Adhesive Capsulitis: Frozen in Time?

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Disclosures

I have no relevant financial relationships with ineligible companies to disclose.

Objectives

1. Review general shoulder anatomy related to adhesive capsulitis
2. Describe basic science related to frozen shoulder in 2025
3. Understand the common presentation of adhesive capsulitis
4. Discuss current treatment options and recommendations for adhesive capsulitis in 2025

Epidemiology

- Age
  - 40-60 years
- Incidence → 2-5% of the general population
  - Oregon is 4.272 million people in 2024
    - This means roughly 210,000 frozen shoulders per year!
- Laterality
  - Typically, non dominant
  - 1/3 of patients can develop this in the contralateral shoulder
- Note: DOES NOT typically recur in the same shoulder after resolution

Frozen Shoulder Continued…

- Risk factors
  - Diabetes (I and II)
    - Risk increases as A1C increases beyond 7
  - Hypothyroidism
  - Dyslipidemia
  - HTN
  - Female/perimenopause

Pathoanatomy

- Adhesive Capsulitis
    - Idiopathic → spontaneous (PRIMARY)
    - Post traumatic or post operative arthrofibrosis (SECONDARY)
  - Unknown etiology
    - Possibly related to fibrotic cascade involving transforming growth factor-B
    - Other key regulators include estradiol and subsequent antifibrotic effects
  - Bunker describes it as a Dupuytren's-like contracture of the CHL and capsule
    - Prevents external rotation!

SCIENCE!

