An Osteopathic Approach to the Frozen Shoulder: Adhesive Capsulitis
An Introduction to the Fascial Distortion Model

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A Warm Alaska Welcome
Financial Disclosures

- Nothing to disclose
- I am a certified instructor in the Fascial Distortion Model, and receive Honoraria when I conduct teaching seminars, but not for this program
- As a presenter at this conference, my CME fees were waived 😊

Shoulder pain

- Every patient with shoulder pain assumes they have injured the rotator cuff.
- Indeed they may have a damaged rotator cuff. But is that the cause of their pain?

Another Common Syndrome

- Doctors are familiar with this syndrome so it is commonly used to explain a patient's shoulder pain.
The Frozen Shoulder: Adhesive Capsulitis
Another Common Syndrome

Shoulder Pain

- Extensive amount of tissue in this region that can explain a patient's pain.
- A lot of interaction with other regions.
- Interconnected fascial planes.

Shoulder Pain

- Extensive layering of the muscles and therefore fascia.
- Looking at an MRI we can see the fascial layers that can be involved.
Shoulder Pain: Before & After Treatment

Shoulder Pain: Frozen Shoulder/Adhesive Capsulitis

- Adhesive Capsulitis is one of many painful shoulder conditions presenting with progressive limitation of active and passive Shoulder ROM
- Frozen Shoulder does not denote a specific pathology, and is non-specific terminology
- Adhesive Capsulitis is a specific pathologic entity in which chronic inflammation of the capsule subsynovial layer produces capsular thickening, fibrosis, and adherence of the capsule to itself and to the anatomic neck of the humerus.
- The contracted, adherent capsule is painful, especially when stretched suddenly, and produces a mechanical restraint to motion

Adhesive Capsulitis
Frozen Shoulder/Adhesive Capsulitis

Today’s Goals & Objectives

• Review historical and current understanding of Adhesive Capsulitis/Frozen Shoulder (FS)
• Present information on diagnostic criteria, epidemiology, pathophysiological mechanisms, and treatment options
• Demonstrate appropriate physical exam of the shoulder
• Review current Practice Guidelines in the diagnosis and treatment of FS
• Introduce the Fascial Distortion Model (FDM) as a unique osteopathic modality, appropriate for treatment of FS
• Demonstrate safe and effective treatment of FS in the FDM

Adhesive Capsulitis: Historical Perspectives

• 1872 First recorded description -“periathritis scapulo-humeral” Duplay1 (Emanuel Duplay, MD, French Surgeon 1836-1924) Synonyms: Duplay’s Disease, Subacromial Bursitis
• 1934 Codman2 first used the term “frozen shoulder” (Ernest Codman, MD Boston Surgeon 1869-1940) Codman’s (pendulum) Exercises
• 1945 Neviaser1 described gross & histologic surgical findings of decreased synovial fluid in the GHJ, tight, thickened capsule under tension limiting shoulder movements about the Humeral head, proposed the term “adhesive capsulitis” as more accurate3,4

Adhesive Capsulitis: Historical Perspectives

• 1989 Zuckerman & Cuomo-defined Idiopathic adhesive capsulitis1 - “condition of uncertain etiology characterized by substantial restriction of both active and passive shoulder motion that occurs in the absence of a known intrinsic shoulder disorder
• Noted prevalence in presence of endocrine dz (Hyperthyroid, DM), ischemic heart dz, and S/P CVA with hemiparesis suggests microvascular risk factors
• Presence of inflammatory markers (HLA-B27),4 and co-morbidity with Rheumatologic dz (RA, Scleroderma, SLE & Dupuytren’s Dz) suggests auto-immune mechanisms
Adhesive Capsulitis: Historical Perspectives

- Psychiatric implication—so called “periarthritic personality” increased incidence with comorbid depression, anxiety, & hysteria, not confirmed by personality inventories2,3, and may be secondary to the painful conditions.
- Proposed mechanisms of Trauma/Pain, leading to voluntary/involuntary immobilization, resulting decreased synovial fluid viscosity and fibrous capsular adhesion.
- Codman’s work (1934) gave rise to the theory that FS was a consequence of shoulder tendinopathy, but subsequent studies have largely refuted this as a pathophysiologic mechanism for FS.

