Amanda Murphy
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Can active trigger points in junction with a partial bicep tear mimic frozen shoulder: A case report.

Techniques:
Precision Neuromuscular Massage Therapy (PNMT)
Instrument Assisted Soft Tissue Manipulation (IASTM)- FAKTR

Terms:

Myofascial Trigger Point- A hyperirritable spot, usually within a taut band of skeletal muscle or in the muscle's fascia, that is painful upon compression and that can give rise to characteristic referred pain, tenderness, and autonomic phenomena. (Travell, and Simons 1983)

Active Myofascial Trigger Points- A focus of hyperirritability in a muscle or its fascia that is symptomatic with respect to pain; it refers a pattern of pain at rest and/or on motion that is specific for the muscle. An active trigger point is always tender, prevents full lengthening of the muscle, weakens the muscle, usually refers pain on direct compression, mediates a local twitch response of muscle fibers when adequately stimulated, and often produces specific referred autonomic phenomena, generally in its pain reference zone.*To be distinguished from a latent myofascial trigger point.* (Travell, and Simons 1983)

Associated Myofascial Trigger Point- A focus of hyperirritability in a muscle or its fascia that develops in response to compensatory overload, shortened range, or referred phenomena caused by trigger point activity in another muscle. *Satellite and secondary trigger points are types of associated myofascial trigger points.* (Travell, and Simons 1983)

Local Twitch Response- Transient contraction of the group of muscle fibers (usually a palpable Banda) that contains a trigger point. The contraction of the fibers is in response to stimulation of the same, or sometimes of a near by trigger point. (Travell, and Simons 1983)

Palpable Band (Taut Band, or Nodule)- The group of taut muscle fibers that is associated with a myofascial trigger point and is identifiable by tactile examination of the muscle. *Contraction of the fibers in this band produces the local twitch response.* (Travell, and Simons 1983)

Referred (Trigger-Point) Pain- Pain that arises in a trigger point, but is felt at a distance, often entirely remote from its source. The pattern of referred pain reproducibly related to its site of origin. *The distribution of referred trigger-point pain rarely coincides with the entire disruption of a peripheral nerve or dermatomal segment.* (Travell, and Simons 1983)

Instrument assisted soft tissue mobilization (IASTM)- Tools are used to locate and treat myofascial adhesions or restrictions. This therapy has been shown to work well with decreasing the pain pressure

threshold, making manual work more tolerable, and in turn increasing rate of recovery. **FAKTR**- Functional and Kinetic Treatment with Rehab is a certified IASTM program.

Condition:

Let's begin by familiarizing ourselves with the structural anatomy and pathologies presented throughout this case.

The **glenohumeral joint** is a ball and socket joint made up of the clavicle, humerus, and scapula. This joint allows a wide variety of shoulder movement, and is protected by a flexible capsule filled with synovial fluid. Frozen shoulder also known as adhesive capsulitis develops in stages, typically beginning with injury or inflammation of the surrounding soft tissue. These three stages are referred to as freezing, frozen, and thawing which typically have a slow onset, and can collectively take up to 72 months to resolve. As frozen shoulder develops the capsule surrounding the glenohumeral joint begins to thicken and contract subsequently causing a decrease in its playability and therefore displaying a decrease in shoulder range of motion. With the decrease in the capsules capacity to stretch, decrease in its lubricating synovial fluid, and increase in pain, range of motion continuously drops. Typically external rotation is the first to be impacted, and pain at night becomes more prevalent. ("Frozen Shoulder,"2014)

Acromioclavicular joint, or AC joint, is located at the top of the shoulder, specifically the junction between the acromion of the scapula and the clavicle.

Bicep Brachii- Proximal attachments: Long head- supraglenoid tubercle and glenohumeral labrum. Short head- Coracoid process of scapula. Distal attachments: Radial tuberosity and bicipital aponeurosis. Action: Flexion and supination of elbow, flexion of shoulder. (Vizniak, page 220)

The rotator cuff is comprised of four muscles that stabilize the glenohumeral joint, and are each responsible for their own specific humeral movement. These muscles are Supraspinatus, Infraspinatus, Subscapularis, and Teres minor.

