

20th Course in Shoulder Surgery Balgrist

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EXPERTISE IN MOTION  
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« Shoulder Course »  
Day 1  
11. Sept. 2014

# SHOULDER ANATOMY

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[www.balgrist.ch](http://www.balgrist.ch)



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# ANATOMY OVERVIEW

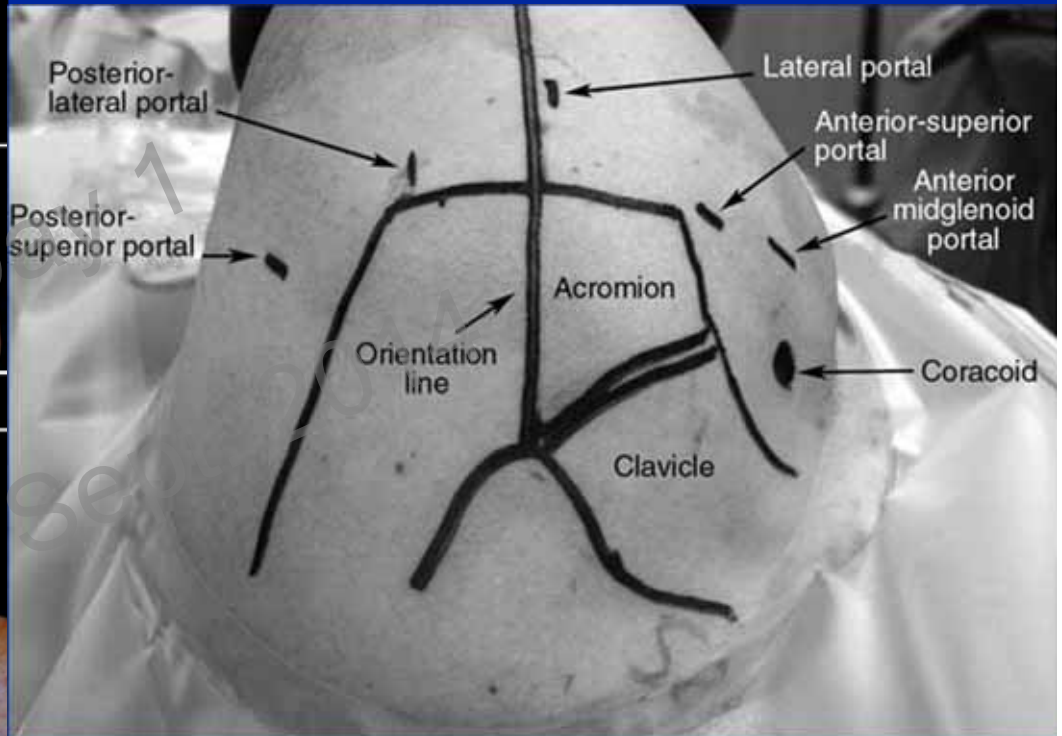
« Shoulder Course »  
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courtesy of Georg Lajtai

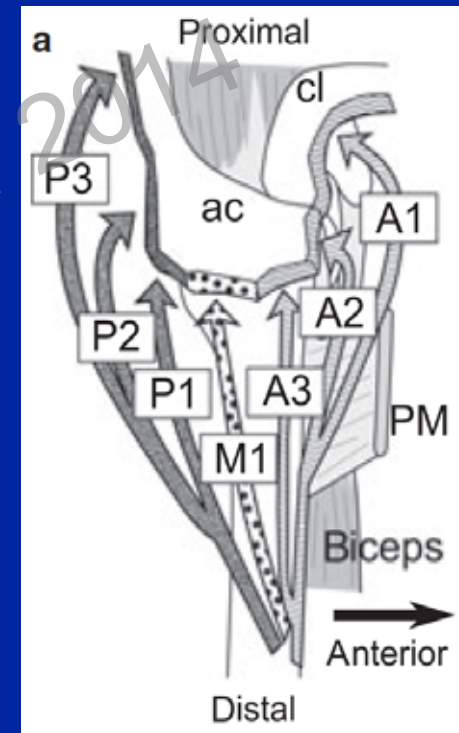
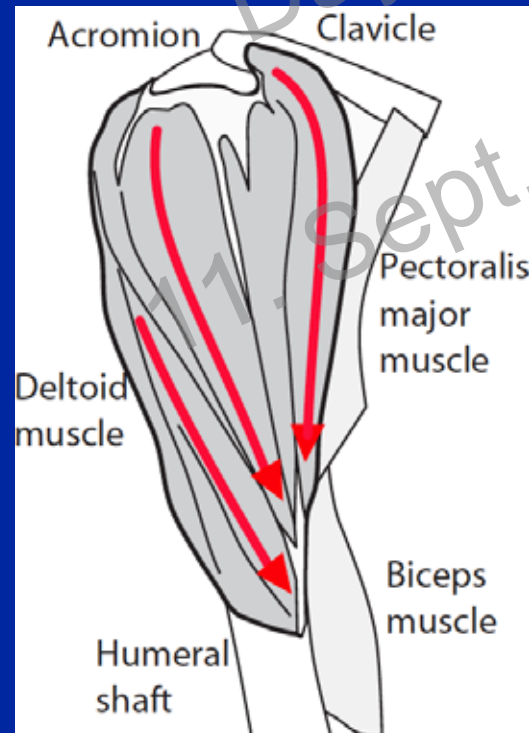
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# BONY LANDMARKS



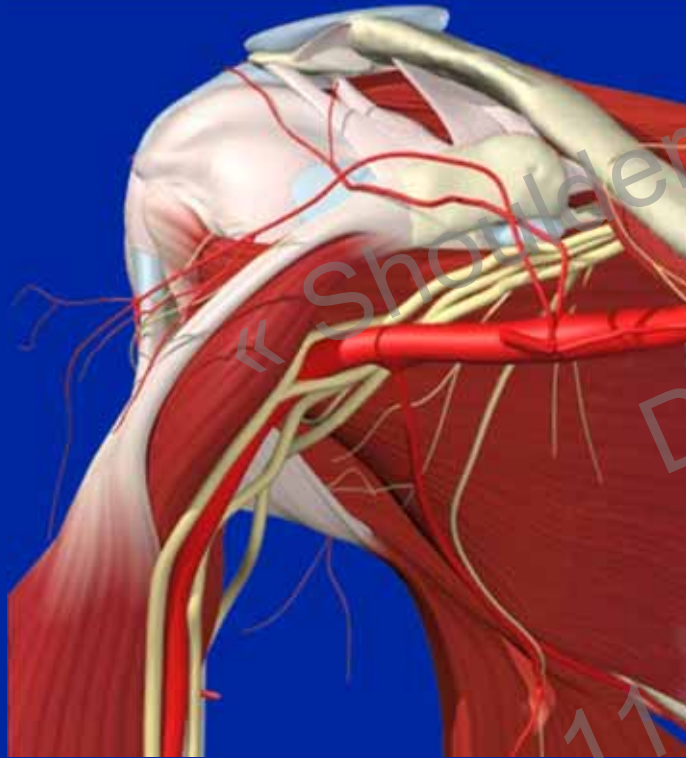
# DELTOID MUSCLE

- origin:
  - clavicular
  - acromial
  - spinous
- insertion: deltoid tuberosity
- innervation: axillary nerve (C5, C6)

