

Adhesive capsulitis: a case report

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Adhesive capsulitis or frozen shoulder is an uncommon entity in athletes. However, it is a common cause of shoulder pain and disability in the general population. Although it is a self limiting ailment, its rather long, restrictive and painful course forces the affected person to seek treatment. Conservative management remains the mainstay treatment of adhesive capsulitis. This includes chiropractic manipulation of the shoulder, therapeutic modalities, mobilization, exercise, soft tissue therapy, nonsteroidal anti-inflammatory drugs, and steroid injections. Manipulation under anesthesia is advocated when the conservative treatment fails. A case of secondary adhesive capsulitis in a forty-seven-year-old female recreational squash player is presented to illustrate clinical presentation, diagnosis, radiographic assessment and conservative chiropractic management. The patient's shoulder range of motion was full and pain free with four months of conservative chiropractic care. (JCCA 2000; 44(3):169-176)

KEY WORDS: active release techniques, adhesive capsulitis, adult, chiropractic, frozen shoulder, manipulation, rehabilitation, racquet sports injury.

La capsulite rétractile ou épaule bloquée se rencontre rarement chez les athlètes, mais elle est une cause fréquente de douleur à l'épaule et d'incapacité dans la population en général. Même s'il s'agit d'un trouble spontanément résolutif, son évolution plutôt longue, gênante et douloureuse incite les personnes atteintes à consulter un professionnel de la santé. Le traitement conservateur reste le pilier de la thérapeutique de la capsulite rétractile. Il comprend des manipulations chiropratiques de l'épaule, l'application de différentes formes de thérapie, la mobilisation, des exercices, le traitement des tissus mous, l'administration d'anti-inflammatoires non stéroïdiens et des injections de stéroïdes. Les manipulations sous anesthésie sont préconisées dans les cas d'échec du traitement conservateur. Voici le cas d'une femme de 47 ans souffrant de capsulite rétractile secondaire à la pratique de la balle au mur avec raquette durant ses heures de loisir; on y présente le tableau clinique, le diagnostic, l'évaluation radiographique et le traitement chiropratique conservateur. L'amplitude de mouvement de l'épaule est redevenue normale et indolore au bout de quatre mois de traitement chiropratique conservateur. (JACC 2000; 44(3):169-176)

MOTS CLÉS : techniques de libération active, capsulite rétractile, adulte, chiropratique, épaule bloquée, manipulations, réadaptation, blessures dues aux sports de raquette.

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Introduction

Squash is a moderate to high intensity sport.^{1,2} Players are active 50 to 70% of the playing time. Eighty percent of the time, the ball is in play ten seconds or less and there are eight second rest intervals.² The most common injuries in indoor racquet sports include contusions, sprains, strains, lacerations, eye injuries, bursitis and tendinitis.^{3,4} Squash players over the age of 40 as well as the beginners are at increased risk for injury.⁴ Increased frequency of play among females was also associated with elevated injury rates.⁴ An injured squash player rarely becomes permanently impaired.⁴ Chard and Lachmann⁵ in their 8-year retrospective study of the injuries in the racquet sports found that the proportion of squash injuries was higher than expected and properly related to higher physical stress and risk of contact in this sport. They also reported that the squash injuries occurred mainly in persons over 25 years of age. Adhesive capsulitis is one of the most common causes of shoulder pain and disability in the general population.⁶ However, it is an uncommon entity in athletes.⁷ There is no report of frozen shoulder syndrome as a result of squash injury in the literature. The incidence of adhesive capsulitis in the general population is 2–5% and 10–20% in diabetics.⁸ It affects females slightly more than males and is usually seen in ages 40–70.^{8,9} The nondominant arm is more likely to be affected.^{8,9} About 12% of individuals affected develop the condition bilaterally. Recurrence is rare in the same shoulder.¹⁰ Adhesive capsulitis is also called, frozen shoulder syndrome, periarticular adhesions, pericapsulitis, irritative capsulitis, periartthritis of the shoulder, scapulohumeral periartthritis, humeroscapular fibrositis, bursitis calcerea, Duplay's syndrome, shoulder portion of shoulder-hand syndrome, and stiff and painful shoulder.⁸

