Arthroscopic Repair of Traumatic Isolated Subscapularis Tendon Lesions (Lafosse Type III or IV): A Prospective Magnetic Resonance Imaging–Controlled Case Series With 1 Year of Follow-Up

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Purpose: The purpose of this study was to prospectively assess the efficacy of arthroscopic repair of isolated high-grade subscapularis (SSC) tendon lesions by means of clinical follow-up combined with magnetic resonance imaging investigations. Methods: Between January 2008 and September 2010, 11 patients (9 men and 2 women; mean age, 45 ± 10 years) with Lafosse type III or IV traumatic isolated SSC tendon lesions underwent arthroscopic repair including tenodesis of the long head of the biceps tendon. All patients were preoperatively assessed by clinical examination (Constant-Murley score [CMS]) and contrast-enhanced magnetic resonance arthrography. At 1 year of follow-up, specific clinical SSC tests, the CMS, and the loss of external rotation were evaluated. A native magnetic resonance investigation was performed to assess the structural integrity of the repair. The SSC muscle was compared with its preoperative condition regarding fatty infiltration and size (cross-sectional area). Patient satisfaction was graded from 1 (poor) to 4 (excellent). Results: The mean time interval from trauma to surgery was 3.7 months. A concomitant lesion of the biceps tendon was observed in 10 patients (91%). The mean CMS improved from 44 to 89 points (P < .001). The functional tests showed a significant increase in strength (P < .05) (belly-press test, 4.8 v 2.9; lift-off test, 4.8 v 2.9). The mean loss of external rotation at 0° of abduction was 10° compared with the contralateral side (P < .05). Patient satisfaction was high. Magnetic resonance imaging evaluation showed complete structural integrity of the tendon repair in all studies. The SSC showed a significant decrease in fatty infiltration and increase in the cross-sectional area. Conclusions: Arthroscopic repair of higher-grade isolated SSC lesions provides reliable tendon healing accompanied by excellent functional results 1 year after surgery. Level of Evidence: Level IV, prospective therapeutic case series.

Isolated lesions of the subscapularis (SSC) are not common. Lafosse et al.1 reported a prevalence of 10.1% comparing isolated SSC tears with all SSC lesions. The importance of the SSC regarding its biomechanical and functional properties has increasingly been recognized. Its function includes internal rotation of the shoulder and force coupling in the transverse plane, and it also contributes to the anterior stability of the shoulder. Thus patients with impaired SSC function present with increased passive external rotation and pathologic lift-off test findings.2 Complete tears of the SSC with retraction may cause an anterior displacement of the humeral head onto the glenoid due to disruption of the force couple of the rotator cuff.

Open repair has been associated with good clinical outcomes in several studies.3,4 In 2002 the technique of arthroscopic SSC repair was described by Burkhart and Tehrany.5 However, some of the previous studies also included anterosuperior lesions or did not distinguish between low-grade and higher-grade lesions.5,6 Only a few study groups included follow-up imaging such as computed tomography (CT) arthrography or magnetic...
resonance imaging (MRI) to assess the structural integrity of the repair or muscular alterations such as fatty infiltration or muscular atrophy.\textsuperscript{1,7-11}

The purpose of this study was to prospectively assess the efficacy of arthroscopic repair of isolated high-grade SSC tendon lesions by means of clinical follow-up combined with MRI investigations. Our hypothesis was that patients with traumatic high-grade lesions of the SSC tendon would benefit from arthroscopic repair.

**Methods**

**Patients**

Between January 2008 and September 2010, 11 consecutive patients with traumatic isolated complete SSC tendon tears of type III or IV according to the Lafosse classification\textsuperscript{1} undergoing an all-arthroscopic repair were included in this prospective case series. Patients with anterosuperior lesions or mass lesions were excluded. The study was approved by the local ethics committee, and informed consent for operative treatment and all the follow-up investigations was obtained from all the patients. Follow-up after 1 year included a clinical examination and MRI to assess the structural integrity of the repair. Fatty infiltration and the muscular mass of the SSC, supraspinatus (SSP), and infraspinatus (ISP) were also evaluated and compared with preoperative imaging.

