J Shoulder Elbow Surg (2018) 27, 172–180

ELSEVIER

Journal of Shoulder and Elbow Surgery

www.elsevier.com/locate/ymse

REVIEW ARTICLES

Clinical outcomes of suprascapular nerve decompression: a systematic review

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Background: Suprascapular neuropathy is an uncommon clinical diagnosis. Although there have been a number of case series reporting on this pathologic process, to date there has been no systematic review of these studies. This study aimed to synthesize the literature on suprascapular neuropathy with regard to clinical outcomes. The secondary objective was to detail the diagnosis and treatment of suprascapular neuropathy and any associated complications.

Methods: A systematic review was performed to identify studies that reported the results or clinical outcomes of suprascapular nerve decompression. The searches were performed using MEDLINE through PubMed and Cochrane Database of Systematic Reviews.

Results: Twenty-one studies comprising 275 patients and 276 shoulders met inclusion criteria. The mean age was 41.9 years, and mean follow-up was 32.5 months. The most common symptom was deep, posterior shoulder pain (97.8%), with a mean duration of symptoms before decompression of 19.0 months; 94% of patients underwent electrodiagnostic testing before decompression, and 85% of patients had results consistent with suprascapular neuropathy. The most common outcome reported was the visual analog scale score, followed by the Constant-Murley score. The mean postoperative Constant-Murley score obtained was 89% of ideal maximum. Ninety-two percent of athletes were able to return to sport. Only 2 (0.74%) complications were reported in the included studies.

Conclusions: Surgical decompression in the setting of suprascapular neuropathy leads to satisfactory outcomes as evidenced by the patient-reported outcomes and return to sport rate. Furthermore, the rate of complications appears to be low.

Level of evidence: Level IV; Systematic Review

Keywords: Suprascapular neuropathy; shoulder pain; decompression; spinoglenoid notch; suprascapular notch; outcomes

Suprascapular neuropathy has become an increasingly recognized pathologic process and cause of shoulder pain and weakness during the past few decades. The clinical entity was first described by Thompson and Kopell in 1959.[23] Since then,

This paper is exempt from Institutional Review Board approval as it is a review article.

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https://doi.org/10.1016/j.jse.2017.09.025

the diagnosis and treatment of suprascapular neuropathy have evolved. Aiello et al[2] first identified 2 different points of compression, 1 at the suprascapular notch and the other at the spinoglenoid notch. Historically, suprascapular neuropathy was a diagnosis of exclusion. However, advanced imaging and electrodiagnostic testing have allowed clinicians to further understand and diagnose suprascapular neuropathy.

Although our understanding of suprascapular neuropathy has grown, it is unclear how patients do clinically after suprascapular nerve decompression. Only recently have studies reported patient outcomes after suprascapular nerve decompression at the suprascapular and spinoglenoid notches. These 2 anatomic sites of compression are separate clinical entities. Compression at the suprascapular notch generally leads to weakness of both the supraspinatus and infraspinatus. The suprascapular ligament is often the offending agent and must be released. In contrast, compression at the spinoglenoid notch leads to isolated infraspinatus weakness, and it is often caused by a cyst with an associated labral lesion. In these cases, the cyst or the labral lesion is generally addressed to alleviate the compression.

Furthermore, in athletic populations, return to sport has not been well defined after suprascapular nerve decompression. In addition, earlier studies described open techniques to release the suprascapular nerve, but with the advancement of arthroscopic techniques, recent studies have published the results of arthroscopic decompression. The type and rate of complications with either open or arthroscopic techniques have not been well studied.

This is the first systematic review on compressive suprascapular neuropathy in the literature. The primary objective of this systematic review was to report on the outcomes of suprascapular nerve decompression at the suprascapular or spinoglenoid notch. The secondary objective was to report on the presentation of symptoms, mechanism, and diagnosis of suprascapular neuropathy and complications associated with decompression.

Methods

The systematic review was performed following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines.

Eligibility criteria

Studies were included if they reported the results of suprascapular nerve decompression at either the suprascapular notch or spinoglenoid notch. Results must have included 1 of the following: patient-reported clinical outcomes, objective strength testing, electrodiagnostic testing preoperatively and postoperatively, or return to sport rate. The following types of studies were excluded: case reports (<3 patients); reviews, editorials, or technique papers; studies that involved concomitant brachial plexopathy or fractures; and studies published in a language other than English.

Data sources

MEDLINE, through PubMed, and Cochrane Database of Systematic Reviews (CDSR) were searched for relevant publications. These online databases were searched in September 2016.

