Frozen shoulder

Postgraduate Teaching Programme
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Codman 1934

- *'This is a class of cases I find difficult to define, difficult to treat, and difficult to explain from the point of view of pathology'*
- *(sigh)*

What you need to know

- What it is…
- Who gets it…
- What happens to it…
- What, if anything, we can do..
- Most aspects are controversial!

The Problem

- Clinical diagnosis
- Affects 2-5% general population
- And those of working age

- Painful, Stiff and Disabling

- Unknown aetiology
- ?inflammatory ?fibrotic condition
- Protracted natural history

Background

- Duplay 1872 — *Periarthrite scapulohumerale*
- Dickson & Crosby 1932 — *Periarthritis*
- Pasteur 1932 — *Tenosynovitis LHB*
- Codman 1934 — *Uncalcified tendonitis*
- Lippman 1943 — *Scarring of LHB*
- Nevasier/ Moseley 1945 — ***Adhesive capsulitis***
- Withers 1949 — *Involvement of subacromial bursa*
- Simmonds 1949 — *Inelastic fibrous tissue*

Background

- DePalma 1952 — *?muscular inactivity*
- Meulengracht 1952 — *18% Dupuytren's*
- Nevasier 1962 — *decreased joint volume*
- Lundberg 1969/ 70 — *?role of GAG, C-spine*
- McNab 1971 — *?autoimmune role*
- DeSeze 1974 — *associated shoulder pathology*
- Bruckner 1981 — *SAH/ depression*
- Neer 1992 — *importance of coracohumeral lig*

What is it?

Codman 1934

- Described shoulder pain of insidious onset with stiffness
- Identified the classic restriction of elevation and external rotation

What it isn't

- OA
- Rotator cuff disorder
- MUST BE EXCLUDED

Who gets it?

- Females > males (1.5 : 1)
- Age 40-70 (mean 56y)
- Dominant = non-dominant
- Pain: constant, toothache-like , sharp pain with movements, affects sleep

Diagnosis

No consensus

Codman

- Global restriction of movement
- Idiopathic aetiology
- Usually painful at onset
- Normal x-ray
- Limitation of ER and elevation

Diagnosis

Lundberg 1969

1. Elevation < 135 degrees
2. Glenohumeral restriction only
3. No other explanation

- No agreement on range of movement
- ER <50% normal often used

Classification of stiff shoulder

- Primary (idiopathic) or true frozen
- Secondary- stiff due to known cause

Frozen shoulder

Associations

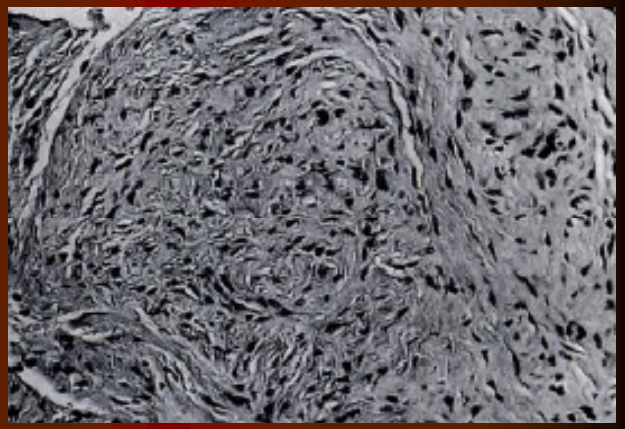
1. Diabetes
2. Dupuytren's
3. Cardiovascular/ hyperlipidaemia
4. Epilepsy
5. Endocrine: thyroid

Diabetes

- 10-20% of frozen shoulders
- Bridgman 1972 (n=800 DM patients)
- 11% of DM had frozen shoulder
- Insulin dependent have 36% incidence
- Bilateral in 42% of DM
- More severe and resistant
- Look for occult DM in frozen shoulder

