

Frozen shoulder syndrome: causes and treatments



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Introduction:

Frozen shoulder syndrome (FSS), also known as adhesive capsulitis (AC) is a common disability that is identified with discomfort accompanied by a gradual functional deficit of the ball-and-socket glenohumeral joint, specifically limiting the shoulder active and passive movement. In 1934, Codman was the first to refer to this condition as "frozen shoulder" and he described it as a poorly understood disability that appears normal in radiographic examinations, characterized with spontaneous pain arising near the deltoid insertion, which interferes with sleep quality and restrict active and passive elevation and external rotation (D'Orsi et al., 2012). According to Yuan, X, Zhang, Z and Li, J. (2017), the technical term "adhesive capsulitis" was introduced by Neviasser 11 years after Codman's statement to highlight the pathological changes occurring within the joint capsular and periarticular tissues. This essay will analyze the condition and the different symptomology presented in each stage while concentrating on the therapeutic management methods that could be advantageous with the presented patient case.

Frozen shoulder syndrome is estimated to emerge in 2 to 5% of the general population and up to approximately 20% in patients with diabetes (Inayat, 2017). It often influences working people between their fourth to the sixth decade of life with a slightly higher predominance in females. Despite the limited evidence of the prognosis, Prestgaard (2018) points that this condition could last for the course of three years or more with most studies suggesting that 40% of patients have recurrent but nonirritating symptoms

Classification + stage of condition :

The flexible structure of the shoulder joint (ball-and-socket) and the elasticity of its capsule allows a wider range of movement in most anatomical planes, this unstable structure is dysfunctional. Any process that causes inflammation would result in the formation of adhesive tissues (Quinn, 2018). When adhesive capsulitis is present, the formation of adhesions in the joint capsule increases inability of the joint performance.

The mechanism contributing to adhesive shoulder capsulitis is a subject of debate, but the most accepted hypothesis explains it as an inflammatory contracture syndrome (Tamai, Akutsu and Yano, 2013). Classification of adhesive capsulitis is either primary or secondary. It is primary if the causative agent is thought to be associated with any modifications to the immune system such as thyroid diseases (Hackett, Millett and Provencher, n. d.). The secondary disease proceeds following any disturbance to the ball-and-socket joint dynamics that result in inflammation, therefore any injury or fracture around the GH joint that causes immobilization is classified as secondary.

The condition has been clinically divided into 3 stages based on the length and pathological changes that produces symptoms (Angelo and Fabiano, 2018). In stage 1, also called the Freezing or red stage, the capsule inner walls, called the synovial membrane appears to be inflamed, therefore the compression of the capsule while moving the shoulder is acutely agitating. patients start to neglect the use of the affected shoulder due to fear of pain, muscle atrophy and posture misalignment are some consequences of the

disuse. Typically, stage 1 last for up to nine months. During the second stage, referred to as the Frozen stage, the shoulder is noticeably stiff, the pain and resistance are more constant, and they occur simultaneously. As synovitis progresses into a hypertrophic and hyper vascular inflammation, this means the capsule is enlarged decreasing with it the amount of synovial fluid that lubricate the joint during movement, followed by the formation of adhesions across the synovial lining and the anterior and posterior axillary fold. The sourness increases the restriction, making simple daily activities more difficult such as reaching overhead to wash the hair or to the back to fasten a bra. this phase can last from 4 to 12 months. The last phase is called the Thawing stage, a major loss of function due to full maturation of scar tissues accompanied with chronic ache, however, it is easier to tolerate once the inflammation vanishes and the symptoms are less severe. It takes around 12 to 24 months to restore normal ROM (Cluett, n. d.).

Examinations:

To determine whether the nature of the condition is in the inflammatory or contracture stage, imaging and arthroscopic examinations are carried out. Those tests are important to present with an accurate diagnosis and treatment regime, also to exclude any other causes of stiffness in the shoulder. For an example, Biopsy test can be done to recognize any inflammatory cells in the lesion. arthrography can show any abnormal changes in the volume of capsular or pericapsular tissues of the joint with the use of Magnetic resonance imaging (MRI) or magnetic resonance angiography (MRA) (Tamai, Akutsu and Yano, 2013).

