Frozen Shoulder: Stuck and Stubborn

Frozen shoulder: we've all heard of it but do we really understand it and know how to treat it? The answer is probably no, because it is a bit of a conundrum. It's aetiology is unclear and there is a lack of consensus for best management. Added to which it can last for a long time (years) and patients often do not fully recover. Physical therapy, however, can speed resolution and improve outcomes. This article will help you to accurately diagnose this condition and provides you with all the information you need to tailor an individualised treatment plan for your patient based on both biomedical and psychosocial factors for optimal outcome. This article is supported by a number of useful videos and links to further information. Read this article online https://spxj.nl/3ltEbXc

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Background

Adhesive capsulitis, periarthritis, and frozen shoulder are all terms used to describe a painful and stiff glenohumeral joint. The aetiology of adhesive capsulitis is not clearly understood and a lack of consensus remains in clinical management for this condition. It can occur as a primary idiopathic condition or secondary to medical conditions or trauma. The hallmarks of frozen shoulder are pain and stiffness, caused by formation of adhesions or scar tissue in the glenohumeral joint. Management strategies vary depending on stage of presentation, patient factors and clinician preferences; treatment ranges from conservative options to surgical intervention (1,2*,3*).

The incidence rate of this painful musculoskeletal disorder is 2–5% in the general population with a higher prevalence among elderly individuals and patients with diabetes. Frozen shoulder is defined by three key clinical characteristics (Video 1) (1):

1. an insidious onset of severe pain;
2. shoulder stiffness with markedly reduced external rotation (Video 2); and
3. negative radiographic findings.

The term 'adhesive capsulitis' is used synonymously, reflecting the pathophysiological features of frozen shoulder – namely inflammation, fibrosis and contracture of the glenohumeral capsule and/or adjacent bursa. Although frozen shoulder is a benign and self-limiting condition, usually extending over a period of 1–3 years, stiffness and pain are incompletely resolved in 20–50% of patients, leading to long-lasting impairment in shoulder-related daily activities and sleep quality. A recent review regarding the natural history of frozen shoulder revealed that the theory of progressing to full recovery without any treatment was not supported in the literature. Therefore, appropriate management is necessary to accelerate symptom relief and attain optimal functional recovery (1).

Even in patients that receive therapy, only 59% have a near normal shoulder after 4 years. However, patients with persistent symptoms seem to cope or accept this, as the longstanding symptoms (beyond 3–4 years) are commonly mild (4).

Non-surgical therapies are the mainstay treatments for frozen shoulder. Surgical management is considered only after failure of conservative

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All references marked with an asterisk are open access and links are provided in the reference list

Video 1: How to diagnose Frozen Shoulder (Courtesy of YouTube user Physiotutors)
https://youtu.be/5zpXbvEf9j0

Video 2: True or Pseudo Frozen Shoulder? | Adhesive Capsulitis Diagnosis (Courtesy of YouTube user Physiotutors)
https://youtu.be/rqCBa2zqASo

ADHESIVE CAPSULITIS, PERIARTHRITIS, AND FROZEN SHOULDER ARE ALL TERMS USED TO DESCRIBE A PAINFUL AND STIFF GLENOHUMERAL JOINT

treatment, and the surgical procedures are heterogeneous, with inconsistent benefits and iatrogenic risks (1). Physical therapy should, however, follow (early) after surgery for complete rehabilitation of the shoulder (5). The current evidence for consensus concerning the most effective non-surgical treatment for frozen shoulder is insufficient (1).

The disease has specific characteristics and demographic factors; the correct recognition of moderating factors, such as the disease stage and comorbid conditions, is critical for tailoring patient-specific treatment options (1). Three phases with varying clinical characteristics are described in frozen shoulder: the painful freezing phase, the frozen or adhesive phase, and the thawing or regression phase. Individual studies and clinical experience indicate that each phase requires different treatment (relating to the most pronounced symptom) for best results, but there is no strong evidence and no meta-analyses determining their effectiveness (1,4). Given the higher prevalence of diabetes mellitus, obesity and hypothyroidism in patients with frozen shoulder, knowing the association between systemic comorbidities and therapeutic responses is helpful for tailoring treatment plans.

No therapeutic intervention is currently universally accepted as most effective for restoring motion and diminishing pain in patients with frozen shoulder (4). The aim of this article is to highlight the most current thinking regarding conservative management and treatment techniques of frozen shoulder.

