



Clinical Case Report Competition

Okanagan Valley College of Massage Therapy

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Third Place Winner

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A combination of modalities constitutes
'best practices' protocol for treating chronic
adhesive capsulitis: A case report

Abstract

Objective: to assess the effectiveness of comprehensive massage therapy and therapeutic exercise in increasing range of motion and quality of life in a subject experiencing chronic adhesive capsulitis.

Methods: A full assessment of the subject was undertaken and baseline data was recorded prior to starting treatment. A therapeutic exercise program was designed to increase Glenohumeral joint mobility, and implemented for the duration of the study. Over the course of five weeks, ten-one hour comprehensive massage treatments were performed. The focus of the treatments was on the glenohumeral joint capsule, muscles of the rotator cuff and postural dysfunction in the cervical spine. Modalities used were Swedish, Trigger Point Release, Fascial techniques, Joint mobilization, Positional Release, Muscle Energy and Therapeutic exercise. Treatment progress was assessed by active and passive ranges of motion and muscle strength testing. To measure qualitative data, a quality of life questionnaire which focused on the subject's ease of accomplishing activities of daily living was filled out both before the study began and again at the end of the fifth week. An assessment was performed and recorded midpoint during the study and again following the tenth treatment. 2, 5, 6, 7, 9, 10, 11

Results: The client's ranges of motion in the glenohumeral joint increased by 50° in flexion, 90° in abduction, 80° in internal rotation and 70° in external rotation. Extension was within normal ranges at baseline. Muscle strength increased in all the rotator cuff muscles with a decrease in pain upon contraction. The client reported an increase in her quality of life in all activities of daily living following treatment including a complete cessation of pain medication usage, improved sleep patterns and increased ability to perform daily chores.

Conclusions: A treatment plan including comprehensive massage therapy and therapeutic exercise was effective in providing relief for the symptoms of chronic adhesive capsulitis. This study provides support for the effectiveness of massage therapy in treating decreased mobility in the glenohumeral joint, and further research is suggested to clarify the relative contributions of the various components of massage therapy in treatment of this condition.

Introduction

Adhesive Capsulitis (AC)

Adhesive Capsulitis (AC) is characterized by tightening of the glenohumeral joint capsule with extreme decreases in both passive and active ranges of motion. The etiology (of AC) is not completely understood but current literature recognizes numerous factors which are associated with this condition. These include: female gender, age older than 40 years, trauma, diabetes, prolonged immobilization, thyroid disease, stroke, myocardial infarction, the presence of autoimmune disease and following a minor injury such as strain/sprain of the glenohumeral area. 1, 2,12,14

There is significant evidence in support of the idea that the underlying pathological changes in AC are synovial inflammation with subsequent reactive capsular fibrosis; making it both an inflammatory and fibrosing condition depending on the stage of disease. 14

The diagnosis of this condition encompasses primary adhesive capsulitis which is characterized by idiopathic, progressive, painful loss of active and passive shoulder motion and secondary adhesive capsulitis which has similar histological appearance and pathophysiology but results from a known intrinsic or extrinsic cause. 2,12,14

Hertling and Kessler suggest that idiopathic cases probably result from an alteration in scapulohumeral alignment, as occurs with excessive thoracic kyphosis. 7

There are commonly 3 stages recognized in Adhesive Capsulitis with some variation between authors. It should be noted though that these stages represent a continuum of disease rather than discrete well-defined stages.12

