Frozen Shoulder & Physiotherapy

Update on Frozen Shoulder

Frozen shoulder is often misdiagnosed in the early stage. It typically involves high levels of pain, restriction of movement, and considerable morbidity. *(Duplay, 1986; Neviaser, 1945; Lundburg, 1969; Wiley, 1991; Uitvlugt et al., 1993; Bunker and Anthony, 1995)*

Pathology

There is continued disagreement about whether the underlying pathology is an inflammatory condition, fibrosing condition, or an algoneurodystrophic process. Evidence suggests there is synovial inflammation followed by capsular fibrosis, in which type I and III collagen is laid down with subsequent tissue contraction. (Dias R et al 2005) Elevated levels of serum cytokines have been noted and facilitate tissue repair and remodelling during inflammatory processes. In primary and some secondary cases of adhesive capsulitis cytokines have shown to be involved in the cellular mechanism that leads to sustained inflammation and fibrosis. It is proposed that there is an imbalance between aggressive fibrosis and a loss of normal collagenous remodelling, which can lead to stiffening of the capsule and ligamentous structures (Kelly M 2009)

Unproven assertions

Many of the studies have been based on early clinical, operative and histological findings and small sample sizes with uncertain inclusion and exclusion criteria. These findings have then been reported without thorough examination of the true quality of these studies. Therefore;

- There is no certainty that women are affected more than men
- The true incidence and prevalence remains unknown
- The non-dominant side is no more frequently involved than the dominant side
- There is no certainty that onset relates to menopause in woman, or personality type
- The number of people being affected bilaterally is often cited as 1 in 6 (17%), but this, alongside the belief that relapse in the same shoulder does not occur, also remain definitively unsubstantiated.
- **Although function improves overtime, full and pain free range, is often not restored in everyone**

(Shaffer et al., 1992; Hand et al., 2008; Lewis 2015)

What we do know about the pathology?

However, there are certain **pathological abnormalities** we know for certain that takes place in a true frozen shoulder. These include:

- Reduced joint volume from 15-35cc to 5-6cc
- Contraction and fibrosis of the coracohumeral ligament
- Thickening and fibrosis of the rotator interval
- Neovascularity is present in the earlier stages of the disease and is found in the rotator interval, superior capsule, posterior capsule and the infraglenoid recess
- Obliteration and scaring of the subscapular recess (area between biceps and subscapularis)
- Increased cytokine concentrations causing ongoing inflammation and fibrosis
- Contraction of the anterior and inferior capsule (axillary recess)
- Proliferation of fibroblasts and myofibroblasts
- Presence of contractile proteins, and uncertainty regarding inflammatory changes
- The contracted tissue resembles Dupuytren's contracture
- Neovascularity is present in the earlier stages of the disease and is found in the rotator interval, superior capsule, posterior capsule and the infraglenoid recess

(De Palma, 1952; Lundberg, 1969; Ozaki et al., 1989; Neer et al., 1992; Bunker and Anthony, 1995; Bunker, 1997; Handa et al., 2003; Ryu et al., 2006; Uhthoff and Boileau, 2007; Bunker, 2009).

Risk Factors

Some of the contributing **risk factors** that have been suggested are:

- Diabetes
- Hypothyroidism
- Genetic Predisposition
- Ethnicity (one study reported that being born or having parents and grandparents born in the British Isles increases the risk)

(Schmidt, 2000; Hakim et al., 2003; Smith et al., 2012; Wang et al., 2013)

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Disease Progression

- Commonly used is the three stage explanation
  (1) frozen or painful stage
  (2) freezing or stiffness stage
  (3) thawing or recovery stage
- The average duration being **30.1 months**, but can last anywhere from 1-20 years.
- It has also been argued that a longer frozen phase may be associated with a longer thawing phase

(Reeves, 1975; Hand et al., 2008)

Diagnosis

There is no clear diagnostic gold standard but we can still get a clearer diagnosis based on:

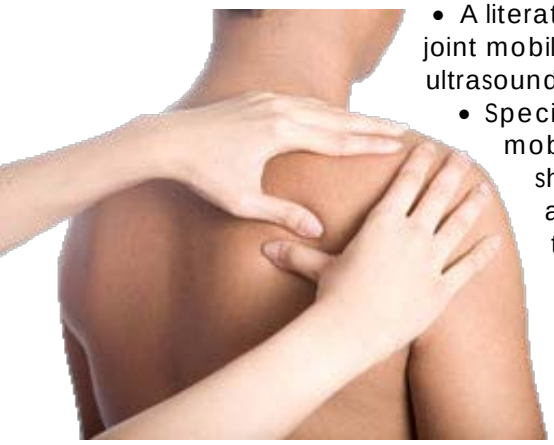
- History
  - Insidious onset pattern of progressively restricted joint movement with initially increasing pain, stiff with pain, and finally stiff without pain
- Clinical examination
  - Restricted joint movement with capsular restriction
  - Restriction to both passive and active movement, especially equal restriction into external rotation with a normal radiograph
- Ultrasound examination
  - neovascularisation of the rotator cuff interval
  - thickening of the coracohumeral ligament
- Radiograph to **exclude** other pathologies that may painfully restrict movement. These include:
  - locked dislocations, arthritis, fractures, avascular necrosis, osteosarcomas