The frozen shoulder was first described as periartthritis involving the periarticular soft tissues of the shoulder by Duplay in 1872.¹¹ Codman¹² coined the term "frozen shoulder" in 1934. He described the frozen shoulder as "difficult to define, difficult to treat, and difficult to explain." J.S. Naviaser¹³ coined the term "adhesive capsulitis" in 1945. He found dense adhesions and capsular contractures causing restriction of motion, intra-articular pain, and microscopic evidence of reparative inflammatory changes in the glenohumeral joint capsule. T.J. Naviaser¹⁴ did arthroscopic examination on many patients with frozen shoulder and described four stages

arthroscopically as pre-adhesive, synovitis, maturation and the chronic stage. The etiology of adhesive capsulitis remains unknown. However, rotator cuff disease, impingement syndrome, chest or breast surgery, diabetes, prolonged immobilization, age, thyroid disease, various medical problems (pulmonary disease, myocardial infarction, cerebrovascular accident), and autoimmune disease are associated with the development of adhesive capsulitis.¹⁵ The idiopathic adhesive capsulitis symptoms have been divided into three phases clinically: (1) the painful phase, (2) the stiffening phase, and (3) the thawing phase.¹⁶ Adhesive capsulitis may complete its course in 12–42 months, but it may be as early as 6 months or as late as 10 years.⁸

Conservative management remains the mainstay treatment of the frozen shoulder.

A case report is presented to illustrate clinical presentation, etiology, diagnosis, radiological assessment and conservative chiropractic management of a secondary adhesive capsulitis in a middle age female squash player.

Case report

A forty-seven-year-old female recreational squash player presented with left shoulder pain. Pain had started insidiously in the cervical spine one year before and later progressed to the left shoulder. At that time, she saw her family physician who gave her anti-inflammatory medications, injected cortisone into her left shoulder and referred her to physiotherapy. The physiotherapy treatment included acupuncture, mobilization of the left shoulder and neck, exercises (using small weights, rubber tube and pulleys), and interferential current therapy for seven months. She also received massage and trigger point therapy for five months. Continuing to have pain and left shoulder movement restriction, she saw an orthopaedic surgeon who injected her left shoulder with cortisone and recommended light exercises. One month prior to presenting to the author's office, having felt better, she went for a game of squash. The day after the game, she had pain in her left shoulder. In spite of continuation of her treatment, her pain and inability to move her left shoulder got worse. At this time the patient presented to the author's clinic with dull and achy pain in the left shoulder and with a sharp pain to the posterior left arm. She complained of not being able to move her left arm and having a hard time dressing and washing herself. The pain was aggravated by any move-

ment of the left arm, lying on the left arm and she was awakened at night when she rolled onto the affected arm. The pain was slightly relieved by taking hot showers.

On examination, upper extremity deep tendon reflexes were 2+ bilaterally and light touch sensation examination was unremarkable. Cervical spine right lateral flexion, right rotation and flexion induced pulling sensation in the antagonist muscle groups (trapezius, levator scapulae and scaleni muscles). Aberrant motions with tenderness were detected in the left C2–3, C7–T1 and T3–4 facet joints upon static and motion palpation. However, the left shoulder pain could not be reproduced by the neck examinations (i.e. range of motion, soft tissue palpation, Spurling's, Jackson's and maximal compression tests). Her left glenohumeral joint active ranges of motion (ROM) were: internal rotation 15 degrees, external rotation 10 degrees, forward flexion 20 degrees, extension 30 degrees and abduction 10 degrees. The resisted left glenohumeral joint flexion, abduction, internal and external rotations were graded 3/5. The left glenohumeral joint passive ROM was 5 degrees more in each direction. Posterior and posteroinferior joint play of the left glenohumeral joint were restricted and painful. Her left scaleni, upper trapezius, infraspinatus, supraspinatus and teres muscles were hypertonic and tender upon palpation. There was a severe point tenderness over the left deltoid tubercle. The cervical spine

and the left shoulder radiographs were unremarkable.

A clinical diagnosis of the left adhesive capsulitis was made with associated cervical and upper thoracic facet joint dysfunctions.

Initial treatment consisted of interferential current therapy, anteroposterior and long axis distraction mobilization, pendular home exercises for the left shoulder, soft tissue therapy (STT) and the spinal manipulation therapy (SMT) of the cervical and the thoracic spine three times per week for two weeks. At the sixth visit, the active left glenohumeral (initial range in brackets) abduction, flexion and external rotation were 35 (10), 60 (20) and 15 (10) degrees respectively. However, the passive ROM showed even more improvements where the passive abduction, flexion and external rotation were 70, 80 and 20 degrees respectively. At this point, strengthening exercises using rubber tubing including external rotation, forward flexion and abduction were introduced. In addition, the left glenohumeral joint long axis distraction, anteroposterior and posteroinferior manual high speed low amplitude manipulation (Figures 1, 2 and 3),¹⁷ tender point therapy and active release techniques (ART)¹⁸ over the hypertonic and tender muscles (trapezius, levator scapulae, lateral deltoid, supraspinatus and infraspinatus muscles) were started. Tender point therapy was also utilized by exerting digital compressive pressure over the tender points pal-



Figure 1 Glenohumeral long axis distraction adjustment.