Pathophysiology and Clinical Presentation

Frozen shoulder can be either primary or secondary; secondary causes include trauma, previous shoulder surgery, prolonged immobilisation, diabetes, thyroid disease, Dupuytren disease and other autoimmune disorders (2*). Primary idiopathic frozen shoulder occurs in patients presenting with painful, restricted shoulder movements where no underlying cause is found. The pathophysiology of primary adhesive capsulitis is still not fully understood, but histological studies have shown that frozen shoulder is characterised by a thickened, tight capsule, with chronic inflammatory cells and fibroblasts found in the joint capsule (6*). Furthermore, fibroblasts in frozen shoulder have an activated phenotype associated with cytokine dysregulation, suggesting an autoimmune aetiology (6*).

Traditionally three stages are recognised but some studies identify a fourth stage which is actually the first starting point – a type of 'pre-freezing' (Table 1) (2*,7*). The condition starts with a painful phase, including severe pain and progressive restriction of movement. This phase is characterised by hypertrophic synovitis with hypervascularity, but a normal appearance of the capsular tissue. This is followed by a 'freezing' stage where symptoms gradually worsen over 9 months; histologically, there is perivascular synovitis and collagen deposition. (Where descriptions are based on three phases only – the painful and freezing stages would be combined). Over the subsequent 1–4 months, the 'frozen' phase occurs, characterised by stiffness as a predominating symptom. The 'thawing' phase, in which symptoms resolve, has the greatest variability in duration and can last for up to 2 years. The latter two stages involve the formation of dense collagenous tissue in the capsule, associated with scar formation (2*).

There is significant variation in clinical practice and the disease course may not follow such a stepwise progression. The diagnosis is usually made clinically, with pain and stiffness as the hallmark of the condition.

Clinical Features for Diagnosis

The following clinical features are included in the diagnosis of frozen shoulder:

- The onset of pain is often gradual

Table 1: Clinical stages of adhesive capsulitis and histological findings

From Date A, Rahman L. Frozen shoulder: overview of clinical presentation and review of the current evidence base for management strategies. Future Science OA 2020;https://doi.org/10.2144/fsoa-2020-0145 (2*). Reproduction by Creative Commons Attribution 4.0 International licence (CC BY 4.0: https://creativecommons.org/licenses/by/4.0/).

Stage	Symptoms	Duration of symptoms (months)	Histology
1 Painful stage	Moderate pain and reduction of movement	<3	Hypertrophic synovitis with hypervascularity Normal capsular tissue
2 Freezing stage	Severe pain and reduction of movement	3–9	Perivascular synovitis and disorganised collagen deposition and scarring
3 Frozen stage	Pain may be present but stiffness predominates	10–14	Dense and hypercellular collagenous tissue of the capsule
4 Thawing stage	Minimal pain and gradual improvement in movement	14–24	Fully developed scar tissue Pathophysiology remains unclear

over a period of months, with night pain being a common feature.
- The pain may be poorly localised and described as a deep ache, or sometimes presents as a pain referred to the deltoid origin, radiating to the biceps area.
- Examination findings are often non-specific without any point tenderness and with normal rotator cuff strength.
- Both passive and active range of motion (ROM) are globally reduced; this is best assessed through passive external rotation with the arm by the side.

The results of laboratory tests are usually normal but may be useful in identifying underlying conditions, such as diabetes or thyroid disease. Plain radiographs of the shoulder are also usually normal but can help diagnose or exclude other conditions, such as calcific tendinopathy of the rotator cuff, glenohumeral arthritis, acromioclavicular arthritis or even a shoulder dislocation. In calcific tendinopathy, disuse osteopenia may be demonstrated on the plain radiographs. Imaging modalities such as arthrography, technetium bone scans and magnetic resonance imaging are not routinely indicated or helpful in evaluation of adhesive capsulitis but can be used to exclude other shoulder pathology (2*).

Conservative Management

The goal of treatment in frozen shoulder is to restore function and manage symptoms. The choice of treatment can vary with patient factors, stage at presentation, clinician preferences and local policies or funding. Non-surgical or conservative management is the preferred choice of treatment, with most patients usually improving in 6–18 months. Conservative treatment options include analgesics, oral steroids, physical therapies, hydrodilatation, suprascapular nerve block and intra-articular steroid or sodium hyaluronate injections. Surgical treatment is offered to patients with persistent symptoms despite conservative management; strategies include manipulation under anaesthesia, arthroscopic release and open release. There remains no consensus or high-level evidence to definitively support one treatment modality over another (1).

