Nonoperative Treatment of Rotator Cuff Tears

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KEYWORDS

• Rotator cuff tear • Conservative management • Nonoperative treatment
• Rehabilitation • Physical therapy

KEY POINTS

- Rotator cuff tears are very common, and prevalence increases with age.
- Best clinical examination includes a cluster of tests to determine rotator cuff involvement including lag signs.
- Rehabilitation or physical therapy has been shown to be an effective conservative treatment of rotator cuff tears with best outcomes seen in partial thickness tears, degenerative nontraumatic full-thickness tears, and massive irreparable tears.
- Tear progression happens in approximately 50% of full-thickness tears, but it is unclear in what circumstances the progression of tear correlates with the progression of pain and dysfunction.

INTRODUCTION/BACKGROUND/PREVALENCE

Rotator cuff tears can be described by the mechanism of injury as acute (or a traumatic—the result of an event with enough energy to cause immediate failure of an intact rotator cuff), acute on chronic (a preexisting rotator cuff tear enlarges after a traumatic event) or chronic (where no history of injury is present, and the tear is likely degenerative in nature). Rotator cuff tears can further be classified by anatomic severity as partial thickness or full-thickness tears. Full-thickness tears are further defined as small (<1 cm), medium (1 to 3 cm) large (3 to 5 cm), and massive (>5 cm). Prevalence of rotator cuff tears increases with age in both symptomatic and asymptomatic populations, and it has been estimated that approximately 10% of people aged 20 years or less have tears, increasing to 62% in those 80 years or older.[1] This information suggests that for many, rotator cuff degeneration is a natural aging process and that rotator cuff tears are quite often asymptomatic.[1,2]

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Phys Med Rehabil Clin N Am 34 (2023) 335–355
https://doi.org/10.1016/j.pmr.2022.12.002
pmr.theclinics.com

These data suggest that rotator cuff tears frequently do not cause pain and disability. As such "It is important to be sure that operative interventions for the rotator cuff are a wise investment of hope, an effective use of resources, and worth the small but real risk of iatrogenic harm, the risk of medicalizing common symptoms, and the risk of interfering with the development of effective coping strategies."[1] Nonoperative treatment should be considered as an initial treatment in partial thickness tears, some full-thickness tears (especially smaller and atraumatic tears), chronic tears in older ages, and irreparable tears with muscle changes that are irreversible.[3] Acute tears and tears with substantial functional loss and weakness may be better treated with surgery.[4,5]

The objectives of this article were to (1) review appropriate examination techniques to determine rotator cuff tear diagnoses, (2) review and understand the evidence behind nonoperative treatment of rotator cuff tears as compared with surgery, (3) review current concepts and interventions, both pharmacological and nonpharmacological, in nonoperative treatment of rotator cuff tears, and (4) discuss outcomes and complications of nonoperative treatment.

PATIENT EVALUATION OVERVIEW

Clinical Assessment: History

There are many known risk factors associated with rotator cuff tears and a thorough history is essential. Risk factors associated with rotator cuff tears include the history of trauma, hand dominance, age over 65 years, diabetes, smoking, cervical spine pathology, long-term alcohol consumption, hypertension, family history/genetics, hypercholesterolemia, weakness with external rotation or elevation, and night pain.[3,6–11] If the following three factors: (1) age 65 years or older, (2) night pain, and (3) weakness with external rotation are present, there is a high suspicion of a rotator cuff tear (positive predictive value of 93.1% and +LR of 9.8).[6]