Infraspinatus- Proximal attachments: Infraspinous fossa, inferior portion of the spine of scapula. Distal attachment: Greater tubercle of humerus. Action: Lateral rotation of shoulder. (Vizniak, page 206)

Teres Minor- Proximal attachment: Superior lateral border of scapula. Distal attachment: Greater tubercle of humerus. Action: Lateral rotation of shoulder. (Vizniak, page 208)

Subscapularis- Proximal attachment: Subscapular fossa of scapula. Distal attachment: Lesser tubercle of humerus. Action: Medial rotation of shoulder. (Vizniak, page 210)

Supraspinatus- Proximal attachment- Supraspinous fossa of scapula. Distal attachment: Greater tubercle of humerus. Action: Abduction of shoulder. (Vizniak, page 168)

Biceps tendinitis- Biceps tendinitis is a disorder of the tendon around the long head of the biceps muscle. Inflammation of the biceps tendon within the intertubercular (bicipital) groove is called primary biceps tendinitis, which occurs in 5 percent of patients with biceps tendinitis.1 The 95 percent of patients without primary biceps tendinitis usually have an accompanying rotator cuff tear or a tear of the superior labrum anterior to posterior, known as a SLAP lesion. Pathology of the biceps tendon is most often found in patients 18 to 35 years of age who are involved in sports, including throwing and

contact sports, swimming, gymnastics, and martial arts. These patients often have secondary impingement of the biceps tendon, which may be caused by scapular instability, shoulder ligamentous instability, anterior capsule laxity, or posterior capsule tightness. Secondary impingement may also be caused by soft tissue labral tears or rotator cuff tears that expose the biceps tendon to the coracoacromial arch. ("Diagnosis and Treatment of Biceps Tendinitis and Tendinosis," September 2009)

According to the article "Biceps Rupture", biceps tendon ruptures are seemingly on the rise in the United States. The long head of the bicep is almost exclusively involved varying in severity from partial tears to complete tears which upon examination can be seen as the classic mid humerus "Popeye" bulge. This article cites that 90-97% of all ruptures involve the proximal attachment, and almost always the long head occurring either at the bony attachment or the tendon-labral junction. Other ruptures can occur at the radial tuberosity and also the short head of the bicep at its acromion attachment, though these tears are least common. Symptoms associated with bicep tears can range anywhere from asymptomatic to sudden acute, sharp pain located in the anterior shoulder sometimes accompanied by a snapping sensation and an audible pop. There can be weakness through the associated arm extending from the shoulder to elbow. Pronation and supination of arm can also be difficult depending on whether it's a proximal or distal tear. Overhead and repetitive activities can be accompanied with pain. According to this article there can also be an indirect pain located in the anterior shoulder which may in fact worsen at night. This article also states that typical tests such as Speed and Ludington tests are performed in office, and then an image will be ordered to rule out any further pathologies. Physical and/or Occupational Therapy are typically ordered and started after office visit. Surgery tends to be more cosmetic. ("Biceps Rupture," 2018)

An article in Emergency Physicians Monthly ("Bicep Tendon Rupture,"2014) listed some common preexisting conditions that can be factors when ruling out bicep tears. Individuals age 40-60 with prior history of shoulder injury causing chronic strain on the tendon are at the highest risk for biceps tendon rupture. Traumatic ruptures that occur in a younger populous are typically caused by an acute strain on the tendon, such as heavy weightlifting, or traumatic fall. Often resulting from the forced extension of the elbow from a supinated and flexed position. Other risk factors for tendon ruptures include chronic diseases such as diabetes, chronic kidney disease, systemic lupus erythematous, rheumatoid arthritis, chronic steroid and fluoroquinolone use, and cigarette smoking.

