

Resolution of Adhesive Capsulitis (Frozen Shoulder) following Chiropractic Care and Applied Kinesiology (AK): A case report

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Objective: The objective was to determine the effect of Chiropractic Care and Applied Kinesiology (AK) techniques to provide relief and range of motion restoration of the effects of right frozen shoulder syndrome.

Clinical features: A 30-year-old male patient presented with complaints of chronic right shoulder pain that radiated into his right upper trapezius from surfing.

Intervention and outcomes: AK based techniques were utilised to in the areas of vertebral subluxation to help decrease the discomfort associated with the patient's right frozen shoulder. Manual muscle testing (MMT) was also used to determine proper facilitation of reactive muscle testing. After two visits utilising chiropractic care and AK based techniques, the patient's shoulder pain had subsided his range of motion was restored.

Conclusion: This case report exemplifies a combination approach of care to a patient with adhesive capsulitis with a resolution of symptoms and a return to activity in a manner of 2 visits. A combination of chiropractic care benefitted the patient by use of AK based analysis through global MMT, and also while working with chief complaints allowed the patient to return to surfing in a relatively quick manner. However, research involving one or two specific techniques would benefit to know the true potential of care involving the area of complaints.

Indexing terms: Chiropractic; Applied Kinesiology; frozen shoulder; adhesive capsulitis; Manual Muscle Testing.

Introduction

Frozen shoulder syndrome (FSS) is a common condition presenting to a variety of health care practitioners including chiropractors, osteopaths, medical doctors, and physical therapists. Also referred to as adhesive capsulitis, FSS remains one of the most poorly understood shoulder conditions, (1) with its aetiology and pathogenesis largely disputed. (2)

Recently, a consensus definition of FSS was reached by the *American Shoulder and Elbow Surgeons* to be 'a condition characterised by functional restriction of both active and passive shoulder motion for which radiographs of the glenohumeral joint are essentially unremarkable' (1)

The prevalence of FSS is thought to be 2% to 5% of the general population.

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(2, 3) Primary (idiopathic) FSS may be defined as idiopathic shoulder pain of at least one month duration accompanied by increasingly severe limitation of active and passive glenohumeral movements in all ranges of motion in persons who have no identifiable general illness and whose radiographs are entirely normal. (4)

Secondary FS is clinically indistinguishable from primary FS, however in secondary FS, an identifiable disorder such as a rheumatological or neurological disease is present (5) or other potential predisposing factors.

Patients with systemic diseases such as thyroid diseases (6, 7) and Parkinson's disease (8) are at higher risk. Secondary adhesive capsulitis can occur after shoulder injuries or immobilisation (e.g. rotator cuff tendon tear, subacromial impingement, *biceps* tenosynovitis and calcific tendonitis). These patients develop pain from the shoulder pathology, leading to reduced movement in that shoulder and thus developing frozen shoulder. (9)

Frozen shoulder often progresses in three stages:

- ▶ the freezing (painful)
- ▶ frozen (adhesive) and
- ▶ thawing stages.

In the freezing stage, which lasts about 2–9 months, there is a gradual onset of diffuse, severe shoulder pain that typically worsens at night. The pain will begin to subside during the frozen stage with a characteristic progressive loss of glenohumeral flexion, abduction, internal rotation and external rotation. This stage can last for 4-12 months.

During the thawing stage, the patient experiences a gradual return of range of motion that takes about 5–26 months to complete. (10, 11) Although adhesive capsulitis is often self-limiting, usually resolving in 1–3 years, (12) it can persist, presenting symptoms that are commonly mild; pain is the most common complaint. (13, 14)

The purpose of this paper is to describe *Applied Kinesiology* (AK) interventions for the management of a patient with right FSS. Future research is needed to determine which protocols will be most effective for different populations and multiple types of FSS, as well as what long term effects AK and AK-based treatments may have on patients. It should be noted that only short-term effects were assessed, and it is still unclear what long-term effects AK may have on adults with FSS.

Case Report

Patient history

The patient was a 30-year old male presenting with right shoulder pain that radiated into the right upper trapezius area. The mechanism of injury reported was due to surfing activities.

The symptoms began 1-month prior to the initial visit. On the initial digital pain drawing paper given to the patient, he indicated a circle around her back right upper trapezius. The description of the timing of the pain in the office paperwork said that the patient was experiencing this pain 'Intermittently' (0-25% of the day).