Searches

The search algorithm used for PubMed was suprascapular OR spinoglenoid OR (shoulder and "entrapment neuropathy") OR (shoulder and "ganglion cyst") OR (shoulder and "transverse scapular ligament"). For the CDSR, the search term used was "suprascapular neuropathy."

Study selection

The titles and abstracts were reviewed to determine the relevance of the study. After nonrelevant papers were excluded, the full text of studies was reviewed for inclusion. In addition, references were reviewed within these studies to identify any additional studies for inclusion. The study selections were performed independently by 2 investigators (A.M.M. and A.K.). These same authors extracted relevant data from the studies. Discrepancies between selected studies were few and settled by consensus.

Results

The CDSR reported no systematic reviews on suprascapular neuropathy. The PubMed database search produced a total of 1176 publications. After exclusion of nonrelevant titles, 165 abstracts were reviewed. From these abstracts, 105 full-text articles were obtained. After exclusion criteria were applied, 21 publications were identified for inclusion in the systematic review. One study was level II, 2 studies were level III, and the rest were level IV studies. No additional studies were included after evaluation of references from the full-text articles (Fig. 1).

Of the 21 studies, 11 involved decompression of the suprascapular nerve at the spinoglenoid notch only and 5 at the suprascapular notch only, and 5 involved a combination of decompression at the suprascapular and spinoglenoid notches. Fifteen studies employed arthroscopic techniques for decompression, whereas 6 studies employed open techniques for decompression. Table I summarizes each of the included studies.

Patient demographics

The 21 studies meeting criteria for the systematic review included 276 shoulders from 275 patients. Of the studies (18) that provided gender demographics, there were 197 men and 61 women. Mean patient age data were available for 214 shoulders and showed a mean age of 41.9 years (range, 14-85 years). Follow-up data were available for 228 shoulders, with a mean reported follow-up of 32.5 months (range, 6-108 months).

