Enigma of Frozen Shoulder / Periarthrithitis

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Abstracts

The term periarthritis was first described by Duplay in 1906, when he described a shoulder condition now recognized as the frozen shoulder. The feared sequelae of shoulder tendinitis, bursitis, partial tear, or even reflex sympathetic dystrophy is the frozen shoulder or adhesive capsulitis or adhesive bursitis. A shoulder that initially painful but which gradually becomes more restricted in motion in all direction is considered frozen.

Inflammation in the capsule & synovium due to relative immobility or not performing full shoulder stretches in our daily activities may lead to capsular contracture which is called adhesive capsulitis. Stiff shoulder is termed primary adhesive capsulitis & Frozen shoulder is termed secondary adhesive capsulitis.

The numerous concepts are evident when the diagnostic labels applied to this condition reviewed: adhesive capsulitis, adhesive bursitis, periarthritis, pericapsulitis, obliterative bursitis, stiff shoulder, scapulohumeral periarthritis, duplay's disease & many others.

Codman considered this condition as due to adhesion of the subacromial bursa & later related this condition to tendinitis of the rotator cuff tendon. It appears that many tissue mainly synovial, are involved in the ultimate frozen shoulder. These include any or all of the following:

1. The synovium of the subdeltoid bursa
2. The synovial lining of the glenohumeral capsule
3. The tenosynovium of the conjoined tendon
4. The synovial lining of the biceps tendon
5. Subscapularis muscle & bursa.

The condition widely claimed to be a frozen shoulder still remains an enigma as to exact origin, tissue involvement, causation, mechanism & the ideal forms of prevention & treatment.

Suggestive Mechanism (in a short): Micro/Repeated trauma & Gradual degenerative changes = Loss of elastic aspect of connective tissue = Inflammatory reaction = Granulations with fibroblast = Adhesion.

Epidemiology

Ratio = Male < Female, Age – most common between 40 to 60 years. Bilateral involvement 12 %. Usually affects 2 % of general population among them 10 to 35 % are diabetic.

Predisposing Factors / Probable Causes:

1. Trauma to capsule e.g. bursitis, tendinitis, post fracture immobilization
2. Joint strains, followed by end ranges of joint not being carried out either actively or passively.
3. Immobilization of the shoulder joint from either fracture or subluxation / dislocation.
4. Cervical spine disorders & poor posture.
5. Autoimmune disorders & Hypothyroidism.
6. Diabetes & other hormonal disorders

Symptoms

Some loss of functional active movement in all joint movement but particularly in external rotation.

Discomfort at end range of all joint movement.

Signs

1. Active & passive classical motions are limited in the same direction; greatest limitation in external rotation, less limitation in abduction & least limitation in internal rotation, scapular motion not restricted.
2. Pain occurs as active & passive end ranges are approached.
3. End range resistance of classical & accessory motion has an abnormal creep resistance.

Physical Examination

(A) Range of motion test – must be restricted normal range of the joint.

Normal ranges of shoulder joint is in table:

Name of the movement	Ranges in Degree
Flexion	180
Extension	50
Abduction	180
Adduction	50
Horizontal Flexion	135
Horizontal extension	45
Internal Rotation (in adduction)	90
External Rotation(in adduction)	90

(B) Soft tissue palpation by clinical zones:

Zone 1. Rotator cuff
Zone 2. Subacromial & subdeltoid bursa
Zone 3. Axilla
Zone 4. Prominent muscle of the shoulder girdle.

Diagnostic Test

1. Active test of range of motion with slight overpressure at the terminal point of real movement; principally abduction & external rotation.
2. Active resisted test of range of motion, at the initial range may be painful.
3. Passive test of range of motion, with patient in supine position, it is important to confirm the capsular pattern of restriction of the joint & the diagnosis of a capsule.

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Imaging Techniques

Plain X-ray films are useful in excludes other pathology.

Arthrography is the gold standard for diagnosis; shows decreased capsular volume with obliteration of the biceps sheath, axillary fold & sub scapular bursa.

MRI is 95 % specific & 70 % sensitive if thickness of capsule & synovium is greater than 4 mm.

Dynamic Ultrasonography is 91 % sensitive & 100 % specific for detection of capsulitis.

Differential Diagnosis (other causes of painful shoulder):

- Tendinitis of Rotator cuff
- Sprain & tear of the Rotator cuff
- Bicipital tenosynovitis & synovitis or the shoulder.
- Sub deltoid bursitis
- Osteoarthritis & rheumatoid arthritis
- Acromioclavicular joint pain & cervical rib
- Osteosarcoma of the humerus
- Pressure on C4, C5 & C6 nerve root
- Spasm of scalene muscle
- Diaphragmatic irritation
- Gall-bladder problem (right shoulder)
- Heart problem (left shoulder)

Management

(A) Modalities:

1. Ice pad & ice massage over hot spot in acute stage;
2. TENS for pain reduce. Pulse electromagnetic energy also effective
3. Interferential therapy (IFT) with suction electrodes is effective for relieving pain. High frequency for acute pain & low frequency for chronic pain.
4. Ultrasonic therapy, Deep heat e.g. SWD & Moist heat - to facilitate relaxation, mobilization, remove inflammatory exudate, reduce spasm & maintain length of capsule. Pulsed UST is most effective via axial over antero-inferior border of the capsule to the closes to the seat of actual defect & also increase extensibility.

