

Rotator Cuff–Related Shoulder Pain: Is It Time to Reframe the Advice, “You Need to Strengthen Your Shoulder”?

Over the past 2 decades, evidence supporting nonsurgical management of nontraumatic rotator cuff–related shoulder pain (RCRSP) has grown. The most recent clinical practice guideline recommends advice, education, and nonsurgical management as the primary approach to managing RCRSP.¹⁵

Nontraumatic RCRSP is pain and dysfunction of the shoulder, commonly observed during shoulder elevation and external rotation, for which other conditions have been excluded.⁵ Terms such as “RCRSP” and “subacromial shoulder pain” may be more appropriate than traditional pathoanatomic diagnoses of the rotator cuff and related structures (including subacromial bursitis, rotator cuff tendinopathy, and partial-thickness and nontraumatic full-thickness rotator cuff tears), as it is difficult to identify a specific structure or pathology as the primary contributor to an individual’s shoulder pain.⁵ The clinical presentation of RCRSP is always influenced by individual cognitions, emo-

tions, behaviors, and sociocultural factors that further complicate the pursuit of a single structure that causes shoulder pain.

Quality nonsurgical management of RCRSP comprises a graduated program of progressive resistance exercise (against gravity and with external load), occasionally in conjunction with stretching and mobility exercises of the shoulder structures and thoracic spine.¹⁴ The pendulum swing toward nonsurgical management is underscored by research demonstrating that subacromial decompression surgery, once the gold standard intervention for RCRSP, does not confer superior outcomes to those derived from nonsurgical approaches or placebo.¹⁵

Resistance exercise—and strength training more broadly—is riding a wave of popularity for managing various nontraumatic musculoskeletal pain presentations, and should be considered a veritable polypill with multisystem benefits. While exercise therapy has emerged as the primary intervention for managing RCRSP, there is uncertainty regarding which exercise approach is best and the absolute benefit of exercise compared to nonexercise interventions.¹³

This Viewpoint explores the use of resistance exercise for managing nontraumatic RCRSP and examines how resistance exercise may provide clinical benefit for patients with shoulder pain.

Why Do Clinicians Use Resistance Exercise for RCRSP?

Clinical reasoning in physical therapy traditionally follows a biomedical framework: pursue a measurable physical impairment and, if one is identified, apply an appropriate intervention to correct the impairment. This model of clinical reasoning works under the guise that pain and dysfunction arise due to observable deficits in physical properties of the body.

For RCRSP, resistance exercise is typically prescribed to strengthen a weak shoulder movement. Resistance exercise may also be prescribed with the intent of improving shoulder girdle kinematics or the timing and activation of peri-

• **SYNOPSIS:** Progressive resistance exercise, in isolation or in combination with other noninvasive therapies such as therapeutic touch, is the first-line approach to managing nontraumatic rotator cuff–related shoulder pain (RCRSP). Resistance exercise may be effective for people with RCRSP secondary to improving mechanical features of the shoulder, including strength, kinematics, and muscle timing and activation. However, strength gains are often small and clinically unimportant when measured during clinical trials. In this Viewpoint, we argue that clinicians should (1)

continue to prescribe resistance exercise when managing RCRSP, and (2) embrace the broad biological mechanisms underpinning the efficacy of resistance exercise. Any benefit is governed by more than simple mechanical changes. The clinical message must go beyond the idea that the patient’s weak, deconditioned, or frail shoulder is the basis of his or her pain, and all the patient needs to do is to get strong. *J Orthop Sports Phys Ther* 2021;51(4):156-158. doi:10.2519/jospt.2021.10199

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shoulder musculature. The implication is an assumed isomorphic relationship between shoulder strength, function, and pain: increase strength to decrease pain and increase function. While biologically plausible, the reality is less certain.

Movement and Strength Deficits Characterize RCRSP—Can Resistance Exercise Help?

People with RCRSP have changes in movement and strength that can be measured. Some people with RCRSP have altered scapulothoracic kinematics⁸; however, there is widespread inconsistency in the type of alterations observed. Glenohumeral and scapulothoracic muscle timing and activity, often measured by electromyography, vary in some people with RCRSP compared to people without symptoms.⁷ People with RCRSP may have deficits in external rotation and abduction strength of up to 43% when compared to an asymptomatic population.⁹ Strength deficits have also been observed in movements of the scapulothoracic joint, such as horizontal extension and protraction, although they are not as profound as movements that bias the glenohumeral joint.³

Does improving shoulder mechanics and strength always improve pain and function? We suggest not. Strength gains with a typical rehabilitation regimen for RCRSP are moderate at best^{6,10} and often clinically unimportant.^{1,4,6} Scapular kinematics (scapular dyskinesis) need not be normalized for pain and function to improve,² and it is unclear whether scapula-focused exercise interventions are superior to general shoulder strengthening. It would be clinically impossible to prescribe an exercise that targeted the scapular muscles at the expense of the rotator cuff, and vice versa. Restoring shoulder muscle timing and activity appears superfluous to overall improvement of pain and function in people with RCRSP.

