

Physical Therapy and Manipulation under Anesthesia for Patients with a Frozen Shoulder

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Abstract

Frozen Shoulder (FS) has been a common disease that causes notable morbidity. Conservative treatments starting from oral medication, physical therapy, exercise, steroid injection, and hydrodilatation can be chosen before surgical procedure. Recently, there are many arguments regarding the Manipulation Under Anesthesia (MUA) procedure whether it is good or bad compared to physical therapy. This study was carried out by reviewing and searching journals with the keywords “bursitis”, “frozen shoulder”, “physical therapy”, “manipulation under anesthesia”, and “conservative” on the search engines. From 47 journals that were reviewed, 45 were found composed as references for this review. There is no exact consensus from few pieces of literature to define which FS patients will benefit the most following the MUA procedure. Physical therapy or home exercise is still the first-line treatment for FS. Most of the cases showed that this first line of treatment is capable of resolving FS. Physical therapy has its place in every phase of the FS, starting from the freezing until the thawing phase. It seems that physical therapy is still the most important treatment to be applied as most of the studies reported satisfaction alongside the combination of other conservative treatments.

Keywords: Bursitis, Frozen Shoulder, Physical Therapy, Manipulation Under Anesthesia, Conservative

Introduction

Frozen Shoulder (FS) or first described as a “periarthritus scapulohumeral” has been a common disease that causes notable morbidity.¹ In 1934, Codman described usual features following the terminology of FS which contains a slow onset of pain felt near the insertion of the deltoid muscle, inability to sleep on the affected side, and limitation in both active and passive elevation and external rotation.^{2,3} A FS is estimated to affect 2% of all population throughout the world.⁴ It has a cumulative incidence of 2.4 per 1000 person-years.⁵ Also, it is frequently found in patients with increasing age between 40 and 60, where a small number of cases were found in the age below 40 and above 70 unless of secondary traumatic FS. In general, this condition affects women somewhat more than men.⁶

There are several symptoms that may occur in FS. Many patients complained of having a painful restriction of shoulder motion because of several factors such as pain inhibition, weakness from rotator cuff tears, or neurological deficits. These can occur with no underlying

causes.³ There are two classifications for FS, the primary or secondary.⁷ FS which is associated with other comorbidities such as diabetes mellitus, thyroid diseases, and Parkinson’s disease is called primary idiopathic FS.⁸⁻¹⁰ On the other hand, secondary FS or adhesive capsulitis is associated with shoulder injuries or immobilization including rotator cuff tendon tear, subacromial impingement, biceps tenosynovitis, and calcific tendonitis. The pain from the shoulder leads to a restrictive movement of the shoulder resulting in the development of a FS.¹¹

There are several modalities of treatment that can be chosen in treating patients with FS. Conservative treatments starting from oral medication, physical therapy, exercise, steroid injection, and hydrodilatation can be chosen before jumping into the surgical procedures.¹² Manipulation Under Anesthesia (MUA) is also a choice of treatment which might be chosen by tearing the thickened inflamed capsule and contracted ligaments.¹³

Recently, there are many arguments regarding the

MUA procedure whether it is good or bad compared to physical therapy. By using the MUA procedure, a tight FS joint capsule is stretched and forced to be torn with manipulation.¹⁴ Some groups believe that it is a time-efficient procedure and relatively easy to perform. MUA has also shown significant quick restoration of the ROM of the shoulder joint and diminishes the symptoms of FS. On the other hand, opponents argue that the process of manipulation cannot be seen which may worsen the capsule condition or damage other structures, and prefer enhancing the physical exercises. Some serious complications of MUA include humeral shaft fracture and rotator cuff injury.^{15,16} Due to the argumentation, MUA is considered as a controversial procedure for FS. The timing to start the MUA procedure in the FS is also still a discussion among the clinicians whereas some prefer to keep sticking to physical exercises. Moreover, the indication for MUA in the FS remains unclear.¹⁷ In this review, the author will discuss the MUA procedure in the FS to gain more insight and discusses the importance of physical therapy compared to MUA.