Case:

This patient is a fairly active 63 year old female, with no prior history of shoulder pathology. Client presented with bilateral anterior shoulder pain right side greater than left. Her 63 pound dog's health had been declining and she was transferring her via harness multiple times a day. She saw her PCP March 2018, and was diagnosed with bilateral bicep tendonitis with frozen shoulder. X-ray was done and showed mild osteoarthritis in her right AC joint. The patient was given the option of seeing an orthopedic surgeon or starting rehab immediately. The patient chose rehab. Her evaluation was completed March 21, 2018, and was consistent with a bicep tendon injury along with frozen shoulder. Their treatment plan involved massage, electrical stimulation, and stretching exercises with a pulley. Patient completed 3 visits, but her shoulders only seemed to be getting worse. This patient decided to stop physical therapy and was scheduled at 360 NeuroMuscular Therapy for an evaluation within two weeks time. Patient continued to do stretches at home without using the pulley. On April 9, 2018, while doing her home exercise plan she heard a pop in her right shoulder, followed by immediate cease of all shoulder range of motion. The patient scheduled an appointment with her Orthopedic surgeon who confirmed a partial right bicep tendon tear in the proximal portion of the long head, and offered a

steroid injection which she refused. Her initial appointment at the clinic was scheduled for April 25, 2018, patient continued with Acupuncture, heat, and rest until her visit.

Treatment:

During initial evaluation both the patients active, and passive glenohumeral range of motion was not measurable. She needed assistance with removing her jacket due to her lack of shoulder range of motion. Her pain was concentrated in shoulders with occasional referral pain down to her elbows, and nerve referral down lateral right arm into ring and pinky finger. Sleeping was difficult as no position was comfortable, and pain increased in her back without any positional resolve. Basic everyday activities were a challenge, especially getting dressed. Client was able to gain slight relief from heat and Capsaicin, and also acupuncture which she continued throughout the first few months in addition to neuromuscular treatments.

Initial treatment was primarily spent attempting to desensitize patients right shoulder girdle. Client needed to lay supine with pillow support under right arm as her arm was stuck anteriorly and she was unable to place it by her side. Initially static pressure was held on pectoralis major in an attempt to familiarize patient with that area being touched. Once guarding diminished soft glides were performed to pectoralis major, pectoralis minor, bicep brachii, and brachialis. Static pressure was also held to infraspinatus and subscapularis. Patient reported feeling sore post treatment, but did immediately experience a small increase with abduction and forward flexion.

Second treatment patient reported that her shoulders maintained the increase in range of motion to where she is able to dress herself without assistance, though range was still not measurable. She also reported that she was still experiencing the same level of pain at night. Patient was able to lay prone with shoulder bolstering for initial 20 minutes of treatment. Trapezius, infraspinatus, rhomboids, teres major and minor were all treated with soft glides. Infraspinatus, rhomboids, and teres major were all sensitive and treated for active trigger points by sourcing taut bands, and attempting to recreate familiar pain referrals. Patient turned supine, where pectoralis major and deltoid were treated. Patient reported decrease in pain and tenderness post treatment.

Third treatment client reported experiencing no back pain at night, and had an increase of forward flexion right side which measured at 110 degrees, and left side measured at 90. She did report experiencing heightened awareness in right deltoid and bicep, it was unclear if this was discomfort. This treatment was focused primarily on bilateral Bicep, Deltoid, and Pectoralis major/minor with the intention of increasing forward flexion and abduction, by sourcing and treating trigger points. Serratus posterior superior, Subscapularis and Infraspinatus were also treated and both recreated familiar arm pain referral.

Treatment four client reported increase in active range of motion in both forward flexion and abduction. Movement through shoulders was becoming less guarded. Her pain had changed to where she was no longer experiencing back pain at night, but was experiencing a general slight increase in discomfort through her anterior shoulder during both day and night. Treatment was again focused primarily on right anterior shoulder, but quick glides to left bicep, deltoid, pectoralis major. Post treatment range of motion testing displayed a slight increase in bilateral forward flexion, and abduction. Patient was able to initiate adduction without significant discomfort.

Treatments five and six were performed by Lisa Erickson Gorman, CMTPT,CNMT.