Clinical Assessment: Physical Examination

There are several physical examination tests that have been used to try to identify rotator cuff tears (**Table 1**)[12–14] (**Figs. 1–4**). Evidence for clinical special tests to detect rotator cuff tears is difficult to analyze, as many studies bring significant bias, decreased quality, and a range of severity in rotator cuff tear anatomy and symptoms. Clinical tests cannot differentiate a partial thickness or small full-thickness tear from subacromial pain syndrome without tear.[15,16] Lag signs (see **Figs. 2** and **4**) are helpful to identify larger full-thickness tears of the rotator cuff and are helpful when present, but because the negative likelihood ratio is not great, the absence of a lag sign cannot rule out a rotator cuff tear. In fact, it is difficult for any specific physical examination test to rule in or rule out rotator cuff tear.[17] A better choice is a cluster of physical examination tests that have shown higher odds or likelihood ratios, sensitivity, specificity, and/or positive predictive values. The combination of a positive painful arc, drop-arm sign (see **Fig. 1**), and weakness with infraspinatus muscle testing (aka resisted external rotation test) has been shown to have a 91% posttest probability for full-thickness tears.[15] The combination of the resisted external rotation test and the Patte sign (see **Fig. 3**) has been shown to have the highest correlation with intraoperative findings of infraspinatus tears.[16]

It is important to look for physical examination findings that can be addressed with nonoperative treatment that have been associated with symptomatic rotator cuff tears. Scapular dyskinesis, degrees of active abduction range of motion, strength of flexion and abduction, increased activity of the trapezius, and decreased activity of the deltoid have all been associated with symptomatic atraumatic full-thickness rotator cuff tears.[18,19]

Table 1
Special physical examination tests to identify larger full-thickness rotator cuff tears[15–17]

Test	Drop Arm Test (see Fig. 1)	External Rotation Lag Sign (see Fig. 2)	Hornblower's Sign (see Fig. 3)	Internal Rotation Lag Sign (see Fig. 4)
Performance description	The patient's arm is passively elevated to 90° in full external rotation, the patient is asked to slowly lower arm when support is removed, positive test is a sudden drop of the arm uncontrolled by the patient	The patient's elbow is passively flexed to 90° with the shoulder elevated to 20° in the scapular plane and near full external rotation, patient is asked to hold this position, a positive test is the sudden drop or inability to maintain this position, amount of lag can be measured by supporting the elbow and asking patient to hold external rotation and measuring the amount of drop	The patient's arm is elevated to 90° in the scapular plane with elbow flexed to 90, the patient is asked to create force into external rotation against manual resistance, the test is positive if the patient is unable to generate force	The patient's arm is placed in maximal internal rotation with the dorsum of the hand on the lumbar region of the spine, the examiner holds the wrist and elbow and extension the shoulder about 20°, the patient is asked to hold this position as the examiner releases the wrist but holds the elbow, positive test is the inability to hold the wrist away from the back
Tendon, specificity (SP), and sensitivity (SN)	Supraspinatus and infraspinatus SN 44, SP 98	Infraspinatus SN 69–98, SP 98	Infraspinatus SN 21, SP 92 Teres Minor SN 95, SN 92	Subscapularis SN 97, SP 96

Fig. 1. Drop arm test (see Table 1 for description of technique).

Clinical Assessment: Radiology

Imaging represents the most accurate way to identify rotator cuff tears. Plain radiographs may be helpful in large tears, as the humeral head may migrate superiorly. The acromiohumeral interval should be filled with supraspinatus tendon and an interval <6 mm is suggestive of a rotator cuff tear.[20,21] In addition, on a true AP of the glenohumeral joint (Grashey view) an arch exists spanning the medial humerus to the axillary border of the scapula (aka Shenton's line of the Shoulder or Moloney's Line). If this arch is disrupted by a superiorly migrated humeral head, this suggests a large rotator cuff tear is present.

MRI, MRI arthrography, and Ultrasound represent the most used imaging technique to identify rotator cuff tears. All of these techniques are very sensitive (.90, .90, .91 respectively), specific (.93, .95, .93), with very high + Likelihood Ratios (12.9, 18.0, 13.0) and very low -Likelihood Ratios (0.1, 0.1, 0.1).[22] Of the three tests, MRI is used more commonly, whereas ultrasound is more cost-effective but may require extensive training to reach optimal accuracy.[23]

PHARMACOLOGIC OR MEDICAL TREATMENT OPTIONS

Medications may be helpful to treat patients with symptomatic rotator cuff tears. Nonsteroidal Anti-Inflammatory Drugs are often prescribed for shoulder pain. Meta-analyses show these medications are effective in treating pain in the short term, but

Fig. 2. (*A*) External rotation lag sign position (see Table 1 for description of technique). (*B*) Positive ER lag sign.