Dupuytren's

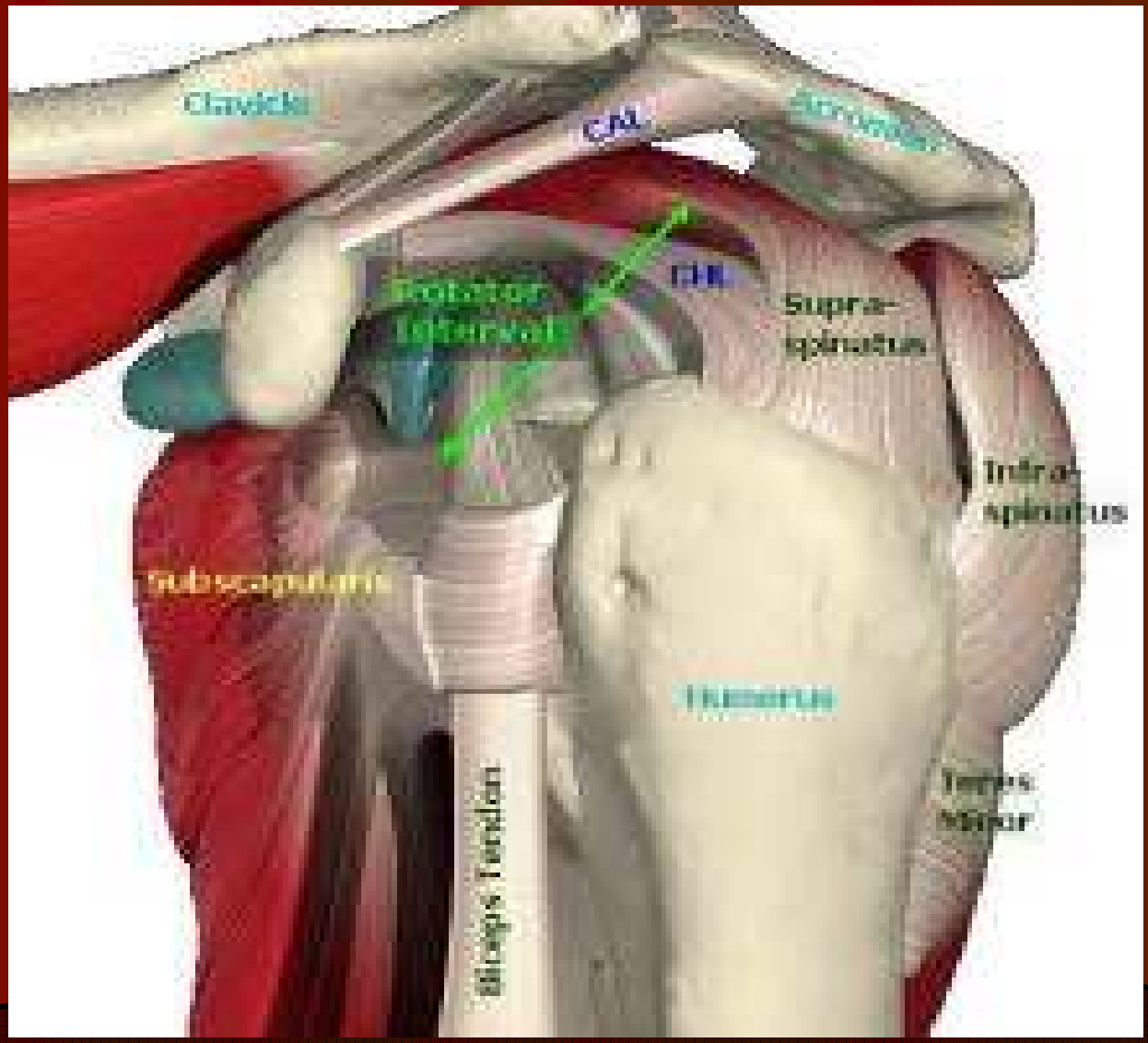
- Tim Bunker 1995, 2000
- 58% (n=50) of idiopathics had DD
- **Myofibroblastic** proliferation; vascular collagen
- Similar pro-inflammatory cytokines: TGF-beta, PDGF
- **N.b. DD is a progressive disease, biopsies from late stage cases**



Secondary 'Stiff' Shoulder

- Intrinsic/ extrinsic
- Post traumatic e.g. #, chondral lesions, AVN, tendinopathy
- Iatrogenic e.g. capsule procedures

Anatomy


Clavicle
CAL
Acromion
Rotator Interval
CHL
Supra-spinatus
Infra-spinatus
Subscapularis
Humerus
Biceps Tendon
Teres Major

