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Mindfulness Based Stress Reduction in Diabetic and Non-Diabetic Frozen Shoulder Conditions

Niraj Kumar[1], Navneet Badoni[2], Kunal Kishor[3], Siddhartha Sen[4]

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Abstract

The term "frozen shoulder" was first introduced by Codman in 1934. He described a painful shoulder condition of insidious onset that was associated with stiffness and difficulty sleeping on the affected side. Codman also identified the marked reduction in forward elevation and external rotation that are the hallmarks of the disease. Long before Codman, in 1872, the same condition had already been labelled "periarthritis" by Duplay. In 1945, Naviesar coined the term "adhesive capsulitis."[2] The pathophysiology of idiopathic adhesive capsulitis (frozen shoulder) is poorly understood. Most authors have reported various degrees of inflammatory changes in the synovial membrane. Adhesions between the shoulder capsule and the humeral head have been noted by some, but not all, authors.[4] The aetiology of periarthritis of the shoulder, however, is not clearly understood. Amongst the factors suggested are trauma myocardial infarction hemiplegia, pulmonary tuberculosis, thyrotoxicosis, cerebral tumor, and epilepsy.[7] The diagnosis of frozen shoulder is probably less frequent, but recognition of this abnormality has an important effect on therapeutic decisions and may prompt invasive therapy.[19] Mindfulness is the common ground of several complementary therapies. Derived from Buddhist spiritual tradition, mindfulness has been secularized and integrated into behavioral treatment approaches.[20]

Keywords: Frozen shoulder; Mindfulness Based Stress Reduction (MBSR).

Introduction

Musculoskeletal shoulder pain is the third most frequent reason People seek treatment from a healthcare professional and while there is evidence that suggests conservative interventions can reduce pain and improve function, 50% of patients report persistent pain at six months and 40% still have pain at one year.[1]

Author Affiliation: [1]Ph.D. Scholar Physiotherapy, Orthopaedics, [2]Professor Orthopedics, Shri Guru Ram Rai Institute of Medical Sciences, [3]Principal / Associate Professor, Shri Guru Ram Rai University, Dehradun, Uttrakhand, [4]Associate Professor, Faculty of Physiotherapy, SGT University, Gurugram, Haryana, India.

Corresponding Author: Navneet Badoni, Professor Orthopedics, Shri Guru Ram Rai Institute of Medical Sciences, India.

E-mail: badoninavneet@yahoo.com

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Frozen shoulder, also known as adhesive capsulitis, is a disabling disease. It is characterized by shoulder pain and limitations of both active and passive range of movement in all directions. Limitation of glenohumeral movement is due to decreased intra-articular volume. It is the result of fibrosis and thickening of the joint capsule and adherence to the humeral head. Frozen shoulder is self-limiting in almost all cases. The natural

course takes 12–42 months before resolution. Fifteen percent of the patients experience long-term disability as a result of chronic loss of shoulder mobility (Fig. 1).[3]