**Operative Technique**

All arthroscopic procedures were performed with patients under general anesthesia with an interscalene catheter for postoperative pain control. The patient was seated in a standardized beach-chair position with arm traction of 2 to 3 kg. Perioperative antibiotic prophylaxis with cefuroxime was routinely administered. A standard 30° arthroscope was used. According to Lafosse et al.,\textsuperscript{1} the portals were named from A (posterior "soft spot" portal) to E (anterosuperior portal). Before the arthroscope was introduced into the glenohumeral joint through portal A, the joint was infiltrated with 20 mL of diluted epinephrine (1 mL of epinephrine [1 mg/mL] and 19 mL of normal saline solution) to decrease intraoperative bleeding. Furthermore, systolic blood pressure was constantly kept at a maximum of 100 mm Hg during surgery. With these measures, the intra-articular pressure could be kept as low as 35 mm Hg until the end of the intervention for most patients. In some cases the pressure had to be increased in a stepwise manner during the procedure to provide good visibility. However, a maximum pressure of 60 mm Hg was never exceeded in this series.

The diagnostic arthroscopy was performed, and a probe was inserted through portal D (anterolateral portal). After the isolated lesion of the SSC was confirmed, the lesion was classified according to the Lafosse classification.\textsuperscript{1} Only type III and IV lesions were included (Fig 1). The long head of the biceps tendon (LHBT) was inspected with a probe. For tenodesis of the LHBT, 1 suture of a double-loaded threaded suture anchor was used to perform a “lasso-loop stitch” in all patients of this series.\textsuperscript{12} The second suture of this anchor was used for reconstruction of the most superior part of the SSC tendon at a later stage. The rotator interval was opened with a shaver and bipolar diathermy (VAPR 3 Premiere Electrode 90° or VAPR 3 LDS Electrode 90°; Mitek Sports Medicine, Raynham, MA). The tip of the coracoid process and the conjoined tendon were dissected before portal E (anterosuperior portal) was created under direct visualization by an outside-in technique. To achieve a 270° release of the SSC, the middle glenohumeral ligament was debrided from the posterior aspect of the SSC. To facilitate mobilization, a traction suture through portal D was routinely used for retracted SSC tendons. The superior glenohumeral ligament was also resected. A shaver and burr were used to prepare the footprint of the SSC on the lesser tuberosity. The arthroscope was then placed through portal D, and the instrumentation was changed from portal D to portal E. To complete the release of the SSC, all adhesions to the coracoid were released and the subcoracoid bursa was removed. In type IV lesions, the axillary nerve was visualized routinely (Fig 2). In type III and IV lesions with no or moderate tension, reconstruction of the SSC was performed with 2 threaded suture anchors, usually with the application of U-stitches. The remaining suture of the SSC tendon, Lafosse type III (right shoulder). (A) Lesion before repair (viewed through posterior portal [portal A]). (B) SSC tendon with applied traction suture for better mobilization and reduction (viewed through anterolateral portal [portal D]). (HH, humeral head; SGHL, superior gleno-humeral ligament.)
LHBT tenodesis anchor was used for a lasso-loop stitch at the upper border of the SSC, achieving a pseudo-double-row reconstruction (Fig 3). In type IV lesions with higher tension (n = 2), lasso-loop stitches instead of U-stitches were used and the reconstruction was reinforced with a double-row reconstruction with a “suture-bridge technique.” No coracoplasties were performed in the study group because we did not see any signs of coracoid impingement. Surgery was completed with a routine acromioplasty. However, a limited acromioplasty, rather than a formal acromioplasty, was performed in asymptomatic patients. All operations were performed by the same surgeon (P.G.).

Rehabilitation
Postoperatively, all patients were immobilized with a 30° abduction pillow for 6 weeks. Physiotherapy was initiated on the first postoperative day, starting with passive and pain-free exercises for the shoulder and continuing for 6 weeks. During this period, external rotation was limited to 0°. Patients were encouraged to perform active wrist and elbow movements from the beginning. For personal hygiene, all patients were advised to shower with a waterproof abduction wedge. After 6 weeks, active exercises were started to regain full range of motion. Weight bearing and strengthening exercises were allowed after 12 weeks. A gradual return to sports activities was allowed, depending on the kind of sport, but not before 6 months postoperatively.