Patient is in supine position, doctor stabilizes the axilla with one hand and pulls on the humerus longitudinally via grasping the distal humerus at the elbow. After removing the joint slack, a low amplitude high velocity thrust is delivered in the direction of the arrowhead.



Figure 2 Glenohumeral anteroposterior adjustment.

Patient is seated with the arm in 90⁰ forward flexion and the elbow fully flexed. Doctor stands behind the patient to stabilize the scapula, cups the olecranon with both hands, removing the joint slack and delivering a quick and shallow thrust along the axis of humerus. (arrowhead)



Figure 3 Glenohumeral posteroinferior adjustment.

Patient is in supine position with the arm in forward flexion and the elbow bent. The practitioner grasps the arm with both hands, removes the joint slack and delivers a quick and shallow thrust inferiorly and posteriorly (arrowhead).

pated in the involved muscles. This pressure was gauged to the patient's tolerance and was sustained until the patient reported the dissipation of the pain. The ART was done utilizing digital longitudinal tension along the involved muscle fibers. Starting at the shortest position of the muscle, the patient actively moves toward the longest position of the muscle while the tension is sustained by the treating clinician. This course of treatment was administered two times a week for eight weeks. At the end of this course of treatment, the patient's left glenohumeral active abduction was 100 degrees and her flexion and external rotation were full. The left glenohumeral passive abduction was full but the resisted remained 4/5. The patient was assessed for isotonic strengthening exercises using free weights. A regimen of weight training exercises (isotonic) for shoulder abduction, forward flexion, extension, internal and external rotations three times per week were prescribed. In addition, the interferential current therapy was changed to microcurrent therapy to promote healing. The patient was seen once a week for six weeks there after. At the end of the sixteen weeks treatment, the patient had pain free full range of motion. (Table 1.)

Discussion

Lundberg¹⁹ classified patients suffering from frozen shoulder syndrome into "primary" and "secondary". Primary adhesive capsulitis pertains to those patients who present with no significant findings in the history, clinical examination, or radiographic evaluation to explain their motion loss and pain. However, patients with secondary adhesive capsulitis disclose a trauma or surgery to the affected upper extremity prior to their shoulder symptomatology.²⁰ The patient in this case report, is classified as secondary adhesive capsulitis because of her neck involvement initially and squash trauma later. Reeves¹⁶ identified three phases in the natural history of the frozen shoulder syndrome: (1) an early painful phase lasting 10–36 weeks; (2) an intermediate, stiff or frozen phase characterized mainly by limited range of motion lasting 4–12 months; (3) a recovery or thawing phase lasting 5–24 months or more. Our patient was in phase one at her initial visit to our office. However, she might had been in the recovery phase prior to her squash injury.

The history usually indicates a gradual onset of stiffness and pain. The pain is quite intense and is often referred to

Table 1
Improvement of the patient's left shoulder active and passive range of motion (ROM, in degrees) with treatment

ROM		Abduction	Flexion	External Rotation
INITIAL	Active	10	20	10
	Passive	15	25	15
AT 2 WEEKS	Active	35	60	15
	Passive	70	80	20
AT 10 WEEKS	Active	100	full	full
	Passive	full	full	full
AT 16 WEEKS	Active	full	full	full
	Passive	full	full	full

the insertion of the deltoid, the deltoid muscle region and the bicipital tendon.^{8,9,10} The pain is aggravated by the shoulder movements, especially external rotation, and sleeping on the involved side, and is relieved by limiting the use of the extremity.^{8,9,10} There is often soreness in the proximal upper back and neck which may be as a result of compensatory overuse of the accessory musculature (trapezius, scalene, levator scapulae, rhomboid muscles). The patient may complain of difficulty putting on a coat, reaching into the hip pocket for a wallet, combing his or her hair, and inability to fasten garments behind the back.⁸ These symptoms closely resemble the patient in this case.

Some authors state that observation reveals guarded shoulder movements.^{8,9} At rest, the patient holds the involved arm in adduction and internal rotation.⁸ The arm swing in gait is usually limited or absent.⁸ Rounded shoulders, stooped posture with the involved shoulder elevated in a protective manner are commonly seen in these patients.⁸ Because of this altered posture, pain and trigger points often develop over the posterior aspect of the shoulder, along the upper trapezius, and in the posterior cervical region.⁸