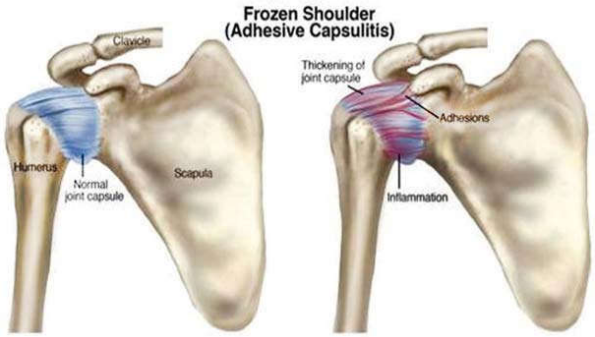


Fig. 1: Frozen Shoulder

Patho-physiology of Frozen Shoulder

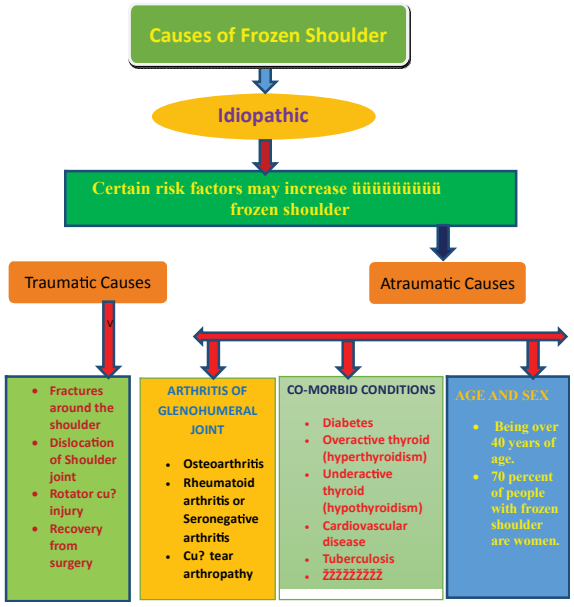
The pathophysiology of idiopathic adhesive capsulitis (frozen shoulder) is poorly understood. Most authors have reported various degrees of inflammatory changes in the synovial membrane. Adhesions between the shoulder capsule and the humeral head have been noted by some, but not all, authors. The optimum management of adhesive capsulitis has been the subject of great debate, particularly since the condition tends to resolve spontaneously over months to years. Intra-articular corticosteroid injections and/or physiotherapy programs combining exercise, physical agents, mobilization and simple home exercise programs are the most common treatment options used in patients with adhesive capsulitis.[4]

The pathology of frozen shoulder has been examined more recently by Bunker and Anthony who describe a 'Dupuytren's-like' contracture of the coracohumeral ligament and capsule which prevents external rotation. It is characterized by severe pain and insidious shoulder stiffness, which can cause almost complete loss of passive and active forward elevation and external rotation of the glenohumeral joint. The natural history of the condition follows a pattern of recovery which moves through three phases: the 'painful phase' lasting three to eight months, the 'adhesive phase' lasting four to six months, and the 'resolution phase' lasting 5 to 24 months. However, the literature suggests that for many patients the symptoms do not resolve completely, leaving them with prolonged pain or stiffness. The pain interferes with sleep and is increased by movement, the patient becoming more aware of limitation of movement as time passes. Some patients may be left with some restriction of movement, but in most there is no residual impairment. Recurrence in the same shoulder has never been reported, though up to 20% of affected persons develop the condition on the opposite side.[5,6]

Aetiology

The aetiology of periarthritis of the shoulder, however, is not clearly understood. Amongst the factors suggested are trauma myocardial infarction hemiplegia, pulmonary tuberculosis, thyrotoxicosis, cerebral tumor, and epilepsy. In this paper, an association of periarthritis of the shoulder with diabetes mellitus is described. The incidence of this condition in diabetic patients is compared with that in nondiabetic medical patients seen during the same period of time.[7,8]

Frozen shoulder can be either primary (idiopathic) or secondary. Secondary frozen shoulder is defined as that associated with trauma; rotator cuff disease and impingement; cardiovascular disease; hemiparesis; or diabetes (although some classify this in diabetics as primary frozen shoulder). The incidence of frozen shoulder in people with diabetes is reported to be 10% to 36%, and these tend not to respond as well to treatment as in nondiabetic.[9]



Flow Chart of aetiology of frozen shoulder

The aetiology is unknown. Lunberg and Helbig et al classified frozen shoulder as primary and secondary. The primary form is idiopathic, usually seen in women older than 45 years of age. Many predisposing factors can lead to secondary frozen shoulder, including upper extremity fracture with

immobilization, cervical disc disease, diabetes mellitus, head injury, and stroke. Double contrast shoulder arthrography is the definitive diagnostic test for adhesive capsulitis. Joint capacity, normally 14 mL or greater, is usually less than 10mL in adhesive capsulitis.[10]