(*Cyriax et al., 1993; Lee et al., 2005; Bunker, 2009; Zuckerman and Rokito, 2011)*

Management

Traditionally people suffering from frozen shoulder have been often been told their condition will go away by itself and "prescribed supervised neglect". However, research suggests more can be offered.

Physiotherapy:



- A literature review of 2370 people diagnosed with frozen shoulder found that joint mobilization and exercise were associated with better outcomes, and ultrasound and massage with poorer results (Jewell et al., 2009).
- Specific physiotherapy techniques, such as end of range mobilisations and mobilisations with movements in combination with exercise have been shown to have the best overall combined effect to help improve ROM and pain levels. A specific soft tissue massage procedure (Neil-Asher technique) demonstrated improvement in shoulder abduction range when compared with a group receiving manual therapy and exercise and a placebo group.
- Certain types of electrotherapies including Short wave diathermy and laser have shown great benefit, especially when done in combination with exercise.

(Leung and Cheing, 2008; Stergioulas, 2008; Vermeulen et al., 2006; Wies et al., 2003; Yang et al., 2007).

Acupuncture:

- Acupuncture has been shown to have some moderate short term benefits, but further studies are needed to fully understand the most effective protocols

(Sun et al., 2001; Favejee et al., 2011; Maund et al., 2012).

Intra-articular Cortisone injections:

- Cortisone injections reduce pain and improve function in the short and medium term. Best result was found in combination with physiotherapy of 12, 1-h sessions over 4 weeks.
- Administering either high or low dose Cortisone injections provided same positive results. *(Carette et al., 2003; Blanchard et al., 2010; Maund et al., 2012; Yoon et al., 2013)*

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Oral Steroid

- Five trials were reviewed in a systematic Cochrane review in 2006 and showed that there were mild short term benefits (<6 weeks) to oral steroid therapy, but this is not maintained in the long term. *(Buchbinder et al. 2006).*

Hydrodistension

- Ultrasound guided hydrodistension is a procedure that involves injecting large volumes of sodium chloride into the glenohumeral joint, with an aim of distending the contracted capsule.
- Improvement in shoulder range of movement has been reported when manual therapy and exercise are performed after the procedure *(Buchbinder et al., 2007)*

Manipulation under anaesthetic (MUA)

- No differences were reported at 1.5, 3, 6 and 12 months, between MUA and exercise compared with physiotherapy exercises alone, in a randomised clinical trial of 127 people diagnosed with FSCS.
- Iatrogenic intra-articular damage following MUA has also been reported, including; haemarthrosis, SLAP lesions, partial thickness tears of subscapularis, osteochondral defects and labral detachment. *(Kivimaki et al., 2007; Loew et al., 2005)*

Athroscopic release:

- Arthroscopic capsular release involves combinations of; glenohumeral joint distension, capsular debridement, ligament splitting, loosening of adhesions, shoulder movement, shoulder manipulation, and post-surgical physiotherapy.
- Currently the procedure is not supported by randomised controlled clinical trials and conclusions have been based on expert opinion and published case series, with an associated risk of bias *(Dattani et al., 2013; Fernandes, 2013; Grant et al., 2013).*

Physiotherapy Treatment of the stiff shoulder

- Restricted shoulder movement conditions that have a similar presentation are identified. Eg. Acute anterior contracture or Posterior capsule tightening. (these have more asymmetrical patterns of restriction and respond much more quickly to Physio mobilisation techniques and stretches.)
- Education of the client to fully understand the condition and to have realistic expectations and prevent aggravations.
- Implement correct rehabilitation protocol for their current stage of frozen shoulder:
  - Stage 1: Gentle home exercises to help maintain ROM/strength, without aggravation. Gentle Physiotherapy as needed for relief of muscle spasm. Medication for control pain, possibly NSAID/Corticosteroids, or Intra-articular cortisone injections allow light Physiotherapy.
  - Stage 2: Progressing strength and ROM gradually as tolerated
  - Stage 3: Increasing intensity of exercise and ROM manual therapy as tolerated. If response is unacceptably slow the patient might be considered by the Doctor for hydrodistension/MUA/Arthroscopic release.

Should you have any questions about frozen or stiff shoulder or for a full list of references please contact one of our Shoulder Physios at Sports & Spinal.