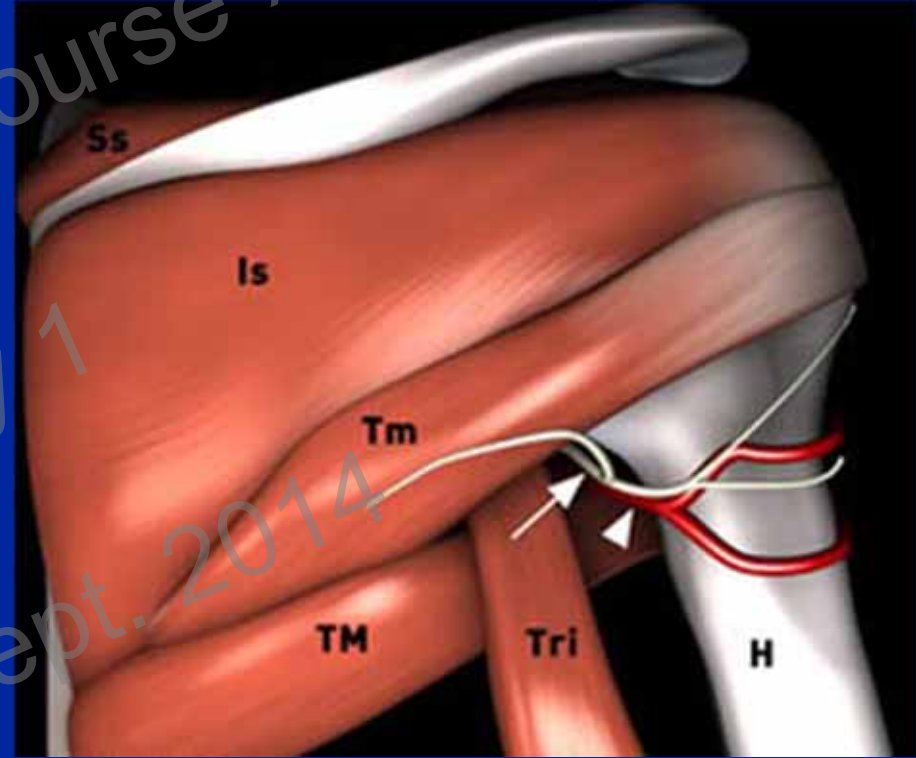




# AXILLARY NERVE



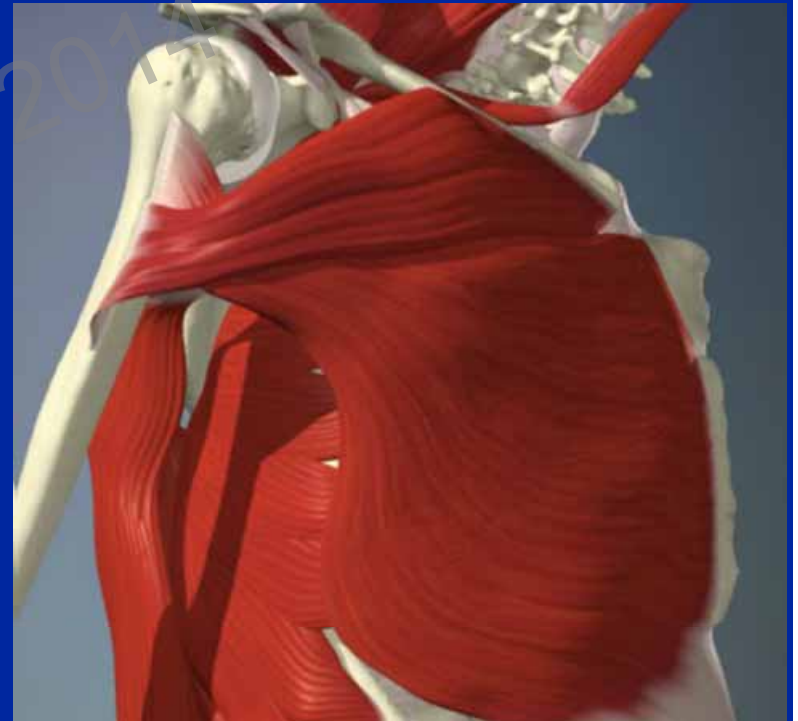
- posterior cord
- level of coracoid



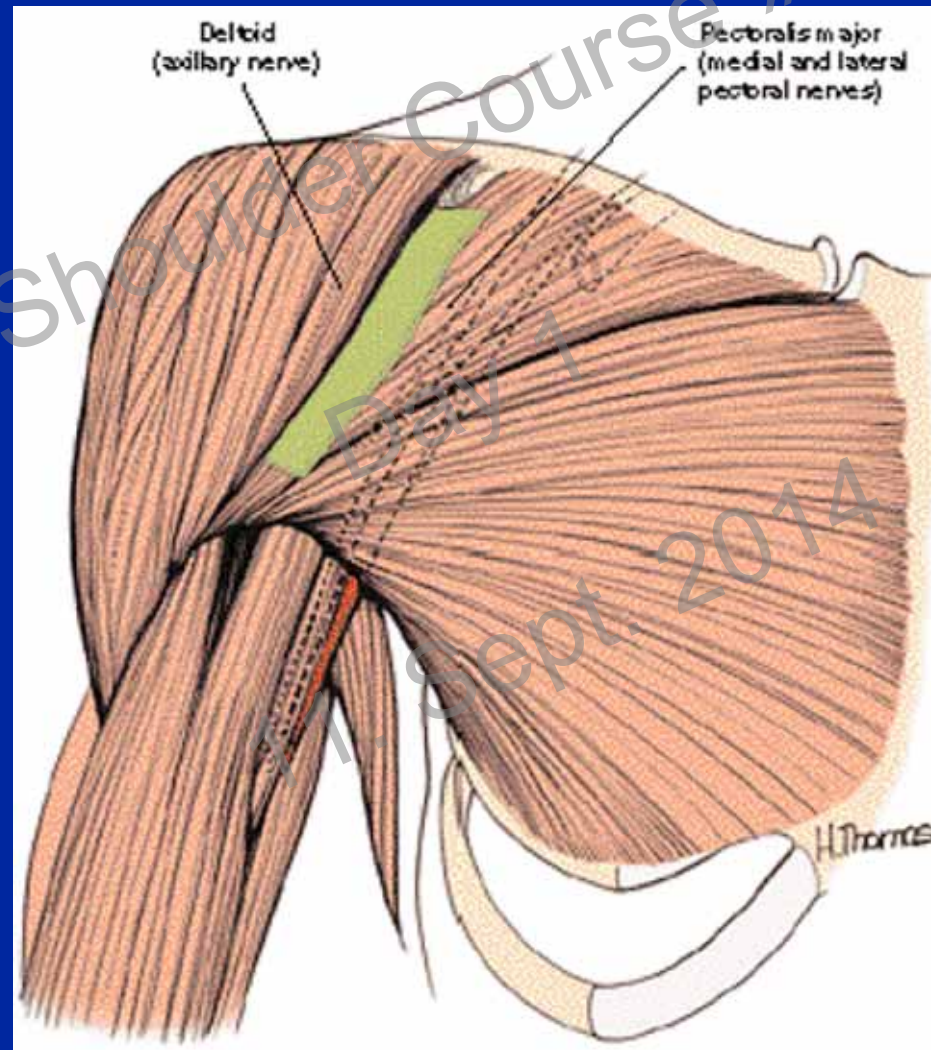
- quadrilateral space
- around surgical neck