Treatment five, patient voiced pain in acromium region of both shoulders prior to treatment. Treatment was started prone where infraspinatus, upper trapezius, and levator scapula were treated. Left infraspinatus was treated for active trigger points which referred a familiar pain down left arm during treatment. Client turned supine where bicep brachii and brachialis glides were treated with glides into deltoid. Client reported a decrease in pain post treatment.

Treatment six client demonstrated the ability to keep scapula in place with reaching, and voiced the ability to do more with her right arm. Treatment was performed supine and concentrated on bilateral internal rotators of the humerus, and upward rotators of the scapula.

Treatment seven client reports a significant ease with every day activities, for example washing her hair, and also driving. She was still experiencing right shoulder pain at night though reports waking up less frequently. Her confidence in her ability to do more with her arms daily is steadily increasing. The focus of this treatment was to decrease right anterior shoulder pain. Right infraspinatus was treated with glides while sourcing active trigger points. Anterior and middle deltoid, coracobrachialis, bicep and brachialis were all treated with NMT glides.

Treatment eight client reported she began practicing the trumpet again, alternating between a real one and a plastic one for a 30 minute time span without pain. Shoulder movements have become more intuitive vs. guarded and thought out. She has noted a decrease overall in pain, but still is experiencing what she describes as a faint pain through her anterior shoulder daily. Treatments eight and nine were spent focusing on anterior deltoid, pectoralis major, and upper trapezius. Glides were done to brachialis and bicep. Light FAKTR was applied to both biceps to address any fascial restrictions.

Treatment ten client reports a decrease in pain level and frequency. She has started a regiment of light range of motion exercises which seem to be going well. Her area of focus is shifting away from her original area, and is directed more towards neck and chest which she reports feeling tighter than her arms. Range of motion measurements were as follows forward flexion 130, abduction 90, and extension is 40.

As treatments continued, areas of focus changed and her shoulder steadily became less of the treatment focus. Client experienced no adverse effects from treatments. By the end of treatments her AROM were all within normal limits, and pain at night had completely subsided.

Discussion:

While writing this case study, it was difficult locating research articles on isolated bicep injuries. Every case study that I came across coupled bicep tears with other shoulder pathologic conditions. I was able to find one case study (“Physical Examination for Partial Tears of the Biceps Tendon”, 2007) Which talked about how the physical examination for isolated bicep injuries needs to be considered carefully. They took 874 patients who had no surgical intervention for bicep or SLAP tears, or bicep dislocation. They then split the participants into two groups, one was partial biceps tear, and the other was no biceps tear. The examiners then ran them through a standard physical examination before they underwent an arthroscopy. These tests included biceps palpation, Speed’s Test, Neer’s Sign, Hawkin’s Sign, Crank Test, Belly Press, Active compression both palm up and down, Lift-Off Test, and Kibbler’s Test. According to the data collected when they did the arthroscopies, 33 of the 40 partial tears were located within 1.5-2 cm of the origin, and did not involve the attachment to the labrum or supraglenoid

tubercle. Seven patients had partial tears in the intertubercular region. Out of the 40 patients, 34 had rotator cuff tears, 3 patients had anterior instability, 2 patients had impingements without rotator cuff tears, and 1 patient had degenerative arthritis. Speed's test had a specificity of 67%, and an accuracy of 66%. No other tests performed in the partial tear group had a sensitivity of more than 68%. This study also states "Speed's test could be found with a variety of conditions, including anterior instability, a tight posterior capsule, and impingement disease. Ideally, a study of partial biceps tears would include patients with isolated biceps tendon injury; however, to our knowledge, no such study exists." The article also suggests that because of biceps pain pattern and its similarity to other shoulder issues, the only way to determine the relationship between bicep lesions and the patients pain pattern would be by performing an isolated bicep tenodesis with and without other pathologic conditions. Their case study also makes mention of finding that patients with a positive lift-off test were more likely to have a partial bicep tear connecting an association between subscapularis dysfunction and bicep tendon issues.