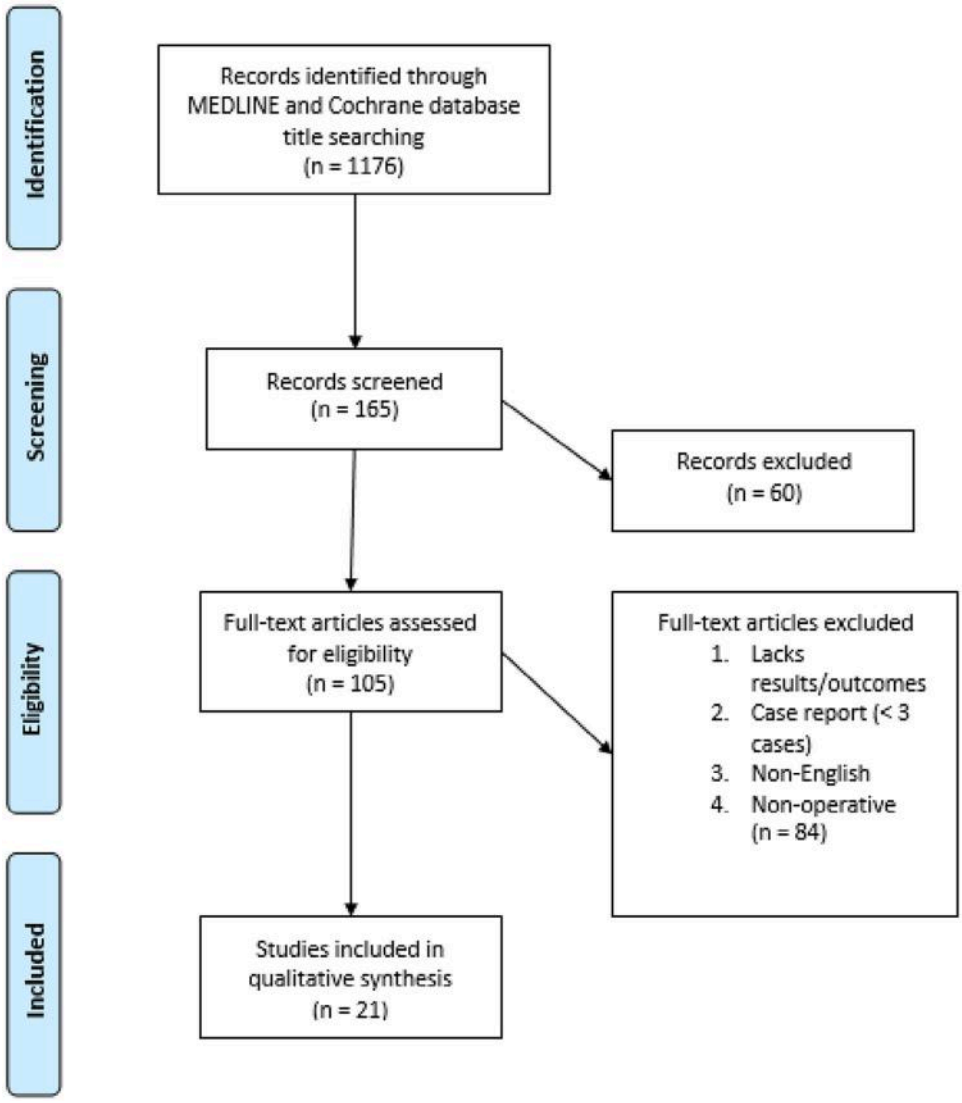

Figure 1 Literature selection algorithm.

Diagnosis

The mechanism of suprascapular neuropathy was reported for 203 patients (15 studies). Of these patients, 119 (58.6%) reported insidious onset from repetitive overhead activities, sports, or occupational activities; 63 (31.0%) reported a traumatic event; and 21 (10.3%) reported an unknown mechanism.

Data were available for symptoms at presentation for 226 shoulders (17 studies). The most common symptom of patients with suprascapular nerve compression was deep, posterior shoulder pain present in 221 shoulders (97.8%). The mean duration of symptoms before decompression was 19.0 months (12 studies), with a range of 0.5-312 months.

Information about physical examination before decompression was available for 192 patients (17 studies). Specifically, muscle atrophy was addressed for 182 patients (15 studies). Of these patients, 142 (78.0%) had visible muscle atrophy of either the infraspinatus or both infraspinatus and supraspinatus. Weakness was addressed for 155 patients (14 studies). Of these patients, 130 patients (83.9%) exhibited weakness on physical examination with external rotation or abduction.

Diagnostic workup was addressed in 20 studies. Among studies documenting the use of advanced imaging (17 studies), 225 patients (88%) underwent magnetic resonance imaging or computed tomography scans before decompression. Among studies documenting the use of electrodiagnostic testing (18 studies), 192 patients (94%) underwent electrodiagnostic testing before decompression. Eight of these studies reported the proportion of patients who tested positive (85%) for suprascapular neuropathy through testing. Two of these studies reported the use of injections for the diagnosis of suprascapular neuropathy. In the study by Shah et al,[22] 3 patients had negative results of electrodiagnostic testing and thus underwent fluoroscopically guided injections, which confirmed the diagnosis of suprascapular neuropathy. In another study by Dramis and

Table I Publications reporting outcomes after suprascapular nerve decompression

Author	Year	Journal	Level of evidence	Location of decompression	Technique	No. of shoulders	Outcome	Follow-up (mo)
Hashiguchi[12]	2016	SICOT J	IV	SGN	Scope	6	Constant, VAS	63.7
Leclere[15]	2014	Arthroscopy	IV	SSN (3), SSN and SGN (1)	Scope	4	SSV, VAS	6
Mall[17]	2013	JSES	IV	SGN	Open	29	ASES, VAS, SST, functional score	51.6
Bilsel[4]	2014	KSSTA	III	SGN	Scope	16	Constant, VAS	26
Arriaza[3]	2013	AJSM	IV	SSN	Scope	4	UCLA, qDASH, VAS, return to sport	18.5
Kim[13]	2012	JSES	II	SGN	Scope	28	Constant, Rowe, VAS, return to sport	32.5
Garcia Jr.[10]	2011	Rev Bras Ortop	IV	SSN	Scope	10	UCLA, SF-36	16.6
Shah[22]	2011	JSES	IV	SSN and/or SGN	Scope	24	ASES, SSV, VAS	22.5
Pillai[18]	2011	CORR	IV	SGN	Scope	6	Objective strength testing	15.2
Schroder[21]	2008	JBJS	IV	SGN	Scope	42	Rowe	43
Costouros[6]	2007	Arthroscopy	IV	SSN	Scope	6	Postoperative electrodiagnostic testing	14
Lafosse[14]	2007	Arthroscopy	IV	SSN	Scope	10	Constant, objective strength testing, return to sport, electrodiagnostic testing	15
Westerheide[25]	2006	Arthroscopy	IV	SGN	Scope	14	Constant, SST	51
Abboud[1]	2006	CORR	III	SGN	Scope	16	ASES, PSS, VAS	40
Dramis[7]	2005	Acta Orthop Belg	IV	SSN	Open	4	Return to sport	6
Lichtenberg[16]	2004	KSSTA	IV	SGN	Scope	8	Constant, SST, electrodiagnostic testing	27
Chen[5]	2003	Arthroscopy	IV	SGN	Scope	3	Return to sport, electrodiagnostic testing	14.3
Fabre[8]	1999	JBJS (Br)	IV	SSN (35), SSN and SGN (2)	Open	35	Constant, return to sport	30
Ferretti[9]	1998	AJSM	IV	SGN	Open	3	Return to sport	24
Sandow[20]	1998	JSES	IV	SGN and SSN	Open	5	Return to sport	16.2
Hama[11]	1992	JSES	IV	SSN (1), SGN (1), SSN and SGN (1)	Open	3	Return to sport, electrodiagnostic testing	100.8

