Suprascapular Neuropathy as a Cause of Swimmer's Shoulder: Results After Arthroscopic Treatment in 4 Patients

Rafael Arriaza, Julian Ballesteros and Emilio López-Vidriero

DOI: 10.1177/0363546513477383

The online version of this article can be found at:
http://ajs.sagepub.com/content/41/4/887

Published by:
SAGE
http://www.sagepublications.com

On behalf of:
American Orthopaedic Society for Sports Medicine

Additional services and information for The American Journal of Sports Medicine can be found at:

Email Alerts: http://ajs.sagepub.com/cgi/alerts
Subscriptions: http://ajs.sagepub.com/subscriptions
Reprints: http://www.sagepub.com/journalsReprints.nav
Permissions: http://www.sagepub.com/journalsPermissions.nav

>> Version of Record - Apr 2, 2013
OnlineFirst Version of Record - Feb 28, 2013
What is This?
Suprascapular Neuropathy as a Cause of Swimmer’s Shoulder

Results After Arthroscopic Treatment in 4 Patients

Rafael Arriaza, MD, PhD, Julian Ballesteros, MD, and Emilio López-Vidriero, MD, PhD

Investigation performed at Arriaza and Associates Medical Institute, La Coruña, Spain, and International Sports Medicine Clinic Seville (ISMEC), Seville, Spain

Keywords: swimmer’s shoulder; suprascapular nerve entrapment; arthroscopic neurolysis; suprascapular ligament arthroscopic release

The term “swimmer’s shoulder,” which refers mainly to anterosuperior impingement, was first coined by Kennedy and Hawkins in the 1970s. In subsequent years, shoulder pain in swimmers has also been attributed to rotator cuff and biceps tendinitis as well as capsulolabral lesions, widening the spectrum of injuries included under this term.

Competitive swimmers perform heavy loads of training, including swimming a range of 9 to 110 km/wk. Thus, swimmers require of their shoulders a significant amount of repetitions. It has been calculated that a competitive swimmer can perform around 18,000 revolutions per week, exposing his or her joint complex to injuries due to overuse and overload.

Shoulder pain is a common symptom among the different possible lesions causing swimmer’s shoulder. Its prevalence among elite-level swimmers has been reported to be as high as 80% during activities, depending on the series, without a clear cause.

Surgical findings have attributed the cause of pain to a variety of lesions including impingement, supraspinatus and infraspinatus tendinitis, biceps tendinitis, labral tears, superior labral anterior and posterior (SLAP) tears, capsular redundancy, and synovitis. In the above-mentioned series, various arthroscopic procedures have been proposed such as subacromial decompression, partial detachment of the coracocromial ligament, capsular plication, and labral stabilization with anchors. After surgical treatment, the return to sport rate has been reported to range from 56% to 80%, although the return to the preinjury training volume of swimming was only 20%.

To our knowledge, suprascapular nerve injury has never been considered as a cause of swimmer’s shoulder. Here, we present a cohort of elite swimmers with suprascapular neuropathy and its treatment with arthroscopic neurolysis and release of the suprascapular notch ligament.

MATERIALS AND METHODS

A review of a shoulder database including cases of suprascapular nerve entrapment in competitive swimmers was conducted at 2 different medical centers from 2008 to 2012.

Because there were no definitive diagnostic findings derived from the clinical examination and magnetic resonance imaging (MRI) studies, all swimmers first completed a nonoperative course of treatment consisting of rest, anti-inflammatory medication, and physical therapy. Table 1 shows the patients’ demographic characteristics. Table 2 shows the patients’ training characteristics.

Upon initial presentation to the authors, 1 patient demonstrated supraspinatus and infraspinatus atrophy, and another 4 swimmers did not improve enough to return to normal training after a minimum 3-month period of rest from swimming. Further evaluation included electromyography (EMG) studies looking primarily for suprascapular nerve lesions. Arthroscopic shoulder exploration and eventual suprascapular nerve release were offered to the patients, who signed an informed consent form for the study. Of the 5 patients, 1 decided to end her swimming career and rejected surgery. The same surgical technique was performed in all patients by 2 leading surgeons (R.A. and E.L.-V.) at 2 different centers, which was arthroscopic release of the transverse ligament at the suprascapular notch and neurolysis of the suprascapular nerve.
Inclusion criteria were being a competitive swimmer who trained more than 30 km/wk with suprascapular nerve entrapment diagnosed by EMG or clinical suspicion. Exclusion criteria were previous shoulder surgery, non-competitive level of swimming, and other systemic conditions that may adversely affect nerve function. All patients underwent EMG and MRI or MRI arthrogram. Arthroscopic surgery was performed to confirm or rule out other injuries and to release the transverse ligament. All patients had been prospectively included in a database for future analysis.