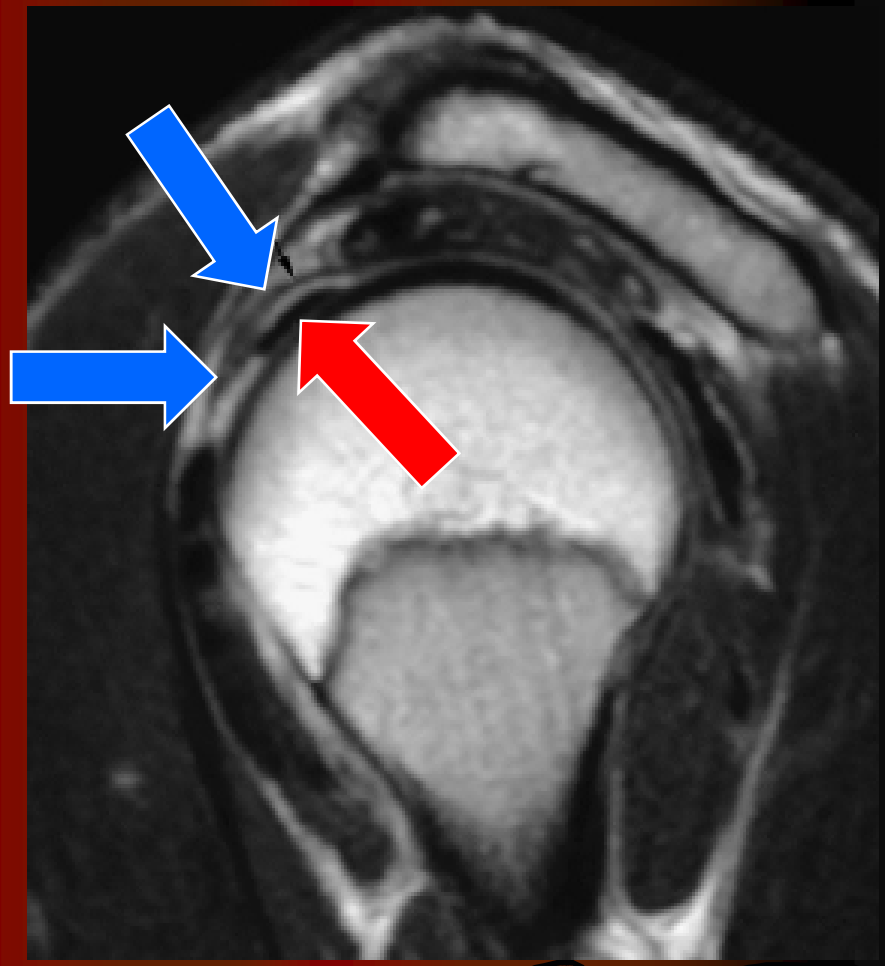
Anatomy

Sagittal MRI

Normal rotator interval

=Hypointense band (blue arrows)

LHB (red arrow)