# PECTORALIS MAJOR

- Pars clavicularis
- Pars sternalis
- Pars abdominalis
- insertion: lat. lip of bicipital groove
- med. and lat. pectoral nerve
- flexion, adduction and IR



# DELTOPECTORAL APPROACH



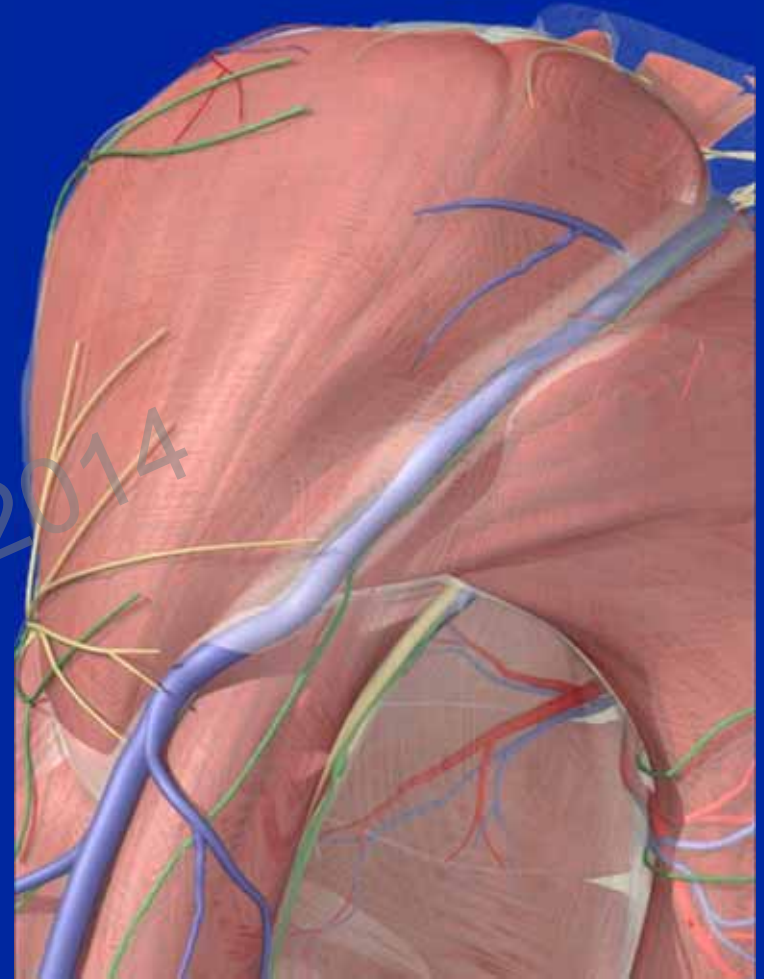
Surgical Exposures, S. Hoppenfeld 3<sup>rd</sup> Edition

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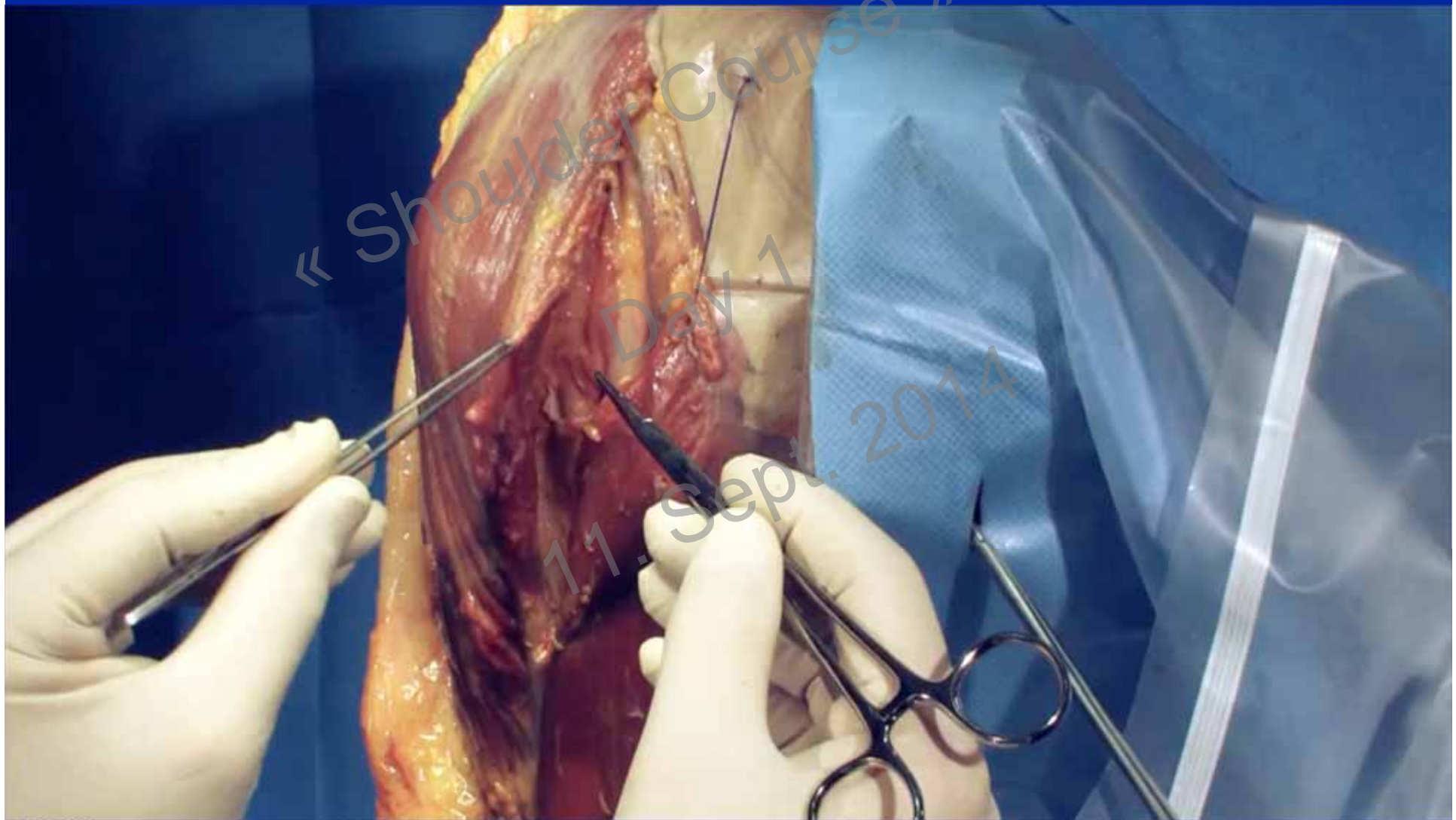
# CEPHALIC VEIN