Physical therapy has traditionally been the initial treatment modality for frozen shoulder and it is often used alongside other adjuncts, including steroid injections, transcutaneous electrical nerve stimulation, analgesics and warm or cold pads. There remains variation of physical therapy regimen in both clinical practice and in the literature; however, the principles revolve around reducing pain, mobilising the joint, and a supervised stretching and strength maintenance programme (2*,8*,9*,10*,11*).

Randomised controlled trials (RCTs) may not have shown significantly better outcomes in patients receiving physical therapy compared to those receiving no treatment (12*,13*). Further research is clearly needed to determine the role of physical therapy and adjuncts to treatment in frozen shoulder management. Although there may be a lack of high-level evidence to support physical therapy over observation or medical therapy alone (2*), the clinical relevance of physical therapy in treating frozen shoulder still remains. Patients require assistance in managing their pain, which can heavily impact on their daily life and emotional wellbeing. At the same time, any improvement in pain and mobility may facilitate a better quality of life, aid in independence, better function and improvements in their work or physical activity ability.

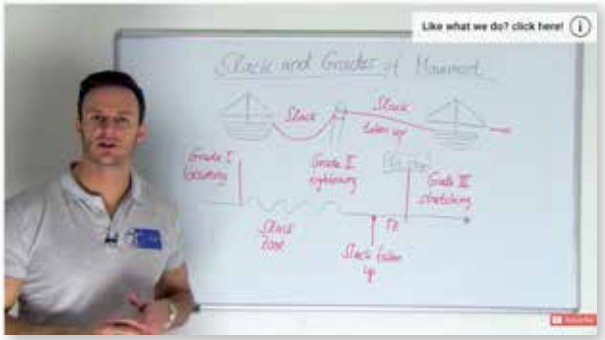
In the early freezing stage, gentle stretching exercises of short duration are recommended, including pendulum exercises and passive external rotation and passive forward elevation in supine (8*). Strengthening exercises such as isometric shoulder external rotation and posterior capsular stretching can be introduced in the later frozen stage (8*). In the thawing stages, both strengthening and stretching exercises can be combined and increased in frequency, or combined with Maitland grade 3–4 mobilisation (Video 3), to improve ROM (8*,9*). Vermeulen et al. showed that high-grade mobilisation (working through the pain barrier)

NO THERAPEUTIC INTERVENTION IS CURRENTLY UNIVERSALLY ACCEPTED AS MOST EFFECTIVE FOR RESTORING MOTION AND DIMINISHING PAIN

was marginally better than low-grade mobilisation (working within pain limits) (14*).This is discussed further below. Griggs et al. in a prospective non-randomised study of 75 patients, showed that a supervised four-directional shoulder stretching programme resulted in a satisfactory outcome in 90% of patients at 22 months (Link 1) (15).

A recent network meta-analysis and systematic review showed the following points (1):

1. As compared with placebo, intra-articular injection (steroid injection and capsular distension) provided benefits for pain relief and improved shoulder function and increased the passive range of external rotation, which is the hallmark clinical sign of frozen shoulder. Of these two injections, capsular distension is the highest-ranked treatment for pain relief.
2. New interventions including extracorporeal shockwave therapy (ESWT) and laser therapy, showed high probabilities of achieving pain relief and functional improvement.
3. Stretching showed a significant effect only in improving shoulder function.
4. Use of non-steroidal anti-inflammatory drugs provided a specific advantage for pain management.
5. Treatment outcomes were moderated by patient-specific factors (disease stage, female sex, and diabetes) and the use of adjunctive therapies.
6. Non-diabetic populations and groups with smaller proportions of female patients respond better to steroid injection and adjunctive therapies, such as self-exercise.