Fig. 3. Horn blower's sign (Patte test) (see **Table 1** for description of technique).

do not seem to improve function.[24] The use of opioids for chronic pain is not recommended; however, the use of opioids for treating rotator cuff symptoms seems higher than expected with up to 20.6% of patients with rotator cuff diagnoses receiving at least one opioid or benzodiazepine prescription at a large heath care center, and, of these, 21% had at least one risk factor for prescription misuse.[25]

Injectable corticosteroids are also commonly used to treat shoulder pain and rotator cuff disease. Most studies show these medications may provide short-term reduction in pain and improvement in function (3 to 6 weeks), but not long-term benefit compared with placebo (>24 weeks).[26–28] When compared with oral nonsteroidal anti-inflammatory drug (NSAIDs), injections of corticosteroids showed no significant advantage.[27]

Care must be taken as preoperative corticosteroid injections are correlated with an increased risk of revision rotator cuff surgery in a temporal and dose-dependent manner. If one is considering surgery, injections should be avoided and if an injection is given, surgery should be delayed at least six weeks to mitigate this risk.[29]

Platelet-rich plasma (PRP) has been studied as an injectable nonoperative treatment of rotator cuff disease. Systematic reviews suggest these can be effective in treating pain related to rotator cuff tendinosis and partial rotator cuff tears.[30] The effect

Fig. 4. Internal rotation lag sign (see **Table 1** for description of technique).

may last substantially longer than injectable corticosteroids.[26] As there are many variations in PRP preparation, there is substantial heterogeneity in the systematic reviews and the optimal PRP preparation is yet unknown.

NONPHARMACOLOGIC INTERVENTIONAL TREATMENT OPTIONS: REHABILITATION

Partial Thickness Tears

As mentioned previously, it is difficult to discern between partial thickness rotator cuff tears and subacromial pain syndrome/subacromial impingement. Nonsurgical treatment including physical therapy is suggested for partial thickness tears due to low evidence of progression of tear severity.[31] Treatment of partial thickness tears should follow guidelines for subacromial pain as described previously.

Full-thickness Tears

There is significant evidence supporting the first-line use of conservative treatment (including physical therapy and exercises) for managing atraumatic or degenerative full-thickness rotator cuff tears. To date, there are three randomized controlled trials comparing surgical versus nonoperative treatment of rotator cuff tears[32–34] (**Table 2**). There are also several large prospective cohort studies demonstrating successful treatment of rotator cuff tears nonoperatively[35–37] (**Table 3**). It is generally estimated that conservative treatment is effective in approximately 70% to 75% of patients as measured by avoiding surgical intervention. Interestingly, the MOON Shoulder Group identified low patient expectations regarding physical therapy as the most important variable to predict the need for surgery, whereas symptom severity or anatomic severity had little effect on the need for surgery.[38] Another group reported that patients who had higher pain or functional disturbances more than 10 years after nonoperative treatment were significantly younger than the rest of the cohort (54 years of age vs 64).[37] Although two of the randomized controlled trials report better pain and functional outcomes in the surgical group,[32,33] it is unclear how to determine which or how many patients would find this difference worth the risk, time lost from work and activities, and cost of surgical intervention given that up to 75% of patients treated conservatively are satisfied enough to not require surgery.[35–37]

It is also important to consider that studies have shown anywhere from a 20% to 94% rate of recurrent defects after surgical repair of a torn rotator cuff.[39–43] For open repairs, Harryman and colleagues[39] reported recurrent defects were seen in 20% of patients with only supraspinatus repairs, 43% for supraspinatus plus infraspinatus tears, and 68% for 3 tendon repairs. Boileau et al. found recurrent defects in 29% of patients after arthroscopic repair of full-thickness supraspinatus tears.[43] Interestingly several studies have shown that patient-reported outcomes are the same for patients whose repairs failed when compared with those whose repairs healed. But it is notable that in patients whose repairs healed, better strength was observed.[44,45] These data make it difficult to determine what is responsible for the improvements in pain and function seen after surgical rotator cuff repair.