Due to the patient called Kate's age, gender and nature of work, she is already at high risk of developing adhesive capsulitis. She has been dealing with what she described as a painful but irregular pain on her dominant right shoulder for a month and she states that it is an NRS of 5-7/10, her pain is more severe at night and first hour after waking up. She has been easing her symptoms by resting and taking painkillers twice a day. She has no history of any health conditions. During assessment, the range of her active and passive movements in all axes were decreased due to pain with LR being the most difficult. Some weakness and nuisance were recorded when resistance is added to most physiological movements.

Due to the pattern and course of her symptoms, it is reasonable to classify her condition with sub-acute Adhesive capsulitis, more specifically, in the middle development of the first stage of the disorder (i. e. freezing stage).

Treatment plan:

As Kate is only in the early stages of the condition, her SIN factor is relatively high and for that reason, she appears with anxiety. Thus, her treatment program should focus primarily on symptomatic relief and restoring normal function of the joint and the supporting tissues. In the freezing stage, inflammation is the distinct hallmark and to control the pain, inflammation must be reduced. According to Dias, Cutts and Massoud (2005), educating the patient in this level can be profitable as it gives them courage and lessens irritation.

In order to control pain in early stages of AC, methods need to be selected with account to the patient comfort. Moreover, it is crucial for these methods

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to stimulate the gating system in the level of spinal cord. This concept was introduced in 1965 by Melzack and Wall and it states that stimulating the A beta fibers, which is a type of afferent neurons with a large diameter that respond to light and touch, activates the interneurons in the dorsal horn that are responsible of inhibitions of pain impulses transmitted via C fibers (Reddi, Curran and Stephens, n. d.).

The patient is experiencing a lot of pain which makes simple daily tasks unachievable. To enable her to resume work faster, Mezian and Chang (2018) recommend prescribing non-steroidal anti-inflammatory drugs (NSAID) as it can aid in short-term pain control during the day and night. Additionally, introducing cold therapy to the patient at the beginning of her program when inflammation hasn't ceased yet, the cooling effect can minimize the pain by slowing nerve conductivity which can be felt as a numbing sensation, also reducing inflammation and swelling by slowing the blood flow to the irritated area. In her case, applying an Ice pack on the lesion for maximally 15 minutes can relieve her symptoms. Heat therapy can also be beneficial in her case, heat alters the joint and tissues tensile properties by inducing vasodilation, this explains the increase of blood flow to the area which brings more oxygen and nutrients while removing waste products, this reduces inflammation and swelling and relaxes muscles. heat packs can also be used at home for 15 minutes when the patient suffers from an acute episode of pain.

It might be useful to alternate between heat and cold prior carrying any physical modalities in sessions or in her home program, this alternation can ensure that the tissues are warmed up and finishing it off with an ice pack to <https://assignbuster.com/frozen-shoulder-syndrome-causes-and-treatments/>

reduce any inflammatory response following the treatment (sutton-Kerchner, n. d.).

Transcutaneous electrical nerve stimulation (TENS) can also reduce pain by working on the pain gate theory. It is a non-pharmacological machine that works by the activation of A beta fibers. it operates by a clinically chosen frequency and intensity from a small power unit that delivers weak electrical currents to electrodes attached to the affected area.

Johnson (2007) recommend using the normal settings for TENS involving a high frequency (50–100 Hz) and low intensity setting for managing pain effectively and comfortably. The conventional settings for TENS are efficient in closing the gate by inhibiting the signals carried via A delta and C fibers. Kate can benefit of using this machine at home as a short-term method for controlling pain whenever it impairs her functional activity.