- Indicates the deltopectoral interval
- absent in 4 %
- feeder vessels lat > med  
→ retract vein laterally





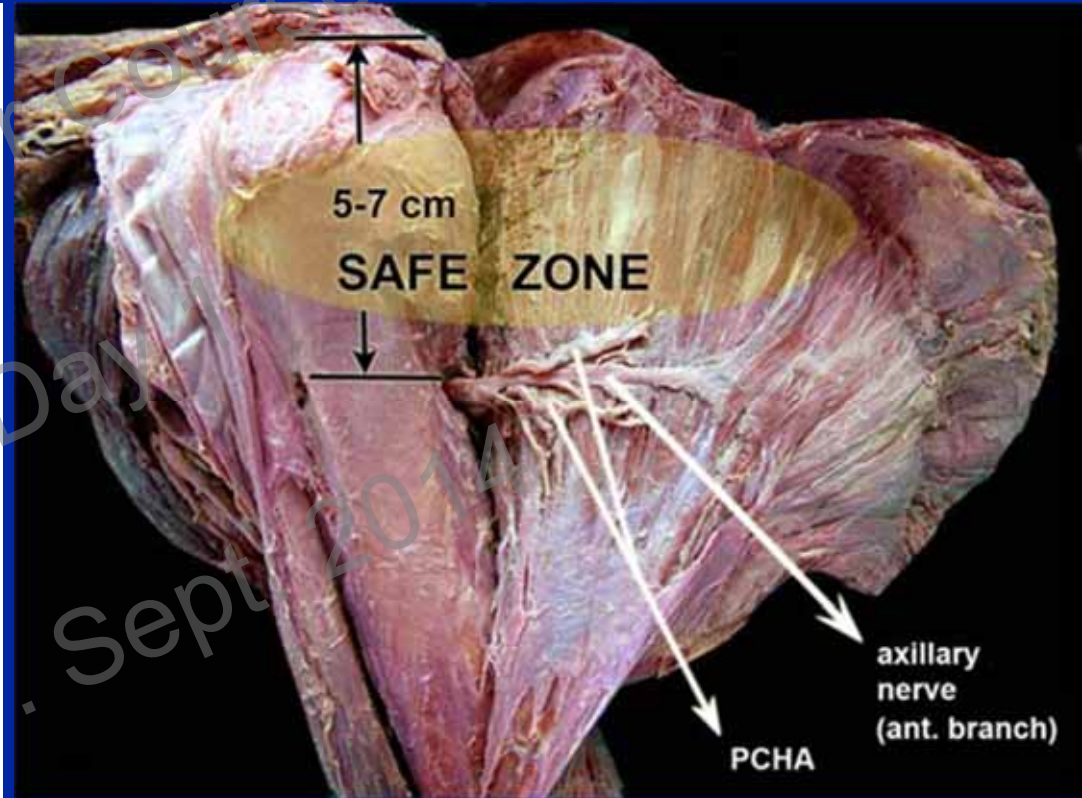
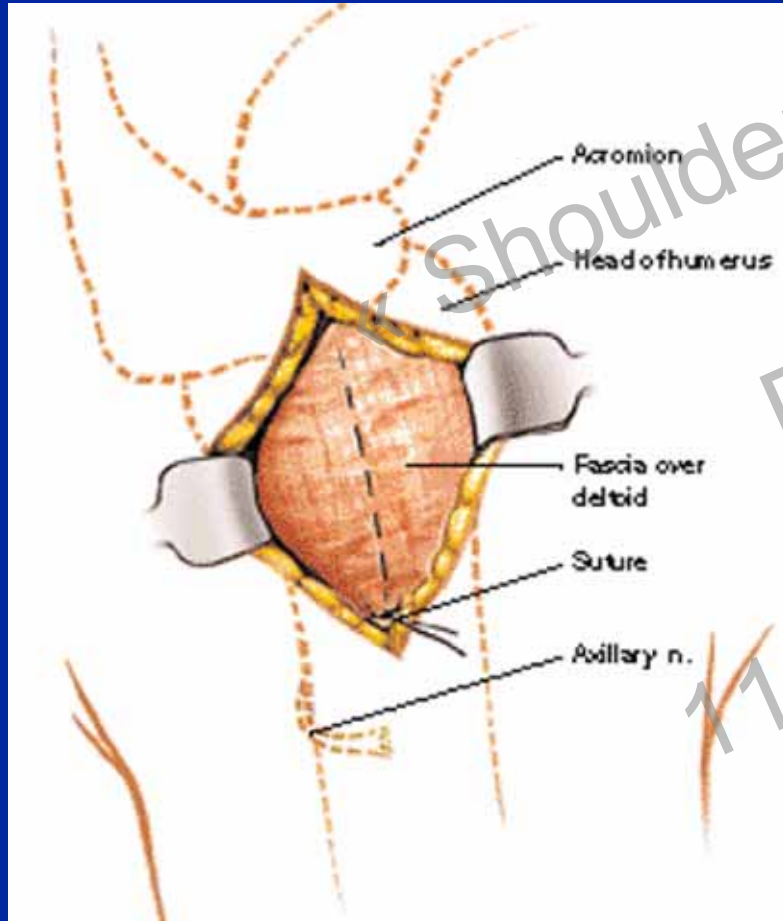
# EXTENDED DELTOPECTORAL ANATOMY



courtesy of Georg Lajtai

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# DELTOID SPLITTING APPROACH AXILLARY NERVE



Cetik O, JBJS(Am) 11: 2395, 2006

Surgical Exposures, S. Hoppenfeld



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# ARTHROSCOPY AXILLARY NERVE



arm in adduction

arm in abduction



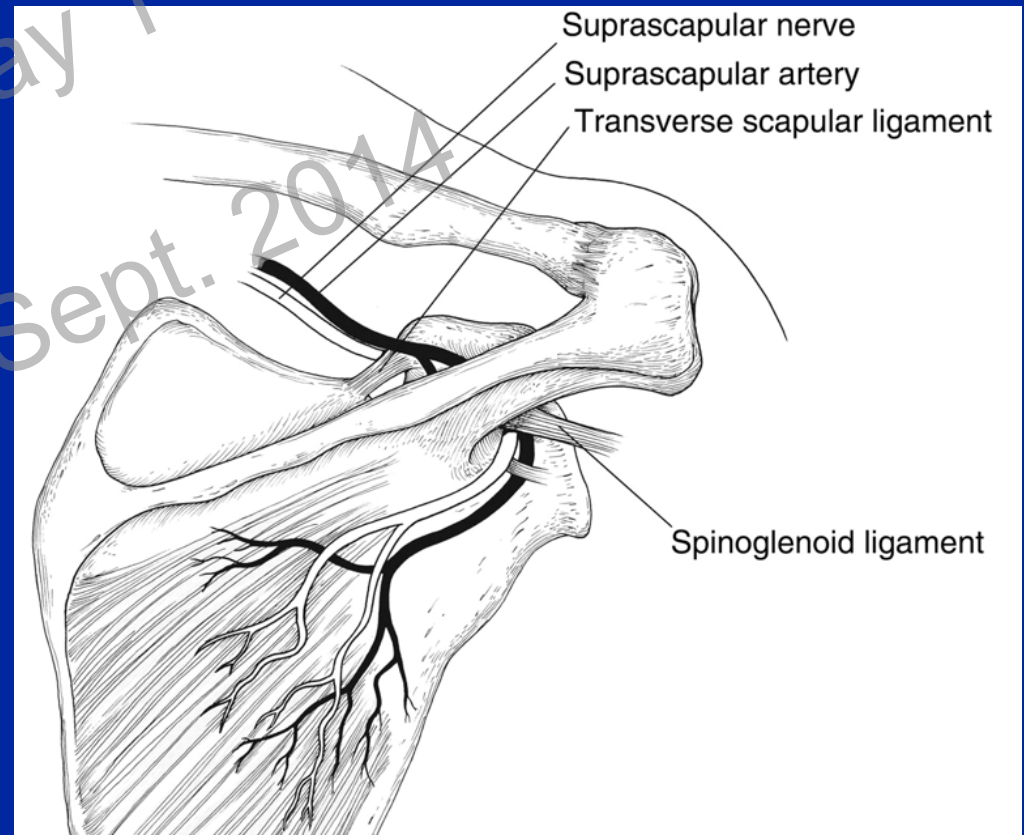
Jae Chul Yoo, Arthroscopy, 23: 1271, 2007

