ADHESIVE CAPSULITIS

ADHESIVE CAPSULITIS

DEFINITION

Inflammation of the capsule's subsynovial layer with fibrosis, contracture, and adhesion between the capsule and the humeral neck and in pockets of the capsule.

Risk Factors

- Diabetes
- Thyroid disease
- Age 40-60
- Gender (Female)
- Upper quarter surgery
- Immobilization
**Shoulder Capsule**

*Where is it?*

The capsule lines and contains the articular space of the joint, blending with the ligaments and tendons of the shoulder.

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**Adhesive Capsulitis**

*How does it cause loss of motion?*

- Painful capsular thickening and contracture reduces tissue excursion:
  1. Axillary Recess
  2. Long Head Biceps Tendon
  3. Rotator Interval
Adhesive Capsulitis
Long Head Biceps

Adhesive Capsulitis
Rotator Interval

For Cytologists
- Collagen shortening
- Fibrofatty tissue changes in the capsular recess
- Ligament atrophy and stiffening
- Collagen bridging across capsular recesses
- Random collagen production
- Reduction in sarcomeres in surrounding muscle tissue

Frozen Shoulder

Online Resource

doi:10.2519/jospt.2013.0503
ADHESIVE CAPSULITIS TYPES

Primary
Secondary
And the wisdom to know the difference!

Differential Diagnosis

• Other causes of shoulder stiffness:
  ✓ Muscular Tightness
  ✓ Osteoarthritis
  ✓ Regional Stiffness (UQ Surgery)
  ✓ Dislocation (Especially Posterior)
Differential Diagnosis

- **Other causes of shoulder pain:**
  - Impingement
  - Biceps Tendinitis/osis
  - Rotator cuff tear
  - Labral Tear
  - Osteoarthritis
  - Fracture

**HALLMARK SIGN**

- Loss of External Rotation > Elevation > Internal Rotation
- **ER less than 50% of unaffected side***

**Gagey Hyperabduction Test**

- Test for inferior glenohumeral mobility
- Passive abduction in sitting with scapula stabilized
- “Normal” 105 degrees abduction
- Compare to unaffected shoulder for ROM and pain

Difinitive Diagnosis: Arthrogram

1º ADHESIVE CAPSULITIS
PHASES
Freezing
Frozen
Thawing

Online Resource

http://www.bestorthopaedicsurgerysydney.com/shoulder-conditions/frozen-shoulder/
Phase Dictates Treatment

Adhesive Capsulitis Phase

- Tissue reactivity
- Surgical candidacy
- Muscle spasm & guarding
- Response to exercise
- Joint mob effects
- NSAIDS? Injection?
- Joint mob effects
- NSAIDS? Injection?
- Joint mob effects
- NSAIDS? Injection?

Freezing Phase
3-9 mos, Pain 7/10, Constant
Painful AROM, unable to assess PROM
Stretching = worse
Neck pain from scapular compensation patterns

Freezing Phase Treatments
- Pain Relief PRIMARY GOAL
- **POOL THERAPY**
- Heat/Ice/TENS
- NSAIDS, Steroid Oral or Injections***
- Exercises
- Pendulum
- Neck and scapular AROM
- Shower AROM behind the head, behind the back, across the body

http://twistedpositions.com/tag/move-like-water/
Freezing Phase
Manual Therapy

1. Extremely gentle,
   • non-painful glenohumeral
   • oscillations Grade I-II
2. Postural correction:
   - Scapular ROM to reduce anterior tilt/restore
     retraction endurance ; Pect minor stretching
   - Address UT/LS/SA pattern of upward
     scapular rotation
   - CROM, Thoracic spine extension

Be Kind To The Freezing

Frozen
4-12 months
Pain 4-6/10,
Intermittent
Tolerates stretching
(end-range pain)
Loss of PROM
(ER>FLEX>IR)
Disuse atrophy of
glenohumeral
muscles
Limited ADL’s
Frozen Phase Treatments

- Pain control as needed
- Heat/Ice/TENS
- NSAIDS, Injections
- **Exercises to prevent further motion loss**
  - *Increased frequency-every 2-4 hours*
  - AAROM with stick, at countertop, or with gravity assistance, wall climbing
  - LLPS such as JAS Shoulder Unit/Flexionator
  - Surgery?

Frozen Phase Manual Therapy

- Manual Therapy Tricks to Reduce Muscle Guarding and Spasm
- Joint Distraction
- Grade 1-2 Oscillations
- MWM, PNF
- Grade 3-4 Glenohumeral Mobilization as tolerated

Thawing Phase

12-24 months

“Turned the corner
Improving motion
Return to ADL’s and activities
Tolerates end-range stretching and mobilization
Thawing Phase Treatments

- **PAIN RELIEF NOT A PROBLEM**
- NSAIDS/Ice only as needed after stretching/activity
- Steroid oral or injections no longer effective

- **EXERCISES STIFFNESS IS A PROBLEM**
- Weighted end-range stretches Flexion, IR, ER, Sleeper Stretch
- Surgery/Manipulation

Thawing Phase Manual Therapy

- **End-Range Mobilization**

ORAL AGENTS & STEROID INJECTIONS

- NSAIDS
- Oral Steroids
- Injections
- Etcetera
Medications

• NSAIDs for anti-inflammatory effect/pain control to allow stretching, activity
• Oral corticosteroids: short term reduction in pain and increase in ROM
• Intraarticular injections: Ultrasound/fluoroscopy ensures injection inside the joint

**STEROID TREATMENTS IMPROVE TOLERANCE TO ROM BY REDUCING INFLAMMATION**


Corticosteroid Injection

Where Do You Put It?