Clinical Findings

Physical examination results were very similar in the 5 patients: symmetric shoulder motion was evaluated. Shoulders hyperextended to approximately 190° in patients 1, 4, and 5 and reached 180° in patients 2 and 3. For all 5 patients, the apprehension sign was negative; the sulcus sign was positive bilaterally; and Jobe, Yocum, and Hawkins test results were mildly positive. There was reduced comparative strength in external rotation in the affected shoulder and a mild scapular dyskinesia, which was especially evident when the patients were examined immediately after finishing a training session. Patient 5 showed evident supraspinatus and infraspinatus atrophy (Figure 1) with significant weakness (3/5) in abduction and external rotation of the shoulder. Needle EMG was performed in all instances. The EMG findings, when positive, were denervation potentials and an increase in latency. The MRI arthograms were performed in patients 1 to 4, while plain MRI was performed in patient 5 (Table 3).

Surgical Procedure

The patients were positioned in the beach-chair position with 3-kg traction on the affected arm. General hypotensive anesthesia supplemented with interscalene block was utilized. Standard portals were used plus a medial Neviaser portal to release the transverse ligament as described by Lafosse et al.\(^{17}\)

First, intra-articular exploration was performed through the posterior portal. An anterior interval portal was placed outside-in to palpate the different intra-articular structures including the biceps anchor. No significant glenohumeral injury was found in any of the patients. The arthroscope was then moved to the subacromial space, and bursectomy was performed via the lateral portal. Next, the arthroscope was placed in the lateral portal, and dissection of the scapular notch was performed through the posterolateral and anterolateral portals. Once the conoid ligament was identified and the transverse ligament was visualized medial to it, the medial Neviaser portal was created after first introducing a spinal needle. Next, the trocar was introduced to protect the nerve medially, and an accessory, more lateral, superior portal was created to divide the transverse ligament (Figure 2). Appropriate neurolysis was conducted with a blunt instrument and the shaver. In 1 case, the most severe (patient 5), the anterior coracoid portals (medial and lateral to the coracoid as described by Reineck and Krishnan\(^{25}\)) were utilized, in addition to the previously described technique, to conduct a thorough neurolysis and exploration of the nerve and artery (Table 3).

Postoperative Rehabilitation

The patients were placed in a sling for comfort and allowed to freely move the shoulder beginning the first postoperative day. Passive assisted range of motion and pendulum exercises were encouraged. Once the wounds were healed, the patients were referred to physical therapy to begin active range of motion exercises. After full range of motion was gained, strengthening exercises were initiated, focusing on the rotator cuff and deltoid and parascapular muscles. Swimming-specific exercises in the pool were started and progressed when patients’ strength had improved to the point they could tolerate a high number

---

**TABLE 1**

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Age, y</th>
<th>Sex</th>
<th>Laterality</th>
<th>Dominant</th>
<th>Length of Symptoms, mo</th>
<th>Positive EMG Result</th>
<th>Positive MRI Result</th>
<th>Follow-up, mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>26</td>
<td>Female</td>
<td>Right</td>
<td>Yes</td>
<td>24</td>
<td>Yes</td>
<td>No</td>
<td>Quit swimming</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>Female</td>
<td>Right</td>
<td>Yes</td>
<td>14</td>
<td>Yes</td>
<td>No</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>Female</td>
<td>Right</td>
<td>No</td>
<td>4</td>
<td>Yes</td>
<td>No</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>Male</td>
<td>Left</td>
<td>No</td>
<td>14</td>
<td>No</td>
<td>No</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>Male</td>
<td>Right</td>
<td>Yes</td>
<td>9</td>
<td>Yes</td>
<td>No</td>
<td>12</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>18.6 ± 4.7</td>
<td></td>
<td></td>
<td></td>
<td>13 ± 7.4</td>
<td></td>
<td></td>
<td>18.5 ± 5</td>
</tr>
</tbody>
</table>

\(^{a}\)EMG, electromyography; MRI, magnetic resonance imaging.
of repetitions with elastic bands. All patients were compliant with this regimen.