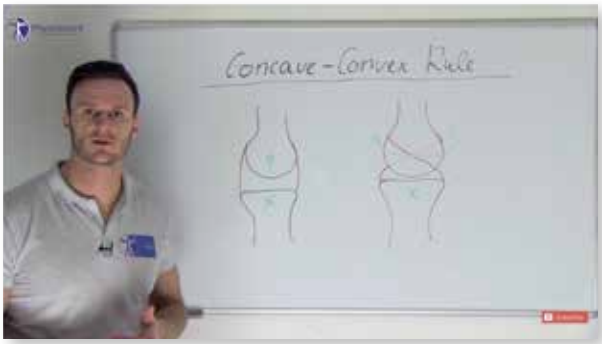


Video 3: Maitland Mobilization Grades (Courtesy of YouTube user Physiotutors)
https://youtu.be/G_QI7bVrHN0

Studies have shown that capsular distension is the highest-ranked treatment for pain relief. Capsular distension, also named hydrodilatation, is an intra-articular injection technique to treat the adhesive joint by expansion of the capsule. There is retrospective evidence indicating the use of capsular distension as a first-line treatment regardless of the underlying cause, supporting its prominent role in improving symptoms of frozen shoulder (1,4). It is also a widely adopted alternative option to surgical treatment in patients with diabetes and frozen shoulder. However, the reported duration of efficacy is inconsistent: some evidence supported the short-term benefits of pain relief and increasing ROM, whereas other studies reported good long-term effects of capsular distension (1).

There is also a lack of high-quality RCT data for new treatment options such as laser therapy and ESWT. Some evidence suggests that low-level laser therapy is strongly recommended as treatment for pain relief and is moderately recommended therefore for improving function (1). Regarding ESWT, there is no high-ranking evidence for meta-analysis or systematic review to evaluate its effectiveness, but currently available data shows satisfactory improvement from multiple aspects (1). The underlying mechanism may be inferred as the ability of ESWT to increase regional blood flow and flexibility of collagen fibres and reduce inflammatory cytokines (1).

Studies report on the prevalence and importance of steroid injection for managing frozen shoulder; however, on closer inspection it seems the benefits may be specific to the painful freezing phase and not to the adhesive phase of frozen shoulder. It is thought that steroid injection should be routine to control inflammation in the painful freezing phase (1). Zhang et al. have used forest plots to show the mean and median surface under the cumulative rankings (which demonstrate the probability of being in the highest rank) with 95% credible intervals for outcomes of pain and shoulder function for a list of 24 treatments [Figure 1 in Zhang J, Zhong S, Tan T, et al. Comparative efficacy and patient- specific moderating factors of nonsurgical treatment strategies for frozen shoulder: an updated systematic review and network meta-analysis. The American Journal of Sports Medicine 2020;https://doi.org/10.1177/0363546520956293 (1)].



Video 4: Kaltenborn Concave-Convex Rule (Courtesy of YouTube user Physiotutors)
https://youtu.be/8YVZFCm7qJ0

Video 5: Kaltenborn/Convex–Concave Rule – Flawed or Misinterpreted? (Courtesy of YouTube user Physiotutors)
https://youtu.be/eB1IPxgIT2Q

Mobilisation Techniques for Frozen Shoulder

Goals of treatment for frozen shoulder are pain relief, maintenance of range, and restoration of function. Physiotherapy treatment consists of stretching and strengthening exercises, electrotherapy modalities or mobilisation, which may be applied side by side. Joint mobilisation is a form of passive movement in a broad spectrum of exercise used to treat painful and stiff synovial joints. Several forms of mobilisation exist and terminology varies among the authorities. The oscillatory movements will be in the direction of the joint's accessory motions, which are small spinning, gliding, rolling or distractive motions that occur between joint surfaces and are essential for normal mobility (3*). An example of an accessory motion at the shoulder would be movement of the humeral head inferiorly as it moves on the glenoid fossa during normal abduction. This gliding motion is necessary for the greater tuberosity of the humerus to pass under the coracoacromial arch and thereby allow full elevation of the arm. Accessory motions can be demonstrated in normal, synovial joints when an examiner passively moves one articular surface while the other is stabilised (3*).

The recent review by Almureef and colleagues showed that in terms of improving shoulder mobility, the evidence suggests that patients receiving manual therapy interventions for shoulder pain will demonstrate improvements in ROM either passive or active or both (3*). Maitland mobilisation was superior to ultrasound in improving symptoms of frozen shoulder. However, combining Maitland mobilisations with ultrasound was more effective in also reducing pain. Maitland mobilisations combined with exercises was proven effective in relieving pain and improving ROM and shoulder function (3*). Maitland mobilisation with kinesiology taping along with conventional therapy has also been shown to improve the pain and disability in patients with frozen shoulder (16*).

It has been shown that end-range joint mobilisation (caudal and anterior glides) along with conventional treatment (pendulum exercise, finger walk, towel stretch, wand exercise) is more effective in reducing pain with improvement in the joint range and functional performance than conventional physiotherapy alone (17).