• 191 Patients in 4 groups:
  1. Subacromial Injection
  2. Intraarticular Injection
  3. Intraarticular AND Subacromial Injections
  4. Medication (NSAID, No injection)

• Measured differences across time between the groups

OUTCOMES

Steroid Injection

• WEEKS 2-16
  • Improved Pain and ROM ALL GROUPS
  • Subacromial Injection
  • Intraarticular Injection
  • Intraarticular AND Subacromial Injections

• WEEKS 16+
  • Medication (NSAID, No injection): the same as injection after 16 weeks.

Problem: Patient too acute for therapy?
Consider asking referral source for oral steroid taper or injection.

DEAR MATH, 
I'M NOT A THERAPIST. 
SOLVE YOUR OWN PROBLEMS.

In the Pipeline: Collagenase

What KIND of injection?

- Bee Venom Acupuncture in addition to therapy
- Improved AROM, PROM, Pain, and Function!!
- 16 sessions over 2 months

THERAPY PROGRAM

Use of Therapy Visits
Home Program

Conservative Care For Adhesive Capsulitis

• 89.5% of 105 patients resolved with non-operative treatment of therapy and NSAIDS alone.
• Younger (40s) and stiffer subjects did not succeed with non-operative therapy.
• Those who were not improved after 4 months of treatment elected for surgery at 12 months after onset.
• Affected shoulder never reached full ROM of contralateral shoulder but patients were satisfied with the result and did not report functional limitations.

OUTCOMES
Therapy Visits

• Supervised patients continued steady improvement for 12 weeks...those with an unsupervised home program improved for 6 weeks, then began to decline.
• Conclusion: Therapy visits to progress exercise programs as tolerated is indicated.
Supervised Home Therapy Program

• HOW TO:
  1. Every visit: Check status of home program, pain, AROM, PROM
  2. Progress exercises as tolerated
  3. Use of joint and soft tissue mobilization only as needed to make gains

Where are we?

• STEP 1
• Every visit
• Frequency/response to home program

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Where are we going?

• STEP 2
• Read the numbers
  • Increased Pain+Decreased ROM=Exercise is too much
  • Decreased Pain+No motion gain=Exercise is too little
  • Decreased Pain+Increased ROM=Just right
  • Progress exercises as tolerated titering out repetitions and force
Progression of Force

- Active Flexion, extension, IR, ER, HADD
- Active Assisted Add stick, pull, countertop
- Passive End-range mobilization, overpressure
- Low-load prolonged stretch, Weighted stretches, etc.

Supervised Home Therapy Program

- **STEP 3**
- **Scheduling Visits**
- Use manual therapy for joint and soft tissue mobilization only as needed to continue to make 5-10 degree improvements every 2 weeks.

Use of Technology

- iPhone Goniometry and HEP monitoring system
- Kinex System
- Gamify
- Exercise Log
Total End Range Time
Low Load Prolonged Stress

APPLICATION OF TENSION

• Overstress of reactive upper extremity tissue causes inflammation, loss of active motion from muscle spasm and loss of passive motion from fibrosis.

Thoughtful Application of Stretch

STRETCH INTENSITY

STRETCH DURATION
Total End Range Time (TERT)
- Six 10-minute sessions of stretching “close to pain”
- Ermi Flexionator (Atlanta GA)
- (holds the affected arm in either ER or ABD)
- Good Results in both high and moderately irritable subjects:
- Increased motion, Improved function in all subjects


Low Load Prolonged Stretch (LLPS)
- Literature supports use of
  - 5-10 minute stretches in the shoulder,
  - 30 minutes 4 times per day for the elbow.

LLPS Methods

1. Joint Active Systems Shoulder Unit
2. Use of weighted ER or IR stretches in variable degrees of Abduction
Effects Of Manual Therapy

1. Increased Glenohumeral ROM
   - Stretches capsular tissue
   - Breaks adhesions
   - Initiates fibroclastic activity
   - Reduces muscle spasm

2. Decreased pain
   - Peripheral mechanoreceptor stimulation and nociceptor inhibition
   - Improves synovial fluid to articular cartilage, reducing the deep ache associated with shoulder immobility

3. Synovial Stress
   - Changes synovial fluid viscosity
   - Increases synovial turnover time

Glenohumeral End-Range Joint Mobilization

Inclusion: More than 50% limitation in elevation or lateral rotation and greater than 3 months since onset.

- 6 subjects treated twice per week for 12 weeks of end-range mobilization.
- Active abduction, flexion, and lateral rotation ROM increased in each of 6 patients 12 weeks of end-range mobilization.
- Correlation of increased motion with increased joint capacity from 10cm³ to 14cm³!