The nature of the symptoms was described as a 'sharp pain' that was not changing. The patient at the time of the appointment was reporting the pain to be about a 3/10, '10' being the worst amount of pain possible. At its worst, a 4/10 pain, and 0/10 pain at its best.

The patient had also described that his symptoms were being made worse by reaching as well as laterally flexing his neck to the left. The patient reported his symptoms to be relieved by rest and stretching. The patient considered his overall health to be considered 'very good'.

The patient had previously had chiropractic treatment 3-4 years previous to this appointment from another doctor, but it was only for wellness based care. The patient also noted previous scar tissue within the nasal passages from being previously punched in the nose from a fight, and this was further impacted by a deviated septum. The only significant family medical history was mentioned on the initial intake form was that there was alcoholism and depression throughout the patient's family.

Initial vital examination

The patient's height and weight were measured, with the patient weighing in at 79 kg (175 lbs) at 1.82m (6'0). The patient's blood pressure was taken, and was recorded at 135/76 mmHg and had a resting pulse of 66 beats per minute.

Chiropractic examination

The patient attended on November 2, 2022 for the chiropractic evaluation and treatment. No advanced imaging was taken on this first visit.

Postural exam

Postural examination revealed a slightly elevated right head tilt, a high right shoulder, as well as an elevated right hip. There was also slight a right foot pronation as well as an internally rotated shoulder on the left arm.

Range of Motion exams

The patient did not have any range of motion issues or limitations based on cervical and lumbar examinations.

Orthopedic exams: Shoulder

The patient had a positive *Mazion's Shoulder Manoeuvre* test regarding the right shoulder. This indicated localised pain in the right glenohumeral joint. (15, 16) The patient also had a positive Right Apley's Scratch test. In an Apley scratch test, patient is asked to put his/her arm above head and arrive at behind the neckline to touch his/her upper back. This test analyses the rotation of upward, external and elevation. (17) During physical examination if the patient is having severe pain, then the physical assessment is marked positive. Previous studies have shown that the ROM (range of motion) and Apley scratch test are good for diagnosing frozen shoulder. (18)

Motion Palpation

Upon spinal examination, there was noted myalgia and myospasm on the left C1 vertebrae, right C5 vertebrae, L1 on the right, L5 on the left. The C1 vertebra noted to have a 'lateralization' to the left while the C5 vertebra was noted as a C5 'vertebral body right'. The L5 spinous process was noted to be posterior, right, inferior, or what Diversified protocol determines as a PRI-M listing. There also were restrictions of extension noticed in the thoracic vertebrae of T4-T6 and T8-10.

Techniques utilised

Applied Kinesiology (AK) Muscle Testing

One of the main ways that the patient was evaluated during treatment was by means of Manual Muscle Testing (MMT)/Applied Kinesiology (AK) analysis. Within the chiropractic profession, the ICAK has established an operational definition for the use of the MMT:

'Manual muscle tests evaluate the ability of the nervous system to adapt the muscle to meet the changing pressure of the examiner's test. This requires that the examiner be trained in the anatomy, physiology, and neurology of muscle function. The action of the muscle being tested, as well as the role of synergistic muscles, must be understood. Manual muscle testing

is both a science and an art. To achieve accurate results, muscle tests must be performed according to a precise testing protocol.'

The following factors must be carefully considered when testing muscles in clinical and research settings:

- ▶ Proper positioning so the test muscle is the prime mover
- ▶ Adequate stabilisation of regional anatomy
- ▶ Observation of the manner in which the patient or subject assumes and maintains the test position
- ▶ Observation of the manner in which the patient or subject performs the test
- ▶ Consistent timing, pressure, and position
- ▶ Avoidance of preconceived impressions regarding the test outcome
- ▶ Non-painful contacts – non-painful execution of the test
- ▶ Contraindications due to age, debilitating disease, acute pain, and local pathology or inflammation. (19)

This technique was well utilised in the care of this patient for the treatments regarding a need for chiropractic adjustments/manipulations, sacro-occipital technique (SOT) blocking needs, ocular lock technique, nutritional testing, soft tissue care, acupuncture meridian therapies, Therapy Localisation (TL) of care, and Ileocecal Valve (ICV) functioning.

