLAP tear management, which mainly involves nonoperative rehabilitation.^{4,19} Furthermore, a certain group of patients may benefit from early surgical intervention. Additional constructive methods may be required to diagnose and to establish a treatment protocol for SLAP lesions based on clinical presentation and patient factors.

To our knowledge, no studies thus far have reported the effect of patient-related factors on nonoperative treatment outcomes of SLAP tear. The purpose of this study was to evaluate the clinical outcome in a series of patients with type II SLAP tears who were treated nonoperatively with a standardized rehabilitation protocol as well as to identify factors associated with the failure of treatment in an attempt to guide treatment regimens and to improve selection of patients and clinical outcome. We hypothesized that nonoperative treatment of SLAP tears would result in improved outcomes compared with pretreatment status.

Materials and methods

This is a retrospective case-control study of prospectively collected data from all patients who underwent nonoperative management for type II SLAP tears. The authors identified a total of 172 patients who underwent conservative treatment at our institution from 2009 to 2012. Patients with other concomitant lesions including rotator cuff tears, shoulder arthritis, glenohumeral instability, labral tears outside the SLAP region (10:30- to 1:30-o'clock position of the superior labrum), and severe stiffness were excluded. On consent, an initial nonoperative treatment using standardized physical therapy was started with all patients, who were surveyed before treatment by a questionnaire that included American Shoulder and Elbow Surgeons (ASES), Constant, and University of California at Los Angeles (UCLA) shoulder scores. Pain was recorded with the Visual

Analog Scale (VAS); a score of 0 indicated no pain, and 10 points indicated the worst possible pain. We excluded patients who did not consent to or comply with our physical therapy program.

Inclusion criteria were as follows: 18 to 49 years old; clinical diagnosis of SLAP tear based on at least 2 positive findings from O'Brien active compression test, compression-rotation test, biceps load test, or tenderness on biceps groove; and documentation of SLAP tear based on MRI or magnetic resonance arthrography. The MRI findings diagnostic of a SLAP tear consisted of joint fluid or contrast medium filling the clefts between the superior labrum and glenoid.² The O'Brien active compression test was performed with the patient's arm flexed to 90° with the elbow fully extended and adducted 10° to 15° medial to the sagittal plane. Pain with forward elevation against resistance in maximal pronation, not in supination, was considered positive.²² A compression-rotation test was performed with the patient's shoulder abducted 90° and the elbow flexed 90°. The humerus was compressed against the glenoid and rotated medially and laterally by pushing on the elbow. If catching or snapping with pain occurred in the shoulder, as a positive McMurray test result of the knee with a torn meniscus would present,³⁰ it was considered positive.²⁸ Biceps load test was performed with the patient's arm elevated to 120° and externally rotated to its maximal point, with the elbow at 90° flexion and the forearm in the supinated position. The patient was asked to flex the elbow while resisting elbow flexion by the examiner. The test result was considered positive if the patient complained of pain during resisted elbow flexion.¹⁵

In total, 63 patients were eligible for final evaluation. We retrieved data related to demographics, clinical history, and preoperative medical evaluation from medical records. After a minimum follow-up duration of 1 year, functional outcome was evaluated according to the VAS and ASES scores. Incomplete or missing information was clarified by a telephone survey carried out by an orthopedic resident trained in administering these scores. Patients who received arthroscopic surgical fixation of a SLAP lesion after an initial nonoperative treatment were noted. Failure was defined as abandonment of nonoperative management for surgery at any time point, <20-point improvement in ASES score at the final follow-up, or an inability to return to activities.

Nonoperative treatment protocol for SLAP lesions

All patients underwent a consistent nonoperative treatment protocol. Our protocol for rehabilitation was to provide physical assistance with sessions at our facility at least 2 times a week, with 3 sets of 15 to 20 repetitions of each exercise, for at least 12 weeks. The protocol was modified according to progression. Patients were encouraged to do home exercises between sessions. We have endeavored to provide a well-organized and comprehensible protocol to follow the exercises at home, and progression was monitored at each visiting session.

The goal of rehabilitation was to restore muscle strength, endurance, and normal glenohumeral and scapulothoracic motion. Initially, pain and inflammation were controlled with nonsteroidal anti-inflammatory drug treatment and subacromial or intra-articular injections. Instructions for activity modifications, especially for those avoiding overhead activities, were also implemented during this phase. Physical therapy consisted of passive or active assisted stretching exercises, including posterior inferior

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