In the literature, a wide variety of exercise interventions are used in nonoperative management of rotator cuff repairs. Another common parameter to consider is the duration and frequency of formal physical therapy and when a home exercise program will be sufficient treatment.

The studies included in **Tables 2** and **3** provide limited information regarding the specific exercise guidelines used. Kukkonen and colleagues[34] report their patients were educated in a home exercise program by a physical therapist in one visit. The first 6 weeks focused on glenohumeral range of motion and active scapular retraction,

Table 2
Randomized controlled trials comparing surgical and conservative treatment

	Moosmayer et al,[32] 2019	Kukkonen et al,[34] 2021	Lambers Heerspink et al,[33] 2015
N = (number of patients)	103	180	56
Follow-up years (% follow-up)	10 (88%)	5 (83%)	1 (80%)
Tear size included	Full-thickness not exceeding 3 cm	Atraumatic, symptomatic, isolated full-thickness supraspinatus tears in patients over 55	Degenerative full-thickness
Outcomes measures	Constant score; the self-report section of the American Shoulder and Elbow Surgeons Score; Short Form 36 Health Survey; measurement of pain, strength, and pain-free mobility of the shoulder	Constant score; visual analog score for pain; patient satisfaction	Constant score; visual analog scale for pain; visual analog scale for disability
Conclusion	At 10 years, the differences in outcomes between primary tendon repair and physiotherapy had increased, with better results for primary tendon repair	Operative treatment is no better than conservative treatment in small, nontraumatic, single-tendon supraspinatus tears in patients older than 55. Operative treatment does not protect against degeneration of the glenohumeral joint or cuff arthropathy. Conservative treatment is reasonable for initial treatment of these tears.	No differences in functional outcomes in Constant scores at 1 year. Significant differences in pain and disabilities were observed in favor of surgical treatment.

Table 3
Prospective cohort studies of conservative treatment of atraumatic rotator cuff tears

	Kijima et al,[37] 2012	Boorman et al,[36] 2018	Kuhn (MOON) et al,[35] 2013
N = (number of patients)	103 shoulders	104	452
Follow-up years (% follow-up)	13 (63%)	5 (84%)	2 (84%)
Tear size included	Rotator cuff tears by MRI (did not report size or traumatic vs atraumatic)	Chronic, full-thickness tears of supraspinatus or infraspinatus	Atraumatic, full-thickness tears
Outcomes measures	Japanese Orthopedic Association shoulder scoring system	Successful defined as no surgery needed vs failed as needing surgery, rotator cuff quality of life index	SF-12, ASES score, WORC index, SANE, Shoulder Activity Scale, cross-over to surgery
Conclusion	90% of patients had no or slight shoulder pain, 70% had no disturbance in activities of daily life, younger patient had more pain or disorder in daily life	75% were successfully treated with nonoperative management at 5 years, between 2 and 5 years, only 3 crossed over to surgery indicating most that were successful at 2 years remain so at 5 years	Nonoperative treatment affective in 75% of patient and most who crossed over to surgery did so between 6 and 12 weeks, few had surgery between 3 and 24 months

followed by a second 6 weeks of static and dynamic exercises for scapular and glenohumeral muscle function.[34] After 12 weeks, the patients increased resistance and strength for up to 6 months.[34] Moosemayer and colleagues[46] included in-person treatment sessions for 40 minutes each averaging twice a week for 12 weeks, with the possibility of lesser frequency visits throughout the following 6 to 12 weeks. This protocol was described as focusing on upper quarter posture and restoring scapulothoracic and glenohumeral muscular control and stability.[46] The cohorts by Kijima and colleagues[37] and Boorman and colleagues[36] both report including stretching and strengthening exercises but do not include specific on exercises are frequency and duration. Kuhn and colleagues[35] published their MOON Shoulder physical therapy protocol in detail and can be found at the following link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3748251/