Outcomes
The main outcome variables were kilometers of swimming per week (km/wk) and return to competition. Secondary variables of the study were the University of California, Los Angeles (UCLA) shoulder; Disabilities of the Arm, Shoulder and Hand–quick version (qDASH); and sport-specific qDASH scores. Outcomes using a visual analog scale for pain (VAS; range, 0-10) and motor strength (manual muscle test; range, 1-5) and the presence of atrophy were also measured. The procedure for assessing the outcomes was written assessment with completion by patients themselves with minimal investigator assistance.

Statistics
Statistical analysis was performed with SPSS version 14 (SPSS Inc, Chicago, Illinois). Analysis of normality was performed using the Shapiro-Wilk test. Because of the

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Preoperative MRI Results</th>
<th>Preoperative EMG Results</th>
<th>Operative Findings</th>
<th>Follow-up Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MRI arthrogram showed a small amount of fluid interposed between the glenoid cartilage and the superior labrum in the coronal plane, which could represent a type II SLAP lesion, without rotator cuff tears and with moderate subacromial bursal hypertrophy.</td>
<td>EMG showed acute denervation potentials, both in the supraspinatus and infraspinatus muscles.</td>
<td>Patient decided to quit swimming to try to avoid surgery.</td>
<td>Pain resolved 5 mo after retiring.</td>
</tr>
<tr>
<td>2</td>
<td>MRI arthrogram showed no evidence of lesions, except for subtle tendinosis changes in the supraspinatus tendon.</td>
<td>EMG showed a moderate increase in the supraspinatus latency (5.4 m/s), with a subtle chronic denervation-reinervation pattern.</td>
<td>An arthroscopic suprascapular nerve neurolysis was performed. During arthroscopic examination, no labral, biceps tendon, or rotator cuff injuries were seen.</td>
<td>18-mo follow-up: 2 wk after surgery, the patient reported marked improvement in symptoms, with almost complete alleviation of pain, both at night and during daily activities; after 3 mo, she resumed training with minor discomfort that did not interfere with her performance.</td>
</tr>
<tr>
<td>3</td>
<td>MRI arthrogram did not show significant lesions.</td>
<td>EMG did not show denervation potentials or an increase in latency, but there was a small comparative amplitude decrease with the unaffected shoulder.</td>
<td>During arthroscopic examination, no labral, biceps tendon, or rotator cuff injuries were seen, and an arthroscopic suprascapular nerve neurolysis was performed.</td>
<td>20-mo follow-up: 2 wk after surgery, the patient was able to sleep on the right shoulder without pain; 3 mo after surgery, she indicated only minor discomfort that did not interfere with training.</td>
</tr>
<tr>
<td>4</td>
<td>MRI arthrogram showed a minimal contrast leakage between the superior labrum and the glenoid, which could represent a type II SLAP lesion, without rotator cuff tears.</td>
<td>EMG showed no evidence of suprascapular neuropathy.</td>
<td>During arthroscopic examination, a sublabral recess was identified between the biceps-labral complex and the superior portion of the glenoid cartilage and was interpreted as a normal anatomic variant. No other labral, biceps tendon, or rotator cuff injuries were seen. The suprascapular nerve was explored; it was found to cross under a tight transverse ligament, causing marked supraspinatus muscle contractions when probed. The suprascapular transverse ligament was released, and no other therapeutic gestures were performed.</td>
<td>24-mo follow-up: the patient resumed training 2 mo after surgery; after 6 mo, he returned to full training and competition.</td>
</tr>
<tr>
<td>5</td>
<td>MRI showed marked signal increase in T2 in the supraspinatus and infraspinatus muscles, suggesting denervation changes.</td>
<td>EMG showed increased latency for the supraspinatus (9.7 m/s) and infraspinatus (10.4 m/s) muscles, with a chronic denervation-reinervation pattern.</td>
<td>During arthroscopic examination, no labral, biceps tendon, or rotator cuff injuries were seen. The suprascapular transverse ligament was released using the anterior portals.</td>
<td>12-mo follow-up: 6 mo after surgery, muscle atrophy had resolved (Figure 2), and the patient resumed training.</td>
</tr>
</tbody>
</table>