Table 1. Stages of Adhesive Capsulitis 2

<i>acute stage 1</i>	<i>The “freezing”/painful stage. Pain is severe at night and person is unable to sleep on the affected side. Pain is over the outer aspect of the shoulder and deltoid insertion. Muscle spasm in rotator cuff muscles; inflammation in capsule, stiffness progressively setting in @ 2-3 weeks after the initial pain begins. This stage could last up to 9 months.</i>
<i>sub acute stage 2</i>	<i>Also called the “frozen” stage. The severe pain begins to diminish; stiffness is primary complaint, interfering with activities of daily living .Fibrosis is starting in the capsule. The primary restriction is in the capsular pattern of external rotation, abduction and internal rotation with pain at end ranges of motion. . This stage can last four to 12 months.</i>
<i>chronic stage 3</i>	<i>Also called the “thawing” stage. Pain is localized to the lateral arm and continues to diminish. Motion and function gradually return, however full ranges of motion are not always regained. Some studies have shown that people can remain symptomatic for as long as 10 years.</i>

Travell and Simons state that primary symptoms of Frozen Shoulder; pain in the shoulder region and restricted range of motion; are also primary symptoms of active subscapularis muscle trigger points. 11

Trigger points in all the muscles of the rotator cuff refer pain into the shoulder area and restrict movement. 11

Enthesitis, a condition of tendon inflammation and subsequent fibrosis as a result of recurring muscle stress; is common to both subscapularis and supraspinatus. This could be another explanation for the inflammation and fibrosis in the adjacent subscapular and subdeltoid bursa which has been recognized in Adhesive Capsulitis. 11

It has been proposed by several researchers that there is a contribution to this condition from the sympathetic nervous system. Adhesive Capsulitis may not be a single etiology, but rather a combination of several pathologies. Sympathetic involvement could be responsible in part for the production and maintenance of pain associated with AC which does not respond readily to standard treatment. (Sympathetically Maintained Pain)
12

In the thorax, the sympathetic trunks lie on or just lateral to the costovertebral joints. These sympathetic chains appear to undergo mechanical deformation during trunk and body movement. Because of their location, the sympathetic trunk is vulnerable to mechanical interference from pathological changes in interfacing tissue. 12

An assessment of thoracic and cervical posture could help find a possible dysfunction in this area which might be contributing to adhesive capsulitis which is not responding to “traditional treatment”.

Studies have shown that chiropractic adjustments to the cervical and thoracic spine have had positive outcomes measured, with increased ranges of motion and reduced pain in cases of AC and complex Regional Pain Syndrome of the arm. (A sympathetic maintained condition) 13

Other modalities which have been shown to effectively treat dysfunction in these areas are Muscle Energy Techniques and Positional Release Techniques. 5, 6

A review of current literature shows that non conservative methods of treatment for adhesive capsulitis include distention-arthrography, local anesthetics and steroids intra-articularly, closed forceful manipulations under general anesthesia and arthroscopic capsular release. Possible side effects of these treatments include, rupture of the capsule, spiral fracture of the proximal humerus, tearing of the muscles of the rotator cuff and complications from general anesthetic. 2,10, 13, 14, 15,

Also of interest is a statement by Hannafin and Chiaia, stating that radiographic evidence of decreased bone mineral density has been observed in patients with long standing adhesive capsulitis. In follow up studies it was shown that the recovery of bone density appeared after 10 years of recovery. 10

Literature regularly refers to the importance of trying conservative therapy first, and frequently identifies physical therapy or therapeutic exercise as an essential part of the conservative therapy. 13

It would be prudent to choose a modality which has shown to be fast and effective as well as safe and free of side effects if possible.

Rationale for study

After reviewing current literature, it was found that massage therapy with joint mobilization has been used successfully in treating adhesive capsulitis. 2, 11, 15, 16

Travell and Simon's research on trigger points in the muscles of the rotator cuff also shows strong evidence that these are contributing factors to the disease and should be considered in the treatment. 11

It also is apparent that dysfunction in the cervical and thoracic spine and possible contribution to sympathetically maintained pain could be treated effectively with muscle energy techniques (MET) and Positional Release Therapy (PRT). 5, 6, 8

It was decided that a combination of all 4 of these modalities would constitute 'best practice' protocol for this condition.