- H
- V

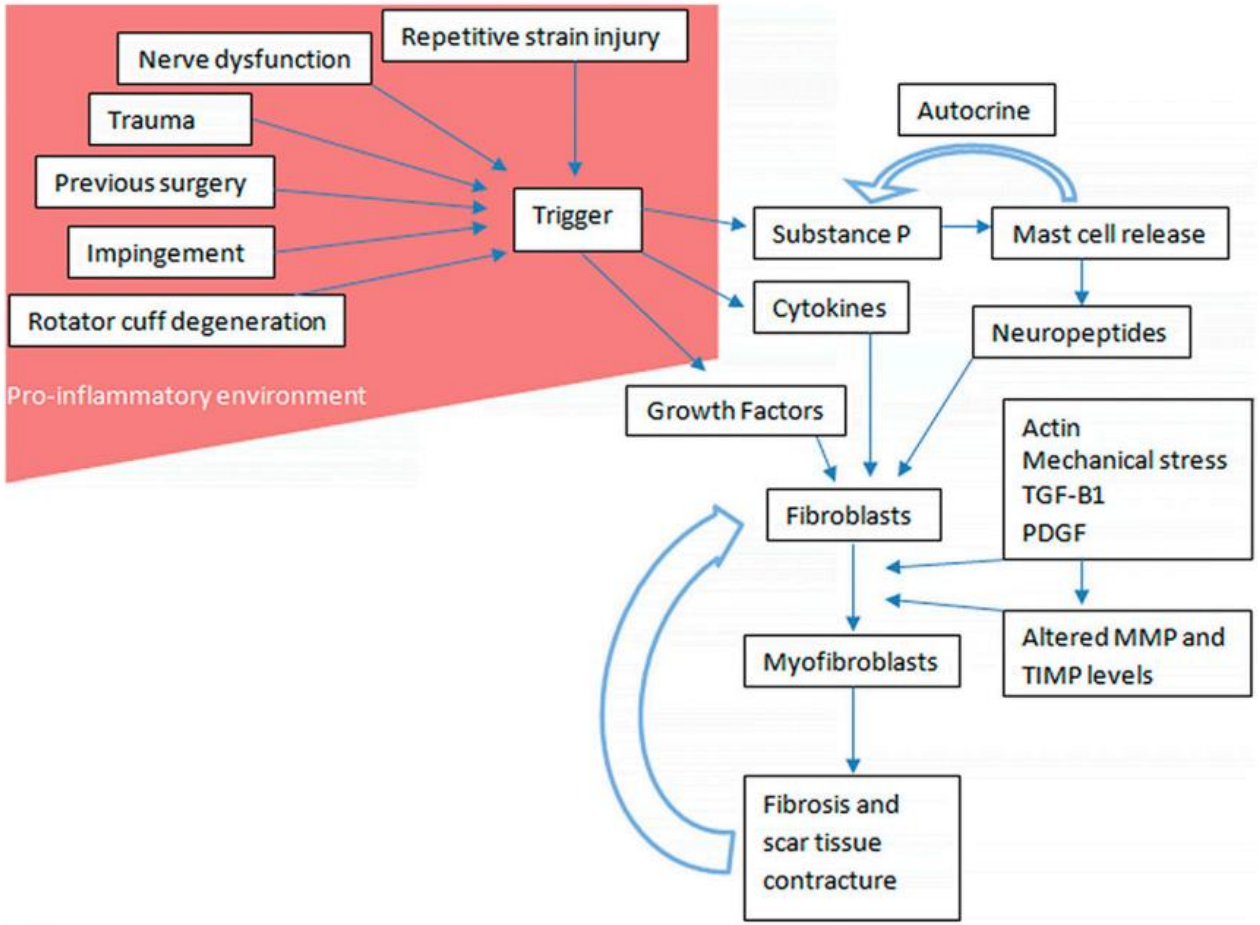


Fig. 2
Proposed sequence of alterations in the development of frozen shoulder.

Table 5 Inter-operative observations and histological findings

		Bunker [39] Arthroscopy +/− open release *N* = 35	Uhthoff and Boileau [41] Arthroscopy *N* = 4	Xu et al. [37] Arthroscopy *N* = 8
Rotator interval	Appearance	Nodular thickening	No signs of inflammation	----
	Histology	↑ Fibroplasia ↑ Cellularity ↑ Vascularity	↑ Fibroplasia	----
Coraco-humeral ligament	Appearance	----	No signs of inflammation	----
	Histology	----	↑ Fibroplasia ↑ Vascularity	----
Inferior glenohumeral ligament	Appearance	----	No signs of inflammation	----
	Histology	----	----	----
Joint capsule	Appearance	Fibrous contracture in RI area	*Posterosuperior :* No signs of inflammation *Inferior:* No signs of inflammation	*Above subscapularis tendon:* Thickened
	Histology	↑ Vascularity	↑ Fibroplasia ↑ Vascularity	↑ Fibroplasia ↑ Vascularity Neoangiogenesis
Synovium	Appearance	*Between subscapularis bursa and RI:* 4/35 Scarred.	*RI:* Villous *CHL:* No villi *Posterosuperior:* Very villous *Inferior:* No villi *AF:* Very villous	----
	Histology	31/35 Abnormal villous fronding. 31/35 ↑ Vascularity	*RI:* ↑ Vascularity *Posterosuperior:* ↑ Vascularity *AF:* ↑ Vascularity	----
Subscapularis bursa	Appearance	"Consistent abnormalities"	----	----
	Histology	----	----	----
Axillary fold	Appearance	----	No signs of inflammation.	----
	Histology	----	↑ Vascularity	----

N (sample size), ↑ (increased), ↓ (decreased) CHL (coracohumeral ligament), RI (rotator interval), AF (axillary fold), −—(no findings or observations recorded)