As mentioned earlier, research by Vermeulen et al. showed statistically significant greater scores in ROM and shoulder disability scores using high-grade mobilisation techniques (15). These were done twice a week for 12 weeks. Inferior glides, posterior glides, anterior and medial glides were performed as well as distraction of the humeral head with respect with the glenoid; 10–15 repetitions per glide position were performed. If fixation

of the scapular during distraction of the humeral head proved difficult, then reverse distraction can be used (Link 2) (18*). If the glenohumeral joint ROM increases during treatment, then mobilisation techniques can be performed at greater elevation and abduction angles. In these new positions, the changed position of the humeral head and glenoid required an individual adjustment of the direction of the accessory movements in accordance with the concave-convex rules stated by Kaltenborn (19). Greater detail on the high-grade (grade 3–4) Maitland mobilisation done in this study can be found in Appendix 2 of Vermeulen et al. (14*) (Link 3).

Mulligan techniques are superior to ultrasound in improving symptoms of frozen shoulder (3*). Also, Mulligan mobilisation along with supervised exercise is more effective than Maitland mobilisation in reducing pain and improving shoulder functional ability in subjects with adhesive capsulitis of shoulder (20*).

Mulligan mobilisation [also called mobilisation with movement (MWM)] can be performed:

- in a pain-free manner, 6–10 repetitions in 3–5 sets;
- for shoulder flexion, abduction and elevation;
- for mid-range mobilisation using postero-lateral glides in sitting;
- to restore a loss of internal rotation (hand behind back) using inferior glides;
- to improve end-range shoulder elevation using posterior and inferior glides in supine; and
- to improve shoulder external rotation using posterior joint mobilisation.

A study has shown that MWM combined with conventional physiotherapy was superior to diclofenac phonophoresis with conventional physiotherapy in improving pain and shoulder ROM (21*).

Do Moon et al. compared the Maitland and Kaltenborn mobilisation techniques (Videos 4–8) and found significant differences in pain and the ROM of both internal and external shoulder rotation pre-and post-intervention using both techniques (22*). However, there were no significant differences between the groups when comparing outcome measures, and therefore from this one can't say one technique is superior to the other (22*).

Sengpya Phukon et al. conducted a study showing that both Maitland mobilisation and muscle energy techniques are effective in improving the ROM and decreasing pain in patients with adhesive capsulitis (23*).

Research by Jung et al. (24*) showed that the combination of MWM with hold–relax (HR) proprioceptive neuromuscular facilitation (PNF) technique had significantly greater effects on shoulder flexion ROM, shoulder flexor muscle strength, and pain and function compared to MWM alone. Their MWM–HR combination was performed as follows (24*):

- **MWM Flexion**: Subject was seated in a comfortable sitting position with a belt on the head of the humerus, and the therapist's hand was wrapped around an appropriate area of the humeral head to perform a glide. Counterpressure was applied onto the scapula by the other hand of the therapist. A glide was applied over the pain-free range during slow active shoulder movements and was released after returning to the starting position. This process was repeated 15 times in 3 sets, and a 1-minute rest period was provided between each set (Link 4).
- **MWM External Rotation:** Subject had a folded towel under the scapula while lying in a comfortable position, and the elbow flexed to 90°. The subject held the stick with both hands, and then pushed the stick with the opposite hand to produce shoulder external rotation. In the meantime, the therapist stood on the other side and held the subject's humeral head and applied the slide within pain-free range, back and outwards based on the joint concavity. This process was repeated 15 times in 3 sets, and a 30-second rest period was provided between each set. A pressure gauge (hand dynamometer) was used to apply a uniform pressure (5N) to the slide that was applied to the subject (Link 5).
- **PNF HR:** With the patient in supine position and the shoulder joint was slightly relaxed at the end of the flexion range up to where the patient felt pain, the therapist slowly provided resistance in the direction of flexion, abduction, or external rotation, and (without the subject intending to move) the subject tried to go against the resistance towards extension, adduction, and internal rotation, with particular emphasis on trying to resist external rotation. The

Video 6: Caudal Shoulder Capsule | Roll Glide Assessment & Mobilization (Courtesy of YouTube user Physiotutors)
https://youtu.be/8jpw78Kt4Xs