Despite the limited improvements in mechanical measures of the shoulder, there are often substantial improvements in pain and function in trials that use re-

sistance exercise for rehabilitation.^{1,4,6} We suggest that these clinical phenomena challenge the relationship between shoulder strength, function, and pain.

Why the Limited Increases in Strength? Underloaded Exercise and Excessively Cautious Therapists?

A frequent critique of clinical trials using resistance exercise is that they are underloaded and overly cautious. It is possible that a more stringent application of strength and conditioning principles, such as intensity, volume, and duration of training, could elicit a more dramatic increase in shoulder strength. However, it is unclear whether this would translate into similar improvements in shoulder pain and function.

Trials that purportedly employ high-load resistance exercise often report underwhelming improvements in strength,^{4,6} and it is unclear whether high-dose (high-load or high-volume) resistance exercise is clinically superior to low-dose (low-load or low-volume) resistance exercise for RCRSP.¹²

Have Clinicians Been Seduced by the Hype of Strengthening?

Manual therapy, once a mainstay of nonsurgical management of RCRSP, has not stood the test of rigorous trials. Many proponents of, “You only need to get strong” may suffer a similar demise, as the next-generation treatment approach, strength training, has not yet passed muster through rigorous clinical trials. Telling a person with RCRSP, “You are weak—all you need is to get stronger,” may be as counterproductive as telling the person, “You have poor posture, and it needs to be improved.” It is essential that clinical trials test modern strength and conditioning principles to establish the relationship between strength, function, and shoulder pain.

Is There More to Resistance Exercise Than Meets the Eye for RCRSP?

Emerging evidence suggests that non-traumatic RCRSP is a multidimensional

condition, associated with several biopsychosocial subdomains. The severity of shoulder pain and level of shoulder function do not appear strongly associated with shoulder strength.^{3,11} There is more to RCRSP than simple strength, and the same could be said for resistance exercise. Exercise (including resistance exercise) may have a hypoalgesic effect, improve health-related quality of life, improve pain-related self-efficacy and confidence, influence systemic inflammatory markers, mark time while nature takes its course, provide a distraction, and potentially lead to a re-evaluation of pain. Clinicians might consider these factors when prescribing resistance exercise as part of a rehabilitation regimen for a person with nontraumatic RCRSP.

Integrating Resistance Exercise Into a Modern Understanding of RCRSP

A modern interpretation of pain emphasizes a multidimensional experience, far more than a simple linear read-out of sensory input from the peripheral tissue. Perhaps clinicians could apply this logic to mechanical measures of the shoulder? Variables such as shoulder strength and scapulothoracic kinematics may be relevant to nontraumatic RCRSP. However, devoting an inequitable amount of time and attention to these factors may be a naïve and inadequate approach.

Summary

We are concerned that resistance exercise for managing RCRSP is at risk of use without critical thought in a classic recipe-based approach. Awkwardly, this is an illustration of the type of biomedical clinical reasoning the profession of physical therapy has spent the past 2 decades (or more) trying to avoid. Resistance exercise has a place in a quality rehabilitation program for people with RCRSP—to improve how the shoulder functions, increase confidence to use the shoulder, and help reduce pain. Resistance exercise is an important and cost-effective intervention, and physical therapists should not be afraid to use it. However, we argue

that there is nuance to consider when using resistance exercise for rehabilitation.

Key Points

- People with RCRSP often have demonstrable variations in kinematic, strength, and muscle timing and activation profiles compared to people without RCRSP.
- Resistance exercise can improve pain and function in people with nontraumatic RCRSP without a significant normalization of shoulder mechanical factors, including strength, scapulothoracic kinematics, and muscle timing and activation.
- Nontraumatic RCRSP is a multidimensional condition that requires a multidimensional approach.
- The rationale for prescribing resistance exercise for nontraumatic RCRSP needs to be reframed as a multidimensional intervention that can confer benefit by numerous interrelated biopsychosocial processes, not simply by increasing shoulder strength or improving shoulder mechanics.
- Future research should study the ideal dose of resistance exercise, considering training variables such as intensity, volume, and duration, for managing nontraumatic RCRSP.
- For a list of recommended further reading, please see the **APPENDIX** (available at www.jospt.org). ●

STUDY DETAILS

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APPENDIX

RECOMMENDED FURTHER READING

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