The MOON protocol includes flexibility and range of motion exercises that are performed daily and strengthening exercises that are performed three to four times a week with resistance that causes only minimal discomfort.[35] Rehabilitation after rotator cuff tear is obviously not focused on treating pathology, but more so on modifiable impairments including strength, range of motion, and motor control that are considered to affect pain and function.[47] In a clinical review, Edwards and colleagues[47] describe key evidence-based concepts; and in **Table 4** the authors suggested guidelines for an exercise-based protocol for conservative management of rotator cuff tears.

Glenohumeral range of motion is needed for best motor planning.[47] Therefore, exercises should be given to restore any range of motion deficits. **Figs. 5** and **6** show some common range of motion exercises.

Scapular movement has been shown to be affected by soft tissue tightness along with pain, altered motor control, strength imbalances and posture,[47,48] and specifically pectoralis minor and posterior glenohumeral capsular tightness have been associated with scapular dyskinesis.[49] Mobility of these two structures should be assessed and proper mobility exercises (**Figs. 7–9**) should be given for any deficits.

Suboptimal scapular movement control, or scapulohumeral rhythm, can have effects on rotator cuff strength and loading. In patients with rotator cuff-related pain, the serratus anterior and upper, middle, and lower trapezius are often seen to have changes in activation patterns and strength, specifically decreased or late activation of the serratus anterior and lower and middle trapezius and possibly hyperactivation of the upper trapezius.[47,49] **Figs. 10–12** are examples of common exercises given more strength and movement coordination patterns in these muscles suggested in the literature.[50,51]

The rotator cuff muscles are important to maintain the centering of the humeral head in the glenoid and a disruption of these muscles could cause elevation of the humeral head into the coracoacromial arch. But there is some evidence that there is some redundancy in the mechanism.[52] Hawkes and colleagues[52] showed increased activity of the scapular stabilizers, elbow flexors, latissimus dorsi and teres major in shoulders with rotator cuff tears to help balance the pull of the deltoid on the glenohumeral joint. Therefore, it is important to strengthen any remaining intact portions of the rotator cuff, but also consider mechanisms that can compensate for the deficient portions when developing a rehabilitation program.[47]

Massive, Irreparable Tears

In the literature, there have been several identified ways to classify rotator cuff tears. Goutallier and colleagues[53] introduced a system based on the amount of fatty infiltration in the torn cuff muscles and Patte and colleagues[54] described a classification

Table 4
Evidence-based exercise protocol for the conservative management of rotator cuff tears

Phase	Goals	Exercises	Dose	Progression
Range of motion (ROM)	1. Improve glenohumeral motions (forward flexion, abduction and external rotation) 2. Improve shoulder and thoracic posture	• Passive ROM (PROM) ○ Forward flexion, internal/external rotation ○ Pendulum (see Fig. 2) • Posture ○ Postural education ○ Scapula setting exercises • Active-assisted ROM (AAROM ○ Wand exercises: elevation, abduction, adduction, internal/external rotation (see Fig. 3) ○ Pulley-assisted elevation • Active ROM (AROM) ○ Wall slides	3 × 15 reps, daily	• ROM should begin with PROM and pendulum exercises progressing to AAROM and AROM as comfort dictates
Flexibility	1. Improve flexibility and reduce tightness of anterior and posterior capsule	• Anterior capsule (pectoralis minor) stretch ○ Supine bear hugs ○ Door frame stretch (see Fig. 6) • Posterior capsule stretch ○ Cross-body stretch (see Fig. 5) ○ Towel stretch • Upper trapezius stretch	5 × 30 s stretches, daily	N/A