Adhesive Capsulitis: Current Classification Models1,2,3,4,5

- Primary Idiopathic Adhesive Capsulitis—"a condition of uncertain etiology that is characterized by clinically significant restriction of active & passive shoulder motion that occurs in the absence of a known intrinsic shoulder disorder”:
  - Insidious, Idiopathic, no Identified Inciting event
- Secondary Adhesive Capsulitis—generally due to trauma and/or subsequent immobilization
  - Known inciting event without recovery of ROM as expected

What is Adhesive Capsulitis?
Primary Idiopathic Adhesive Capsulitis

- Idiopathic disease with 2 principal characteristics
  - Pain—progressive, associated with movement, becomes constant even at rest, and worsens with end ROM activity, psychological stressors, exposure to cold/vibration, weather changes, may last 1/2 years
  - Contracture—progressive loss of ROM, passive & active, in capsular pattern
  - Condition of uncertain etiology characterized by clinically significant restriction of active and passive ROM in absence of known intrinsic shoulder disorder

1. 1992 American Shoulder & Elbow Surgeons Society consensus definition of FS
What is Adhesive Capsulitis?

- Global Loss of Range of Motion of the Shoulder
- Idiopathic restriction of shoulder movement, usually painful at onset
- Secondary causes: alteration of supporting structures, autoimmune, endocrine, other systemic diseases
- 3 defined stages of Primary Idiopathic Adhesive Capsulitis:
  - Painful stage (freezing stage): 3-9 mos, acute synovitis of GHJ
  - Adhesive stage (frozen/transitional stage): 4-12 mos, fibrous adhesions
  - Recovery stage (thawing stage): 12-24 mos, gradual return of shoulder mobility

1. Adhesive Capsulitis: A Sticky Issue  Lori Siegel, MD, Norman Cohen, MD Eric Gall, MD Finch University of Health Sciences/Chicago Medical School. Am Fam Physician. 1999 Apr 1;50(7): 1843-1850

3 Stages of Adhesive Capsulitis:

- Painful Stage: Pain with movement, lasts 3-8 months
  - Generalized ache difficult to localize,
  - Muscle spasm
  - Increased pain at night and at rest
- Adhesive Stage: Less pain, lasts 4-6 months
  - Increasing stiffness and restriction of motion
  - Decreasing pain at night and at rest
  - Discomfort at end ROM
- Recovery Stage: Decreased Pain, lasts 1-3 months
  - Marked restriction with slow gradual increase in ROM
  - Recovery is spontaneous but frequently incomplete

1. Adhesive Capsulitis: A Sticky Issue  Lori Siegel, MD, Norman Cohen, MD Eric Gall, MD Finch University of Health Sciences/Chicago Medical School Am Fam Physician. 1999 Apr 1;50(7): 1843-1850

Adhesive Capsulitis: Breaking it Down

- Primary Idiopathic Adhesive Capsulitis
- Secondary Adhesive Capsulitis-associated or resulting from other pathologic states
  - Trauma
  - Enthesopathies
  - Autoimmune Dz
  - Endocrine Dz
  - Referred Pain conditions

1. Adhesive Capsulitis: A Sticky Issue  Lori Siegel, MD, Norman Cohen, MD Eric Gall, MD Finch University of Health Sciences/Chicago Medical School Am Fam Physician. 1999 Apr 1;50(7): 1843-1850
Secondary Adhesive Capsulitis: Associated Conditions

- Diabetes Mellitus
- Hyperthyroidism
- Trauma, avascular necrosis, osteoarthritis
- Rheumatoid Arthritis/Scleroderma
- Referred Pain-MI, Lung CA, COPD, Cervicalgia, Cholecystitis, CRPS1, Hepatitis,
- CVA/hemiplegia
- Parkinson’s Dz
- Post-mastectomy syndrome

Risk Factors for Adhesive Capsulitis:

- Age >50
- Female-Ratio 1.4:1
- Diabetes
- Dyslipidemia/Hypertriglyceridemia
- Hyperthyroidism
- Microvascular Disease

Epidemiology of Adhesive Capsulitis

Shoulder Pain is one of the most common presenting CO in Primary Care.