SGN, spinoglenoid notch; *SSN*, suprascapular notch; *VAS*, visual analog scale; *SSV*, subjective shoulder value; *ASES*, American Shoulder and Elbow Surgeons; *UCLA*, University of California–Los Angeles; *qDASH*, Quick Disabilities of the Arm, Shoulder, and Hand; *SF-36*, 36-Item Short Form Health Survey; *SST*, Simple Shoulder Test; *PSS*, Penn Shoulder Score.

Table II Functional outcome measures after suprascapular nerve decompression

Outcome measure	No. of studies	No. of shoulders	Mean preoperative score	Percentage ideal	Mean postoperative score	Percentage ideal
Visual analog scale	7	123	6.3	37%	1.6	84%
Subjective shoulder value	2	28	37.0	37%	67.0	67%
American Shoulder and Elbow Surgeons score	3	69	47.7	48%	77.3	77%
University of California–Los Angeles rating scale	2	14	14.8	42%	28.4	81%
Constant-Murley	6	117	57.4	57%	88.8	89%
Simple Shoulder Test	3	51	5.6	47%	9.9	83%
Functional score	1	29	13.3	44%	21.2	71%
Disabilities of the Arm, Shoulder, and Hand score	1	4	22.7	77%	1.1	99%
Rowe	2	70	58.0	58%	96.7	97%
36-Item Short Form Health Survey	1	10	Not reported		122.9	
Penn Shoulder Score	1	16	73	73%	93	93%

Pimpalnerkar,[7] all 4 patients underwent diagnostic injections before decompression to confirm suprascapular neuropathy.

Technique

Among studies that looked at suprascapular nerve decompression at the spinoglenoid notch only (11 studies), 9 studies employed arthroscopic techniques and 2 studies employed open techniques. Among these studies, the authors in 7 of the studies routinely débrided the cyst and repaired any associated labral lesion when present. In general, the most common labral lesion present was a type II superior labral anterior-posterior (SLAP) lesion. It was extended in the anteroposterior direction with the use of a probe or elevator. The cyst was débrided using a shaver. Manual pressure was sometimes applied to help express its contents. Subsequently, the SLAP lesion was repaired. If no labral lesion was present, release of the capsule was performed directly over the cyst to evacuate its contents, and the capsule was left unrepaired. One study described repair of the labrum only.[21]

Another study described release of the spinoglenoid ligament in every patient and débridement of an associated cyst if present.[17] This was accomplished through an incision directly over the scapular spine. The deltoid was split in line with its fibers. The split was centered over the spinoglenoid notch. The fascia of the infraspinatus was then split and the infraspinatus muscle belly lifted off to expose the spinoglenoid notch. The spinoglenoid ligament was then released under direct visualization. A different study described neurolysis of the suprascapular nerve through an open approach similar to that previously described.[9] One study directly compared techniques: cyst decompression plus labral repair vs. labral repair only.[13] No differences were shown in outcome scores between the 2 groups.

Among studies that looked at suprascapular nerve decompression at the suprascapular notch only (5 studies), 4 studies employed arthroscopic techniques and 1 study employed an open technique. With regard to the open technique,[8] an incision was made parallel and proximal to the scapular spine. The trapezius muscle fibers were then split, and the supraspinatus muscle belly was reflected to expose the suprascapular ligament. When an arthroscopic technique was used, an anteromedial bursectomy was performed, followed by medial dissection along the coracoacromial ligament to the coracoid. The coracoclavicular ligaments were then followed down to the base of the coracoid, where the lateral insertion of the superior transverse ligament is found and released. Another study evaluated decompression of the suprascapular nerve through an indirect technique.[6] The authors approached decompression of the nerve through arthroscopic repair of the rotator cuff tear. All of the patients underwent electrodiagnostic testing preoperatively to confirm suprascapular neuropathy, and this testing was repeated 6 months postoperatively, which showed partial or complete resolution of suprascapular neuropathy.