Video 7: Ventral Shoulder Capsule | Roll Glide Assessment & Mobilization (Courtesy of YouTube user Physiotutors)
https://youtu.be/bUlx4mQl7UE

Video 8: Dorsal Shoulder Capsule | Roll Glide Assessment & Mobilization (Courtesy of YouTube user Physiotutors)
https://youtu.be/ECi9gFoKpEM

THE HALLMARKS OF FROZEN SHOULDER ARE PAIN AND STIFFNESS, CAUSED BY FORMATION OF ADHESIONS OR SCAR TISSUE IN THE GLENOHUMERAL JOINT

therapist's bare hand was placed in contact onto the antagonist muscle area to apply resistance and gradually increased the resistance by isometric contraction to reach the maximum resistance. When relaxation was achieved by inducing relaxation, this procedure was repeated 6 times. Then, after securing the newly obtained range, it was repeatedly attempted again at the limit point and carried out for a total of 15 minutes (Link 6, Link 7) (24*).

Moderate evidence therefore exists in favour of mobilisation techniques in the short and long term, for the effectiveness of arthrographic distension alone and as an addition to active physiotherapy in the short term (4).

Exercise Therapy for Frozen Shoulder

ROM exercises can contribute to improving joint and soft tissue mobility and decreases the risk of adhesion and contracture formation. Exercise therapy has already been touched on through this article, including the use of isometric exercises and mobility exercises such as pendulum, finger walk, towel stretch and wand exercises. Stretching exercises given as home programmes are also helpful in breaking the collagen bonds and realigning the fibres for permanent elongation or increased flexibility and mobility of the soft tissues that have adaptively shortened and become hypomobile over time in the frozen shoulder (3*).

The home exercise programme should not focus on stretching alone. Although the standard exercises (including pendulum, finger walking on the wall, and using a stick to passively mobilise the joint) are beneficial, these are not performed as static stretches but rather dynamic movements. A lot of posterior shoulder tightness that limits ROM, can be due to muscle fatigue. Therefore including strengthening exercises and facilitating the shoulder muscles (both scapular and rotator cuff) to work through the range (whatever range the patient has) can be beneficial.

A recent study showed that rotator cuff strengthening (combined with manual therapy) had significant impact on shoulder pain, ROM, function and disability in patients with adhesive capsulitis compared to those patients receiving manual therapy alone (25*). The strengthening routine can be progressed from basic isometric internal and external rotation and abduction, to dynamic strengthening using a thera-band and scapular stabilisation exercises (25*).

Group exercise classes produced significantly greater improvements in shoulder symptoms compared to individual physiotherapy and home exercise performed alone (26). The study by Russel et al. showed improvement in shoulder ROM was significantly better in both physiotherapy groups (individual and group classes) compared to home exercise therapy performed alone (26). Interestingly the improvement in HADS (hospital anxiety and depression scale) score was significantly greater in both physiotherapy intervention groups than in home exercises performed alone. Therefore a group exercise class may facilitate a more rapid improvement in patients' symptoms (26).

There are many options when considering physiotherapy for a patient with frozen shoulder. Initially, this may be based on what stage they present with – their primary complaint may be pain and therefore treatment may have a different focus to someone who presents at stage 3 with minimal pain but significant loss of function owing to limited ROM. Whether you choose manual therapy, massage, stretching, a mobilisation technique (with the grade or range depending on pain tolerance), PNF and exercise therapy, or a combination of any of these, doing something – anything – seems to be beneficial (11*). As shown in the forest plot in Figure 1 in Zhang et al., it seems that doing most things will help to a greater or lesser extent, rather than doing nothing at all (1). But this is a very slow and frustrating recovery for patients, and their therapist! So what else could make the difference? Are you missing a key component to really helping these patients improve?

Biopsychosocial Component to Shoulder Pain

Clinicians are often faced with challenging questions from patients, insurance or compensation providers, administrators and policy makers about the outcome of soft tissue disorders of the shoulder. Frequent questions include "What will the extent of recovery be?" and "Are there any factors that could delay recovery?" The literature on prognosis and potential prognostic factors in shoulder disorders, however, is limited. Reviews have identified a series of indicators that seem to be prognostic for outcome including initial baseline pain or disability, age, sex, general physical health, physical therapist's predictions, duration of symptoms before starting therapy, being post-surgery, and being involved in a worker's compensation claim (27*).