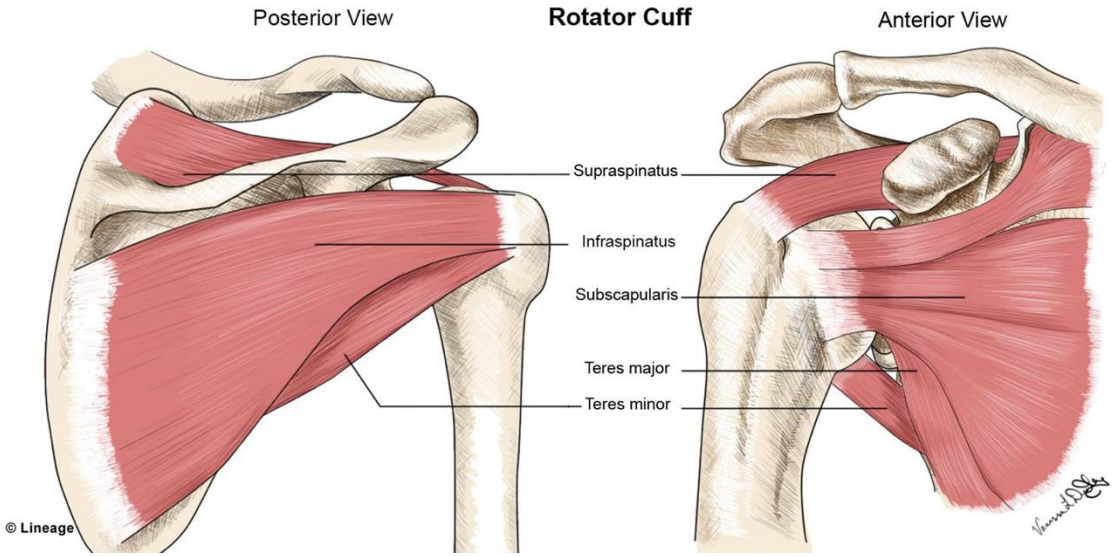
Perimenopause

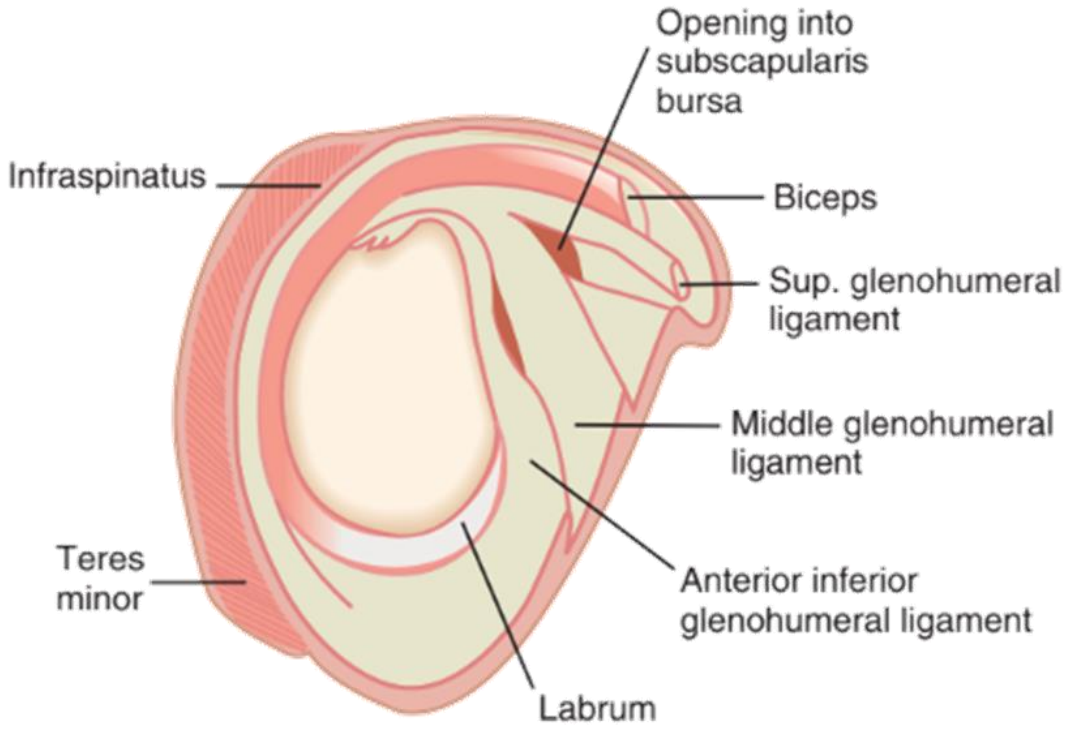
Estrogen depletion → fibrosis

Estradiol exhibits antifibrotic effects

HRT → May be protective against frozen shoulder


Women'sHealth
“
I had frozen shoulder a couple years ago. Nobody knows what causes it and there's nothing you can do about it, like every ailment for women in their 50s."
–Amy Poehler