Patient profile

The subject of this study is a 51 year old female who is suffering with chronic *Adhesive Capsulitis*. 17 ½ months ago while picking up her child she felt a sharp pain in her left anterior deltoid area; she describes the pain as "feeling like something ripped". She did not see her family doctor following the incident and throughout the next six months her pain did not subside and her range of motion decreased to a level which made it difficult to function in her activities of daily living.

The patient is an LPN by profession as well as being a full time foster parent. She has stopped nursing since the shoulder injury and she is having difficulty with child care; although her family is very supportive and helpful, she is finding it necessary to pay for extra help with house hold chores and child care responsibilities.

After 6 months the subject saw her family doctor who ordered an ultrasound; the results were unremarkable in his opinion and she was diagnosed with secondary Adhesive Capsulitis. At that time her doctor suggested physiotherapy which she started at approximately nine months following the injury.

She has been seeing the physiotherapist now for eight months and feels that the least pain experienced daily has decreased from 9/10 to approximately 5/10. She has only gained a few degrees of movement though.

Recently the patient visited an orthopedic surgeon who ordered an MRI for her. The date is still pending for this exam. The specialist instructed her to continue with physiotherapy.

Modalities use at physiotherapy have been ultrasound, acupuncture (for pain), and therapeutic exercise, which included ‘wall walking’, ‘countertop walking’ and assisted range of motion exercises in all planes.

Upon the initial assessment the subject demonstrated restriction and pain of the left glenohumeral joint in most ranges with a rigid capsular end feel. Restriction in extension was minimal. Arthrokinematically, she demonstrated reduced joint play in the glenohumeral joint with profound lack of movement in inferior glide. She was displaying symptoms which were consistent with stage 2 of the dysfunction. (The right glenohumeral joint had full ranges of motion with no pain)

The postural assessment revealed head forward posture and anterior rotation of the glenohumeral joints bilaterally.

Methods:

- i. Active and Passive Ranges of Motion of the glenohumeral joint, were assessed during the first appointment using “eyeball estimation” and recorded in approximate degrees.
- ii. The muscles of the rotator cuff were tested for strength using the protocol set out by Kendall⁴ and Magee³. Also included in the muscle testing were the Rhomboid major and minor as well as Middle Trapezius and all three bellies of Deltoid.
- iii. Special Tests done include: Empty Can test, Lift Off test, Pectoralis major and minor length tests to test the functional ability of these muscles, as described by David Magee.³
- iv. The patient was also given a questionnaire to fill out at the beginning and end of treatment to qualify and quantify subjective pain and her level of dysfunction (available upon request)

Table 2. Normal ranges of motion at the glenohumeral joint 3

flexion	160-180°
extension	50-60°
abduction	170-180°
adduction	50-75°
internal rotation	60-100°
external rotation	80-90°

Table 3. muscle testing definitions 3, 4

5	normal 100%	<i>complete range of movement against gravity with maximum resistance</i>
4	good 75%	<i>complete range of motion against gravity with some (moderate) resistance</i>
3+	Fair +	<i>complete range of motion against gravity with minimum resistance</i>
3	Fair 50%	<i>complete range of motion against gravity</i>
3-	Fair -	<i>some but not complete range of motion against gravity</i>
2+	Poor +	<i>initiates movement against gravity</i>
2	Poor 25%	<i>complete range of motion with gravity eliminated</i>
2-	Poor -	<i>initiates movement if gravity is eliminated</i>

1	Trace	<i>evidence of slight contraction but no joint motion</i>
0	Zero	<i>no contraction palpated</i>

Massage Therapy Treatments:

As previously discussed in Rationale for treatment, the modalities used were specifically chosen for their proven success in the areas used.