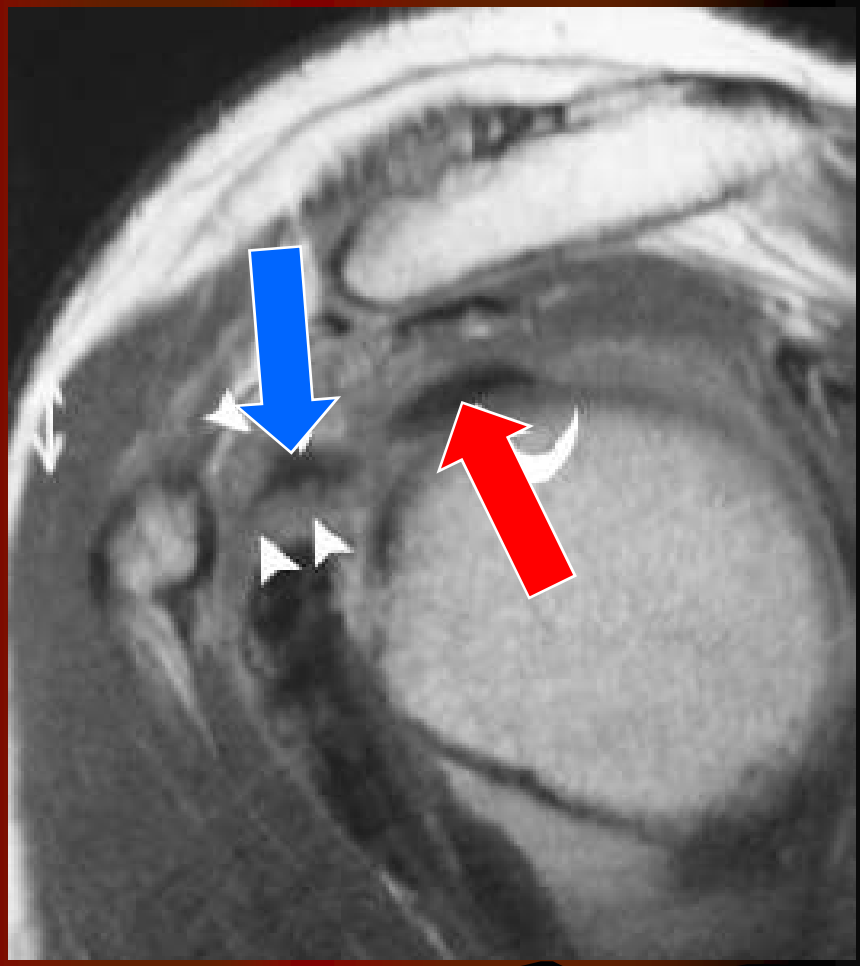


Anatomy

- Axial MRI view
- Coracohumeral ligament = Hypointense band

Anatomy

- Sagittal T1 MRI/gad
- CHL (blue arrow) surrounded by soft tissue (white arrows)
- = synovitis
- LHB (red arrow)



Pathology

- Early: inflammatory, cytokine modulated
- Later: fibrosis, cytokine down-regulation?
- Histology:
  - Early:
    - Lymphocytes
    - increased vascularity; synovitis
  - Late:
    - Collagen bundles and nodules
    - Highly cellular: Fibroblasts and myofibroblasts
    - Reorganisation of collagen matrix

Pathology

- Thickened fibrotic anterior capsule (MGHL)
- Rotator interval: coraco-humeral ligament
- Contracture: check rein to ER

- **Reduced gleno-humeral joint volume** (5-10 ml vs 25-30 ml normally)

Investigations

- Bloods
  - ESR/CRP may be raised
  - TFT
  - Lipids
  - Glucose intolerance
- Xray
  - Osteopenia
  - Superior migration
  - Rule out posterior dislocation! (esp epilepsy)

Investigations

- Arthrogram
  - little used now
  - Distension and rupture of capsule
- Ultrasound
  - Associated cuff pathology
  - Restricted movement of supraspinatus

Investigations

- Isotope bone scan
  - Increased uptake
  - No relation to severity or length of Sx
- Arthroscopy
  - Gold standard to confirm Dx
- MRI
  - Rarely used/needed/excluding other Dx
  - Demonstrates capsule thickness
  - >4mm diagnostic?

Arthroscopic findings

- Small joint; difficult to get into
- Loss of axillary fold
- Tight anterior capsule
- Mild/ moderate synovitis
- NO ADHESIONS
- N.b. May find a secondary cause

Arthroscopic findings

Four arthroscopic stages: Neviaser 1987

1. Inflammatory synovitis; no capsule involved
2. Proliferative synovitis; hypertrophic
3. Maturation of capsule; reduced vascularity
4. Burnt out synovium; dense scarring

Natural history

- 1-3 years but varies (educate the patient!)
- Self-limiting? but incomplete restoration of ROM

- Stage 1 : Freezing phase

- Stage 2: Frozen phase

- Stage 3: Thawing phase

Freezing phase

- Pain is predominant
- Often confused with impingement, night pain
- Arm used less and less
- Lasts 2-9 months

Frozen phase

- Stiffening phase
- Lasts 4-12 months
- **Decreased ROM**
- Pain reduces usually
- Aches at the extremes of motion

Thawing phase

- Gradual improvement in ROM
- Lasts 4-12 months

Outcome

- 10-15% suffer persistent pain and stiffness (Dudkiewicz et al 2004, Shaffer 1992)
- Can improve up to 10 years
- 'Normal' Constant score with 'supervised neglect' (Diercks 2004) at 2 years
- Recurrence is very rare (case reports)

Treatment

1. Education
2. Analgesia
3. Steroid injections
4. Physio
5. MUA
6. Open / arthroscopic capsular release
7. Others

Summary

- Condition peculiar to the shoulder
- Good history and examination required
- Xray usually all that is needed for Ix
- Fibrosis and contracture of the rotator interval
- No intra-articular adhesions

The End

References

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