The predictors mentioned above and the impact of chronic pain on the patient as a 'whole' – their mental and emotional wellbeing combined with their physical health – are not always under our control and care. Psychological distress, fear of movement, catastrophic thinking and decreased self-efficacy are all associated with greater shoulder pain and disability (28). We are unable to treat many of these variables through standard physical therapy modalities. However, being aware of them, helping guide a patient to other healthcare providers, listening carefully, and educating the patient may be the one 'modality' that turns the corner for a person suffering with frozen shoulder. Even a focus on 'what can you do' rather than 'what can't you do' could be beneficial. Focus on positive reinforcement, even suggesting that patients not engaging in leisure time physical activity or hobbies are

encouraged to do so and those taking part are encouraged to remain doing so, in whatever capacity they are able (27*,29*).

Prognostic factors associated with the outcome of physiotherapy for shoulder pain are unclear, and currently cannot fully support clinical decision-making (30*). A recent analysis identified five such predictive factors that were measured with disabilities of the arm, shoulder and hand questionnaire (DASH) at discharge or the amount of change in DASH score over treatment time (27*). DASH reflects the effect of the disorder in terms of physical function and symptoms, which are the primary reasons patients seek care for musculoskeletal disorders.

Factors that predict persisting disability include (27*):

1. higher initial disability;
2. therapist prediction of restrictive activities (watch what you say about what they can't do!);
3. workers compensation claim;
4. older age; and
5. being female.

Chester et al. made the following conclusions (29*):

- Higher patient expectation of recovery as a result of physiotherapy, higher pain self-efficacy, lower pain severity at rest, and for patients not retired, being in employment or education were associated with a better outcome.
- Clinical examination findings suggestive of a structural diagnosis were inconsistently associated with outcome.
- Physiotherapists' predictions of how well a patient will respond to treatment cannot be relied on.
- Psychosocial in addition to biomedical information should be formally assessed and feed into decision-making about management options.
- Physicians referring patients to physiotherapy should reinforce a positive expectation of recovery as a result of physiotherapy treatment.
- Patients with resting pain and/or pain arising from other comorbidities may be provided with and guided on appropriate pain medication or other pain-relieving treatments before or at the same time as referral to physiotherapy.
- A multidisciplinary approach should be considered for patients with more extreme psychological responses associated with a poorer outcome, resting shoulder pain not responding to medication provided by their physician, and patients not currently employed or in education but of working age.

High levels of pain and disability at baseline are associated with high levels of pain and disability at 6-month follow-up. However, this 'predicted' poor outcome is modified to a predicted better outcome if the patient has high pain self-efficacy and a greater expectation of treatment. Pain self-efficacy is the extent or strength of the patient's belief in their ability to complete tasks and reach a desired outcome despite their shoulder pain.

Low levels of baseline pain and disability are associated with low levels of follow-up pain and disability. This predicted better outcome is modified to a predicted poor outcome if the patient has low pain self-efficacy. Examples of questions regarding patient beliefs, experience and expectations – which are the foundation of self-efficacy – can be found in Supplementary File 1 (Link 8) from Chester et al. (29*). Therefore it is strongly suggested that pain self-efficacy and patient expectation should be formally assessed and discussed at the first physiotherapy appointment (31).

Conclusion

Frozen shoulder is a common condition that causes significant and prolonged morbidity for patients and carries wider economic implications. The last two decades have seen significant progress in understanding of the pathophysiology behind frozen shoulder, which has complemented developments in current management strategies. However, there remains variation in clinical practice with no consensus in treatment for this condition. Non-operative interventions remain the first-line approach. Studies appear to show that combining mobilisation techniques with conventional physiotherapy, including exercise therapy, may be beneficial. Considering the psychological health of the patient may be critical in moving forward and making progress during treatment. The optimal intervention should be individualised, depending on disease stage, primary symptom or complaint, adjunctive therapies, sex, and complex comorbid conditions such as diabetes.