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# SUPRASCAPULAR NERVE

- upper trunk of brachial plexus C5/(C6)
- under transverse scapular lig.
- around spinoglenoid notch
- **Supraspinatus**
- **Infraspinatus**



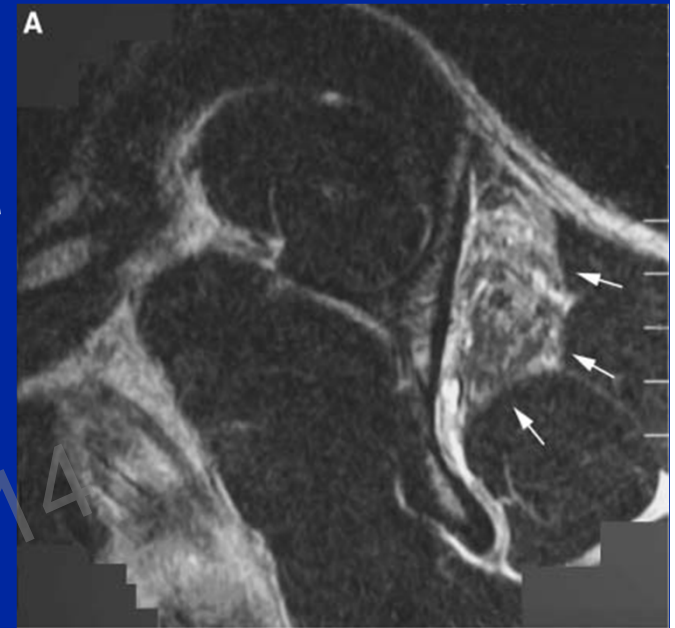


# SUPRASCAPULAR NERVE

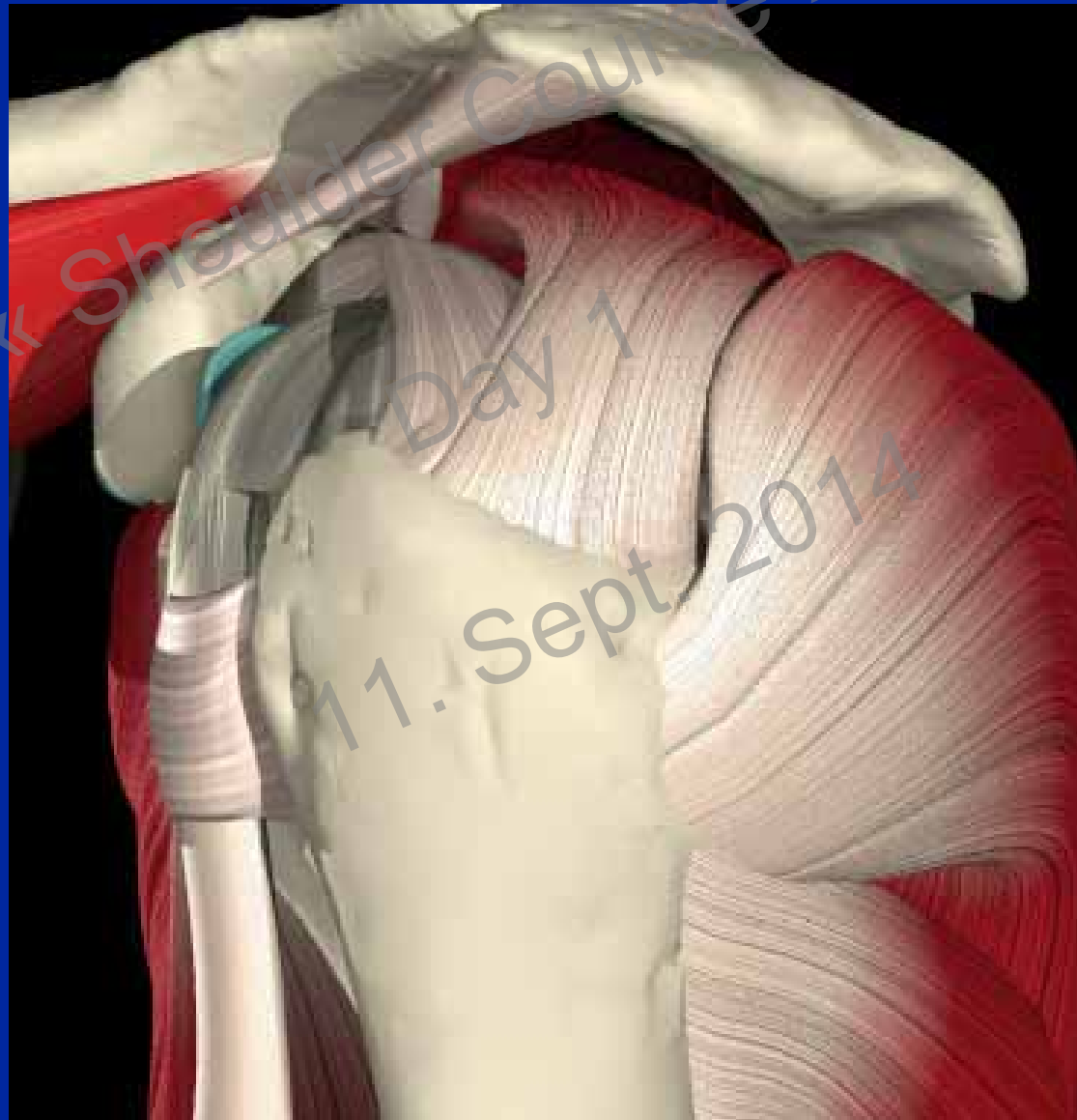
## Nerve injury:

- Ossified transverse scapular ligament
- Hypertrophied spinoglenoid ligament
- SLAP lesion
- Ganglion cyst
- Traction injury