Anatomy of the Shoulder

SGHL/CHL – Inferior restraint
MGHL – Anterior restraint at 45º
AIGHL – Anterior restraint at 90º

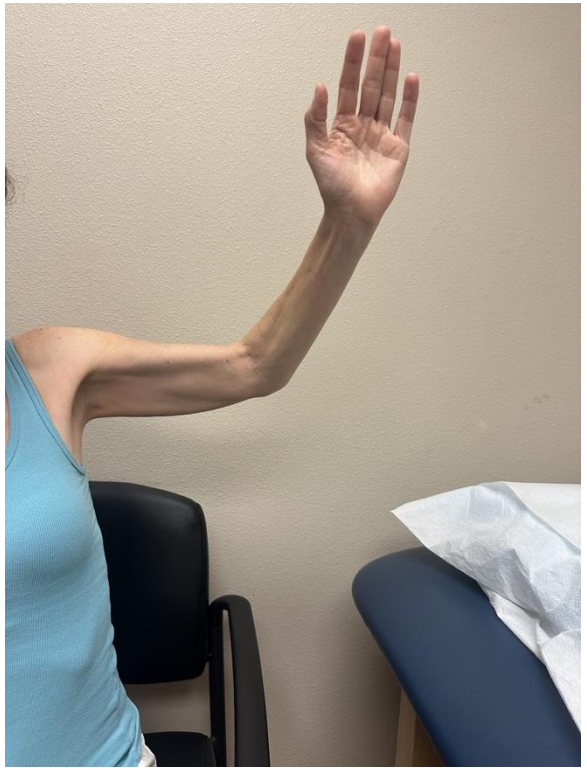
Glenohumeral Ligaments

- CHL
  - Originates at the base of the coracoid
  - Splits over RI and subscap
  - Inserts between LHB and subscap
- MGHL
- AIGHL
- PIGHL

Clinical Presentation Of Frozen Shoulder

Classically presents as:

- Severe pain
- Stiffness
  - Loss of flexion and external rotation (ACTIVE AND PASSIVE)
  - ER typically less than 30^{o}



Frozen Shoulder

- Three phases
  - Inflammatory/Freezing (3-8 months)
  - Frozen (4-6 months)
  - Thawing (5-24 months)

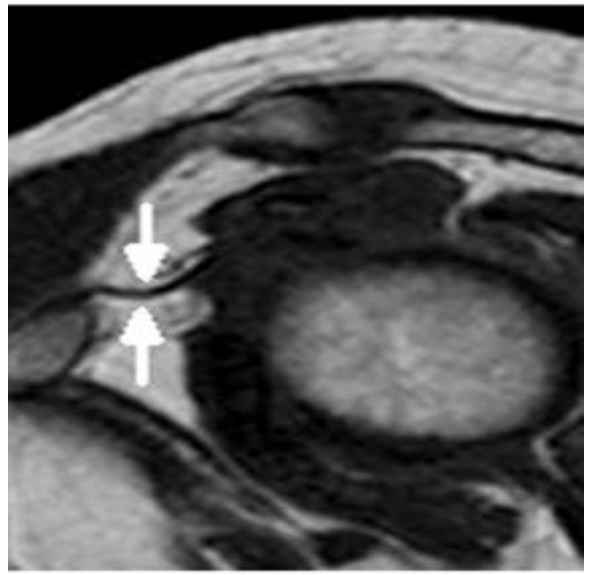
Imaging Findings in Frozen Shoulder

- XR commonly negative
  - Ensure no underlying arthritis which commonly presents with loss of ER
  - Rule out other pathologies such as calcific tendonitis or glenohumeral osteoarthritis

MRI

- Common findings
  1. Thickened CHL
  2. Joint capsule thickening in RI and axillary recess
  3. Thick synovial membrane in RI
  4. Partial or complete obliteration of subcoracoid fat triangle