Quantum Neurology (QN)

Quantum Neurology® Rehabilitation is a method of exercising and strengthening the Nervous System. This is done by incorporating neurological activation, physical mobilisation, and light therapy. Using a patented system of evaluation and correction, it enables the practitioner to find hidden neurological weaknesses in the body. Specific techniques allow practitioners to activate the Nervous System's innate healing power so that the body can heal itself. (20)

This technique was used in evaluating and treating various myotomes and cranial nerves and their associated inhibitory muscle tests.

Diversified technique

Spinal manipulation is a passive and rapid movement of a joint beyond its active and passive limit of movement, but remaining within the limit of the joint's anatomical integrity.

This patient received one to two dynamic thrusts, applied with high velocity low amplitude force, directed at one or more restricted lumbar, thoracic or cervical spine segments. This approach to manipulation is commonly referred to as diversified technique. (21) This technique was well utilised in the correction of adjusting specific segments of the spine and pelvis.

Chiropractic and AK Treatment

The patient was seen for a total of 2 visits of the time period from November 2nd 2022 to November 8th 2022. After the initial exams were conducted, the doctor undertook the initial chiropractic analysis on the first visit as well.

Upon the first visit, November 2nd 2022 the doctor evaluated and adjusted based on AK analysis in a standing position by using the right deltoid muscles as a group evaluating the patient in a head forward and cervical flexion position, and it was determined to do a standing first thoracic (T1) adjustment. This was performed by having the patient place his feet together, arms out horizontally and bilaterally to each side, and then the doctor placing their hands interlocked underneath the patient's arms and hands on the back of his neck. This was followed by the patient placing their hands on the doctor's interlocked hands, followed by the patient taking a

deep inspiration and expiration, while slouching back into the supporting knee of the doctor and then the doctor would do a manual 'traction' of the cervico-thoracic junction area. The right deltoid muscle group was retested and shown to be facilitated.

The doctor also performed *Primary Atlas Technique* (PAT) (22) and AK analysis and it was determined that the left C1 segment had shifted laterally. This was adjusted in a supine position via a rotary Diversified chiropractic high velocity-low amplitude (HVLA) adjusting in a superior to inferior and lateral to medial line of drive with an 2nd digit (index finger) contact. The 5th cervical vertebrae (C5) was also found via therapy localisation (TL) with the patient contacting the vertebrae to have a '*vertebral body right*' rotation malposition, which was also adjusted via a rotary Diversified chiropractic high velocity-low amplitude (HVLA) adjusting C5 from right to left, counterclockwise with the head in slight flexion.

In addition to the cervical spine segments being adjusted, the *Lovett Reactor* vertebrae (23) of L5 and L1 in the lumbar spine were also adjusted in side posture lying stance using HVLA as well. The patient was evaluated and treated based on findings from an inhibited muscle test via the Quantum Neurology (QN) model of analysis.

The *pubic* bone was checked first. This was performed by the patient laying supine on the table with the knees bent, feet together while flat on the table. The doctor placed the hands on the patient's distal femur heads, and the patient was instructed to approximate the knees while the doctor resisted. There was a failure/inhibition of the knees to approximate. The patient then TL'ed each side of the pubic bone, and it was determined that the patient had a superior left pubic bone. This was corrected with the use of an *Activator*[™] instrument adjusting instrument (24) with a line of drive of Superior to inferior on a superior pubic bone contact while a *GRT*[™] red light was placed at level of the patient's brainstem. The muscle test was rechecked and showed a facilitation of the initial pubic bone test.

The S1 myotome aka the *peroneus tertius* was also tested bilaterally, and shown to have an inhibition on the left foot. This was corrected with the doctor's hands placing pressure on the patient's left inguinal ligament and then a re-testing showed a facilitation of the *peroneus tertius*. This was also determined to showing a right sided rectus femoris inhibition on the right side, and was corrected with firm pressure applied to the space at 5cm (2") above and 2.5cm (1") lateral to the umbilicus. This was also shown to facilitate upon testing the muscle post-treatment.

The doctor also checked the patient's ileocecal valve (ICV), (22) and it was determined that the patient showed as having an 'Open' ICV. This was shown by testing a strong indicator muscle, in this case the *right pectoralis major-clavicular* (PMC) division, and then having the patient TL the right lower quadrant of the abdomen just 2 to 5cm (1-2") above the right anterior superior iliac spine with his fist. This showed an inhibited PMC muscle. The test was then '*challenged*' by having the patient pull the right lower quadrant abdominal tissue superior and medial towards the left shoulder, which did facilitate the PMC muscle. This was also further confirmed showing an inhibition of the right iliacus muscle.