→ **ISP (+/- SSP) Atrophy**



# ROTATOR CUFF

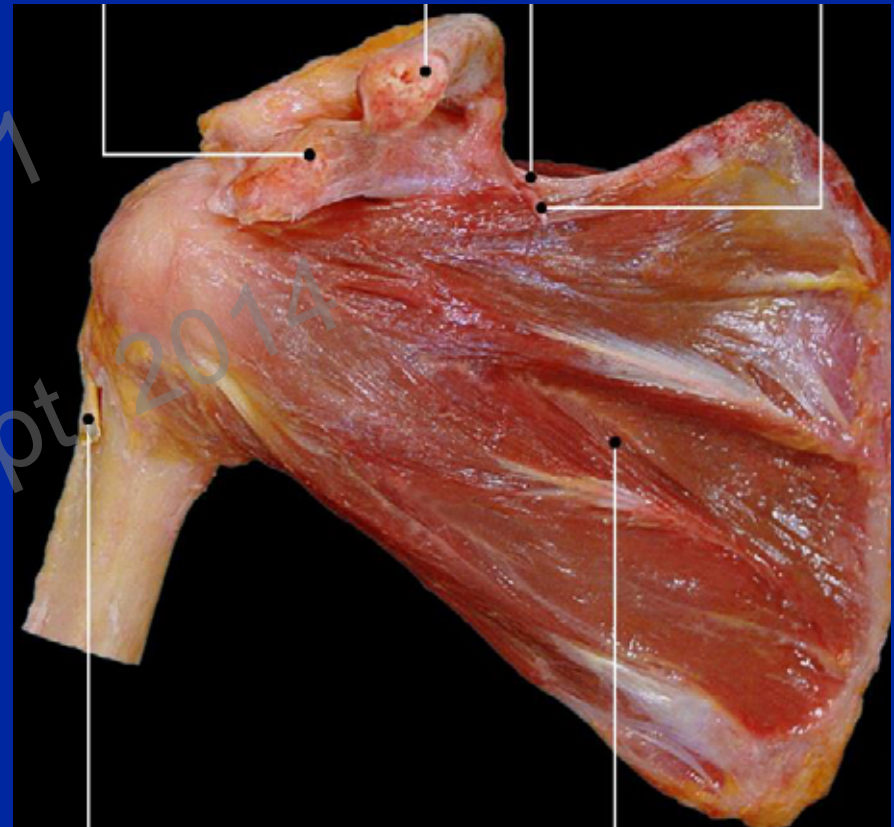


# SUBSCAPULARIS MUSCLE

- origin: subscapularis fossa
- insertion: lesser tuberosity
- innervation:
  - 2 branches (C5,C6)
  - sup. subscapular nerve
  - inf. subscapular nerve

Frick, Thieme, 1980

Bouchet, Simep, 1990



# SUBSCAPULARIS MUSCLE

function: internal rotation (lift-off test)



Gerber, JBJS (Br), 73(3):389, 1991

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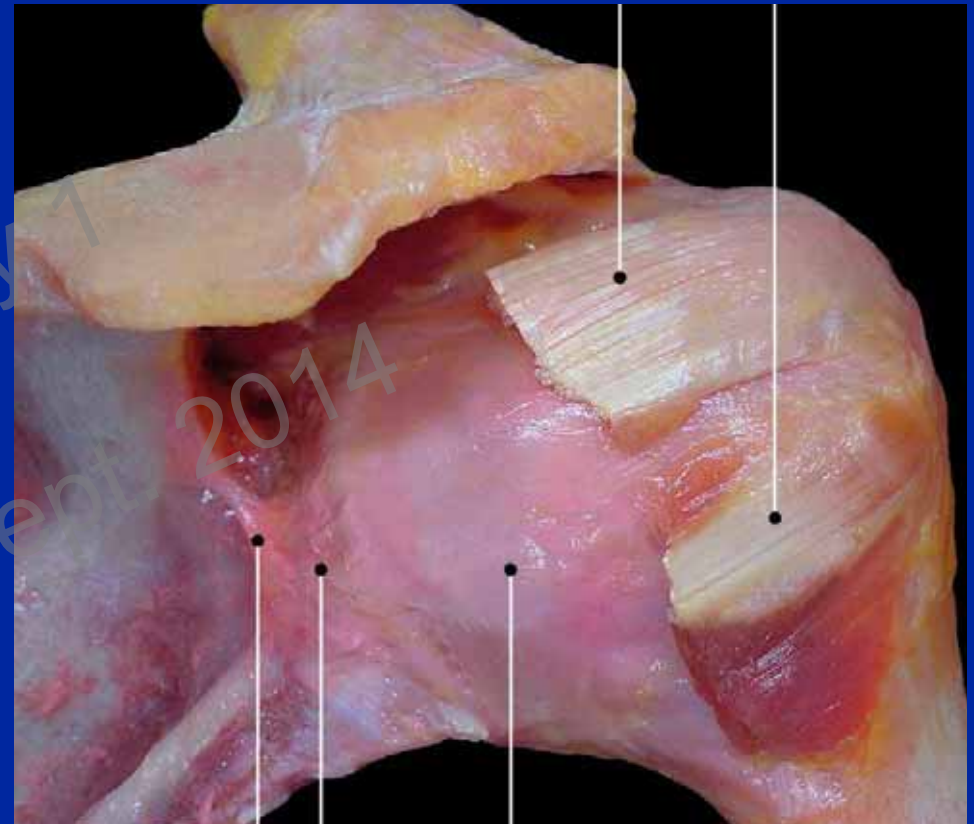
# SUPRASPINATUS MUSCLE

- origin: supraspinatus fossa
- insertion: greater tuberosity
- suprascapular nerve (C5, C6)
- function: abductor (Jobe test)



# INFRASPINATUS AND TERES MINOR MUSCLE

- origin: infraspinatus fossa  
laterale margin
- insertion: greater tuberosity
- suprascapular nerve (C5,C6)
- axillary nerve (C5, C6)
- function: external rotation



# INFRASPINATUS AND TERES MINOR MUSCLE



external rotation lag in  
adduction



external rotation lag in  
abduction  
(Horn blower sign)



Arthuis M., Rev Chir Orthop Reparatrice Appar, 58:124, 1972

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# POSTEROSUPERIOR ROTATOR CUFF