Figure 4. A 57-year-old male patient with clinical evidence right frozen shoulder. Sagittal oblique, T1-weighted image (T TE = 550 ms/15 ms) shows the complete obliteration of subcoracoid triangle and distinct fatty tissue surrounding the CHL as havi disappeared, and the CHL cannot be measured (arrows).
doi:10.1371/journal.pone.0028704.g004



ıre 2. A 49-year-old male no
eighted image (TR/TE = 550 m
showing homogeneous , low si
0.1371/journal.pone.0028704.g0

Common Treatment Options in 2025

- Watchful Waiting
- NSAIDs
- Medrol dose packs
- Therapy
- Injections
  - Local
  - CSI
  - PRP
- Surgery
  - Perc CHL release
  - Arthroscopic release with MUA

AAOS 2024 best paper in the shoulder and elbow classification: watchful waiting provides higher value with similar functional outcomes to physical therapy for frozen shoulder: a prospective randomized controlled trial

Scott D. Martin, MD[a], Michael C. Dean, BA[a,b,*], Christopher T. Eberlin, MD
Michael P. Kucharik, MD[a,d], Paul F. Abraham, MD[a,e], Mark R. Nazal, MD[a,f],
William K. Conaway, MD[a,g], Nathan J. Cherian, MD[a,h]

Steroid Injections

- How much volume?
- High versus low dose steroids?
- How many intra articular injections are ok?

Chondrolysis of the Glenohumeral Joint After Infusion of Bupivacaine Through an Intra-articular Pain Pump Catheter: A Report of 18 Cases

S. Lance Anderson, M.D., F.R.C.S.C · Jordan Z. Buchko, B.Sc., M.D. · Mario R. Taillon, M.D., F.R.C.S.C · Mark A. Ernst, M.D., F.R.C.S.C

Intra-articular Corticosteroid Injection for Adhesive Capsulitis: A Randomized Controlled Trial

Julie Chan[1], Allison Tucker[3], Christina Hiscox[4], Paul Fenton[2], and , Ryan T Bicknell[1,*] ✉ Authors Info & Affiliations

THE OPEN ORTHOPAEDICS JOURNAL • 25 Sep 2024 • Clinical Trial Study • DOI: 10.2174/0118743250330711240916064941

High- versus Low-dose Steroid Injection for Adhesive Capsulitis (Frozen Shoulder): A Systematic Review and Meta-analysis

Seong Jun Kim, MD[1], Jong Mi Park, MD[1], Junmin Song, MD[2], Seo Yeon Yoon, MD, PhD[1], Jae Il Shin, MD, PhD[3], and Sang Chul Lee,MD, PhD[1]

Therapy Protocols

Shoulder mechanics altered due to tight capsule

Shrug sign

- Scapula migrates superior due to maladaptive movements

Gentle therapy preferred over intensive painful therapy

TERT

- Total end-range time
- 60 minutes per day

PCHLR

- Percutaneous CHL Release
  - Ultrasound guided microtip blade
- Reliable option over arthroscopy
  - Significant improvement in ROM including ER and abduction over a local only injection group

To Cut Or Not To Cut

In Primary Frozen Shoulder, Arthroscopic Capsular Release Improved Function and Reduced Pain Compared with Manipulation Under Anesthesia or Early Physiotherapy with Steroid Injection at 1 Year, but Changes Were Not Clinically Important

Brealey S, Northgraves M, Kottam L, Keding A, Corbacho B, Goodchild L, Srikesavan C, Rex S, Charalambous CP, Hanchard N, Armstrong A, Brooksbank A, Carr A, Cooper C, Dias J, Donnelly I, Hewitt C, Lamb SE, McDaid C, Richardson G, Rodgers S, Sharp E, Spencer S, Torgerson D, Toye F, Rangan A. Surgical treatments compared with early structured physiotherapy in secondary care for adults with primary frozen shoulder: the UK FROST 3-arm RCT. Health Technol Assess. 2020 Dec;24(71):1-162.