Disuse atrophy may be seen in the rotator cuff, deltoid, biceps and triceps brachii muscles.¹⁰ The active and passive glenohumeral ROM are restricted.^{6,8-18} This limitation of ROM is characteristic of a capsular pattern; that is, external rotation is limited more than abduction, which is restricted more than internal rotation.¹⁰ In addition, forward flexion is also limited in patients with adhesive capsulitis. Naviaser and Naviaser⁹ stated: "At the limits of motion there is a sense of mechanical blockage or tethering of the joint rather than resistance because of pain." Hence, it is not the patient resisting the motion because of the pain but rather there is a mechanical blockage (especially in passive ROM) that limits the motion. Anterior, inferior glides and lateral distraction of the humerus on the glenoid are also restricted.^{8,10} These joint play findings confirm the mechanical blockage which is the glenohumeral capsular adhesions. These signs match the findings in our patient except for glenohumeral anterior glide restriction. Many shoulder orthopedic tests may be done to exclude other causes of a painful and stiff shoulder. However, these tests may lose their sensitivity and specificity because of the global shoulder pain and limited range of motion associated with adhesive capsulitis.²⁰ It is the author's opinion that the sense of mechanical block of the

joints at the limit of the passive ROM is the most significant physical finding.

Radiographic examination of the shoulder is required in the patients with adhesive capsulitis to exclude other conditions.^{6,8-10,15,20} Plain x-rays of these shoulders ranges from normal to osteopenic with degenerative changes, calcium deposits, or cystic changes in long-standing cases.⁸ The shoulder radiographs in our patient were normal. Pearsall and Speer²⁰ recommend anteroposterior (AP), axillary and supraspinatus outlet views of the affected shoulder. The AP film is assessed for osteopenia, bony abnormalities and superior migration of the head of the humerus. The axillary view is obtained to assess glenohumeral subluxation or glenoid or humeral head articular damage. Finally, the supraspinatus outlet film is scrutinized for supraspinatus outlet narrowing characterizing acromial impingement.¹⁴ This view was not taken in our patient.

Bone scans may show increased uptake in the affected shoulder; often a nonspecific finding.^{6,8,15} Shoulder arthrography shows loss of the normal axillary recess and a significantly decreased capsular volume.¹⁵ Although arthrography might be helpful, it is an invasive procedure that is painful and costly.⁸ MRI can be a better choice since it is not invasive and the MRI examination of the frozen shoulder in comparison to the normal shoulder shows thickened joint capsule and synovium.²¹

Many therapeutic regimens have been advocated for adhesive capsulitis. These include: TENS,²² interferential current therapy,²³ therapeutic ultrasound,²³ utilization of heat and ice,²³ shoulder mobilization,^{8,10,24} manipulation of the neck and shoulder using activator,^{25,26} trigger point therapy,^{27,28} exercise therapy,^{6,8-10,15,22,25,26} anti-inflammatory medications,^{6,8,10,15,22,25} corticosteroid injections,^{6,8,29} arthrographic infiltration,¹ and manipulation under anesthesia.^{6,8-10,30}

Rizk et al.²² divided 50 patients with frozen shoulder into two groups. Group A (26 patients with 28 involved shoulders) was treated utilizing heat modalities, Codman's exercises, wall climbing exercises, shoulder wheel-pulley exercises, and gentle, rhythmic stabilization manipulation of the glenohumeral joint. Group B (24 patients with 28 involved shoulders) was treated using prolonged pulley traction and transcutaneous nerve stimulation simultaneously. Although both groups showed improvement, group B displayed better results at the completion of the treat-

ment period. Our patient was initially instructed to do pendular exercises (patient leans on the wall or on a table/counter with the good arm and lets the affected arm hang, then moves the affected arm in flexion/extension, abduction/adduction and circumduction clock-wise and counter clock-wise as a pendulum) wall walking with hands, utilization of pulleys and broom stick for stretching the tight muscles and structures. Emphasis was placed on the external rotation. Later on, as the pain decreased, strengthening exercises were added.

Polkinghorn^{25,26} reported successful treatment of two cases of adhesive capsulitis utilizing a mechanical force, manually assisted short lever adjusting device (activator) to manipulate the affected shoulder, cervical and thoracic spine. However, in the case presented, the author used high velocity low amplitude manual adjustments¹⁷ which were well tolerated by the patient. It is the author's experience and opinion that a trained manual adjustor is skilled enough to modulate the force and the speed of the manipulation to achieve the desired outcome in the patient's comfort zone. Ferguson²⁸ reported three cases of frozen shoulder which he successfully treated using trigger point therapy techniques. Although no trigger point was found in our patient, tender points were treated. Active Release Technique was utilized on the rotator cuff and the scapular stabilizing muscles to release the adhesions in the muscles caused by the restricted ROM and disuse associated with adhesive capsulitis.

Conclusions

Many authors suggest that adhesive capsulitis is a clinical diagnosis of exclusion. However, it can be identified by the restricted capsular pattern and forward flexion, pain, and severely decreased passive ROM with feeling of a mechanical block at the end range. A case report is presented to illustrate the potentials of conservative chiropractic management and manual chiropractic manipulation of the shoulder in a patient with adhesive capsulitis. However, further research is required to identify the effectiveness of this treatment.

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