Outcome measures

A total of 11 different outcome measures were used in the included studies. The outcome most commonly reported was the visual analog scale (VAS) score, followed by the Constant-Murley score. The mean Constant-Murley score obtained was 89% of ideal maximum. Overall outcome scores are summarized in Table II. Further stratification by location of decompression is shown in Tables III and IV. The data were also stratified by concomitant labral lesion vs. no labral lesion (Table V). We also sought to evaluate outcomes after suprascapular neuropathy in the setting of rotator cuff repair, but such data were limited.

Objective strength testing was performed in 4 studies. In the study by Bilsel et al,[4] external rotation strength improved compared with the contralateral arm from 50% to 70% and 70% to 90% in their 2 cohorts. In the study by Pillai et al,[18] mean postoperative external rotation strength increased from 45% to 85% of the contralateral arm. In the study by Lafosse et al,[14] supraspinatus strength increased from 2.4 kg to 4.6 kg, and infraspinatus strength increased from 2 kg to 4.3 kg. Fabre et al[8] reported a mean force of abduction strength of 5 kg at

Table III Functional outcome measures after suprascapular nerve decompression at the suprascapular notch only

Outcome measure	No. of studies	No. of shoulders	Mean preoperative score	Mean postoperative score
University of California–Los Angeles rating scale	2	14	14.8	28.4
Constant-Murley	1	10	60.3	93.4
Disabilities of the Arm, Shoulder, and Hand score	1	4	22.7	72.5
36-Item Short Form Health Survey	1	10	NR	122.9

Table IV Functional outcome measures after suprascapular nerve decompression at the spinoglenoid notch only

Outcome measure	No. of studies	No. of shoulders	Mean preoperative score	Mean postoperative score
Visual analog scale	5	95	6.0	1.3
American Shoulder and Elbow Surgeons score	2	45	53.7	80.9
Constant-Murley	5	58	63.1	93.9
Simple Shoulder Test	3	51	5.6	9.9
Functional score	1	29	13.3	21.2
Rowe	1	28	52.8	94.7
Penn Shoulder Score	1	16	73	93

follow-up compared with 7 kg for the unaffected shoulder. The authors of this study did not report preoperative abduction strength.

Postoperative electrodiagnostic testing

Postoperative electrodiagnostic testing was obtained and reported in 28 patients (5 studies). Of these patients, 27 (96.4%) had complete resolution of suprascapular neuropathy on the basis of electrodiagnostics.

Return to sport

Return to sport data were available for 63 athletes (9 studies). Sixty (95%) of these athletes were able to return to sport at some level. Among the studies that reported the type of sport, the majority of athletes were volleyball players (51); the others included swimmers (6), dancer (1), and javelin thrower (1). Only 4 studies differentiated athletes who returned to sport at preinjury level vs a lower level. Of the 17 athletes in these studies, 15 (88%) were able to return to sport at preinjury level. Of the 18 athletes (3 studies) who underwent decompression at the suprascapular notch only, 18 (100%) were able to return to sport. Of the 33 athletes (4 studies) who underwent decompression at the spinoglenoid notch only, 30 (90.9%) were able to return to sport.

Complications

Complication data were reported for 269 shoulders. There were only 2 complications reported, giving an overall rate of 0.74%. The complications reported included 1 superficial soft tissue infection[4] and 1 adhesive capsulitis.[16] Both of these complications were in patients who underwent suprascapular nerve decompression at the spinoglenoid notch.

Discussion

This systematic review is the first in the literature to evaluate outcomes after suprascapular nerve decompression. Previous reported outcomes after suprascapular nerve decompression have been limited to case series. Furthermore, the diagnosis of suprascapular neuropathy is often elusive for clinicians. This review synthesizes information from all available studies with the goal of clarifying the presentation and diagnosis of suprascapular neuropathy and complications associated with decompression for clinicians to use in their practices.

Workup

The diagnosis of suprascapular neuropathy can be difficult, and patients are often not diagnosed or treated until after a prolonged period as evidenced by a mean time of 19.0 months from symptom onset to decompression. We sought to determine whether a delay in treatment of suprascapular neuropathy led to poorer outcomes, but such detailed data were not available for analysis from the included studies. Our review found that the most common presenting symptom is deep, posterior shoulder pain. Such a symptom can often be present in other diagnoses and difficult to differentiate from labral or tendon disease or muscle imbalance. One should evaluate for visible infraspinatus atrophy, which was shown to be present in 78% of patients in the included studies, and weakness with external rotation or abduction, which was present in 84% of patients. Clinicians should order electrodiagnostic testing for those patients with suspected suprascapular neuropathy. In