Discussion

Overview of FS

FS or also known as adhesive capsulitis is described as “*a condition of uncertain etiology, characterized by significant restriction of both active and passive shoulder motion that occurs in the absence of a known intrinsic shoulder disorder*”.¹⁸ Insidious shoulder stiffness, severe pain that usually worsens at night, and near-complete loss of passive and active external rotation of the shoulder are typical symptoms in the patients with a FS. One of the main problems is the absence of notable findings in the patient’s history, clinical examination, or radiographic evaluation to explain the loss of motion or pain.¹⁹

As explained before, the FS can be divided into the primary idiopathic and secondary FS.⁷ There are three stages of a progressing FS, starting from freezing (painful), frozen (adhesive), and thawing phases. The freezing stage occurs and lasts around 2-9 months which is followed by several symptoms such as, gradual onset of diffuse, severe shoulder pain that characteristically worsens at night. In the frozen stage, some immobility will appear as the pain begins to diminish. The typical signs of this stage are progressive loss of glenohumeral flexion, abduction, internal

rotation, and external rotation which can last around 4-12 months. The patient may finish the condition in the thawing stage. In this stage, the patients experience a better condition toward the return of range of motion which needs 5-26 months to recover completely.²⁰⁻²²

The etiology of primary adhesive capsulitis is still unexplored. It is usually associated with some systemic conditions such as diabetes mellitus. Diabetes mellitus may enhance the risk of adhesive capsulitis around 2-4 times than healthy people in the general population.²³ In the general population, FS is thought to have an incidence of 2%, and other studies stated a range of 3%-5%, while diabetic patients are thought to have the incidence of up to 20%.^{4,23} The painful phase of the FS which is followed by stiffness is suggesting that the initial inflammatory response has evolved into a fibrotic reaction.²⁴ The embarking factors in the FS is still inexpertly understood. Recent studies show that the embarking fibroblastic proliferation inside the capsule, later on, is followed by fibroblast to myofibroblast transformation.²⁴ This results in an inflammatory contracture of the shoulder which diminishes the capsular volume and significantly withstands the movement of the glenohumeral joint.^{3,24}

Management of FS is still controversial and relies on the phase of the disease. Quality of life and whether the patients can handle the pain and/ or stiffness until its time of resolution are important in deciding the choice of treatment. The treatments are varying from conservative therapy until surgical measures.²⁵ Conservative treatment choices may consist of oral non-steroidal anti-inflammatory preparations (NSAIDs), physiotherapy, etc. For symptomatic pain relief, NSAID is the choice and can also be used in any stage of the FS. This effect of this treatment for the disease progression is still poorly understood. Physiotherapy is the major choice of early and mid-stage disease. Most of the trials and studies conducted indicated the decent improvement following the role of physiotherapy. The advancement is achieved in pain scores, functionality, and range of motion.²⁶⁻²⁸ A study conducted by Griggs *et al.* showed that the majority of 77 patients who were given non-operative treatment including physiotherapy and passive stretching were satisfied with the results. Also, 90% of the patients were satisfied following the prospective study which was controlled for over two years.²⁶ As we know, physical exercises are still the mainstay of treatment as a result of high satisfaction value.

The usage of corticosteroids has also been examined in several studies. Not only do oral corticosteroids, but intra-articular corticosteroids also demonstrate a short-term clinical benefit. A significant improvement has also been observed especially for the pain at night and quick initial recovery. However, five months of treatment showed no distinction when compared to the control group.²⁹ A prospective, randomized, double-blinded, placebo-controlled trial conducted by Buchbinder showed no benefit after six weeks following the three weeks of treatment with 30 mg oral Prednisolone.³⁰ Intra-articular steroids also showed only short-term clinical benefit as the report said no difference was demonstrated after six months besides the early clinical improvement.²⁴ conducted study by Ryans *et al.*, revealed that a combination of intra-articular steroid injection and physiotherapy in 80 patients showed early improvement without any difference after 16 weeks.³¹

Overview of MUA

MUA is still controversial among clinicians, as the indication is varied in many articles. The duration of the symptoms was used as the indication by the majority of the authors distinct from one to six months minimum duration.^{32,33} Before jumping to MUA, other conservative treatments should be considered such as physiotherapy, analgesics, and corticosteroid infiltrations (both subacromial and intra-articular).^{32,34} This intervention is done under only general anesthesia or with a supplementary brachial plexus nerve block. Lateral decubitus position can be used however the majority of the papers reported the patients positioned supine.^{32,33,35}

The top of the shoulder was gripped to the stabilized scapula by the supine position.³⁶ Short lever arm was reported to be used to prevent fractures by most authors. The sequence of manipulation to reduce the complications can be used repeatedly until the maximal ROM is achieved. Usual cracking sound, snap, or the feeling of tissue breakdown of the shoulder was frequently notified.³⁷ Following the MUA procedure, the patients should receive physiotherapy to maintain the shoulder joint ROM which was achieved in the procedure. The frequency of physiotherapy is often given right away after MUA. Physiotherapy sessions varied after the initial phase according to the physician and patients' condition. The physiotherapy sessions may include pool exercises, 'land-based' exercises, and

also some home exercise programs.^{36,38}

MUA Instead of Sticking to Physical Therapy?