Clinical Evaluation
Preoperatively, the patient’s history in general and the trauma mechanism and time of injury in particular were recorded. A standardized physical examination was performed before the operation and at follow-up by the first author (P.G.). The clinical examination included the Constant-Murley score (CMS). The SSC function was tested with the modified belly-press test and the modified lift-off test as described by Lafosse et al. Muscular strength was graded from 0 to 5 according to the classification of neurologic assessment. External rotation in 0° of abduction was measured, and the loss of external rotation compared with the contralateral side was recorded. Internal rotation was assessed according to the CMS subscore for internal rotation. The loss of internal rotation was defined by the loss of points compared with the contralateral side (CMS subscore for internal rotation). At follow-up, our patients were also asked to rate their level of satisfaction as poor, fair, good, or excellent.

Radiologic Evaluation
All patients underwent a standardized radiographic evaluation including a true anteroposterior radiograph in neutral rotation and an axillary view before and immediately after surgery. Preoperatively, all patients were also evaluated with contrast-enhanced MRI (arthro-MRI). Fatty infiltration of the SSC was graded according to Goutallier et al., modified by Fuchs et al. for MRI, from 0 to 4. Accordingly, grade 0 indicates no fatty infiltration; grade 1, some fatty streaks; grade 2, less fat than muscle; grade 3, as much fat as muscle; and grade 4, more fat than muscle. The cross-sectional area (CSA) of the SSC was measured according to the method proposed by Zanetti et al. using
standard measurement tools in our picture archiving and communication system software. The CSA was measured in square millimeters on the most lateral image on which the scapular spine was in contact with the rest of the scapula in the sagittal reconstructions.

At follow-up after 1 year, an MRI investigation with a dedicated shoulder coil (Magnetom Avanto, 1.5 T; Siemens Medical Solution, Erlangen, Germany) without contrast enhancement was obtained. On the axial and paracoronal views, the tendons of the SSP, ISP, and SSC were evaluated regarding continuity and retraction. Tendon integrity was assessed on axial and sagittal T2-weighted and proton density-weighted sequences (Fig 4). A tendon rerupture was diagnosed if a clear retraction was present or if a gap in a tendon was filled with a water-equivalent signal. The fatty muscular infiltration and CSA of the SSP, ISP, and SSC were determined as described earlier (Fig 5). The integrity of the tenodesis of the LHBT was evaluated on the most superior axial cross section where the bicipital groove was still visible. In contrast to the preoperative magnetic resonance (MR) arthrography studies, only native MRI studies were performed at follow-up. Acceptance of an invasive technique for purely scientific reasons without direct benefit to the patient may be low and may be controversial because of ethical concerns. Furthermore, the superiority of MR arthrography for evaluating the structural integrity of SSC repair is not proven.17 The application of intra-articular gadolinium does not change the appearance of the muscles, such as the SSC, on the images. The complete preoperative and postoperative radiologic assessment was performed by 1 experienced MR radiologist with special training in musculoskeletal imaging. This radiologist (N.N.) was blinded to the clinical results.

**Statistical Analysis**

The results were analyzed with statistical software (IBM SPSS, version 20; IBM, Armonk, NY). Statistical analysis was performed with the paired t test and the Wilcoxon signed rank test when appropriate. All data are presented as means and standard deviations, with ranges in parentheses. A double-sided P < .05 was considered statistically significant.

**Results**

Between January 2008 and September 2010, a total of 11 traumatic isolated SSC tendon lesions of Lafosse...
type III or IV were included in our prospective consecutive case series. The mean age of the patients was 45 ± 10 years (range, 32 to 65 years); there were 9 men and 2 women. The dominant shoulder was affected in 8 patients (82%). In 5 patients, a forceful external rotation was reported; 3 patients fell on their outstretched arm; and 2 patients had their first episode of traumatic anterior shoulder displacement. In 1 patient the trauma mechanism could not be clarified.

The mean interval from trauma to surgery was 3.7 ± 4.7 months (range, 0.3 to 13.3 months). All patients had a full clinical follow-up investigation after 1 year. However, 1 patient—who presented with an excellent clinical outcome—refused MRI because of claustrophobia. Thus a complete 1-year follow-up including clinical and MRI investigation was performed in 10 patients (90%).