Strengthening	1. Improve strength of the scapular stabilizing muscles and dynamic scapular control
	2. Improve strength of the anterior deltoid for shoulder elevation
	3. Improve active external rotation strength
		• Isometric low rows (see Fig. 7)
		• Scapula retraction/rows
		  ○ Prone scapula retractions (squeezes), prone shoulder extension (see Fig. 9)
		  ○ Bent over rows, seated/standing (elastic resistance)
		• Scapula protractions/presses
		  ○ Supine scapula protraction
		  ○ Upright wall scapula protractions/retractions, wall push-ups
		  ○ Quadruped scapula protractions
		  ○ Standing scapula presses with elastic resistance
		• Anterior deltoid strengthening
		  ○ Isometric deltoid contractions
		  ○ Should flexion; supine (see Fig. 10), inverted (see Fig. 11) and standing (see Fig. 12)
		• External Rotation
		  ○ Standing 0° abduction with elastic resistance
			3 × 15 reps per exercise, 3 to 4 times per week	• Strengthening is undertaken within limits of pain
				• Increase volume and load, as comfort, strength and tolerance dictate
				• Patients exceeding appropriate discomfort level should reduce the level of resistance

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Table 4
(*continued*)

Phase	Goals	Exercises	Dose	Progression
		○ Side lying with dumbbell (see Fig. 8) • Internal Rotation ○ Standing 0° abduction with elastic resistance ○ Side lying with dumbbell		
Strengthening/ proprioception (advanced)	1. Advance strengthening of the scapular stabilizers 2. Advance strengthening of the rotator cuff 3. Introduce work/sport-specific exercises	• Scapula protractions/ presses ○ Upright Fitball push-ups, push-ups on ground ○ Standing cable press ○ Dynamic bug exercise • External rotation ○ Seated and standing 90° abduction (dumbbell and elastic resistance) ○ External rotation 90° prone horizontal abduction • Internal rotation ○ Standing 90° abduction (elastic resistance)	3 × 15 reps per exercise, 3 to 4 times per week	• Strengthening is undertaken within limits of pain • Increase volume and load, as comfort, strength and tolerance dictate • Patients exceeding appropriate discomfort level should reduce the level of resistance

(Copyright © 2016 Int J Sports Phys Ther. Apr 2016;11(2):279-301. Exercise Rehabilitation In The Non-operative Management Of Rotator Cuff Tears: A Review Of The Literature. Authors: Edwards P, Ebert J, Joss B, Bhabra G, Ackland T, Wang A.)

Fig. 5. Supine active assisted flexion.

system to quantify the amount of retraction from the greater tuberosity in the torn tendons. It has been shown that chronic rotator cuff tears involving 2 or more tendons with significant retraction (Patte grade 3) and Goutallier grade 3 or 4 fatty infiltration are less likely to respond well to surgical repair.[43,53,55–57] For patients whose tears meet these criteria, nonoperative management including physical therapy, is often the first line of treatment.

In a systematic review in 2021, Shepet and colleagues[58] identified 10 level III and IV studies addressing clinical outcomes of nonoperative treatment of massive, irreparable rotator cuff tears; no level I or II studies were identified. The authors found that nonoperative treatment was reported as successful in a range from 32% to 100% of cases. In these studies, poor outcomes were associated with abduction and external rotation strength <3/5, muscular atrophy, superior migration of the humeral head, decreased glenohumeral passive range of motion, glenohumeral osteoarthritis, active forward flexion <50°, anterior cuff tears, subscapularis tears, and lack of teres minor hypertrophy.[59–62] The most included range of motion exercises were into forward flexion and external rotation.[58] Other commonly found interventions found in this systematic review included an anterior deltoid program that progresses from supine to upright, deltoid and teres minor strengthening, and supervised physical

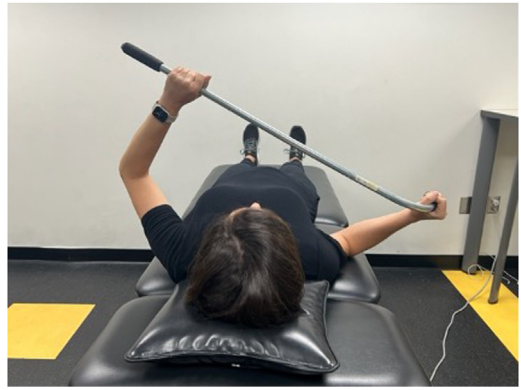

Fig. 6. Supine active assisted external rotation.