Proprioceptive Muscular Technique (PNF)

- Home Exercise and PNF Stretching both improve ER and ABD ROM and SPADI scores after 2 & 4 weeks.
- PNF alone is significantly better than Home Program Alone.
- Effective Techniques:
  - Slow Reversal
  - Contract/Relax


Mobilization With Movement (MWM)

- Less Painful because physiological movements normalize accessory joint motion (Arthrokinematics)
- Neural Pain inhibition loop
- Reduction in antagonistic muscle cocontraction
- MWM also improves scapulohumeral rhythm


MWM

- Traditional End-Range Mobilization plus MWM worked better than either one alone (Improved ROM and SPADI scores) after 3 weeks.

Niel-Asher Technique (NAT)

- “Trigger Point Based” A la Travel and Simons 1999
- Improvements in AROM (Flexion and Abduction) after pressure or deep stroking to tender points in the muscle
- Appointments 7-10 days apart, 25-40 minutes each
- +/- Home Exercise Program of passive stretching
- Light Painfree Use of the involved arm


NAT

1. Sitting, to Upper Trapezius
2. Side-Lying, To Lateral Humeral Myofascial Band, Elbow to Shoulder
3. Sidelying IRBB, To Posterior Cuff
4. Passive Circumduction
5. Supine, Biceps
6. Supine, Infraspinatus


Bonus! Subscapularis Trigger Point

Subscapularis is palpable in the dorsal axilla
Apply direct pressure to tender spots for 30-60 seconds
Dry Needling

Case Study:
13 Therapy Visits Over 6 Weeks
Restored IR, ER, FLEX, ABD
Improved SPADI and QuickDASH

Exercise, Manual Therapy, Stretching Program

Dry needling, upper trapezius, levator scapula, deltoid, and infraspinatus trigger points


SURGICAL INTERVENTIONS

Manipulation under Anesthesia
Capsular Release

Recommending Plan B
✓ Completed >12 weeks therapy & home program
✓ VERY stiff (great loss of IR/ER)
✓ Phase: “Frozen” Phase, After approximately 8 months duration
✓ Younger (40’s/early 50’s)
✓ More active, higher shoulder demand
✓ Diabetic

Manipulation Under Anesthesia (MUA)

- **Procedure**
  1. Patient supine, one hand stabilizes the scapula of the affected side
  2. Affected arm is held at the humerus, externally rotated (to clear the greater tuberosity from beneath the acromion and prevent fracture), then elevated
  3. Arm returned to 90°, and internally rotated, continue until symmetrical motion

- **Risks**
  - Humeral fracture, brachial plexus injury, glenohumeral dislocation

Capsular Release

- Anterior Capsule
- Rotator Interval
- Restore External Rotation
  - *Not Subscapularis*
  - *Close to the axillary nerve*
- Posterior Capsule
  - Restores Internal Rotation and Horizontal Adduction

Expected Progress

- Excellent ROM, Pain, Function results with “early rehabilitation”
- Best ROM observed within 48 hours of surgery because of the anesthetic
- Dip in ROM at 1 month post-operatively (post-op adhesion formation)
- Nearly complete ROM, Minimal functional deficit and pain at 6 months post-op


Therapy After MUA

- **INPATIENT, 3 days:**
  1. Head of bed 30°
  2. 90° Shoulder abduction and ER at night for two weeks
  3. Hand on top of the head as much as possible all day
  4. IR/ER/Flex AROM 2x/day
  5. Then, Begin outpatient therapy 3x/week “full go”
  6. Home program 3x/day


Therapy After MUA/Capsular Release

- **OUTPATIENT**
  - Daily therapy with range of motion in all planes as tolerated the first 1-2 weeks,
  - Reduce to 2-3 visits per week as indicated by progress
  - Features adherence to home program:
    - 3x30 minutes per day
    - Vs.
  - “Do something” for 10 minutes every 2 hours
Axillary Nerve Evaluation

- **Resisted Test:** Abduction of the arm, (palpating anterior, middle, and posterior Deltoid eliminates the possibility of supraspinatus substitution)
- **Sensation Test:** Lateral aspect of the upper arm

SPECIAL CASES OF SECONDARY ADHESIVE CAPSULITIS

- Hemiplegic Shoulder Pain
- Post-Mastectomy Shoulder Stiffness
Hemiplegic Shoulder Pain

- Painful
- Loss of ER and ABD
- Loss of motor control
- Subluxation
- Brachial plexus traction

**Therapy:**
- NMES
- Support to reduce traction
- Gentle ER Stretches


Post-Mastectomy Shoulder Stiffness

Surgical scarring
Radiation fibrosis
Pain, lymphedema, refer out as needed
Increased scapular excursion and upward rotation with humeral elevation


WRAP IT UP
Referral Source Talking Points

- Define the terms “what do you consider frozen shoulder”
- Practice patterns: View of injection, NSAID, low load prolonged stress devices
- Pros and Cons of therapy in the past
- Capsular release: anterior only or anterior and posterior?
- Use of steroids to reduce acute inflammation