**Intraoperative Findings**

The arthroscopic evaluation of the 11 patients showed 9 type III SSC lesions (82%) and 2 type IV SSC lesions (18%). Thus all patients showed at least complete lesions of the tendon’s superior two-thirds with some retraction from intermediate up to the level of the glenoid rim. In 3 cases, minor PASTA (partial articular supraspinatus tendon avulsion) lesions were seen. However, these lesions did not require any surgical treatment because of their small size, involving only the innermost part of the deep tendon layer. The LHBT was completely dislocated in 3 patients. Subluxation of the LHBT with the tendon riding on the anterior aspect of the bicipital groove was seen in 5 cases (45%), whereas 2 biceps tendons (18%) presented with pronounced anterior instability due to a lesion of the anterior pulley. A concomitant SLAP lesion was diagnosed in only 1 patient (9%). In 2 patients (18%) a partial tear of less than 50% of the biceps tendon was observed. Alterations of the muscular mass and the cervical spine were noted in only 1 patient (9%). In 2 cases, minor PASTA lesions were seen. A complete structural integrity of the SSC tendon was shown in all cases (100%).

**Follow-Up**

At 1 year postoperatively, 9 patients (82%) had returned to their previous work. One patient was already retired at the time of the injury, and 1 patient already had a disability because of a cervical spine injury. Six patients reported a full return to their sports activities, whereas 1 patient had to reduce his sports participation because of some persistent shoulder problems. The remaining 4 patients had never participated in any sports activities, even before the injury.

**Clinical Outcome**

The results of the clinical examination are shown in Table 1. Preoperatively, all patients were able to perform the belly-press test. However, muscular strength was reduced in all patients compared with the contralateral side. A positive lift-off test was shown by 7 patients (64%); in 1 case a lag sign was evident. Because of limited internal rotation or pain exacerbation, 4 patients (36%) did not demonstrate a correct lift-off test preoperatively. In contrast, at follow-up, all patients correctly performed both tests, and a significant improvement in these specific SSC tests regarding strength was found. Compared with the uninjured contralateral side, the mean loss of internal rotation was 1.5 ± 2.0 points (range, 0 to 6 points) in the CMS subscore for internal rotation ($P < .05$). External rotation in 0° of abduction was 46° ± 19° (range, 20° to 70°) on the operative side compared with 57° ± 18° (range, 30° to 85°) on the contralateral uninjured side ($P < .05$). External rotation strength was similar to the uninjured side. The CMS and all its subscores—activities of daily living, pain, range of motion, and strength—showed a marked improvement at follow-up when compared with the preoperative situation. Nine patients rated their outcome as excellent (82%), 1 patient had a good result, and 1 patient was satisfied.

**MRI Follow-Up**

Complete structural integrity of the SSC tendon was seen in all investigated patients ($n = 10$). Neither a partial nor a complete rerupture of the reconstruction was observed. Alterations of the muscular mass and the course of fatty infiltration of the SSC are shown in Table 2. The CSA of the SSP and ISP significantly increased, although no significant lesions were not found.

**Table 1.** Preoperative and 1-yr Follow-Up Results

<table>
<thead>
<tr>
<th>Strength</th>
<th>Preoperative</th>
<th>1-yr Follow-Up</th>
<th>$P$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified belly-press test</td>
<td>2.9 ± 0.3 (2-3)</td>
<td>4.8 ± 0.6 (3-5)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Modified lift-off test</td>
<td>2.9 ± 0.4 (2-3)</td>
<td>4.8 ± 0.6 (3-5)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Internal rotation</td>
<td>3.1 ± 1.6 (0-6)</td>
<td>7.8 ± 2.6 (2-10)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>CMS</td>
<td>43.5 ± 21.3 (16-80)</td>
<td>89.3 ± 15.0 (51-100)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>ADL (maximum, 20 points)</td>
<td>8.2 ± 4.8 (2-18)</td>
<td>18.4 ± 3.1 (10-20)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Pain (maximum, 15 points)</td>
<td>4.6 ± 4.2 (0-10)</td>
<td>13.2 ± 3.8 (5-15)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>ROM (maximum, 40 points)</td>
<td>22.7 ± 7.2 (12-32)</td>
<td>36.0 ± 5.4 (22-40)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Strength (maximum, 25 points)</td>
<td>8.0 ± 7.0 (0-20)</td>
<td>21.7 ± 5.3 (10-25)</td>
<td>&lt;.05</td>
</tr>
</tbody>
</table>

NOTE: Data are given as mean ± standard deviation (range).

Abbreviations: ADL, activities of daily living; ROM, range of motion.
arthroscopically and these muscles or tendons were not involved in any surgery. Interestingly, there was no change in fatty infiltration in these muscles. No failure of the LHBT tenodesis was observed, and all the humeral heads were anatomically centered in the glenoid.