<table>
<thead>
<tr>
<th>Prevalence of AC in United States is estimated to be 2-3% of the US general population.</th>
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<tr>
<td>Prevalence of 10% in unselected diabetics, 40% lifetime risk of AC in DM.</td>
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<tr>
<td>AC may be bilateral, simultaneously or sequentially in 16% of pts.</td>
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<tr>
<td>Bilateral AC more common in DM.</td>
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<td>Contralateral AC usually occurs within 5 years of AC onset, relapse in same shoulder is unusual.</td>
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<td>Impacts a wide range of patients.</td>
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<tr>
<td>Most patients are between 50 and 60 years of age. Mean age onset: 52; M 55</td>
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<td>Women more likely to be diagnosed than men, F/M ratio 1.4:1</td>
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<td>No reported racial or regional variations in frequency of occurrence of AC.</td>
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Adhesive Capsulitis of Shoulder  
2015 ICD-9-CM Diagnosis Code 726.0

- 2015 ICD-9-CM Diagnosis Code 726.0
- 2015 ICD-10-CM Diagnosis Code M75.0
- M75.0 is a specific ICD-10-CM diagnosis code that can be used to specify a diagnosis.
- ICD-9-CM will be replaced by ICD-10-CM beginning October 1, 2015, therefore, M75.0 and all other ICD-10-CM diagnosis codes should only be used for training or planning purposes until then.

2015 ICD-10-CM  
Adhesive Capsulitis

- M75 Shoulder lesions
- M75.0 Adhesive capsulitis of shoulder
- M75.00 Adhesive capsulitis of unspecified shoulder
- M75.01 Adhesive capsulitis of right shoulder
- M75.02 Adhesive capsulitis of left shoulder

2013 Clinical Guidelines on Adhesive Capsulitis

Guideline Title:  
Shoulder pain and mobility deficits: adhesive capsulitis: clinical practice guidelines linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association.

Bibliography Source:
Adhesive Capsulitis: Pathophysiologic Mechanisms

• After 140+ years, still largely mysterious and unknown
• Genetic Factors
  – Trisomy 7 & 8 cultured from fibroblasts of the GHJ
• Triggers
  – Physical Trauma/CVA w Hemiparesis/- microvascular changes?
• Pathophysiologic Mechanisms-Autonomic/Neuroendocrine Dysfunction
  – Autonomic sympathetic dysfunction-similarities with CRPS1, Hyperthyroidism
  – Microvascular Dz-DM, Dupuytrens DZ

Adhesive Capsulitis: Pathophysiologic Mechanisms:

• Neurologic Mechanisms-Common to AC & CRPS1
  – Peripheral alpha-adenoreceptor hyperresponsiveness-Allodynia
  – Dorsal-root reflex’s (DRR’s)-increased substance P & cytokine
  – Central nervous system (CNS) factors-Allodynia
  – Myxoid globular degeneration-loss of terminal sensory nerve fibers -5th & 6th decades
  – Sympathetic autonomic hyperactivity
• Current research into the similarities of CRPS1 and FS include neuromodulatory concepts from CRPS in which Idiopathic Adhesive Capsulitis is a distinct clinical entity

Adhesive Capsulitis: Signs & Symptoms:

• Gradual onset of pain, followed by progressive stiffness
• Discomfort is vague, and typically worse at night
• Pain is present with ROM, often leading to self immobilization, both conscious and unconscious
• Pain not often associated with specific or known trauma or injury
• Painful ROM may be the only physical finding
• Both active and passive ROM are decreased
• Abduction and External Rotation (ER) are most severely affected
• Diagnostic criteria include loss of ≥ 30° ER, and Flexion < 130° both Active and Passive ROM