MRI, magnetic resonance imaging; EMG, electromyography; SLAP, superior labral anterior and posterior.
parametric behavior of the variables, the paired $t$ test was used with significance set at $P < .05$. The data are presented as mean ± standard deviation.

RESULTS

Of the 4 patients who underwent surgery, all reported complete relief of pain at rest and at night while sleeping at approximately 2 weeks postoperatively. The patient who rejected surgery did so because she decided to retire from her competitive swimming career.

All patients were elite-level athletes competing at least at the regional level and swam between 20 and 50 km/wk during training. Four of 5 patients were primarily freestyle swimmers. Swimming results are shown in Table 4.

The 4 patients who underwent surgery achieved their preinjury level at a mean of 7 ± 1 months. At final follow-up, they were training at a mean of 48.7 ± 10 km/wk, demonstrating improvement of approximately 15 km/wk (Tables 3 and 4).

The UCLA score was 22.6 ± 4 preoperatively and 34 ± 1 postoperatively ($P < .05$). The preoperative qDASH score was 22.7 ± 7 and 1.1 ± 1 postoperatively ($P < .05$), and the sport-specific qDASH score was 72.5 ± 3 preoperatively and 2 ± 3 postoperatively ($P < .05$). The VAS score was 6 ± 1 preoperatively and 0.25 postoperatively ($P < .05$). Manually tested strength improved after surgery from a rating of 4 to 5 (of a possible 5) (Table 5).

In summary, the UCLA scores improved approximately 12 points at final follow-up. The qDASH scores improved approximately 20 points at final follow-up. The sport-specific scores of the qDASH improved approximately 70 points at final follow-up. The patient with preoperative atrophy was observed to have nearly symmetric muscle mass at the time of final follow-up (Figure 3).

DISCUSSION

To our knowledge, suprascapular nerve injury has not been considered in the differential diagnosis of swimmer’s shoulder in the literature previously,11 nor have the results of arthroscopic release in elite swimmers been previously published. Suprascapular neuropathy has been described in other overhead sports such as volleyball,9,22,34 baseball,7,8,13,28 and tennis.13,18,29 Although the biomechanics of these overhead sports are different than swimming in terms of contact with the ball (tennis and volleyball) or the direction and force of the follow-through phase (baseball), all of these athletes perform a high number of repetitions.26,27 In regard to swimming, the number of revolutions per week is likely to be higher than that of other overhead athletes and may lead to overload abnormalities rather than overuse.2 Proper technique of swimming-specific shoulder activity is crucial to avoid injuries due to overload.

Surgical treatment of suprascapular nerve entrapment has been proposed in volleyball,9,10,22,31 baseball,7,13,28 and tennis players.13 The senior author (E.L-V.) has also diagnosed and surgically treated this entity in elite-level windsurfers. Although surgical treatment has been mainly focused on releasing the nerve at the spinoglenoid notch, there are also references to its release at the suprascapular notch,9,28 as we did in our study. All are retrospective case series with small numbers of patients (range, 1-5).
The results are variable in the different series. The main outcome was considered to be pain relief. Elite athletes who were released at the suprascapular notch were free of symptoms at 5 months28 and 6 months9 after surgery. In our study, we noted that neuropathic pain disappeared quite soon, around 2 weeks after surgery. At final follow-up, the VAS score had improved from 6 to 0.25 (P < .05). Regarding time to return to sports and to the preinjury level, recovery ranged from 3 months7 to 12 months28 depending on the series. In our study, all 4 operated swimmers returned to the preinjury level at 7.6 months. Interestingly, when atrophy was reported, most of the series described that the muscle bulk did not return, although the patients were able to return to their sport. The only patient who suffered atrophy preoperatively in our series (patient 5) recovered most of the muscle bulk by 10 months, although it was not completely symmetric with the unaffected side. In terms of specific outcome measures, only 1 report of suprascapular nerve entrapment was found that used validated scores.22 The DASH and its sport-specific subscale were used, and the authors reported results at 6 weeks and at 10 months. The DASH score at 6 weeks was 14.1, improving to 2.5 at 10 months. The sport-specific DASH score was 93.7 at 6 weeks, improving to 0 at 10 months. In the single case report by Ozer et al.,22 there were no preoperative measurements, which impeded comparison of improvement with our series. At final follow-up, our patients had similar results compared with this case report, with very good results in the qDASH and sport-specific qDASH. Moreover, we utilized more outcome variables in our study, including the UCLA score, obtaining an excellent result of 34 ± 1.