Discussion

Arthroscopic repair of SSC lesions of Lafosse types III and IV is associated with a good clinical outcome including high patient satisfaction. MRI follow-up at 1 year showed complete healing of the reconstructed tendon with no rerupture.

Burkhart and Tehrany5 published the first article describing arthroscopic SSC tendon repair in 2002. Still, the level of evidence on arthroscopic repair of isolated SSC tears is low. A recent systematic review comparing open and arthroscopic surgical repair of isolated SSC lesions failed to show a clear advantage for either method.18 However, one must realize that only Level IV studies were available for this evaluation. Good pain relief and excellent function may be achieved by open and arthroscopic surgery. Edwards et al.3 published the largest series so far describing open repair of isolated SSC tears, either of traumatic origin or due to degeneration. Of the lesions, 23 were limited to the superior one-third of the tendon, leaving 64 patients with higher-grade lesions.

Furthermore, there are only a few studies available with radiologic follow-up by either CT arthrography or MRI.1,7-11 In contrast to other studies, we focused on isolated traumatic SSC lesions with at least moderate tendon retraction.

Clinical Outcome

In general, with either open or arthroscopic repair of the SSC lesion, good clinical results can be achieved. In accordance with the literature, we observed significant improvement in the CMS and all its subcategories. The CMS achieved after arthroscopic repair of isolated SSC lesions ranged from 74 to 85 points.9-11 In our series the CMS after 1 year was 90 points. One could hypothesize that this result was achieved because of the short interval between trauma and surgery. This view is supported by the observation that a delay in open SSC repair resulted in poorer clinical outcomes. In accordance with the CMS, the specific SSC tests, such as the modified belly-press test and the lift-off test, also improved significantly after surgery.1,7-11

LHBT Pathologies

Besides the SSC tendon repair, we also performed an anchor tenodesis in all patients regardless of the underlying pathology. At follow-up, all tenodeses were intact. In a series with 40 patients with isolated or combined rotator cuff tendon lesions, concomitant pathology of the LHBT was found in 63%. In the largest series investigating open repair of isolated SSC tears, Edwards et al.3 could clearly show that the performance of either LHBT tenodesis or tenotomy had a beneficial effect on the CMS and the subjective outcome regardless of the preoperative condition of the LHBT. Thus they suggested performing routine LHBT tenodesis or tenotomy at the time of the SSC repair.

Structural Integrity of SSC Tendon Repair

In a human cadaveric study Wellmann et al.19 compared single-row repair with double-row repair using the suture-bridge technique as well. The double-row technique restored 48% of the ultimate load of an intact tendon, whereas the single-row repair failed significantly earlier at 34%. At the 1-year follow-up, all SSC tendon repairs in our study group were intact because no rerupture was evident on MRI 1 year postoperatively. We routinely performed a “pseudo—double-row” repair for Lafosse type III tears. A double-row repair with suture bridges was used for more retracted type IV lesions. According to the current literature, rerupture rates range from 5% to 14%.1,7-9,11 In all these studies, either CT arthrography or MRI was used to study structural integrity at follow-up 20 to 57 months postoperatively. In the largest published study so far, Toussaint et al.10 evaluated 129 patients either with isolated lesions or with lesions in combination with SSP tears with a radiologic follow-up period of at least 6 months. The rerupture rate in this large series was 8%.

Altered SSC Muscle

Although MR evaluation showed a significant decrease in fatty SSC muscle infiltration and an increase in muscular mass at follow-up compared with the preoperative images, the interpretation of these findings may be controversial. Our observations are in contrast to the results of 2 other studies found in the recent literature,10,11 both of which reported a progression of fatty infiltration despite successful surgery.

| Table 2. MRI Evaluation: Fatty Infiltration and CSA of Rotator Cuff Muscles |
|-----------------|----------------|------|------|
|                 | Preoperative  | 1-yr Follow-Up | P Value |
| SSC             |               |                 |        |
| Fatty infiltration | 1.7 (0-3)   | 0.7 (0-2)     | <.05   |
| CSA (mm²)       | 1,491 (900-2,120) | 2,158 (1,370-3,080) | <.001 |
| SSP             |               |                 |        |
| Fatty infiltration | 0.4 (0-2)   | 0.2 (0-2)     | NS     |
| CSA (mm²)       | 682 (350-940) | 865 (480-1,060) | <.001 |
| ISP             |               |                 |        |
| Fatty infiltration | 0.3 (0-2)   | 0.3 (0-2)     | NS     |
| CSA (mm²)       | 1,441 (990-1,830) | 1,716 (1,020-2,300) | <.001 |