Clinical Feature

Frozen shoulder limits the daily activities of the patients by causing pain around their shoulder and reducing the range of motion (ROM) of their joints. Limitation of ROM is due to the adhesion of the joints, hyperplasia of the synovial membranes through reduction of the area of the joint cavity, contraction of the articular capsule, and historical tissue proliferation. Such musculoskeletal system pain results in motor control disorders and degrades the balance control capability. These can cause secondary problems and weakening as well as psychological problems that will further limit the movements and weaken the muscles.[11]

Cyriax claimed that these symptoms occur in a natural cycle which cannot be altered by physical treatment. Phase 1: Pain at the limit of active movement leading to decreased Gleno-humeral range. Phase 2: Constant and severe pain referred down the arm, further decrease in Gleno-humeral joint range, slight jarring causing excruciating pain. Phase 3: Constant pain decreasing to pain on movement only. Range of glenohumeral movement unaltered. Phase 4: Decreasing pain on movement and increasing range of glenohumeral joint leading to full painless function. Each stage varies in duration, but it is rare for the constant pain to disappear in less than eight months, while it is common for all symptoms to remain for twelve to eighteen months.[12]

Differential Diagnosis

In early (freezing) stage might be a diagnostic challenge as it may mimic subacromial pathology and rotator cuff tendinopathy. Regarding shoulder impingement and rotator cuff pathology, patients report predominantly pain with less pronounced passive range of motion. Several facets help to distinguish frozen shoulder from other shoulder disorders. Regarding the causes other than Adhesive capsulitis, patients often state lifting a heavy object or performing repetitive overhead movements. In contrast, frozen shoulder patients usually describe spontaneous onset without an apparent cause or a history of overuse activity. Extra precaution should be paid in case of the history of malignancy.

Common conditions that may mimic early adhesive capsulitis:

- Subacromial pathology and rotator cuff tendinopathy.
- Post-stroke shoulder subluxation.
- Referred pain (cervical spine or malignancy, e.g., Pancoast tumor).

Later in the course of frozen shoulder, as severe restriction of motion comes to predominate, the diagnosis becomes more apparent. However, glenohumeral joint arthritis should also be considered, which can be ruled out by free shoulder movement following lidocaine injection to the glenohumeral joint.

Age of onset provides additional clues to diagnose AC. Frozen shoulder is unlikely in patients younger than 40 years of age, and patients older than 70 are more likely to develop rotator cuff tears or glenohumeral osteoarthritis instead of Adhesive capsulitis.[13]

Features of frozen shoulder are commonly present in patients with calcific tendonitis, fractures of the proximal humerus (especially those of the greater tuberosity), tears of the rotator cuff and early osteoarthritis of the glenohumeral joint. These pathologies can usually be detected using conventional radiographs and ultrasound examination. There are several causes of shoulder pain, but few shoulder disorders are associated with a markedly limited range of passive motion. Frozen Shoulder (FS) is differentiated from reflex sympathetic dystrophy by the vasomotor and trophic changes in the latter. It may be necessary to perform blood tests and radiography to exclude rheumatoid arthritis and bone diseases. Arthrography should be done in case of doubt. It is uncertain whether electromyography may be of value in a few cases with suspected neurological disease. Arthroscopy seems not to be useful in diagnosis of frozen shoulder. Since diabetes mellitus is over represented in patients with frozen shoulder, this disease should be considered in patients with frozen shoulder.[14,15]

The differential diagnosis of Frozen Shoulder.[16]

Traumatic and Infectious Causes	Degenerative and other Causes
Fracture of clavicle	Acute calcific tendonitis/ bursitis
Fracture of scapula	Secondary Bursitis of the shoulder

