

Research Paper Review

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> **Frozen Shoulder Contracture Syndrome: Aetiology, Diagnosis and Management** *Manual Therapy 2015; 20(1): 2-9*

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ABSTRACT

Frozen shoulder is a poorly understood condition that typically involves substantial pain, movement restriction, and considerable morbidity. Although function improves overtime, full and pain free range, may not be restored in everyone. Frozen shoulder is also known as adhesive capsulitis, however the evidence for capsular adhesions is refuted and arguably, this term should be abandoned. The aim of this Masterclass is to synthesise evidence to provide a framework for assessment and management for Frozen Shoulder. Although used in the treatment of this condition, manipulation under anaesthetic has been associated with joint damage and may be no more effective than physiotherapy. Capsular release is another surgical procedure that is supported by expert opinion and published case series, but currently high quality research is not available. Recommendations that supervised neglect is preferable to physiotherapy have been based on a quasi-experimental study associated with a high risk of bias. Physiotherapists in the United Kingdom have developed dedicated care pathways that provide; assessment, referral for imaging, education, bealth screening, ultrasound guided corticosteroid and hydro-distension injections, embedded within physiotherapy rehabilitation. The entire pathway is provided by physiotherapists and evidence exists to support each stage of the pathway. Substantial on-going research is required to better understand; epidemiology, patho-aetiology, assessment, best management, health economics, patient satisfaction and if possible prevention.

BACKGROUND INFORMATION

Frozen shoulder contracture syndrome (FSCS) has been long studied, dating back to 1896, when Duplay coined the term '*péri-arthrite scapula-humérale*'. There have been many theories regarding its etiology, and frustratingly so, it's treatment. Some attributed it to inflammation of the subacromial bursa, periarthritis and non-calcifying tendinitis of the rotator cuff (1). Later on, the term 'adhesive capsulitis' was coined, as scientists visualized inflammation, fibrosis and contraction of the shoulder capsule, with the axillary fold becoming adhered to the humeral head (2). The terms primary (idiopathic) and secondary (trauma, forced inactivity due to trauma) were proposed in 2011 (3), and can be further subcategorized into intrinsic, extrinsic and systemic categories. Suffice it to say, there has been a lot of debate and misunderstanding surrounding this challenging clinical syndrome. This article describes what is known about the pathogenesis of this challenging condition and proposes some treatment strategies.

SUMMARY

Pathogenesis

The first sign of FSCS is a tremendous decrease in capsular volume, secondary to capsular restriction. There are a number of opinions as to why this occurs, namely inflammatory processes, or a chronic inflammation with fibroplastic proliferation. In spite of this, histological studies have reported an insignificant number of inflammatory cells in affected capsular tissues (4). Histological and immunochemical sampling have found proliferation of contractile scar tissue. Some have also found an association between pripionibacterium acnes infection and FSCS (5).

Below are known elements of FSCS:

- 1. Thickening and fibrosis of the rotator interval (bordered medially by subscapularis, laterally by the supraspinatus tendon, with the biceps tendon in the middle)
- 2. Obliteration and scarring of the subscapular recess (area between biceps and subscapularis)
- 3. Neovascularity
- 4. Increased cytokine concentrations
- 5. Capsular contraction (namely anterior and inferior)
- 6. Reduced joint volume
- 7. Contraction and fibrosis of the coracohumeral ligament
- 8. Contractile protein presence
- 9. Fibroblast and myofibroblast proliferation
- 10. Adhesion of the capsule to the humeral head DOES NOT occur
- 11. People who develop FSCS after shoulder surgery have greater concentrations of substance P (SP), compared to those who don't. Going one step further, SP has been reported to accelerate angiogenesis and hypercellularity in tendons.
- 12. Interleukins (which have also been shown to promote angiogenesis) have been shown in the glenohumeral capsule and subacromial bursa in people with FSCS (6).
- 13. Knowing this, targeting neovascularity may help in the treatment of FSCS.

Epidemiology and Natural History

The current evidence suggests FSCS occurs in 2-5% of the population. Still, its actual prevalence is uncertain, likely due to underreporting. The most well known risk factors are diabetes, family history, genetic predisposition, hypothyroidism and possibly ethnicity (ex. British).

FSCS is best known to pass through 3 stages: frozen/pain, freezing/stiffness and thawing/recovery (7). Its average duration is 30.1 months. Still, some pain and disability might be present up to 7 years post-onset (average 4.4 years).