NOTE. Data are given as mean (range). Fatty infiltration and CSA of the SSC was graded according to Goutallier et al.,14 modified by Fuchs et al.15 The CSA of the SSC was measured according to the method proposed by Zanetti et al.16

Abbreviation: NS, not significant.
Interestingly, no correlation with clinical outcome was found. Only Bartl et al. and Lafosse et al. did not observe a progression of fatty infiltration. However, the interval between trauma or the onset of symptoms and surgery ranged from 5.8 months up to 35.7 months in these studies. One could hypothesize that in our study, the SSC muscle improved in quantity (mass) and quality (less fatty infiltration) because the mean interval from trauma to surgery was only 3.7 months and was thus considerably shorter than the intervals in most other studies. Interestingly, fatty degeneration was already evident on the preoperative images of our study group despite the short interval between trauma and diagnostic workup. One could hypothesize that fatty degeneration may occur earlier and develop more quickly in traumatic lesions than in degenerative SSC tears. However, to our knowledge, there are no scientific data available to support this clinical observation.

Our findings may indicate that muscular changes of the SSC are reversible if the tendon is reattached shortly after trauma. However, the significance of fatty degeneration and muscle wasting is still unclear. In their multicenter study, Toussaint et al. reported no adverse clinical effects despite marked muscle alterations. Furthermore, comparison of muscle mass and fatty degeneration preoperatively and postoperatively may be hazardous because the noted differences could also be attributed to a pure volumetric distortion once a retracted muscle is reattached. Moreover, the preoperative MRI studies were contrast enhanced whereas the follow-up MRI studies were not. This fact may have impaired the accuracy of our measurements. This view is supported by the fact that we also observed an increase in the CSA for the SSP and ISP even though they were neither injured nor involved in any surgery. However, fatty infiltration was decreased in the SSC at follow-up whereas it remained unchanged in the other 2 studied muscles. In a recent study, Jo and Shin compared preoperative MRI investigations with MRI studies obtained 3 days after surgery. In a first study, a significant increase in the CSA of the SSC was shown despite the fact that no surgical cuff repair was performed in these patients. No conclusive reason for this finding was given by the authors. Thus the CSA of the SSC was excluded from further evaluations. However, no difference was seen regarding fatty infiltration of the SSC, and no difference was found in the SSP and ISP regarding both parameters. In a second study, patients with arthroscopic rotator cuff repair were evaluated. Interestingly, rotator cuff repair significantly increased the CSA of the SSP by as much as 45% for massive tears. The decrease in fatty infiltration was significant as well, but only for the SSP and ISP, whereas no significant change was found for the SSC. To overcome this potential bias, Jo and Shin suggested that images should also be obtained immediately after the surgical procedure and compared with long-term follow-up images for a true assessment of muscular alterations, rather than being compared with preoperative images.

Limitations

With 10 patients available for complete follow-up and 1 patient with clinical follow-up only, the sample size of this case series is small, and the study design lacks a comparative control group. We studied only complete isolated SSC tears (Lafosse types III and IV), which are usually considerably retracted. Because we did not include minor lesions such as Lafosse types I and II, our results are not falsely improved by the inclusion of clinically less significant tears. Furthermore, anterosuperior tears and mass lesions of the rotator cuff were not included.

In the largest study published so far, a total of 208 patients with SSC tears, either isolated or associated with a limited anterosuperior lesion, were analyzed. Of these, only 35 patients with isolated or “very predominant” SSC lesions were available for follow-up. Heikenfeld et al. published a case series with 20 patients. However, they also included 10 Lafosse type II lesions. Other authors published case series with similar sample sizes ranging from 7 to 17 patients when only tears equivalent to Lafosse type III and IV lesions were counted. In a recently published study, 46 patients undergoing arthroscopic repair of only large SSC lesions (Lafosse types III and IV) were investigated. However, only 6 SSC tears were isolated and either traumatic or degenerative in nature.

Conclusions

Arthroscopic repair of higher-grade isolated SSC lesions provides reliable tendon healing accompanied by excellent functional results 1 year after surgery.

References