- High powered study with 503 patients in the UK FROST trial
  - ACR not clinically beneficial compared with ESP
  - MUA likely most cost effective
    - Be wary of timing when considering MUA!

Arthroscopic Release

- Technical Pearls:
  - Ensure portal is placed in the superior portion of the joint
    - Low portal increases risk of iatrogenic chondral damage
  - Perform inferior release close to labrum to avoid axillary nerve
    - Show image of position of axillary nerve during arthroscopy (study reference?)***
  - Complete MUA after ligament release

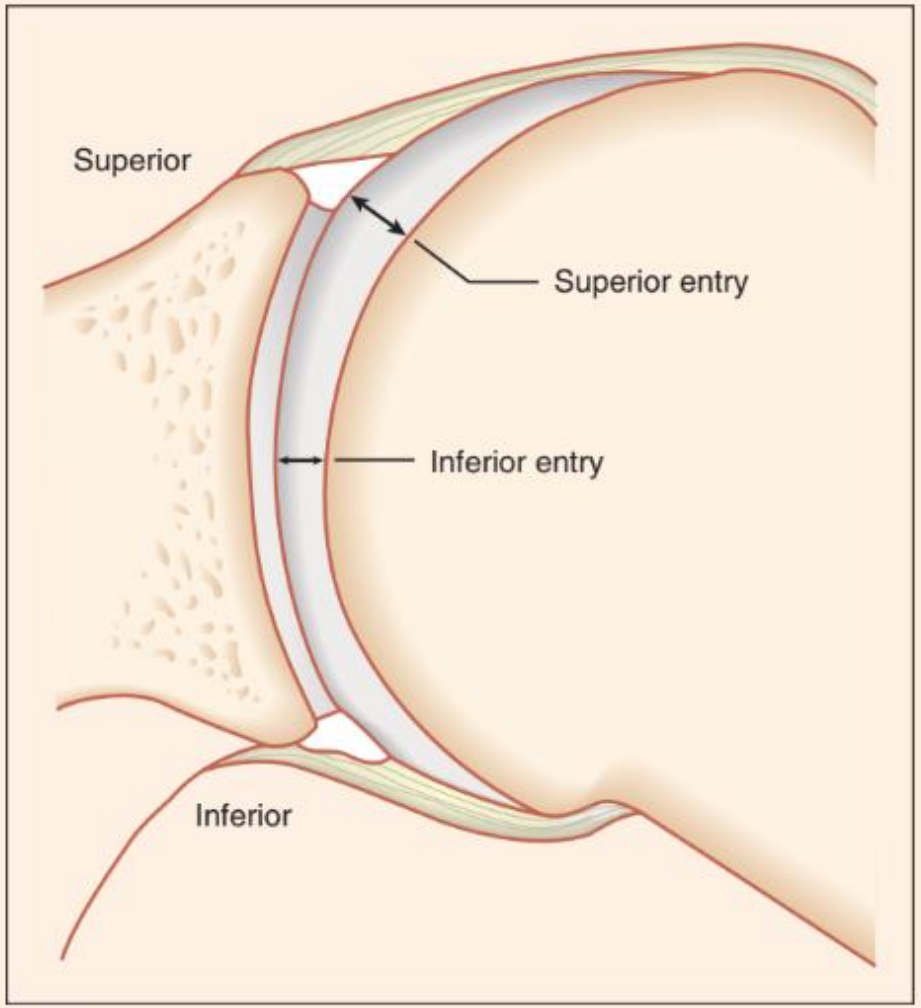


FIGURE 55-3 Location of joint entry. *(From Gartsman GM: Shoulder arthroscopy, Philadelphia, 2003, Elsevier.)*

Conclusions

1. Frozen shoulder drags on forever (2 years or more) without return of full motion
2. Consider biologic factors such as perimenopause, diabetes, hypothyroidism, etc
3. Therapy, CSI, therapy, NSAIDs, therapy, then try more therapy
4. MUA likely more cost effective and lower risk than ACR if therapy fails

Thank You!

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