Diagnosis

There is no gold standard for the diagnosis of FSCS. It is typically diagnosed via thorough clinical examination, exclusion of other pathologies and normal shoulder radiographs. Clinically, there should be a pattern of progressively restricted joint movement attributed to capsular restriction. The simplest clinical diagnostic criteria are: equal restriction of active and passive shoulder external rotation, with an essentially normal radiograph. Neovascularity has been visualized inside of the rotator interval, but requires further research (8).

Management

FSCS is often classified based on a 3 stage model mentioned above ('freezing', 'frozen', 'thawed' – along those lines). This particular author simplifies this a little bit, dividing patients into two general camps: 1) those with more pain than stiffness (usually early stages); and 2) those with more stiffness than pain (usually late stages).

Typically, the first stage of treatment in all cases is patient education. Patients will naturally have questions and we should be able to provide them with realistic answers. Prior treatment recommendations included 'supervised neglect', suggesting this condition would recover with no

intervention. Although not necessarily incorrect, most patients are unwilling to wait an average of 30+ months for this to occur!

As with most musculoskeletal conditions, a variety of treatment options exist for FSCS. Unfortunately, the literature to date is far from conclusive. Joint mobilization/manipulation (high and low grade, in all directions) are popular and potentially effective options. When combined with exercise, joint mobilizations have been associated with better outcomes compared to ultrasound and massage (9). However, many of the clinical studies on manual mobs/manipulation published to date lack adequate control groups, or generally have small sample sizes in their study groups.

There is some research to suggest that shortwave diathermy (SWD) combined with stretching is superior to superficial heating and stretching, and to stretching alone (10). The effectiveness for acupuncture therapies remains contentious, with the some evidence showing moderate short term benefit in combination with exercise (11). However, the evidence remains overwhelmingly equivocal. Also not definitive is the literature pertaining to corticosteroid (CS) injection, which may reduce pain and improve function in the short term. There is some suggestion that the benefits of (some method of imaging-) guided-CS injections may be enhanced when combined with physiotherapy (12). Hydrodistension of the articular capsule, followed by physical therapy after the procedure has been reported by some groups to have positive effects (13). However, more research is needed to substantiate this. Manipulation under anaesthesia (MUA) and exercise has not shown better clinical outcomes in comparison to physiotherapy alone. MUA is not without its risks too, with hemarthrosis, SLAP lesions, partial thickness tear of subscapularis, osteochondral defects and labral detachment, having been reported in the literature.

In the UK, treatment of FSCS occurs in the following fashion:

- Diagnosis through an equal limitation of internal and external rotation, with a normal radiograph.
- The patient can follow a 'wait and see' approach with home based therapy; clinically based physiotherapy; referral for an orthopaedic opinion or; a combination of injection and physiotherapy.
- Clinician-assisted mobilizations are usually in the AP direction, or AP while they perform passive ER with the assistance of a dowel (see first picture below).
- Mobilizations into shoulder IR by placing the upper limb at the end of the 'hand behind the back' range, and can be combined with traction using a belt or towel tied around the therapist (see second picture below).
- Proprioceptive neuromuscular facilitation (PNF) can also be utilized to address movement and motor control/coordination.





CLINICAL APPLICATION & CONCLUSIONS

Pain and functional movement restriction of the shoulder associated with FSCS generally improves over time. However, pain free ROM might not be achieved in all individuals. They need to be patient, and reassured that in time, with great passive and active care, their pain will decrease and their function will increase. It is important for the clinician to physically mobilize the shoulder capsule and tell the patient that they are expected to perform exercises consistently at home. It is also important to tell your patients that treatment of this syndrome is like a marathon, not a sprint – it will take time!

STUDY METHODS

This was a clinical commentary. No statistical methods or rigorous search strategy were performed.

STUDY STRENGTHS / WEAKNESSES

Strengths

- The author provides the reader with a very balanced opinion of the evidence both orthopaedic and conservative. He chose to avoid stating his own opinion, and stuck to the evidence (with exception to describing how the programs he's presumably involved with in the UK treat FSCS).
- The author also provided the reader with information regarding where more research needs to be performed.

Weaknesses

- The author picked each and every article included in this commentary, without inclusion criteria. This leads to the possibility of significant bias!
- He also provided us with his interpretation of the data, and did not apply any statistical measures to his interpretation.

Additional References

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