In the article "Diagnosis and Treatment of Biceps Tendinitis and Tendinosis" the beginning paragraph under diagnosis states: Patients with biceps tendinitis often complain of a deep, throbbing ache in the anterior shoulder. The pain is usually localized to the bicipital groove and may radiate toward the insertion of the deltoid muscle, or down to the hand in a radial distribution. This makes it difficult to distinguish from pain that is secondary to impingement or tendinitis of the rotator cuff, or cervical disk disease. Pain from biceps tendinitis usually worsens at night, especially if the patient sleeps on the affected shoulder. Repetitive overhead arm motion, pulling, or lifting may also initiate or exacerbate the pain. The pain is most noticeable in the follow-through of a throwing motion. Instability of the tendon may present as a palpable or audible snap when range of motion of the arm is tested. ("Diagnosis and Treatment of Biceps Tendinitis and Tendinosis," 2009)

As you can see from my clients treatment notes, she did in fact present with symptoms very similar to frozen shoulder; however, the only thing visible on X-Ray was right shoulder partial long head bicep tendon rupture and mild osteoarthritis. Given the repetitive movement with load while lifting a 60lb failing dog, in junction with her other medical diagnoses, it makes sense that this patient would eventually display some type of repetitive injury. It is unknown as to what her glenohumeral range of motion was pre tear, only because the tear happened right before she was scheduled for her initial treatment at the clinic. Her chief complaints aside from significant decrease in range of motion were pain in her shoulders and back at night, and referral down right arm into ring and pinky finger.

Bicep Brachii's pain referral is localized to to muscle itself, but infraspinatus, supraspinatus, brachialis, also have a pain pattern that includes bicep. Pectoralis major and serratus anterior also include a portion of bicep, and also extend down the arm into the ring and pinky finger. Keep in mind, trigger point referral can display as pain, nerve, ticklish, and itchy. Anterior shoulder pain that worsens at night is a flag for frozen shoulder, and both infraspinatus and subscapularis are anecdotally thought to be key players in mimicking frozen shoulder.

From what I was able to find, frozen shoulder is typically a slow onset. The shoulder capsule has to go through all three stages, freezing, frozen and thawing, which involves the thickening and thinning of synovial fluid which takes anywhere from 6-72 months. This case start to finish was from March 2018 to August 2018, the patient had started with NeuroMuscular treatments in April making it four months of hands on therapy every other week with a gradual taper. At the time of injury there was an immediate loss of almost all arm range of motion. One would believe that in her body's attempt to protect and heal, there were a series of trigger points activated secondary to trauma, along with postural changes requiring adaptive lengthening and shortening of the majority of her internal and external rotators.

Throughout our treatments we were able to locate taut palpable bands that were in fact hypersensitive bilaterally, and we were able to recreate and alleviate the majority of her pain patterns. She regained range of motion fairly quickly. Speed's test, and Apely test's remained positive for the few treatments, but steadily improved each time we tested. Where the trauma to her shoulders that resulted in her partial tear occurred while doing physical therapy (PT), this patient was a bit apprehensive when I suggested she revisit PT. I explained that she wasn't in the same state she was in the original time when she attempted PT, and that we had sourced taut bands and given her length back in those shortened fibers. This client eventually trusted her shoulders enough where she believed she would be able to withstand some light PT, and was able to get strength back in fibers that had been weakened.

With this case, both shoulders were in crisis. Her right bicep had sustained a tear, while the left bicep only had developed tendonitis. With work to her biceps bilaterally we were able to clear up the pain referral on her left side relatively quick. Would that have happened with her right shoulder had we been able to see her before she started PT? I hope more patients are encouraged to seek out therapies such as Neuromuscular Therapy before being offered cortisone injections, or other intrusive or aggressive therapies/procedures. At this time, and with the lack of research on just isolated bicep tendon injuries, there isn't enough information to confidently state a positive yes, or no, as to whether or not active trigger points in junction with a bicep injury has the capability to mimic a frozen shoulder.

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