Positional release and Muscle Energy techniques were used on the cervical spine to address positional dysfunctions and decreased ranges of motion. 5, 6

The rotator cuff muscles were treated with Fascial techniques, Swedish massage, Trigger Point release, and PNF (proprioceptive Neuromuscular Facilitation) stretching to decrease tissue hypertonicity and ischemia. 2, 10, 11

Joint mobilization and friction massage were used to decrease adhesions in the joint capsule, increase joint lubrication and nutrition, decrease pain and increase proprioceptive response. 9

A therapeutic exercise regime which focused on self mobilization and active ranges of motion of the glenohumeral joint was implemented for the duration of the study. 10

The duration of the study was a total of 5 weeks, with 2 - one hour treatments each week.

See 'appendix 1' for a descriptive overview of the treatment protocol

See 'appendix 2' for a description of trigger point patterns

Results

Table 4. Muscle strength testing showing baseline measurements and measurements taken after 5 weeks of treatment {see Table 3 for explanation of grades}

	<i>at baseline</i>	<i>after 5th week of treatment</i>
Pectorals major	(supine) 3- with pain lateral shoulder	3+ pain free
Rhomboids	prone) 3- with pain anterior shoulder	3+ pain free
Internal rotators	(supine) 2+ with pain posterior shoulder	4 pain free
Supraspinatus	(sitting) 2+ with pain lateral arm	4 pain free
External rotators	(supine) 3 with pain anterior shoulder	4 Pain free
Deltoid anterior	(sitting) 3 with pain anterior shoulder with resistance	4 slight pain anterior shoulder with resistance
Deltoid middle	(sitting) 3 with pain anterior shoulder	4 pain free
Deltoid posterior	sitting) 4 no pain	4 pain free
Middle trapezius	prone) 3- with pain anterior shoulder	3+ pain free

Muscle Strength

Strength testing was performed on the first appointment, before treatment and on the last appointment, after the final treatment. All muscles tested showed an increase in strength and decrease in pain. The least significant changes were in Pectoralis major and the Rhomboids.

All muscles of the rotator cuff returned to near normal strength after treatment.

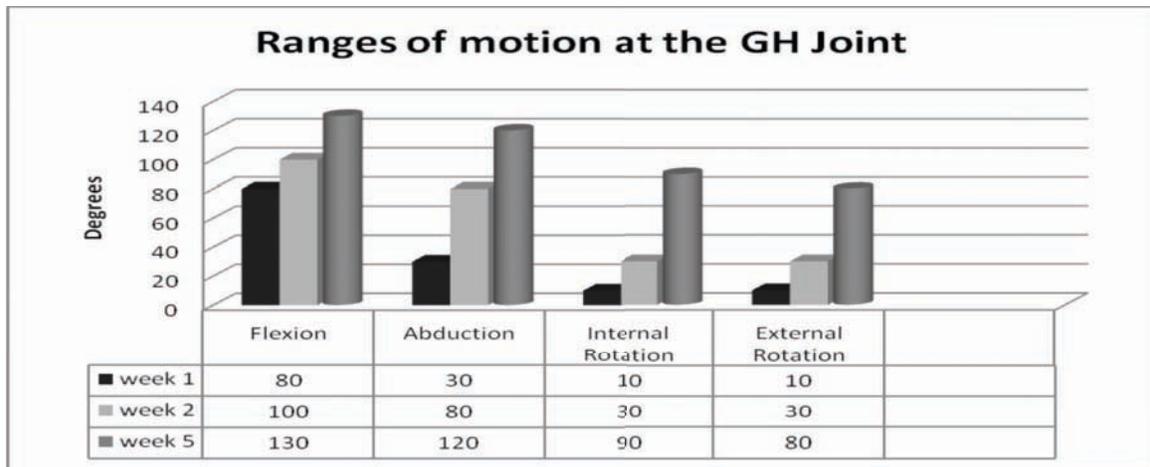


Figure 1. Ranges of motion at the glenohumeral joint at baseline, following 3 weeks treatment and after the last treatment at 5 weeks.