Adhesive Capsulitis: Differential Diagnosis & Work Up

- H & P
- Lab: CBC, ESR +/- CRP, Thyroid Function tests; FBS/HbA1c; ANA/RA if clinical suspicion of Autoimmune Dz
- Imaging, Neurologic (EMG) testing: Limited value
- Differential DX: Painful & frozen shoulder
  - Consider and R/O Diabetes, Hyperthyroidism, Hyperparathyroidism and other Endocrinopathies;
  - RA, Scleroderma, Ankylosing Spondylitis, SLE, other Autoimmune Disorders
  - AC & Glenohumeral OA, Cervical DJD w radiculopathy, Rotator Cuff Tears, Subacromial/deltoid bursitis
  - Neoplasm-Pancoast tumor, TB, Lung CA, Osteosarcoma

Adhesive Capsulitis: Case Presentation

Adhesive Capsulitis: Physical Exam

- Dx of Adhesive Capsulitis is primarily clinical
- Decreased Active & Passive ROM, with pain
- Document ROM in degrees, Flexion, Abduction, Internal Rotation, External Rotation
- ROM Exam
Physical Exam of the Shoulder

- Inspection/Palpation
  - Anterior
    - SC Joint
    - Clavicle
    - AC Joint
    - Shoulder Heights
  - Posterior
    - Supraspinatus
    - Infraspinatus
    - Scapular Heights
- Range of Motion
  - Glenohumeral rhythm
  - Scapular dyskinesis
  - Painful arc
  - External/Internal Rotation

Physical Exam of the Shoulder

- Muscle Testing
  - Supraspinatus-ABD
  - Infraspinatus-ER
  - Biceps LH-forward FLEX
  - Subscapularis-Lift Off
  - Serratus Anterior-Winging Scapula

Orthopedic Special Tests (OST’s) for the Shoulder

Five Categories of Tests

- Impingement
- Rotator Cuff Pathology
- Labral Tears and Biceps Pathology
- AC joint pathology
- Instability
Physical Exam of the Shoulder

• Specific Shoulder Diagnostic Tests
  – Lift off: Subscapularis
  – Jobe’s test/Empty Can test: Supraspinatus, Infraspinatus
  – Hornblower’s sign: Teres Minor
  – Yergason’s/Speed’s test: Bicipetal tendonosis,
  – Neer’s test/Hawkin’s test: Impingement
  – O’Brien’s test/Apprehension: Labrum tear/Instability

Physical Exam of the Shoulder
Provocation Tests

• AC Joint Tests
  – Horizontal Flexion
  – Adduction
  – Resisted ABD in horizontal flexion
• Impingement Signs
  – Neer’s/Hawkin’s
• Stability
  – Sulcus test
  – Apprehension & Relocation
  – AP Glide
• Labrum
  – O’Brien’s

Shoulder Pain: Imaging Studies
General Considerations

• Conventional radiographs should be obtained before advanced imaging.
• CT is often the preferred modality for evaluation of displaced fractures and subluxations, whereas stress fractures and some incomplete or non-displaced fractures may be better imaged with MRI or radionuclide bone scintigraphy.
• MRI is often the preferred modality for evaluation of soft tissue abnormalities and for interrogation of possible osteomyelitis, despite negative or non-diagnostic plain films and/or triple-phase bone scintigraphy.

Shoulder Pain: Imaging Studies
General Considerations

- If radiographic findings are typical of osteomyelitis, advanced imaging may not be necessary.
- Use of contrast is at the discretion of both the ordering and imaging physicians.
- Brachial plexus imaging: MRI, when not contraindicated, is the preferred imaging modality for brachial plexus. The brachial plexus is a network of nerves in the neck, passing under the clavicle and into the axilla. Assign either a CT or MRI of the upper extremity (non-joint) for imaging the brachial plexus.