Traumatic and Infectious Causes	Degenerative and other Causes
Fracture of shaft of humerus	Arthrosis of the shoulder,
Fracture of upper end of humerus	Osteoarthritis of the acromioclavicular joint
Contusion of shoulder and upper arm	Osteoarthritis of the cervical spine
Impingement syndrome of the shoulder	Osteoarthritis of the glenohumeral joint
Injury of blood vessels at shoulder and upper-arm level, including avascular necrosis	Cervicobrachial syndrome
Osteoporosis with pathological fracture	Rheumatoid arthritis
Injury of nerves at shoulder and upper-arm level, including supra-scapular nerve entrapment	Radiculopathy, Cervicalgia & Cervical disc disorders
Injury of muscle and tendon at shoulder and upper-arm level, including Labral lesions	Juvenile rheumatoid arthritis
Sprain and strain of acromioclavicular joint	Neoplasm
Sprain and strain of sternoclavicular joint.	Fibromyalgia
Diseases of the digestive system	Persistent somatoform pain disorder
Pyogenic arthritis	Psychological and behavioural factors associated with disorders or diseases
Pain in thoracic spine	Somatoform autonomic dysfunction

Diagnosis

The diagnosis of painful stiff shoulder (capsular syndrome) was made using the standard diagnostic guidelines for shoulder complaints, that is, passive glenohumeral mobility must be painful and limited, lateral rotation must be relatively more restricted than abduction and medial rotation, and there must be no clear signs (painful arc, positive resistance tests, loss of power) that the shoulder pain was caused by another condition. After enrollment prognostic indicators and baseline values of outcome measures were assessed.[17]

Adhesive shoulder capsulitis is a clinical diagnosis made on the basis of medical history and physical exam and is often a diagnosis of exclusion. Other causes of a painful stiff shoulder must be excluded before a diagnosis of adhesive capsulitis is rendered, including septic arthritis, mal-position of orthopedic hardware, fracture malunion, rotator cuff pathology, glenohumeral arthrosis or cervical radiculopathy. Clinically, patients with this condition usually first present with shoulder pain followed by gradual loss of both active and passive range of motion (ROM) due to fibrosis of the glenohumeral joint capsule. BoyleWalker et al. observed that the majority of patients (90.6%) reported developing shoulder pain before loss of motion. External rotation is often the first motion affected on clinical examination, with steady global loss of ROM with disease progression. Pain is generally worse at the extremes of motion, when the contracted capsule is stretched. Passive ROM is lost with firm painful endpoints of motion, suggesting a mechanical rather than a pain-related restriction to motion. Imaging studies are not necessary for the diagnosis of adhesive shoulder capsulitis but may be helpful to rule out other causes of a painful and stiff shoulder. Plain films of the shoulder may reveal osteopenia in patients with prolonged adhesive capsulitis secondary to disuse (i.e. disuse osteopenia). Magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA) may reveal thickening of capsular and pericapsular tissues as well as a contracted glenohumeral joint space. Mengiardi et al. reported that MRA findings of coracohumeral ligament (CHL) ligament thickness 4mm (95% specificity, 59% sensitivity) or capsule thickness 7mm (86% specificity, 64% sensitivity) may aid in the diagnosis of adhesive capsulitis. Dynamic sonography may reveal thickening of the joint capsule and limited sliding movement of the supraspinatus tendon. These findings correlate with intraoperative direct visualization, documenting thickening of primarily the rotator interval and CHL.[18]

The diagnosis of frozen shoulder is probably less frequent, but recognition of this abnormality has an important effect on therapeutic decisions and may prompt invasive therapy.

Magnetic resonance (MR) imaging is widely used to assess shoulder pain. A large number of publications have described the MR imaging assessment of the rotator cuff, labrum, capsule, and biceps tendon, and abnormalities of these structures are frequently described in radiology reports.

MR arthrography was performed in all patients to demonstrate additional pathologic condition. The referring clinician initiated MR arthrography to rule out an additional rotator cuff tear in 20 patients with frozen shoulder and to rule out an additional lesion of the long biceps tendon in two patients. At arthroscopy, all patients showed signs of synovitis in the area of the rotator cuff interval. Eight patients had an intact rotator cuff. Three patients had a full-thickness tear of both the supraspinatus and the infraspinatus tendons, seven patients had

a full-thickness supraspinatus tendon tear, and four patients had a partial-thickness tear of the supraspinatus tendon. In five patients an additional partial or complete tear of the subscapularis tendon was present. In one patient the tendon of the long head of the biceps was torn.