(B) *Exercises:* [More effective than modalities, NSAID's or steroid injection]

1. Gentle manipulation, Rhythmic stabilization, and Relax passive mobilization – manipulate restricted motion in the direction of lateral distraction, anterior glide,posterior glide, and inferior glide. On study found mobilization to be more effective than manipulation for increase range of motion.
2. Self-mobilization or isometric manipulation to coincide with the arthrokinematic movement.
3. Manual stretching of external rotators & self assisted stretching.
4. Graduated relaxed sustained stretching based on PNF pattern.
5. Pendular exercise is very effective
6. Exercises by pulley or sling suspension & tolerable weight in supine or sitting position.

(C) *Others:*

1. Some effective techniques: Distraction technique, Massage technique, Injection technique, and Forced elevation of shoulder joint.
2. Traditional & Translational manipulation under anesthesia – for chronic failed cases.
3. Arthrographic distention & Arthoscopic release- for no responsive cases usually done by surgeons.
4. Medication- NSAID's, relaxants etc have no significant benefit except temporary Pain relief.

Prognosis

Last 5-10 degree movement of all planes may be limited & subjectively described as a pulling restriction during functional activities. This range may be the goal of treatment.

Natural Resolution:

1. Early painful stage – lasts for 2 to 9 months. Patients have diffuse pain & difficulty with sleeping on the affected side. Patients begin to restricted movement secondary to pain.
2. Stiffness stage – lasts for 4 to 12 months. Progressive loss of range of motion & decreased function are noted.
3. Recovery stage – lasts for 5 to 24 months with gradual increase range of motion & decreased pain.

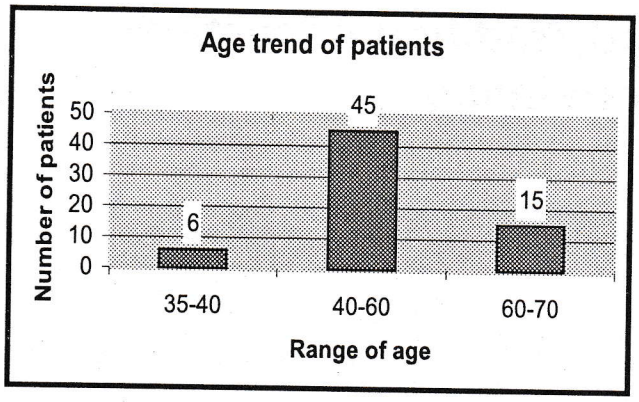
Outcome of natural resolution

Time is variable, 12 to 36 months. 20-60 % of patients have some limitation in range of movement & residual pain for up to 10 years.

Experimental Study

During my practice period, last 3 years I handled the frozen shoulder cases; an average of 15-20 patients/month, yearly 180-240 patients, total in 3 years about 540-720 cases. Among them most of the cases I was unable to follow-up. But in 2003, I could to follow-up at least 60 % cases, among the total frozen shoulder cases; from the period of January to July 2003.

Name 7 Months	Total Frozen Shoulder cases	Follow-up of cases	Male	Female
Jan.	18	10	4	6
Feb.	15	7	4	3
Mar.	19	10	5	5
Apr.	12	8	3	5
May	24	14	8	6
Jun.	14	8	2	6
July	18	9	4	5
Total:	120	66	30	36



All of my follow-upped patients taken their treatment course 3 to 6 weeks. The prognosis result is as bellow:

Fair	Good	Better	Best
10-40 % Cured	40-60 % Cured	60-80 % Cured	80-100% Cured
4 patients	16 patients	35 patients	11 patients

So, we can count the better & best result = 35+11 = 46 patients. Among 66 patients in this retrospective study, the success rate is 70 %.

For true experimental study we can compare this 'physiotherapy treatment outcome' to 'natural resolution outcome'

Group	Time	Curing rate
Natural Resolution Out come	12-36 months	40 %
Physiotherapy Treatment Outcome	1-2 months	70 %

Conclusion

Though a frozen shoulder still remains an enigma as to exact origin, tissue involvement, causation, mechanism & the ideal forms of prevention & treatment. So accurate treatment is very difficult. But physiotherapy can give the best form of relief among the all treatment methods. Even Physiotherapy is much better than natural resolution in terms of patients suffering from pain & functional limitation, long duration time & curing rate.

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