The Use of Ultrasounds can also be beneficial with treating pain and the healing process in Adhesive capsulitis. It is a therapeutic modality that works with sounds of higher frequency (usually 1Hz-3Hz) to treat medical conditions, especially conditions influencing the musculoskeletal system like inflammations following injuries (Ingraham, 2016). The vibration of the crystal quartz within the machine's head cause a vibration in the treated soft tissues, resulting in either thermal or non-thermal outcome. This result depends mainly on the used settings. With Kate's condition, it is more beneficial to get a non-thermal effect. According to Bertaggia and Lowe, the combination of stable cavitation and micro-streaming which are non-thermal effects can increase the cellular activity of the cells and thus controls what

inters the cells. The patient dosage would be Deep 1Hz, with a pulse of 1:432 (20-33% duty cycle) and intensity of 0, 2-0, 5 Wcm² as she is in the subacute stage, the crystal head would be aimed at the lesion site for 5 minutes.

Therapeutic exercises:

The application of physiotherapy methods including manual therapy or rehabilitation exercises to the case combined with the discussed pharmacological and clinical modalities can hasten the healing process by minimizing inflammation and restoring the normal function of joint. Kumar et al (2012) state that the use of Maitland mobilization techniques to manually move the joint can aid in the recovery of shoulder normal extensibility.

Those techniques involve the use of an external mechanical force to passively stretch the joint capsule (Pickar, 2002). The direction of force, amplitude and duration are highly dependent on the patient's stage of healing and their response to pain. Keeping in mind that the patient experienced pain and resistance at the same time during assessment. consequently, performing a large amplitude (grade II of Maitland's system) movements through a bearable range until a slight resistance is felt is appropriate. Before carrying on any passive accessory movement with patients, it is important to work out the direction of force and what movement it facilitates, this depends on the understanding of the joint arthrokinematics and the shape of its articular surfaces. Hall and Brody, (2005) used the Concave-convex rule to improve movement in all axis effectively.

Firstly, an anterior to posterior force facilitate a posterior gliding movement of the humerus against the fossa, this can enhance her flexion and internal rotation. Starting the treatment with her supine on a plinth and placing her elbow on a rolled towel to ensure a natural position of the shoulder, forearm resting on the abdomen and the stabilizing hand maintaining a stabilized scapula. With the heel of the mobilizing hand, start by pushing the convex part which is the anterior side of the humoral head towards the plinth with a large amplitude (grade II) while keeping the concave part which is the glenoid fossa fixed. Doing this twice for 30seconds can ensure the permeant deformity of the capsular tissues.

Secondly, For restoring the abduction ROM, preforming a grade II while applying a longitudinal caudad force can promote shoulder abduction. Slightly pulling the humerus from the elbow towards the patient's feet causes the distal glide of the humerus against the glenoid fossa. It is important to distract her upper arm away from the glenoid fossa and acromial arch before applying the graded force to the distal head of the humerus. Starting in the same supine position on a plinth, elbow resting on the plinth with biceps flexion to 90 degrees, placing the mobilizing arm on the anterior side of the elbow and the stabilizing arm around the patient's wrist, the dose of the treatment depends on her pain tolerance.

Thirdly, using the same principles of Maitland techniques, an Anterior glide on the posterior head of humerus can promote external rotation In a the same position, with shoulder girdle close to the edge of the plinth, mobilizing thumbs on the posterior head of the humerus and the rest of fingers

stabilizing the joint, force is carried through range until resistance is felt for two intervals lasting for 30 seconds.

Lastly, although the patient hasn't lost her normal range of extension (45-60 degrees), the movement was restricted with an increased pain. With patient sitting on a bench with the stabilizing hand on the shoulder to fixate the scapula and the clavicle, passively stretching her arm from the distal end of the humerus into extension and holding it between 30 seconds and 2 minutes.