MR arthrography reveals characteristic findings in patients with frozen shoulder. Thickening of the CHL and the capsule at the rotator cuff interval and complete obliteration of the fat triangle under the coracoid process (subcoracoid triangle sign) are the most characteristic MR findings in frozen shoulder.[19]

Management

Mindfulness is the common ground of several complementary therapies. Derived from Buddhist spiritual tradition, mindfulness has been secularized and integrated into behavioral treatment approaches. In this study total 117 patients has taken and MBSR given 8 weeks programmes for 90 minutes session. This systematic review found only inconclusive evidence of short-term effectiveness of MBSR in improving pain intensity and disability in patients suffering from low back pain. However, there is limited evidence from 2 wait-list controlled trials that MBSR can improve pain acceptance.[20]

MBSR has been seen to manage chronic pain as highlighted by Kabat-Zinn (2003). A study in Manitoba conducted by Carlson et al. (2003) has shown that MBSR in primary care setting with chronic pain patients has shown a decline in intensity of pain, psychological distress, disability, willingness in life activities, acceptance of pain and subjective rating of current pain. A few other studies conducted by the founder of MBSR in patients with chronic pain (Kabat Zinn, et al., 1982, 1985, 1987). The results suggested some relief in pain however self-reported pain did increase following completion of MBSR in some cases but did not return to pre interventional levels.

A significant decrease in psychological distress was also reported and also the benefit was maintained over an extensive follow up period of 4 years. Zatura et al. (2001), carried out a study of patients with rheumatoid arthritis who participated in MBSR programme and achieved the understanding of one's mood and emotions had better clinical outcomes. Another study in fibromyalgia patients by Kaplan et al 1993 also reported that there was a significant reduction (39%) in psychological distress however lack of control group in the study points to methodological limitations (Bishop, 2002).[21]

Body and Mind Dimensions of Diabetes Before we address the applications of MBSR to those with diabetes, it affect both body and mind. Diabetes poses a major life stress that requires considerable physical, emotional, and psychological accommodation and coping. This heavy burden is related to at least four principal factors: Anxiety, Depression, Social burden & Diabetes complications.

MBSR improve glucose control, much more work is needed to better understand the myriad possible applications of MBSR to diabetes care. The ability of MBSR techniques to lower stress and improve coping could have very broad applications in the care of diabetes and related conditions.[22]

All study participants were adults with chronic diseases, including conditions such as fibromyalgia, chronic pain, rheumatoid arthritis, type 2 diabetes, chronic fatigue syndrome, multiple chemical sensitivity, and cardiovascular diagnoses.

Published studies have demonstrated that while MBSR programs might not reverse underlying chronic disease, they can make it easier to manage and cope with symptoms, improve overall well-being and quality of life, and enhance health outcomes. MBSR as an adjunct to standard care has potential for much wider application in Australian primary care settings.[23]

MBSR intervention as a psychosocial intervention done in cancer patient for a period of 6–15 weeks, We retrieved 15 original studies that involved cancer populations, but only 10 reports, comprising 583 individuals who completed pre- and post-assessment, were included in the meta-analysis. With 9 of the 10 eligible studies focusing on breast cancer, majority of the patients who participated were female, comprising 79% of the total cancer patient population meta-analyzed. The modal stage of various types of cancer was Stage II, with patients either still in active disease or in remission while participating in the MBSR programs. Of the total pre-intervention patient population from seven studies that reported the breakdown of cancer staging (two studies overlapped patients), 81% of participants were in early stages (Stages 0–II), with the remaining 19% in late stages (Stages III–IV).

The small number of studies included in this meta-analysis point to our inability to generalize these results to the overall cancer population. However, the homogeneity of results found

among the mental health variables allows us to conclude that MBSR is effective in improving the psychosocial conditions of breast cancer patients.[24]

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