None of the published series utilized arthroscopic surgery to release the nerve and to conduct neurolysis. This procedure has been shown to be effective and safe in different series.16,17 Different arthroscopic techniques have been proposed to release the suprascapular notch,3,4,17 the spinoglenoid notch,24 or both sites of entrapment.12 In our series, the surgery was performed arthroscopically, allowing for accurate exploration of the nerve under the transverse ligament in the suprascapular notch and for performing neurolysis, removing fibrous tissue around the nerve approximately 3 cm. Arthroscopic surgery also has other advantages such as magnification, which improves visualization of encountered structures, enabling the diagnosis of other possible intra-articular and subacromial concomitant abnormalities and their treatment. Because arthroscopic surgery is minimally invasive, the patient has less postoperative pain, permitting early rehabilitation and return to training, potentially preventing the occurrence of fibrosis around the nerve. The accurate diagnosis and the opportunity of eliminating other concomitant injuries possibly allowed a higher degree of success in our study compared with other series reporting on surgical treatment of swimmer’s shoulder.

There are few published series of surgical treatment for swimmer’s shoulder.6,19,21 A study by Brushoj et al6 reported a 56% rate of return to the preinjury level of performance after a mean of 4 months after surgery in 16 shoulders. They used different surgical techniques

### TABLE 4
Postoperative Swimming Data

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Return to Competition</th>
<th>Competitive Level</th>
<th>Time to Achieve, mo</th>
<th>Distance, km/wk</th>
<th>Style</th>
<th>Presence of Atrophy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>Freestyle</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td>National</td>
<td>8</td>
<td>50</td>
<td>Freestyle</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>Regional</td>
<td>5</td>
<td>35</td>
<td>Freestyle</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
<td>National</td>
<td>6</td>
<td>60</td>
<td>Freestyle</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>Yes</td>
<td>International</td>
<td>9</td>
<td>50</td>
<td>Breaststroke</td>
<td>No</td>
</tr>
</tbody>
</table>

### TABLE 5
Summarized Clinical Outcome Data

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>UCLA, 0-35</th>
<th>qDASH</th>
<th>Sport-Specific qDASH</th>
<th>VAS, 0-10</th>
<th>Strength (MMT), 1-5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preop</td>
<td>Postop</td>
<td>Preop</td>
<td>Postop</td>
<td>Preop</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>—</td>
<td>18.2</td>
<td>—</td>
<td>75</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>33</td>
<td>27.3</td>
<td>2.3</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>35</td>
<td>18.2</td>
<td>2.3</td>
<td>68.8</td>
</tr>
<tr>
<td>4</td>
<td>27</td>
<td>33</td>
<td>15.9</td>
<td>0</td>
<td>68.8</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>35</td>
<td>34</td>
<td>0</td>
<td>75</td>
</tr>
</tbody>
</table>

Mean ± SD: 22.6 ± 4.5 34 ± 1.2 22.7 ± 7.7 1.2 ± 1.3 72.5 ± 3.4 2.1 ± 3.6 6 ± 1.2 0.2 ± 0.5 4 ± 0 5 ± 0