Table V Functional outcomes stratified by the presence or absence of concomitant labral lesion

Outcome measure	Concomitant labral lesion				Absence of labral lesion			
	No. of studies	No. of shoulders	Mean preoperative score	Mean postoperative score	No. of studies	No. of shoulders	Mean preoperative score	Mean postoperative score
Visual analog scale	4	58	6.4	1.0	1	4	5.8	0.0
Subjective shoulder value					1	4	32.5	80.0
American Shoulder and Elbow Surgeons score	1	8	64	95				
University of California–Los Angeles rating scale					1	4	22.6	34.0
Constant-Murley	5	50	62.0	94.1	2	45	50.0	80.6
Simple Shoulder Test	1	14	4.3	11.5				
Disabilities of the Arm, Shoulder, and Hand score					1	4	22.7	1.1
Rowe	2	70	58.0	96.7				
Penn Shoulder Score	1	8	74	96				

the current review, 94% of patients underwent electrodiagnostic testing, and of the results reported, 85% of these tests showed evidence of suprascapular neuropathy. However, a negative electrodiagnostic test result should not necessarily rule out suprascapular neuropathy, as Shah et al[22] demonstrated successful outcomes after decompression in patients with false-negative preoperative electrodiagnostic studies. The clinician may consider a fluoroscopically guided injection and evaluate for resolution of symptoms for confirmation of the diagnosis.

Technique

Because of the lack of standardization of outcome scores and the paucity of studies reporting outcomes after open suprascapular nerve decompression, it is difficult to draw any conclusions on differences in outcomes between arthroscopic and open techniques. Lafosse et al[14] described some distinct advantages of arthroscopic decompression, including the ability to obtain superior visualization of the neurovascular structures around the transverse scapular ligament at the suprascapular notch and the avoidance of detachment of the trapezius insertion, which may lead to less pain.

With regard to decompression at the spinoglenoid notch, it has been debated whether a cyst needs to be evacuated or whether simply repairing a concomitant labral tear will decompress the cyst and thus resolve the suprascapular neuropathy. In the study by Kim et al,[13] SLAP repair alone was compared with SLAP repair with cyst decompression. The 2 groups did not differ in mean VAS scores and Constant and Rowe scores. This study suggested that one may simply repair the associated labral lesion. Similar evidence was found in a study by Schroder et al,[21] which reported high patient satisfaction and resolution of spinoglenoid cysts after labral fixation without cyst decompression. However, Pillai et al[18] questioned such results and showed that cyst decompression led to greater strength increases than SLAP repair alone. However, a major limitation of this study was the lack of a cohort that had a cyst and a SLAP lesion and underwent an isolated SLAP repair. Further studies should be conducted to evaluate the role of cyst decompression along with labral repair in the outcomes of suprascapular nerve decompression.

With regard to decompression at the suprascapular notch, 1 study examined an indirect method of decompression. Costouros et al[6] published their results of indirect decompression by repair of a massive rotator cuff tear. Thirty-eight percent of these massive rotator cuff tears showed evidence of suprascapular neuropathy on electrodiagnostic testing. Of patients who underwent partial or complete repair of their massive rotator cuff tears, all demonstrated partial or full recovery of suprascapular neuropathy with follow-up electrodiagnostic testing. Thus, this study suggested that indirect decompression by rotator cuff repair may be possible to resolve the suprascapular neuropathy.

Outcomes

The current literature describes satisfactory results with regard to outcomes after suprascapular nerve decompression. However, no studies directly compared operative vs. nonoperative treatment of suprascapular neuropathy. Nonoperative modalities include physical therapy to strengthen rotator cuff muscles, periscapular muscles, and the deltoid; activity modification; and ultrasound-guided aspiration of the cyst when present. Although nonoperative treatment remains the first line of treatment for suprascapular neuropathy, patients can expect improvement in symptoms and function after surgical decompression of the suprascapular nerve with either open or arthroscopic techniques after failure of nonoperative treatment.

This systematic review identified 11 different functional outcome measures throughout the included literature. The most common outcomes included the VAS score (7 studies) and the Constant-Murley score (6 studies). The Constant-Murley score measures pain, range of motion, function, and strength. The mean score obtained was 89% of maximum ideal score. It is challenging to compare the various studies on decompression of the suprascapular nerve, given the lack of standardization of outcome scores. In addition, despite that pain is the most common presenting symptom, only 7 studies reported a VAS score. Furthermore, only 4 studies reported objective muscle strength postoperatively. Many of the other studies reported subjective descriptions of patients' outcomes with regard to pain, strength, and satisfaction. Such variability makes it difficult to draw meaningful comparisons between studies.