Ranges of Motion

Following five weeks of treatment the ranges of motion increased in the following ranges:

Flexion increased by 50 °

Abduction increased by 90 °

Internal rotation increased by 80°

External rotation increased by 70°

Table 5. Muscle functional testing measured at baseline and at the end of 5 weeks. 3

Test done	result before first treatment	result after final treatment
Empty can test (left arm)	positive/ could not hold against resistance (<i>indicating lesion to supraspinatus muscle, tendon or dysfunction of the suprascapular nerve</i>)	negative/ could hold against resistance
lift off sign (left arm)	positive/ could not achieve position (<i>indicating a lesion in subscapularis</i>)	negative/ could achieve position and hold against slight resistance
Pectoralis Major length test (bilateral)	short bilaterally	short bilaterally
Pectoralis minor length test (bilateral)	short bilaterally	short bilaterally

Special Tests

The ‘Empty can test’ showed extreme dysfunction of the supraspinatus muscle before treatment began with a marked improvement after the final treatment.

The ‘lift off sign’ was unable to be performed before the first treatment as the patient could not achieve the position, indicating dysfunction of the subscapularis muscle; after 5

weeks of treatment the patient could achieve the position and lift off with no resistance applied. Both the Pectoral muscles show significant shortening both before and after treatments.

4). Muscle Energy and Positional Release treatments for the Cervical and Thoracic Spine

At the beginning of each treatment the patient was assessed for dysfunction in the cervical and thoracic spine. The following levels were treated with muscle energy: C1, C4, C6 and T3

Tenderness was found on ‘anterior cervical 7’, ‘anterior cervical 4’, and ‘posterior cervical 2’ and treated with positional release. The patient showed decreased discomfort and increase in range of motion after these treatments. ^{5,6}

5). Quality of life

A questionnaire was developed to compare subjective findings both before the treatments started and after the treatments ended. Questions were related to sleep patterns, medication use, financial impact, and activities required for normal daily living. The subject reported increased ability to get a full night’s sleep, more ease in activities of daily living and fewer days of pain medication use. (See addendum 4)

Conclusion

Chronic presentation of Adhesive Capsulitis responds well to massage therapy with significant improvement in ranges of motion, decrease in pain and increase in quality of life. Using muscle energy and positional release treatments can be a good adjunct to massage therapy, trigger point release and joint mobilizations in treating this condition, especially when dysfunction is suspected in the cervical and thoracic spine or the patient shows evidence of head forward posture. The four modalities seem to have a synergistic and greater effect when used together for this condition.

Part of the success of this case study must be contributed to the patient’s conscientious adherence to therapeutic exercise. A regime of active ranges of motion and self mobilizations were done at least twice daily for the duration of the study. Postural dysfunction plays a very large part in this patient’s condition and she would increase even greater ranges of motion and decrease risk of reoccurrence if she decreased the shortening of the pectoral muscles and increased the strength of the rhomboid muscles.

Work with a trainer who specializes in posture retraining would be a good follow up for this patient.

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Appendix 1.

Detailed Treatment Protocol

Each treatment was started with the patient supine and then sitting for assessment of the cervical and thoracic spine with muscle energy and positional release techniques. Treatment was given with each of these modalities depending on the findings at each session using the protocol set out by D'Ambrogia and Roth ^{5,6}