There are many discussions among the clinicians regarding the best usage of MUA for patients with FS. There is no exact consensus from few pieces of literature to define which FS patients will benefit the most following the MUA procedure. Usually, the MUA procedure will take place following the failure of conservative treatments. The right time to do MUA is still controversial, however, it is crucial as theoretically, the sooner manipulation is done the better outcome achieved.³⁹ However, MUA in early-stage may be considered as over-treatment for patients with the mild and natural progress of the disease. Furthermore, sometimes it is even considered as a contraindication if MUA is done in the early stage. On the contrary, the late intervention of MUA may lead to long complaints of persistent symptoms.³⁸

There is also a case series that showed that there is a significant repair in all ROM following the manipulation with keeping abduction and external rotation position for the extremity compared to the manipulation only. MUA which was thought to be dangerous, may actually help as it may be the critical modality to be performed.⁴⁰ However, it is important to know to combine MUA with physiotherapy programs as studies said that it may enhance the patients' ability to achieve better ROM sooner and prevent a recurrent stiffness.³⁴

Many FS problems may also be treated and managed in a primary care setting. Physical therapy or home exercise is still the first-line treatment for FS. Most of the cases showed that this first line of treatment is capable of resolving FS as the disease is also considered as a self-limiting disease.⁴¹ Reports added that the combination of physical therapy with NSAIDs or intra-articular corticosteroid injections is evident to be more effective than those modalities of treatments alone. If MUA does not have any clearly defined indication, physical therapy has its place in every phase of the FS, starting from the freezing until the thawing phase. Physical therapy is really important even if after the patients got the surgical procedure, physical should also be applied as it may prevent recurrent shoulder stiffness.^{42,43}

It is important to do the gentle stretching exercises repeatedly as the shoulder motion usually reoccurs in stiffness conditions frequently. In the freezing phase,

Table 1. Physical Therapy Alongside Other Conservative Treatments Can Be Applied to A Patient with Fs in Every Different Stage¹¹

	Freezing (2-9 months)	Frozen (4-12 months)	Thawing (5-26 months)
Sign and symptoms	Painful shoulder worsens at night, slow decreasing ROM	Less painful shoulder followed with progressive loss ROM	The shoulder gradually improves and returns to wider ROM
Physical therapy/exercise	<ul style="list-style-type: none"> ● Gentle stretching maneuver ● Heat/ice pack 	<ul style="list-style-type: none"> ● Gentle stretching exercise ● Isometric or static exercise (strength) ● Heat/ice pack 	<ul style="list-style-type: none"> ● Maintaining the same exercise ● Isometric/static exercise added with resistance-based exercise
Conservative treatments consist of patient education and oral NSAIDs or intra-articular glucocorticoid injections			

this physical therapy should be done gently without exceeding the patients' verge or comfort.^{44,45}

As a clinician, it is important to choose the right methods to maintain the goal of therapy. As stated above, MUA has no right indication as it does not have any consensus yet.³⁹ While physical therapy/exercise is still the first-line treatment, all clinicians need to apply the physical therapy combined with other conservative therapy including medications in treating patients.^{41,46,47} Over treating patients with MUA is dangerous because it may lead to the recurrence of FS symptoms. Many aspects should be calculated in choosing treatment with MUA.^{38,48} Iatrogenic complications should be avoided as it may be acquired from MUA treatment. Also, it is important to start physical therapy first with a long term follow up.^{32,35,49} In fact, a vast majority of patients recovered well with a good satisfaction value following shoulder exercises.⁵⁰ We may consider MUA or even surgical procedures if all of the conservative treatments have failed or the patients have unbearable pain and stiffness causing discomfort in daily life activities. However, it is important to stick with physical therapy in any of those methods to prevent recurrent symptoms and re-intervention. In the end, physical therapy must be considered as the core management to treat FS and also can be combined with other modalities.

Conclusion

Physical therapy remains the key and core choice of treatment in treating a patient with FS. Somehow, studies of MUA show quite promising results, however, we should notice that some MUA procedure complications may lead to recurrence symptoms and iatrogenic injuries. It seems that physical therapy is still the most important treatment to be applied as most of the studies reported satisfaction alongside the combination of other conservative treatments. Furthermore, more studies are needed to be conducted to know the specific time and indication of the MUA procedure.

Conflict of Interest

The authors declare that they have no conflicts interest.

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