References

Owing to space limitations in the printed journal, the full reference list can be accessed by clicking the link below, logging into your Co-Kinetic account and downloading the full article PDF from the Media Contents box.
https://spxj.nl/3ltEbXc

KEY POINTS

- Adhesive capsulitis or frozen shoulder is a relatively common condition characterised by pain and stiffness of the shoulder joint.
- The pathophysiology of frozen shoulder is still not fully understood; however, histological studies have shown that the condition is characterised by a thickened, tight capsule, with chronic inflammatory cells and fibroblasts found in the joint capsule.
- Clinically, the presentation can be classified into four stages: painful, freezing, frozen and thawing.
- The goal of treatment is to restore patient function and manage symptoms, with myriad non-operative and operative treatment strategies used in clinical practice.
- Physical therapy, often with adjuncts, is the preferred first-line treatment, although there remains a lack of high-level evidence in the literature to support this approach.
- Physical therapy can include end-of-range mobilisations, grade 3–4 Maitland mobilisations, Mulligan/muscle energy techniques and Kaltenborn techniques.
- Exercise therapy may involve stretching and strengthening of the rotator cuff and scapular musculature.
- Addressing the biopsychosocial component of chronic pain, and specifically shoulder pain, will be a large component of treatment success.
- Predicators of success may include duration of pain and disability, intensity of pain, age, sex, compensation, and self-efficacy.
- A team approach to managing a patient with frozen shoulder will be needed in order to address the many factors that may be in play.

DISCUSSIONS

- What are your key strategies or treatment techniques when managing a patient with frozen shoulder?
- Have you even 'discharged' a patient or 'lost' a patient (patient discontinued therapy) who still had residual symptoms?
- Consider the psychological component of chronic shoulder pain and its impact on treatment success – what additional questions or considerations for self-efficacy will you use during assessment and management?

RELATED CONTENT

- **Managing the Pinch: A Review of Shoulder Impingement Care [Article]** http://spxj.nl/2h8S3L6
- **Shoulder Impingement: Diagnosis, Treatment and Rehabilitation for Physical Therapists [Article]** http://spxj.nl/2w3mxQl
- **Shoulder Pain Patient Information Resources** https://bit.ly/365z3nP

LINK 1: Figures 1–4 from Griggs SM, Ahn A, Green A. Idiopathic adhesive capsulitis. A prospective functional outcome study of nonoperative treatment. **Journal of Bone and Joint Surgery (Am.) 2000;82(10):1398–1407 (15).** https://bit.ly/39JiAYK

LINK 2: Figure 1: Reversed distraction technique of the glenohumeral joint when patient lies on the nonaffected side. Vermeulen HM, et al. End-range mobilization techniques in adhesive capsulitis of the shoulder joint: A multiple-subject case report. **Physical Therapy 2000;80(12):1204–1213 (18).** https://bit.ly/33LEkzn

LINK 3: Appendix 2: Treatment scheme for application of high-grade mobilization techniques (HGMT) and low-grade mobilization techniques (LGMT). Vermeulen HM, et al. Comparison of high-grade and low-grade mobilization techniques in the management of adhesive capsulitis of the shoulder: randomized controlled trial. **Physical Therapy 2006;86(3):355–368 (14).** https://bit.ly/2KZe2mC

LINK 4: Figure 2: MWM for shoulder flexion. MWM: mobilization with movement. Jung J, Chung Y. Effects of combining both mobilization and hold-relax. technique on the function of post-surgical patients with shoulder adhesive capsulitis. **Physical Therapy Rehabilitation Science 2020;9(2):90–97 (24)**. https://bit.ly/2IcwxTN

LINK 5: Figure 3: MWM for shoulder external rotation. MWM: mobilization with movement. Jung J, Chung Y. Effects of combining both mobilization and hold-relax. technique on the function of post-surgical patients with shoulder adhesive capsulitis. **Physical Therapy Rehabilitation Science 2020;9(2):90–97 (24)**. https://bit.ly/36KO3YR

LINK 6: Figure 4: HR PNF stretching for shoulder flexion. Jung J, Chung Y. Effects of combining both mobilization and hold-relax. technique on the function of post-surgical patients with shoulder adhesive capsulitis. **Physical Therapy Rehabilitation Science 2020;9(2):90–97 (24).** https://bit.ly/2VC3sEh

LINK 7: Figure 5: HR PNF stretching for shoulder external rotation. Jung J, Chung Y. Effects of combining both mobilization and hold-relax. technique on the function of post-surgical patients with shoulder adhesive capsulitis. **Physical Therapy Rehabilitation Science 2020;9(2):90–97 (24)**. https://bit.ly/2L9zHZB

LINK 8: See Supplementary File 1 in "Psychological factors are associated with the outcome of physiotherapy for people with shoulder pain: a multicentre longitudinal cohort study" by Chester, et al. **British Journal of Sports Medicine 2018 Feb;52(4):269–275 (29).** https://bit.ly/39LOpQD

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