Patient Supine

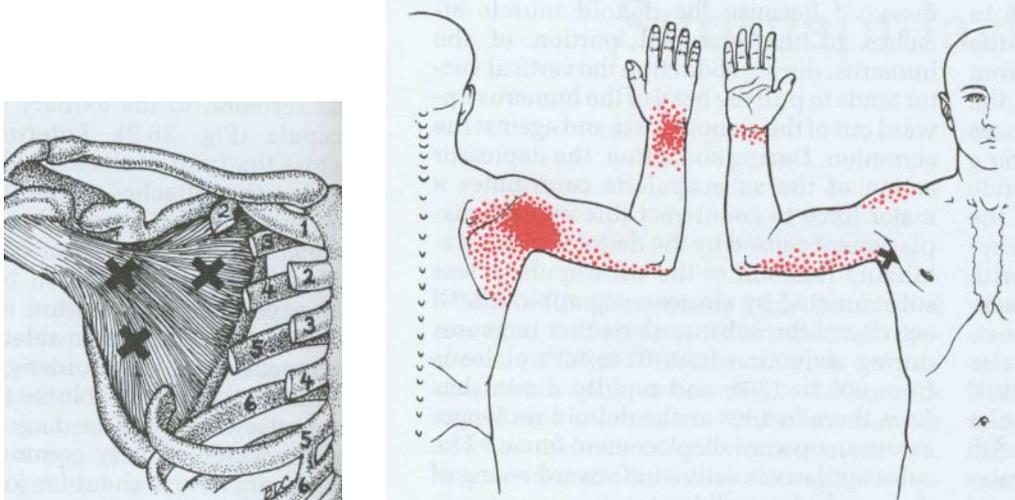
- i. Start with long axis traction--- with grade 2 oscillations to the glenohumeral joint to decrease muscle spasm, increase joint lubrication and nutrition, stimulate proprioceptors and to decrease pain.^{7, 9, 15}
- ii. Treat subscapularis, anterior and middle deltoid, each individually with the intention of releasing fascial restrictions, trigger points, hypertoned tissue and increase perfusion through tissue. Address adhesions/muscle scarring with frictions as they are encountered ^{2,7,11}
- iii. Apply passive stretch, contract relax or other stretch to each muscle after massage treatment to increase the length of the tissues. ⁷
- iv. Gently friction the capsule of the glenohumeral joint in the axillary recess to decrease adhesions/scarring ²
- v. Address the pectoral muscles with massage, fascial work and stretch. ^{2, 7, 15}
- vi. Apply posterior glide to glenohumeral joint, to increase internal rotation and flexion. (Start with grade 2 sustained and increase to grade 3 or 4 oscillations to increase the capsular space.) ⁹
- vii. Finish with long axis traction to the GH with increasing abduction without pain to increase space in the inferior joint capsule.⁹

Patient Prone:

- i. Start with the Posterior Deltoid and follow with Supraspinatus, Infraspinatus and the Teres muscles, treating them as on the front, focusing on fascial restrictions, hypertonicity and trigger points. Address adhesions/muscle scarring with frictions as they are encountered ^{2, 7, 15}
- ii. Follow with passive or active stretching for each muscle. ⁷
- iii. Treat upper trapezius with fascial stretch, trigger point work and treat all compensations as they are found ^{7, 11}
- iv. Perform anterior glide of the GH with the glenohumeral joint at 90 degrees of abduction to increase external rotation. ⁹
- v. Perform lateral glide of the GH with the glenohumeral joint at 90 degrees of abduction to increase flexion and abduction. ⁹

Appendix 2.