As the mobility of the GH joint and its range of movement starts to recover, it is also important to strengthen the muscles tissues that were neglected because of the fear of pain. Prescribing her exercises that can be done under the supervision of clinician and performed individually in a nonclinical setting can help the patient recover to their previous performance in a shorter time frame (Mezian and Chang, 2018). In the case of adhesive capsulitis, once the group of muscles responsible of stabilizing and moving the shoulder are weakened, they can lose their extensibility, the long-term immobilization of the muscles according to Nitz (2014) can reduce the Muscle oxidative enzyme to fall by 26% to 42% causing muscle atrophy and loss of tensile features.

First, the supraspinatus is the muscle that assist the abduction of the shoulder. As Kate lost about 60% of her active abduction, her supraspinatus can be inactive. Strength can be regained by standing next to a wall with her lateral side of the arm pressed against it, start to push towards the wall until the movement is limited by fatigue or pain, this would give the patient an

idea about the number of reps that they should perform to see optimum results.

Secondly, her external rotation was the most effected movement in the duration of her injury (lost more than 50% of its active range), the Infraspinatus and teres minor muscles which originate at the back might become inoperative. A beneficial exercise for this can be performed by holding a Thera band of a light resistance in the hand of the affected shoulder while attaching the other end to a door knob, starting with elbow close to the body flexed to 90 degrees, slowly pulling the Thera band away from the center of her body, repeat this movement until a sign of fatigue arise.

Lastly, Infraspinatus is also responsible for internal rotation that can facilitate reaching behind the back or head. To strengthen this muscle severally, holding a towel or any stick-like object with both hands and pushing it away from the body using the healthy shoulder while bringing the affected arm to the center of the body. Same baseline of intervals and reps apply to all exercises.

During the observation of the patient, her upper quadrant appeared to be protracted, and with elevation of shoulder girdles, this posture is a result of the impairment of the GH joint. When dysfunction occurs to shoulder joint, it places overactivity on the scapula and its surrounded system of soft tissues that stabilize and move the shoulder joint, this is referred to as the scapulohumeral rhythm (SHR). In this case it is the upper trapezius muscle that is overworked (JJ et al., 2005). A gentle way of stretching the upper

trapezius is by holding the forearm of the effected side across the body while tilting the head to the opposite direction. Holding this stretch for about 30 seconds to 2 minutes can ensure permanent deformity of the tensile tissues.

To summarize, Frozen shoulder is a poorly understood condition that contribute to loss of movement in all anatomical planes combined with pain. Many studies were conducted on this matter thus methods of treating it overlap. Therefore, prescribing a treatment program is highly dependent on the symptomology the patient presents. Fortunately, Non-operative treatments are usually advantageous with most patients and can be based on clinical and non-clinical environment.

Appendix

Treatment list:

treatment	Evaluationmonit oring	goal	Problem
- NSAIDs	Reassessment	Short-term	Pain
- Heat and cold packs	using NRS scale and SPADI	(3 weeks): NRS 5-710	manageme nt
- TENS	questionnaire in every session	to NRS 3- 410	
- Ultrasound		Long-term goal (6 weeks):	

restoring
normal
ROM

Manual - Re-assessment Restoring ROM
therapy of AROM and normal
Mobilization PROM in each range of
exercises session motion in
using - SPADI scale in all axis by
Maitland a form of a moving the
techniques: questionnaire joint and
- PA for stretching
Flexion and the
internal capsule,
rotation a session
- AP for per week
external for the
rotation duration of
6 weeks
-
Longitudina
I caudad for
abduction
- Passive
physiologic
al

stretching

for

Extension

-Wall stand

exercise for

supraspinat

us

-Internal

rotation

using Thera

band for

infraspinatu

s

-External

rotation

with a

Thera band

for teres

minor and

infraspinatu

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-Stretching

exercise for

upper

Observation in

follow-up

Regain lost

strength in

muscle

caused of

immobilizat

ion

(3-6 weeks)

Strengtheni

ng

exercises

Restore re-

alignment

and release

posture

tension of
trapezius sessions upper
trapezius

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