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# ROTATOR CUFF

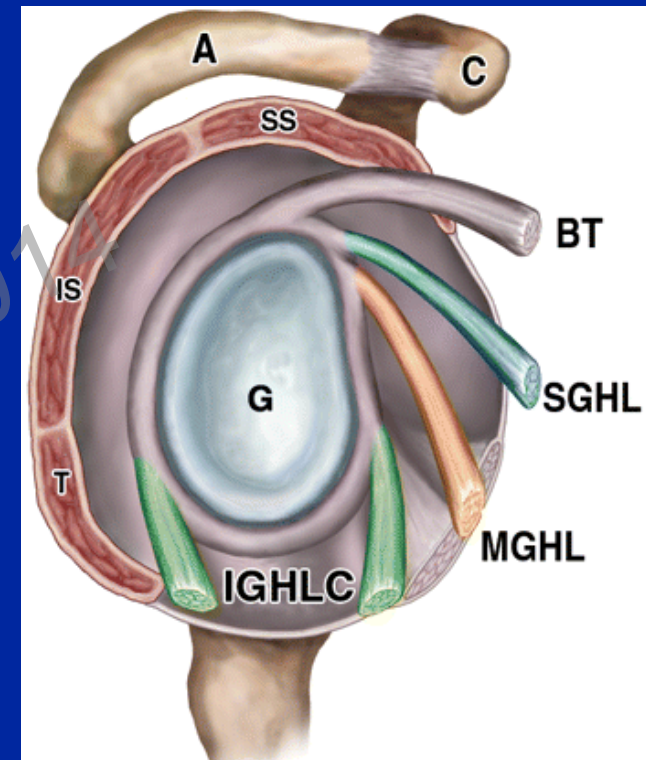


courtesy of Georg Lajtai

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# GLENOHUMERAL LIGAMENTS

- GH joint capsule superior, anterior, inferior reinforced with glenohumeral ligaments:
  - superior (SGHL)
  - middle (MGHL)
  - inferior (IGHL)
- posterior: thin capsule, no ligaments



# SGHL

~ 1/3 - 2/3 of thickness of long biceps

Warner JP, Am J Sports Med, 1992

- in 42 % only thin / rudimentary

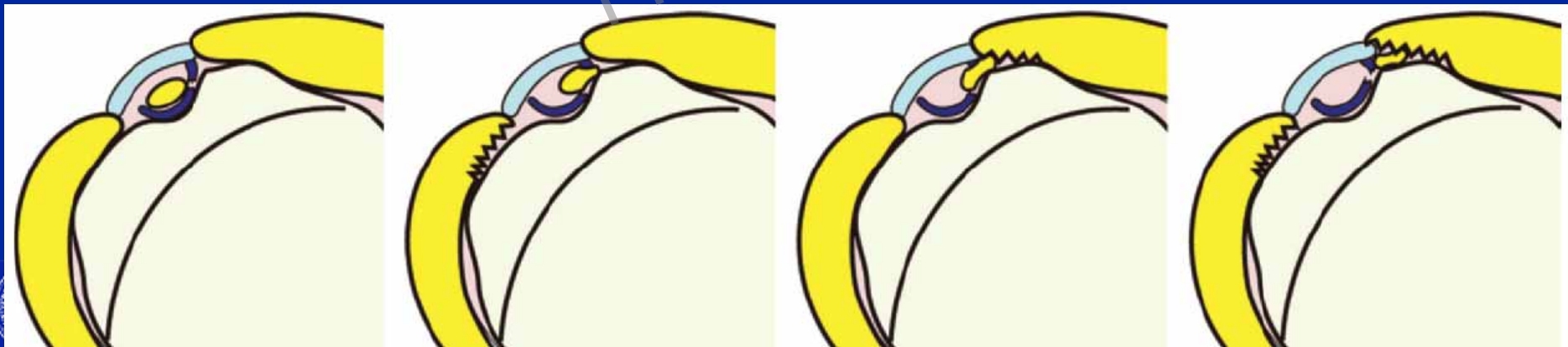
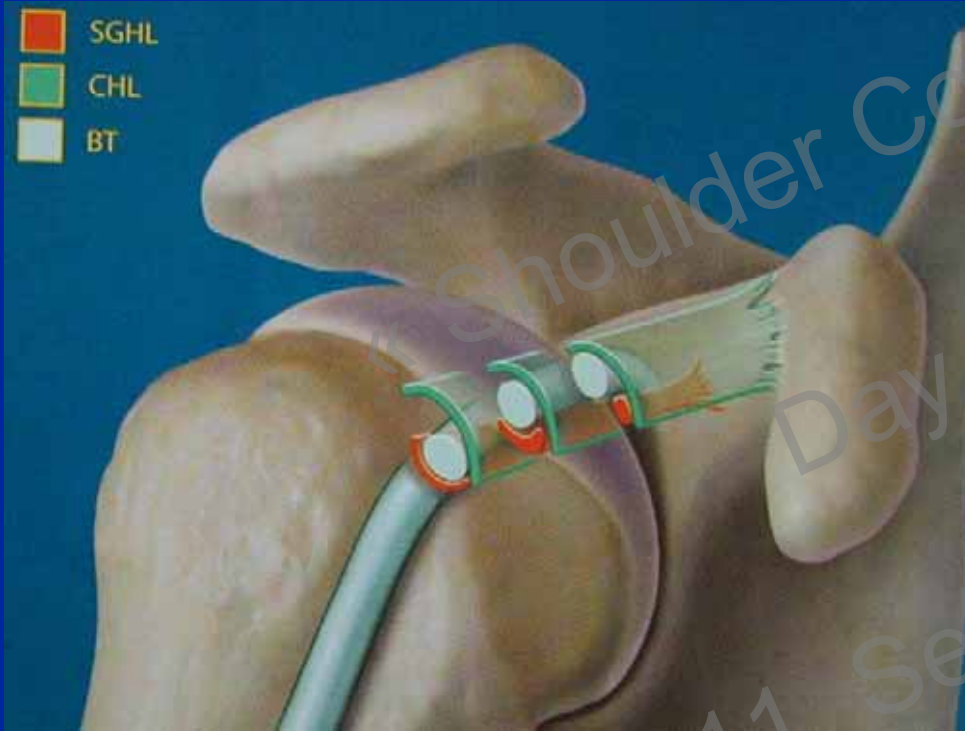
Jost B, JSES, 2000

- origin: labrum / supraglenoidal tubercle

- insertion: above lesser tuberosity



# ROTATOR INTERVAL ANTERIOR PULLEY





# MGHL

- very variable

- in 55 % thin

Warner JP, Am J Sports Med, 1992

- in 13 - 27 % absent

DePalma, AAOS, 1949  
O'Brien, Saunders, 1990



- origins: - glenoid rim adjacent below SGHL

- insertion: - medially of lesser tuberosity  
- subscapularis tendon (fused)

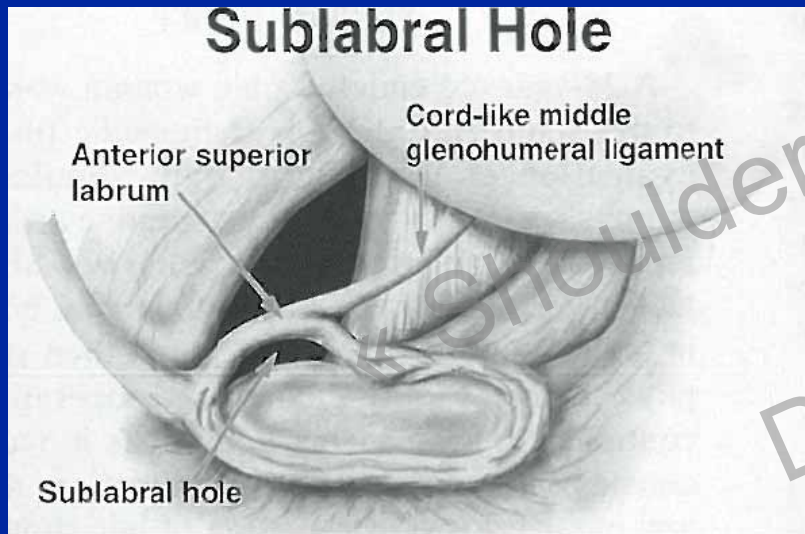
- stabilizes:

- against ER / ant. translation in neutral rotation
- against inferior translation in ER



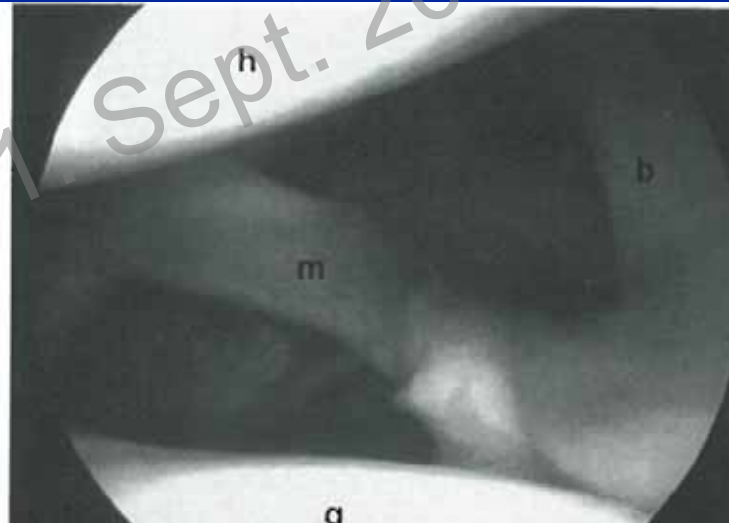
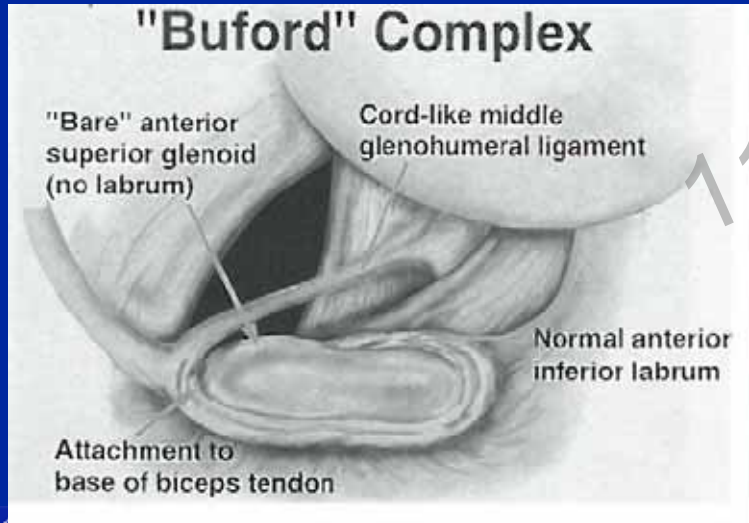
# MGHL (ANTERIOR LABRUM) ANATOMIC VARIATIONS

## Sublabral Hole



12%

## "Buford" Complex



1.5%

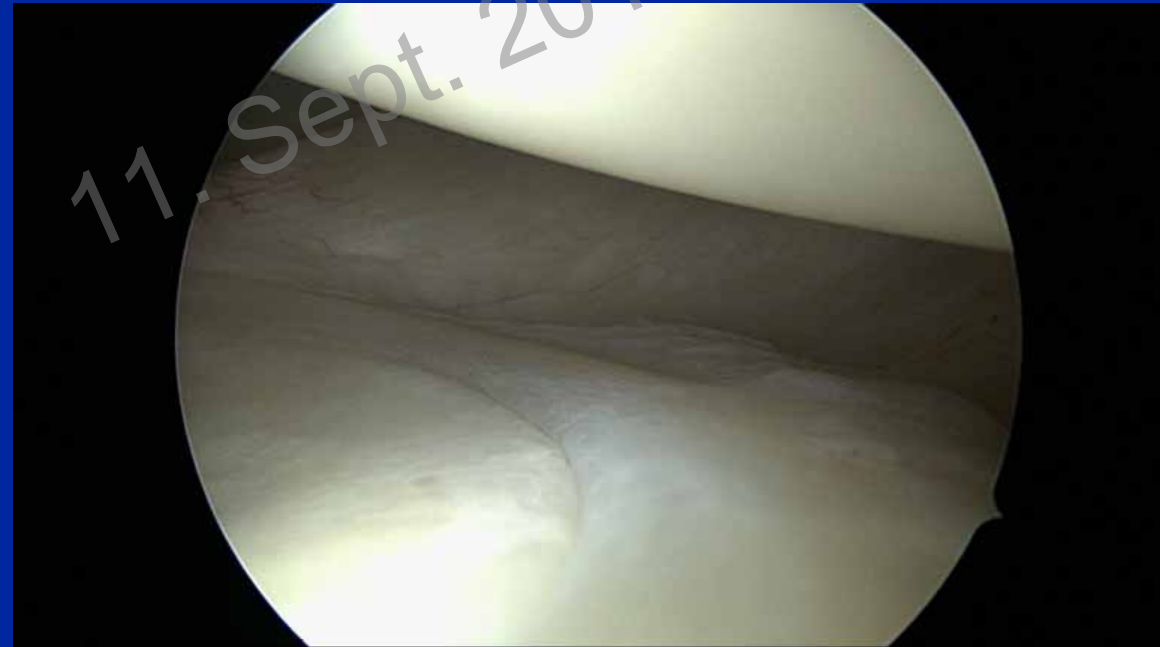
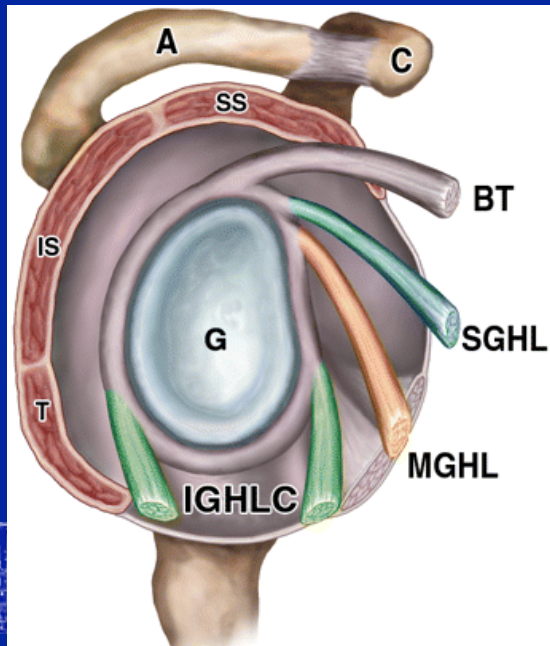


Williams M, Snyder S, and Buford D. Arthroscopy, 1994

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# IGHL

- always present O'Brien, Saunders, 1990
  - consists of:
    - anterior band
    - axillary recess
    - posterior band
  - stabilizes:
    - against a.p and inf. GH translation in 45-90 °
- Abd



# GLENOHUMERAL LIGAMENTS



courtesy of Georg Lajtai

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*Thank you !!!*



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