Return to sport

A total of 9 studies identified return to play rates for athletes undergoing decompression of the suprascapular nerve. Overall, 95.2% of athletes were able to return to sport, whereas 88% returned at preinjury level. Thus, clinicians may counsel patients on reasonably high return to play rates after undergoing decompression for suprascapular neuropathy. We sought to identify differences among types of sport and contact vs. noncontact athletes, but the majority of athletes in the included studies were volleyball players (81%) and swimmers (9.5%).

Complications

Despite the potential technical difficulty encountered during decompression of the suprascapular nerve, there were only 2 reported complications in the included studies. Neither of these complications involved a neurovascular injury. This finding is surprising in light of studies showing aberrant vascular anatomy at the suprascapular notch[19] or ossified transverse scapular ligament.[24]

Limitations

A shortcoming of this study, inherent to all systematic reviews, is a result of the quality of studies included. Most of the studies in our review were case series with a small number of patients because of the rarity of surgical treatment for this clinical condition. This, however, may highlight a strength of this paper in that it takes a collection of small samples and combines them to gain a more comprehensive understanding of presentation, workup, and treatment along with outcomes and complications. Another limitation is the lack of standardization of outcome measures reported in the studies, making it difficult to make comparisons between studies. We attempted to summarize these by applying a "percentage ideal" normalization to the outcomes to facilitate communication, but direct comparison between these normalizations has not been validated. Finally, we included suprascapular nerve decompression that was performed either directly or indirectly at the suprascapular notch or the spinoglenoid notch. Although these sites of compression may represent different pathologic processes, ultimately suprascapular neuropathy is the cause of symptoms and thus these pathologic processes lie along the same spectrum. Furthermore, we reported on different concomitant diseases and procedures, which may have affected outcomes. Nonetheless, all studies were treating suprascapular neuropathy as the primary pathologic process. Finally, it is debatable as to whether all patients in these studies truly had suprascapular neuropathy because not all patients underwent electrodiagnostic testing and fluoroscopically guided injections. We included studies in which the authors explicitly believed they were treating a primary diagnosis of suprascapular neuropathy because of the patient's symptoms, physical examination, electrodiagnostics, or a selective injection.

Conclusion

Indications for surgical decompression of the suprascapular nerve remain unclear, as does the natural history of the disease process. However, after failure of conservative treatment, surgical decompression of the suprascapular nerve, either directly or indirectly, leads to satisfactory outcomes as determined by patient-reported outcomes and return to sport rates. Furthermore, the rate of complications appears to be low.

Disclaimer

The authors, their immediate families, and any research foundations with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.