From there, the various points addressed were the Bladder 58 acupuncture meridian point on the left, which is on the posterior border of the fibula; Kidney 4/5, which is posterior and inferior to the medial malleolus, in the depression medial to the attachment of the tendon of the calcaneus. This was also corrected with firm pressure within the patient's right bicipital groove and over the lamina of the C3 vertebrae on the right. Following all of that treatment, the patient re-TL'ed the ICV and the PMC showed strengthening as well as the right iliacus muscle.

The patient was also shown to have a right hyoid dysfunction as well, specifically his right *omohyoid m.* This was tested by using the bilateral PMC muscles as indicator muscles, and then having the patient protrude the tongue out of his mouth, which showed an inhibition of the bilateral PMC muscles. This was then examined by moving the patient's hyoid bone in various

directions to stretch the muscles and testing a previously strong indicator muscle for weakening. It is assumed that a positive test is due to neuromuscular spindle cell dysfunction in the muscle being stretched. (22) When positive, the doctor evaluated the muscle being stretched with accurate (TL) by having the patient therapy localise to the muscle with the tip of his index finger, the area of dysfunction. The treatment was then directed to the neuromuscular spindle cell to push its ends together. The bilateral PMC muscles were then re-tested with the patient protruding his tongue showing a facilitation and no longer needing any treatment on the hyoid muscles.

The patient's pulse points were also checked as part of AK diagnosis. This test was performed by using the *Rectus Femoris* muscle as an indicator muscle, and then having the patient contact/ TL the various pulse points until there was an inhibition of the muscle noted. It was determined that he had a right-distal wrist crease point show up as an inhibited muscle test, indicating the most deficient meridian, which in Chinese medicine is designated as a 'Metal Element' point. The metal element related muscle that was checked was the *tensor fascia latae* (TFL) on the left side. This was correlated by the patient TL'ing the 'alarm point' for the TFL which is 3-4cm (1.5") lateral to the patient's umbilicus on each side of the abdomen, which facilitated the previously inhibited TFL.

The doctor also held contact at the 'tonification' point of Large Intestine 11 (LI11). LI11 is a point located at the elbow, which is located at the end of the crease on the outer side of the bent elbow. (25) The doctor then retested the original left TFL muscle and there was a facilitation of the muscle.

The patient was also adjusted prone on the T4-T6 as well as T8-10 vertebrae since they were also TL'ed and shown to have inhibition using the hamstrings as a group as an indicator muscle. This was also confirmed via bilateral *teres major* muscle testing showing fixations (22) in these various areas.

The patient was also noted to have a left Category (CAT I) listing (22) with a confirmation of both his hands being placed on the left SI joint testing his left hamstring showing an inhibition. This was also confirmed with his left piriformis inhibiting upon being in a quadruped position. This was corrected with the patient prone, using blocks placed at the right ASIS and the left greater trochanter. This strengthened/facilitated the hamstring response, and the patient was left on these blocks for about 2 minutes until the hamstring was retested, showing a titration point where there was an inhibition and showing no more work was needed.

The second and final visit took place on November 8th 2022 with the patient having no pain in the right shoulder, but only some minor discomfort in the lower back. The doctor used PAT and found a right lateralisation of the C1 vertebrae, which was adjusted supine via a rotary Diversified chiropractic high velocity-low amplitude (HVLA) adjusting in a superior to inferior and lateral to medial line of drive with an 2nd digit (index finger) contact.

The doctor also checked the patient's ileocecal valve (ICV), (22) and it was determined that the patient showed having an 'Open' ICV. It was corrected in the same manner as the first visit.

This patient once again had a 'Metal element' distal wrist crease pulse point identified, which corresponded to an inhibited left TFL muscle, and was treated by holding the LI 11 point until a pulse was found on the left elbow crease, and the left TFL muscle was facilitated.

The patient was also shown to have a CAT I listing on the left side once again, and was treated in the same manner as the first visit.

Chiropractic/AK Outcomes

SOAP notes were taken as a daily record keeping procedure to monitor patient progress. The notes explained the basic procedures mentioned on each subsequent visit and what was found upon chiropractic examination and what was adjusted or worked on with QN and AK therapies.