Fig. 7. Pectoralis minor door stretch.

therapy up to 8 to 12 weeks.[58] Shepet and colleagues[58] went on to publish a detailed synthesized protocol along with this systematic review and contains specifics of the suggested guidelines.

TREATMENT RESISTANCE/COMPLICATIONS

Tear progression could be considered a possible complication of nonoperative treatment of cuff tears. It is reasonable to consider the possibility that a repairable rotator cuff tear could progress to a massive irreparable tear and that the long-term outcomes

Fig. 8. Sleeper stretch.

Fig. 9. Cross-body stretch.

may be better in someone who decided on earlier surgical intervention. Unfortunately, the evidence is unclear on which patients will have a progression of tear size and in which patients this progression may or may not cause a progression or new onset of symptoms.

A significant number of partial and full-thickness rotator cuff tears will progress in size over time. Keener and colleagues[63] looked at patients with asymptomatic rotator cuff tears in patients with pain and rotator cuff disease in the contralateral shoulder. One hundred and eighteen subjects with full-thickness tears, 56 with partial thickness tears, and 50 controls were followed for a median of 5.1 years. Tears enlarged greater than 5 millimeters (mm) in 49% of shoulders (61% of full-thickness tears, 44% of partial thickness tears, and 14% of controls) and median time to enlargement was 2.8 years, with tear enlargement being associated with new onset of pain.[63] Moosmayer and colleagues[64] followed 49 patients over 8.8 years with symptomatic small to medium full-thickness primarily treated with physical therapy, with 37 being re-evaluated by MRI. Mean tear size increased 8.3 mm and 4.5 mm in the anterior/posterior and medial/lateral planes respectively.[64] Jung and colleagues[65] looked at MRI's in 48 patients following conservative treatment with mean follow-up of 22 months. Anterior posterior tear progression was seen in 54% of patients and medial lateral

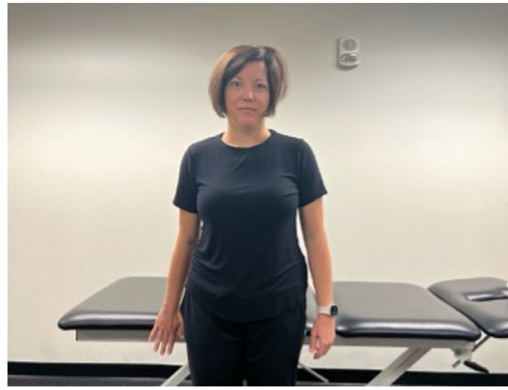

Fig. 10. Low row exercise.

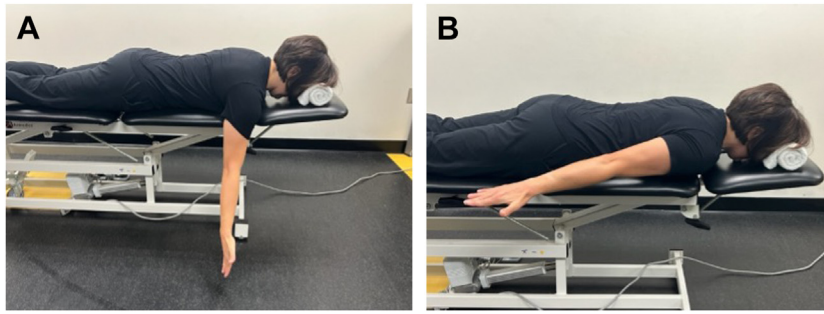

Fig. 11. (*A*) Prone shoulder extension exercise starting position. (*B*) Prone shoulder extension exercise finish position.