Adhesive Capsulitis: Imaging Studies

- **Plain Xray** can detect concomitant conditions & R/O other pathology: Neoplasm, DJD, Frx, avascular necrosis, bicipetal and calcific tendinitis.
- **MRI** not diagnostic for AC, but can identify other conditions: Rotator cuff tendonopathy, subacromial bursitis.
- **US** recently recommended over MRI for Dx Full thicknessRotator Cuff Tears.
- **Arthrography**: Not commonly used, can document decreased joint volume. Normal shoulder 20-30 ml, AC shoulder 5-10 ml.

Treatment Options in Adhesive Capsulitis

- No high-level evidence to support or refute many of the commonly used treatments for AC:
- Pharmacologic interventions
- Non-Pharmacologic interventions: US, E-Stim, heat, ice, or iontophoresis. May provide palliative relief and facilitate participation in Therapy.
- Myofascial Release, Massage, Acupuncture
- Physical Therapy and Rehabilitation
- Osteopathic Manipulative Treatment
Pharmacologic Treatment of Adhesive Capsulitis

- Oral: NSAID’s: ASA, Cox 1, Cox 2;
- Corticosteroids (CS)
- Analgesics: Opioids, Tramadol HCL, Acetaminophen; Combo’s
- Muscle Relaxers: Cyclobenzaprine, Tizanidine, Carisopradol, Methocarbamol
- Antidepressants: TCA’s, SSRI’s, SNRI’s
- Intra-articular: CS, Traumeel, Capsular Distension, HA Derivatives
- Topical: Analgesics, NSAID’s, CS, Lidocaine

Non-operative Management of Adhesive Capsulitis

- Physical Therapy and Rehabilitation
- Osteopathic Manipulative Treatment
- Intra-articular injection
  - Corticosteroids: effective when combined with PT
  - Hydrodilation: may loosen adhesions, improve function, & reduce pain
  - HA Derivatives: Not Recommended
- Manipulation under anesthesia (MUA)

Non-Operative Treatment of Adhesive Capsulitis

- Manipulation Under Anesthesia-Shoulder is mobilized by moving the humerus into flexion, abduction, then adduction and into external rotation
- Has been proven effective, but no more than Hydrodilation & Intra-articular steroid injection
- Iatrogenic risk of humeral fracture, GHJ dislocation, rotator cuff tear, glenoid fracture, brachial plexus injury, labral tears and hematoma
- Widely supplanted by Arthroscopic Capsular Release
Surgical Treatment of Adhesive Capsulitis

- Arthroscopic Release and Repair:
  - Reserved for failed conservative management (3-6 months)
  - Younger pts, with more severe initial sx, & decreased ROM despite 4 mos of compliant therapy, more likely to need Surg:
  - Targets the coracohumeral ligament and rotator interval with the contracted capsule including the axillary pouch
  - Active Manipulation performed to return ROM intraoperatively
  - Shown to decrease duration of disease and to return ROM
  - Total recovery of pain free ROM mean 2.8 mos (1-6 mos)
  - Has supplanted Manipulation Under Anesthesia-improved pain relief & restoration of function with less risk.

Treatment of Adhesive Capsulitis in the FDM

Introduction to the Fascial Distortion Model

- Based on simple principles of personal experience and observation
- Patients intuitively know what needs to happen to feel better
- Patients communicate this through consistent verbal and body language
- This system of knowing and communicating is inherent in the Fascia, and is universal.
**Definition of Body Language: “Kinesics”**

- Body Language, or *Kinesics*, is the study of nonverbal communication
- Body Language is both a learned and instinctual process
- Some is hard wired (instinctual) and therefore the same (universal) in all humans
- The rest is variable (learned) depending on how and where a person was raised (cultural)

*How to Read Body Language, Sharon Livingston, PhD; Glenn Livingston, PhD*  
Psy Tech Inc. 2004

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**Body Language Overview**

- The idea that certain forms of body language and nonverbal communication are universal to all humans dates back to Darwin in the early 1800’s
- While some gestures are learned and deliberate, most nonverbal cues we give out are unconscious
- The body language we convey to the world is a combination of instinct, learned behavior and imitation of others