Upon conclusion of the 2nd and last visit of the patient, he had reported that his right shoulder pain had totally dissipated and was able to perform *Apley's Scratch* test and *Mazion's* test with no discomfort in the shoulder, and he was also able to lift furniture and surf in the 6 days between visits. The patient had mentioned that the incorporation of QN and AK treatments of the right shoulder from visit 1 had made a big difference in the recovery of the right shoulder.

Discussion

The aim of this study was to determine the effect of several different AK based techniques with chiropractic care on decreasing the frequency and duration of shoulder pain this patient had experienced over the last month when surfing. In this case report, the right frozen shoulder discomfort he had been experiencing was likely being caused because of overall body joint mechanics that made the right shoulder, specifically the humerus bone, compensate for the lack of overall motion and subsequent pain he was experiencing.

In this particular case study, the patient responded rapidly with conservative AK and AK-based therapies addressing the entire body since the patient reported the mechanism of injury initially started from surfing. These symptoms were only present for a 1-month duration, so long-term effects were not noted. The evaluation on the follow up appointment also showed that he had no range of motion issues including negative tests of both *Mazion's* test and *Apley's* scratch test on the right. This could indicate that it was more of an acute-based injury and that there was overall postural distortion causing shoulder compensation.

In other types of treatments for FSS, there is a tendency to rely upon injections and/or physical/physiotherapy to aide in the recovery. Based on the available evidence, it appears that the use of an Intra-articular (IA) corticosteroid injections for patients with frozen shoulder of duration less than 1 year is associated with greater benefits compared with all other interventions, and its benefits may last as long as 6 months. (26) This has important treatment ramifications for the general and specialist musculoskeletal practitioner, providing them with an accessible, cost-effective, (27) and evidence-based treatment to supplement exercise regimes, which is anticipated will inform national guidelines on frozen shoulder treatments moving forward.

In the short-term, IA corticosteroid appeared to be associated with better outcomes compared with no treatment in all outcome measures. Adding arthrographic distension to IA corticosteroid may be associated with positive effects that last at least as long as 12 weeks compared with IA corticosteroid alone; however, these benefits are probably not clinically significant. Compared with physiotherapy, IA corticosteroid seemed to be associated with better outcomes, with clinically significant differences. Combination therapy with IA corticosteroid plus physiotherapy may be associated with significant benefits compared with IA corticosteroid alone or physiotherapy alone for ER ROM and function, respectively, at 6 weeks. (25)

Because of the paucity of robust evidence, no firm recommendations exist for clinical practice. *The National Institute of Health and Care Excellence* (NICE) guidelines (28) influenced in turn by the BESS/BOA recommendations, recommend a stepped approach, starting with physiotherapy and only considering IA corticosteroid if there is no, or slow, progress.

Cost-benefit considerations

Many treatments are available for frozen shoulder including both operative and non-operative. Operative procedures include manipulation under anaesthesia and arthroscopic surgeries. Surgery reduces the severe complications of frozen shoulder. Non-operative includes pain management through different modalities (Transcutaneous electrical nerve stimulation, Short wave diathermy, Interferential therapy etc.), mobilisation techniques, exercise plan and precautionary measures. All treatments just improve the functional time to recovery and increase the range of motion. (29)

However, none of the treatment is authentic to totally eliminate the future chance of disease. Physical examinations are generally considered low-cost process and results can directly be obtained at the time of the consultation. On the other hand, precision is based upon doctor's knowledge and practice. Now a day's frozen shoulder is diagnosed by clinical examination and imaging tests. (30) Firstly doctor diagnoses the problem by asking the patient to rotate the shoulder in a different direction. If physicians are uncertain about the problem, then formal test such as magnetic resonance imaging (MRI) can be carried out for diagnosis. Arthrography is considered a standard test for the diagnosis of a frozen shoulder. It is having sensitivity 91 %, specificity 100 % and accuracy 92 %, but the test is an expensive and painful process. (31)

As part of this case study, there was no advanced imaging taken due to the acute onset of the FSS symptoms as well as the patient's fast response to care. There was also no need for advanced imaging from a cost-perspective benefit for the patient as well. There is no existing fact, that any solitary check can diagnose a frozen shoulder problem. (32) Cost-effective treatment process is always dependent upon proper clinical assessment and diagnosis. The severity of the disease can be judged best by imaging tests as compared to clinical examination. According to the recent researches, if we make decision just on the basis of physical examination, it has sure chances that to give us false-positive ratio. Analysis made on the basis of physical examination always conflict with the imaging test. Due to this, we cannot make any decision just on the basis of clinical examination. (30)

