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BRIEF REPORT

Functional and Sports-Specific Outcome After Surgical Repair of Rotator Cuff Tears in Rock Climbers

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Objective.—The purpose of this study was to analyze the general (Constant Murley score) and sports-specific (change in International Climbing and Mountaineering Federation [UIAA] grade) outcome after surgical repair of rotator cuff injuries in rock climbers.

Methods.—In a retrospective study, 12 rock climbers (10 men, 2 women; age 55 years; SD±9; range 28–66 years [mean±SD with range] with rotator cuff lesions were re-evaluated 27±16 (12–72) months after arthroscopic surgical repair of the rotator cuff of the shoulder. The etiology of the rotator cuff pathology was equally chronic (age 61±12 [28–66] years) and acute (age 53±5 [51–65] years). The postoperative general outcome, including the Constant Murley score, was assessed with a standardized questionnaire and clinical examination. The postoperative sports-specific outcome was analyzed using the UIAA metric scale.

Results.—The postoperative Constant Murley score was 92±7 (80–98). All participants had already started climbing again; 11 of 12 climbers regained a climbing level within ±1.33 UIAA metric grades of their initial capability.

Conclusion.—Arthroscopic repair of acute and chronic rotator cuff tears shows a good functional outcome, enabling most patients to regain a high level of rock climbing ability.

Keywords: rotator cuff tear, rotator cuff repair, rock climbing, climbing injury, overhead sports

Introduction

The diagnosis and understanding of shoulder injuries among rock climbers has increased in recent years. In an analysis of 911 climbing injuries from 2009 to 2012, Schöffl et al[1] reported that 17.2% (n=157) of these injuries were located in the shoulder; 10 years earlier, it was only 5%. In that study, superior labral lesions were most common (32.5%), whereas rotator cuff injuries accounted for 3.2%. Despite this lower incidence, rotator cuff tears can be significant injuries requiring treatment to regain strength and stability and prevent later problems such as humeral head superior migration and rotator cuff tear arthropathy.[2]

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The etiology of rotator cuff tears can be classified as acute traumatic (with or without shoulder dislocation) versus chronic atraumatic (resulting from tendon degeneration through progressive microtearing associated with mechanical outlet impingement).[3] Symptoms of rotator cuff tears can include increasing pain and loss of function in chronic cases, sleep-disrupting night pain, and sudden weakness associated with an adequate trauma. These lead to difficulties in overhead activities, especially when abduction, forward flexion, and external rotation are required—all of which are essential in rock climbing. Common clinical signs include painful impingement tests, a positive Jobe test, and an objective weakness in internal or external rotation.[4,5]

Choice of treatment for rotator cuff tears should be based on a thorough evaluation of the extent of the injury. This includes an assessment of the individual patient history, including previous treatments; clinical examination; appropriate imaging, which may include radiograph, ultrasound, and magnetic resonance imaging;

and a discussion of the patient's activity goals and expectations. In general, surgical treatment is recommended for acute tears, and chronic tears are initially managed nonsurgically with rest, ice, nonsteroidal anti-inflammatory drugs, physical therapy, and cortisone injections if needed. Indications for surgical repair in chronic cuff tears include full thickness tears and partial thickness tears when 50% or more of the tendon is affected and the patient has failed conservative therapy.[2,5,6] Patient age, body mass index, diabetes status, tear size, and presence of rotator cuff muscle atrophy and fatty infiltration are important outcome predictors when considering surgical treatment.[5,7]

Open, arthroscopic-assisted mini-open, and all arthroscopic techniques using single-row, double-row, and transosseous-equivalent have been reported with greater than 90% good to excellent results at both short- and long-term follow-up.[2,5] Nonetheless, radiographic follow-up studies have shown up to a 25–30% retear rate regardless of the technique used and indicate that radiographic retear does not necessarily correlate to a poor functional outcome. Saraswat et al demonstrated that surgery leads to a favorable outcome in a nonathletic population, with improved function and health-related quality of life observable in a 10-year follow-up.[8] However, there is limited knowledge on the suitability of surgical treatment for athletes, particularly those primarily involved in overhead sports. Reported outcomes in athletes who engage in throwing have had mixed results, including less predictable return to prior level of sport function.[9]

There is, to the best of our knowledge, no valid data on the postoperative sports-specific outcome for rock climbers. The purpose of this study was to analyze the general (Constant Murley score[10]) and sports-specific outcome (change in International Climbing and Mountaineering Federation [UIAA] grade[11]) after surgical repair of rotator cuff tears in rock climbers.

Methods

STUDY DESIGN

The study was approved by the ethics board of the Friedrich-Alexander University Erlangen-Nuremberg. Inclusion criteria were active rock climbers, partial or complete rotator cuff tears, surgical repair performed in our department, and follow-up for at least 12 months after surgery. All patients gave their informed consent for evaluation and anonymized data use. Data are presented as mean±SD with range, as appropriate.

We identified 12 rock climbers (10 men, 2 women) who had undergone rotator cuff repairs at our institution between 2008 and 2015. The patient age was 55±9 (28–66) years. The etiology was acute in 6 cases (patient age 53±5 [51–65] years) and chronic in 6 cases (patient age 61±12 [28–66] years). The patients with chronic tears had previously undergone conservative treatment (physiotherapy).

Seven patients had a complete rotator cuff tear (retraction in the frontal plane according to Patte classification[10]: 4 grade 1, 2 grade 2, 1 grade 3), and 5 patients had a partial avulsion of the supraspinatus tendon (PASTA lesion; Ellmann classification of partial thickness rotator cuff tears[10]: 1 grade 2, 4 grade 3). One patient had previously undergone surgical rotator cuff repair in a different hospital and presented with a retear.

All patients had no or only minor atrophy of the supraspinatus muscle (stage I according to Thomazeau classification[9]) and no to minimal fatty atrophy according to Fuchs.[6] The overall characteristics of our study collective are summarized in Table 1.

In addition to the rotator cuff tear, all patients presented associated shoulder pathologies at the time of surgical therapy. They are presented in Table 2. Furthermore, comorbidities relevant to climbing performance at the time of re-evaluation are presented in Table 2.

SURGICAL AND FOLLOW-UP TREATMENT

All surgeries were performed by the same experienced shoulder surgeon (VS) in beach-chair position. Depending on the degree of injury, the rotator cuff was

Table 1. Characteristics of the study collective (n=12)

Characteristics	*n*
Sex	
Male	10
Female	2
Side	
Right	10
Left	2
Etiology of rotator cuff pathology	
Acute	6
Chronic	6
Full thickness rotator cuff tears (Patte classification[9])	7
Grade I	4
Grade II	2
Grade III	1
PASTA lesion (Ellmann classification[9])	5
Grade II	1
Grade III	4
Follow-up time (months)	27±16 (12–72)

PASTA, partial articular supraspinatus tendon avulsion.