*aStatistical significance set at P < .05. All of the comparisons were statistically significant. P values of comparisons between preoperative (Preop) and postoperative (Postop) outcomes are as follows: University of California, Los Angeles (UCLA), P = .02; Disabilities of the Arm, Shoulder and Hand–quick version (qDASH), P = .01; sport-specific qDASH, P = .0001; visual analog scale (VAS), P = .005; strength (manual muscle test [MMT]), P = .04.
depending on the lesion found. Mainly, arthroscopic debridement (n = 11) was utilized; the second most common procedure was partial resection of the coracoacromial ligament with bursectomy (n = 4). In our series, the return to the preinjury competition level was 100%. In fact, these swimmers were able to increase their training workload. In a study by Montgomery et al., the reported rate of return to competitive swimming was 80% at a mean of 9 months in 15 swimmers (n = 18). However, the return to the preinjury training level was only 20%. At a follow-up of 11 months, the swimmers were training 1100 yd (1000 m) less per workout than preoperatively. In our study, the training workload per week improved approximately 15 km/wk at final follow-up. The main surgical procedure performed in the study of Montgomery et al. was capsular plication with anchors (n = 18), and rotator interval closure was associated in 11 shoulders. They used as clinical outcome measurements the American Shoulder and Elbow Surgeons (ASES) and L’Insalata scores. At an average follow-up of 29 months, the ASES score was 78, and the L’Insalata score was 82. However, the preoperative scores were not reported; thus, the degree of improvement is not known.

These variable results are probably caused by the fact that swimmer’s shoulder likely consists of an assortment of abnormalities that are not well defined. As a result, accurate treatment is difficult. By knowing more precisely the etiology and pathophysiology of the shoulders of these patients, results are likely to improve.

Several pathophysiological explanations for swimmer’s shoulder have been proposed including swimming technical errors, muscle imbalance and fatigue, over-use, and overuse. In terms of suprascapular nerve entrapment, in swimmers who utilize mainly the freestyle stroke, we propose that scapular dyskinesia is a frequent risk factor for shoulder pain in swimmers, consisting mainly of external rotation of the scapula winging away from the midline because of muscle imbalance. Scapular dyskinesia, in combination with a certain degree of adaptive hyperelasticity of the shoulder and infraspinatus hypercontraction, may cause entrapment of the nerve at the medial wall of the suprascapular notch of the scapula. Additionally, fatigue may lead to “letting go of the shoulder” in the follow-through phase, causing traction neuropathy. Lastly, the vast amount of training and revolutions of the shoulder may lead to a thickened ligament. All of these and probably more factors may lead to entrapment of the suprascapular nerve and its neuropathy.

There are various limitations of this study. First, it is a small cohort; however, this is a very specific group of patients with a very uncommon lesion, and our study is comparable in terms of numbers with others reporting on suprascapular nerve entrapment and a specific sport. According to the Coleman methodology score for quality assessment, our study is considered of moderate quality with 68 points. Second, in terms of outcomes, postoperative EMG was not performed; nevertheless, the main outcome measure was the return to swimming at the preinjury level or higher, and additionally, we assessed the DASH and UCLA clinical scores as secondary outcomes. Third, the spinoglenoid notch was neither released nor augmented, but preoperative EMG showed entrapment at the suprascapular notch, and all of the swimmers who underwent surgery returned to swimming pain free at the preinjury level or even better.

When evaluating swimmers with poorly defined posterior shoulder pain without a clear diagnosis and inconclusive physical examination and MRI studies, the team physician should take into account the possibility of suprascapular nerve injury and consider ordering an EMG. Even in those cases where the EMG results are negative, lidocaine injection may be helpful in clarifying the diagnosis. Finally, if arthroscopic surgery becomes the last diagnostic tool and no other lesion is found, exploration and release of the suprascapular nerve may be an option to increase the success rate in treating such patients.

CONCLUSION

Suprascapular nerve entrapment may be taken into account in the differential diagnosis of swimmer’s shoulder. Arthroscopic surgery is a useful tool to evaluate and treat entrapment and neuropathy of the suprascapular nerve at the suprascapular notch in competitive swimmers.

ACKNOWLEDGMENT

The authors express their gratitude to Dr Emilio López-Vidriero Abelló for his help in the expansion of the article, statistical calculations, and mentorship; Dr Iris A. Drey for her assistance in the revision of the article; and Dr Miguel Angel Toledo, head of the Upper Extremity Unit at Virgen del Rocío Universitetary Hospital, for his help and assistance.

REFERENCES