Physiotherapy is widely adopted as an initial treatment in many shoulder conditions including FS. (33, 34) Physiotherapy should include an exercise program that can restore shoulder motion. The patient should be placed on an exercise program with the goal of regaining and maintaining motion. Patients receiving exercise therapy should begin an active assisted ROM exercise program as well as gentle passive stretching exercises including forward elevation, internal and external rotation, and cross body adduction. These exercises should be performed five to six times per day. And it is important to perform multiple 5- to 10-minute sessions per day as the shoulder will become stiff again in the time between sessions. (35)

Many studies have demonstrated physiotherapy as an adjunctive intervention that provides good results. NSAIDs were proven to be more effective when used in combination with physiotherapy as compared to NSAIDs alone. (36) Similarly, steroid injection used in combination with physiotherapy resulted in better outcomes compared to injection alone. (37, 38)

Despite the self-limited natural history of the disease, some patients fail to achieve desired outcomes with non-operative management. (11, 39, 40) Factors that influence the decision on surgical management include severity and duration of symptoms as well as response to conservative treatment. (39, 41) General indications for surgery are persistent pain and limited motion despite a minimum 3 to 6 months of non-operative management including medication, local injections, or physiotherapy. (11, 29, 40) Levine et al (42) reported that patients with more severe initial symptoms, younger age at the time of onset, and reduction in motion despite 4 months of compliance with therapy are most likely to require surgery.

Another potential treatment for addressing FSS is Manipulation under Anaesthesia (MUA). MUA involves passive tearing of the thickened inflamed capsule and contracted ligaments. It is mainly performed under general anaesthesia; however, recent development of ultrasound technology enabled it with brachial plexus or cervical nerve root block. (43, 44) Magnetic resonance imaging after MUA shows capsular tears (mid-substance and humeral avulsion of glenohumeral ligaments), labral tears, or bone bruises of the humeral head. (44) And arthroscopic findings of post-MUA include hemarthrosis, tearing of the joint capsule or rotator cuff, superior labrum from anterior to posterior tear lesion, labral tear, middle glenohumeral ligament rupture.

Even though the optimal timing of MUA has not yet been determined, Vastamaki et al (45) suggested that if conservative management failed, the best time for MUA might be between 6 and 9 months from the onset of the symptom. They believed that too early manipulation (before 6 months after the onset of symptom) may lead to a recurrence because the disease is still at the inflammation stage. (45) MUA has been used extensively with satisfactory short- and long-term results. This particular case study also did not have a use for MUA regarding the patient.

The evidence for Chiropractic management

There is presently very little evidence to support chiropractic management of FSS. Murphy et al (46) reported that the *OTZ Tension Adjustment* restores normal function of C0-C1, trapezius, and SCM, thereby restoring normal glenohumeral mechanics, improving shoulder ROM, and reducing pain on elevation of the arm. It has been previously shown that some shoulder complaints resolve after practitioner-applied manipulation. (47, 48, 49, 50, 51, 52, 53, 54)

However, with regard to the efficacy of chiropractic adjustments specifically for shoulder complaints, the current evidence is limited, (55) consisting of one small pilot study, (56) a qualitative study, (57) and a number of case reports. (55, 58, 59, 60)

In AK based treatments of evaluation, it appears that the subclavius muscle is important in rotating the clavicle. In many cases of 'frozen shoulder', great improvement can be made by treating the subclavius muscle. (61) Since the subclavius muscle cannot be directly tested, it must be evaluated by observation of clavicle movement and therapy localisation over the muscle. Treatment of the *subclavius* muscle is usually directed to the neuromuscular spindle cells, Golgi tendon organ, or origin/insertion. The digital pressure applied must be rather heavy to contact as much of the muscle as possible. (22) This was not addressed in this particular case study, but serves as a good indicator for future studies.

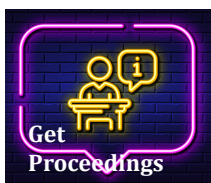
Conclusion

This case study describes several AK based therapies for the treatment of frozen shoulder syndrome (FSS). It's applicability to other patients with similar conditions should be explored.

More research is needed on the subject of AK care-based therapies with chiropractic for the treatment of frozen shoulder. Specifically, focusing on one individual technique in the treatment of FSS or limited shoulder mobility for further research would be best.

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