Trigger Point patterns in the rotator cuff muscles (Travell) 11

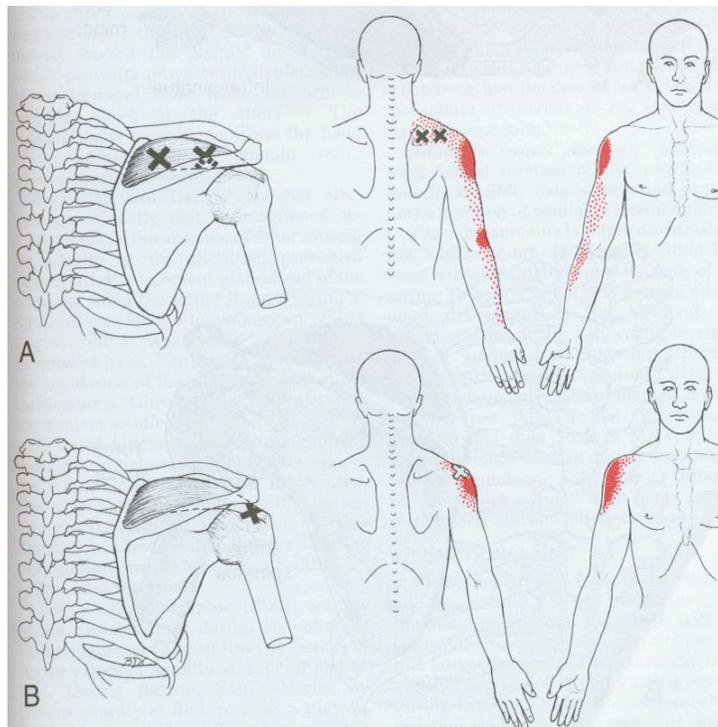


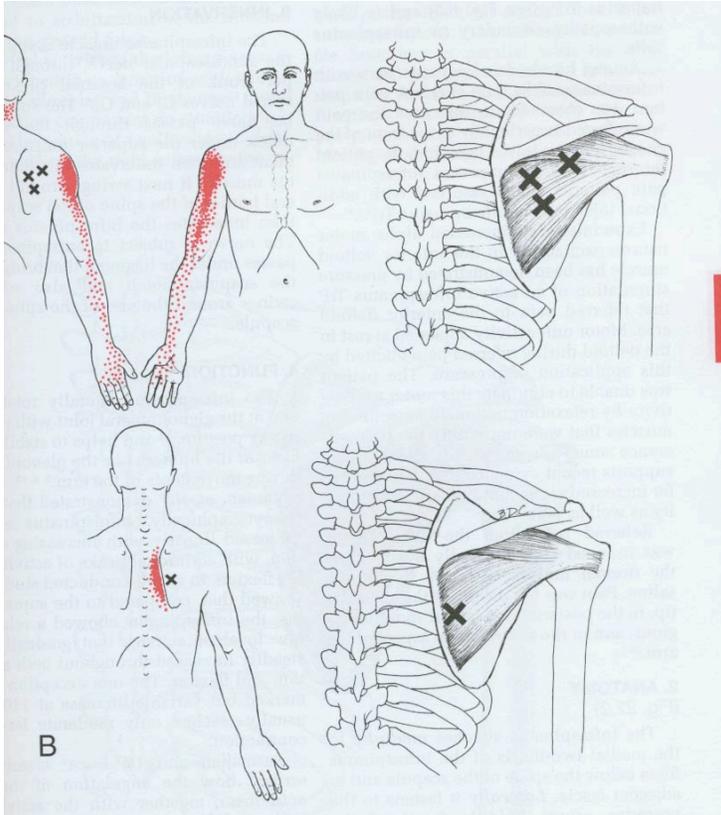
Trigger points in subscapularis are perpetuated by repetitive movements requiring medial rotation of the humerus. Head forward posture and abducted scapula can also perpetuate these trigger points by fostering sustained medial rotation of the humerus. The referred pain from subscapularis trigger points is primarily over the posterior deltoid and extends medially over the scapula, down the posterior arm with a band like area around the wrist.

Supraspinatus trigger

Points and referral pattern

With active trigger points in supraspinatus, the patient has restriction of medial and lateral rotation of the glenohumeral joint. These trigger points cause a deep ache of the shoulder, concentrating in the mid deltoid area. Patients have pain during abduction of the arm and can feel a dull ache at rest.





Infraspinatus trigger points refer deeply into the glenohumeral joint and over the anterior deltoid; also extending down the front and lateral aspect of the arm and forearm. Sometimes pain is referred to the suboccipital and posterior cervical area and medial to the scapula.

Pain from Teres Minor trigger points is primary felt near it's tendon of insertion of the humerus and extends inferiorly to the deltoid tuberosity.