*How to Read Body Language, Sharon Livingston, PhD; Glenn Livingston, PhD*  
Psy Tech Inc. 2004

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**Body Language in the FDM**

- Body Language in the FDM is postulated to be instinctual and intuitive
- The majority of people exhibit body language clues without being aware they are doing so
- Much of the behavior is either autonomic (hard wired and reflexive), or so highly conditioned that it occurs without thinking.
- FDM Body Language is consistent & reliable across cultures, and as such, is Universal
What is Fascia?
• Fascia is the soft tissue component of the connective tissue system that permeates the human body.
• It forms a whole-body continuous three-dimensional matrix of structural support.
• Fascia interpenetrates and surrounds all organs, muscles, bones and nerve fibers, creating a unique environment for body systems functioning.

Fascia
• A continuous sheet of tissue that extends from the head to the toes.
• Every cell is wrapped with the fascial material.
• The fascia is under tension and supports the internal structures such as bone, ligament, and vessels.
• Fascia is sensory, proprioceptive, supportive, conductive, and contractile.
What is Fascia?

- All fibrous connective tissues including:
  - Ligaments
  - Tendons
  - Retinaculæ
  - Joint capsules
  - Aponueroses

What is Fascia?

- Organ and vessel tunics
- Epineurium
- Meninges
- Periostium
- All the endomysial and intermuscular fibers of the myofascia.

Intact Dissected Fascial System
Fascia

- Osteopathic Physicians consider fascia to be an organ system, much like skin
- Fascia communicates what is going on inside the body much like skin does outside the body
- Fascia is neurosensory, has proprioceptive function, and structural/mechanical tensegrity
- Fascia has “memory”, the emotional component of an injury is stored in the fascia

What is the Fascial Distortion Model?

- Anatomical perspective in which most musculoskeletal injuries and certain medical conditions are envisioned as consisting of one or more of six principal fascial distortion types - each of which have signature clinical presentations.

Fascial Distortion Model

- In the manipulative practice of the FDM, each injury is envisioned through the model, and the subjective complaints, body language, mechanism of injury, and objective findings are woven together to create a meaningful diagnosis that has practical applications
Fascial Distortion Model

- In the FDM approach, treatment is directed to the specific anatomical distortions of the capsule, ligaments, and surrounding fascia, physically reversing them.

- When the fascial distortions are corrected, the anatomical injury no longer exists, the patient can resume normal function and is pain free.

Fascial Distortion Model

- This model allows for strikingly effective manipulative treatments for diverse, and often difficult to treat conditions such as pulled muscles, sprains, fractures, frozen shoulders, and other soft tissue injuries.

- It is effective in the treatment of other musculoskeletal and neurologic conditions with heretofore limited treatment options.

Results of Treatment in the Fascial Distortion Model

- Immediate
- Measurable
- Objective
- Obvious
- Predictable
- Reproducible
Six Principal Types of Fascial Distortions

- Triggerband
- Herniated Triggerpoint
- Continuum Distortion
- Folding Distortion
- Cylinder Distortion
- Tectonic Fixation

Six Principal Types of Fascial Distortions

- Triggerband: Distorted banded fascial tissue (TB)
- Herniated Triggerpoint: abnormal protrusion of tissue through fascial plane (HTP)
- Continuum Distortion: Alteration of transition zone between ligament, tendon, other connective tissue and bone (CD)
- Folding Distortion: Three dimensional alteration of fascial plane (FD)
- Cylinder Distortion: Overlapping of cylindrical fascial coils (CyD)
- Tectonic Fixation: alteration in ability of fascial surfaces to glide (TF)

Treatment of Adhesive Capsulitis in the FDM
Questions?

Conclusion

- Thank you for your participation
- Hands-On Session will cover Physical Exam tests of the shoulder
- Afternoon session will focus on the Rotator Cuff Syndrome, with treatment in the FDM

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