References

1. Abboud JA, Silverberg D, Glaser DL, Ramsey ML, Williams GR. Arthroscopy effectively treats ganglion cysts of the shoulder. Clin Orthop Relat Res 2006;444:129-33.
2. Aiello I, Serra G, Traina GC, Tugnoli V. Entrapment of the suprascapular nerve at the spinoglenoid notch. Ann Neurol 1982;12:314-6.
3. Arriaza R, Ballesteros J, López-Vidriero E. Suprascapular neuropathy as a cause of swimmer's shoulder: results after arthroscopic treatment in 4 patients. Am J Sports Med 2013;41:887-93. http://dx.doi.org/10.1177/0363546513477383
4. Bilsel K, Erdil M, Elmadag M, Ozden VE, Celik D, Tuncay I. The effect of infraspinatus hypotrophy and weakness on the arthroscopic treatment of spinoglenoid notch cyst associated with superior labrum anterior-to-posterior lesions. Knee Surg Sports Traumatol Arthrosc 2014;22:2209-15. http://dx.doi.org/10.1007/s00167-013-2469-0
5. Chen AL, Ong BC, Rose DJ. Arthroscopic management of spinoglenoid cysts associated with SLAP lesions and suprascapular neuropathy. Arthroscopy 2003;19:E15-21.
6. Costouros JG, Porramatikul M, Lie DT, Warner JJ. Reversal of suprascapular neuropathy following arthroscopic repair of massive supraspinatus and infraspinatus rotator cuff tears. Arthroscopy 2007;23:1152-61. http://dx.doi.org/10.1016/j.arthro.2007.06.014
7. Dramis A, Pimpalnerkar A. Suprascapular neuropathy in volleyball players. Acta Orthop Belg 2005;71:269-72.
8. Fabre T, Piton C, Leclouerec G, Gervais-Delion F, Durandeau A. Entrapment of the suprascapular nerve. J Bone Joint Surg Br 1999;81:414-9.
9. Ferretti A, De Carli A, Fontana M. Injury of the suprascapular nerve at the spinoglenoid notch. The natural history of infraspinatus atrophy in volleyball players. Am J Sports Med 1998;26:759-63.
10. Garcia Junior JC, Paccola AM, Tonoli C, Zabeu JL, Garcia JP. Arthroscopic release of the suprascapular nerve: surgical technique and evaluation of clinical cases. Rev Bras Ortop 2011;46:403-7. http://dx.doi.org/10.1016/S2255-4971(15)30252-4
11. Hama H, Ueba Y, Morinaga T, Suzuki K, Kuroki H, Yamamuro T. A new strategy for treatment of suprascapular entrapment neuropathy in athletes: shaving of the base of the scapular spine. J Shoulder Elbow Surg 1992;1:253-60.
12. Hashiguchi H, Iwashita S, Ohkubo A, Takai S. SLAP repair with arthroscopic decompression of spinoglenoid cyst. SICOT J 2016;2:1. http://dx.doi.org/10.1051/sicotj/2015036
13. Kim DS, Park HK, Park JH, Yoon WS. Ganglion cyst of the spinoglenoid notch: comparison between SLAP repair alone and SLAP repair with cyst decompression. J Shoulder Elbow Surg 2012;21:1456-63. http://dx.doi.org/10.1016/j.jse.2012.01.013
14. Lafosse L, Tomasi A, Corbett S, Baier G, Willems K, Gobezie R. Arthroscopic release of suprascapular nerve entrapment at the suprascapular notch: technique and preliminary results. Arthroscopy 2007;23:34-42. http://dx.doi.org/10.1016/j.arthro.2006.10.003
15. LeClere LE, Shi LL, Lin A, Yannopoulos P, Higgins LD, Warner JJ. Complete fatty infiltration of intact rotator cuffs caused by suprascapular neuropathy. Arthroscopy 2014;30:639-44. http://dx.doi.org/10.1016/j.arthro.2014.01.010
16. Lichtenberg S, Magosch P, Habermeyer P. Compression of the suprascapular nerve by a ganglion cyst of the spinoglenoid notch: the arthroscopic solution. Knee Surg Sports Traumatol Arthrosc 2004;12:72-9. http://dx.doi.org/10.1007/s00167-003-0443-y
17. Mall NA, Hammond JE, Lenart BA, Enriquez DJ, Twigg SL, Nicholson GP. Suprascapular nerve entrapment isolated to the spinoglenoid notch: surgical technique and results of open decompression. J Shoulder Elbow Surg 2013;22:e1-8. http://dx.doi.org/10.1016/j.jse.2013.03.009
18. Pillai G, Baynes JR, Gladstone J, Flatow EL. Greater strength increase with cyst decompression and SLAP repair than SLAP repair alone. Clin Orthop Relat Res 2011;469:1056-60. http://dx.doi.org/10.1007/s11999-010-1661-5
19. Reineck JR, Krishnan SG. Subligamentous suprascapular artery encountered during arthroscopic suprascapular nerve release: a report of three cases. J Shoulder Elbow Surg 2009;18:e1-3. http://dx.doi.org/10.1016/j.jse.2008.08.007
20. Sandow MJ, Ilic J. Suprascapular nerve rotator cuff compression syndrome in volleyball players. J Shoulder Elbow Surg 1998;7:516-21.
21. Schroder CP, Skare O, Stiris M, Gjengedal E, Uppheim G, Brox JI. Treatment of labral tears with associated spinoglenoid cysts without cyst decompression. J Bone Joint Surg Am 2008;90:523-30. http://dx.doi.org/10.2106/JBJS.F.01534
22. Shah AA, Butler RB, Sung SY, Wells JH, Higgins LD, Warner JJ. Clinical outcomes of suprascapular nerve decompression. J Shoulder Elbow Surg 2011;20:975-82. http://dx.doi.org/10.1016/j.jse.2010.10.032
23. Thompson WA, Kopell HP. Peripheral entrapment neuropathies of the upper extremity. N Engl J Med 1959;260:1261-5.
24. Ticker JB, Djurasovic M, Strauch RJ, April EW, Pollock RG, Flatow EL, et al. The incidence of ganglion cysts and other variations in anatomy along the course of the suprascapular nerve. J Shoulder Elbow Surg 1998;7:472-8.
25. Westerheide KJ, Dopirak RM, Karzel RP, Snyder SJ. Suprascapular nerve palsy secondary to spinoglenoid cysts: results of arthroscopic treatment. Arthroscopy 2006;22:721-7. http://dx.doi.org/10.1016/j.arthro.2006.03.019