progression in 41%, with increase being defined as greater than 5 mm, with severe infraspinatus atrophy as the independent risk factor for tear enlargement.[65] Although Keener and colleagues[63] found an association between tear enlargement and an onset of symptoms, the MOON (Multi-Center Orthopedic Outcomes Network) shoulder group found that duration of symptoms did not correlate with severity of rotator cuff disease or tear size[66] and patients who cross over to surgery from conservative care are more influenced by low expectations regarding physical therapy than anatomic features of the rotator cuff tear.[38] More studies are needed to determine if tear progression, which happens in at least half of full-thickness tears in the above studies, correlates to increased symptoms, and what characteristics are risk factors for the onset or increase in symptoms.

Other possible barriers to positive outcomes are psychosocial factors. In a systematic review looking at psychosocial factors associated with outcomes in patients with rotator cuff tears by Coronado and colleagues,[67] the authors found weak to moderate associations for emotional or mental health with function and disability and pain. Lower emotional or mental health was associated with lower physical function and higher pain and disability at initial evaluation for rotator cuff tear and patient expectations were associated with patient reported outcomes after treatment.[67] It is currently unclear how clinicians can affect these factors, when referral should be made to other specialties in this area of expertise, and what effects intervention would have on outcomes.

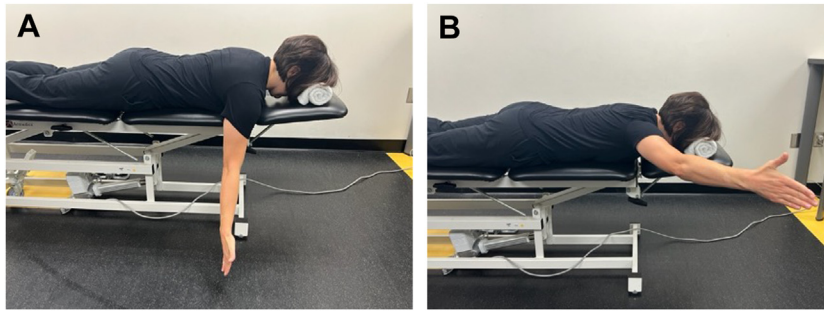

Fig. 12. (*A*) Prone scaption exercise starting position. (*B*) Prone scaption exercise finish position.

SUMMARY/DISCUSSION/FUTURE DIRECTIONS

Conservative treatment has been shown to be effective in many patients with rotator cuff tears. Nonsurgical care is often the first line of treatment of partial thickness tears, degenerative nontraumatic full-thickness tears, and massive irreparable tears.

Suggested future directions could include continuing to determine specific predictors for failure of nonoperative treatment of rotator cuff tears and better exploration of physical therapy parameters needed for success including supervision, frequency and duration, specific exercises and interventions along with dosing. Further information is also needed in what psychosocial factors affect outcomes in this population and how we can intervene to improve the factors that do affect positive outcomes in this patient population.

CLINICS CARE POINTS

- Prevalence of rotator cuff tears increases with age in both symptomatic and asymptomatic populations
- Approximately 10% of people aged 20 years or less have tears, increasing to 62% in those 80 years or older
- If all three factors of age 65 years or older, night pain, and weakness with external rotation are present, there is a high suspicion of a rotator cuff tear (positive predictive value of 93.1% and +LR of 9.8)
- Rehabilitation or physical therapy has been shown to be an effective conservative treatment of rotator cuff tears with best outcomes seen in partial thickness tears, degenerative nontraumatic full-thickness tears, and massive irreparable tears
- Physical therapy should include restoring range of motion, addressing any pectoralis minor or posterior capsule stiffness, and restoring motor control/strength to the scapula and rotator cuff

DISCLOSURE

R.N. Dickinson has no disclosures. J.E. Kuhn has no disclosures.

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