



## Shoulder Conditions

International Certificate in Sports Chiropractic



HELPING  
ATHLETES  
ACHIEVE  
THEIR  
OPTIMAL  
PERFORMANCE  
NATURALLY  
[HTTP://FICS.SPORT](http://fics.sport)

Image - <https://ar.pinterest.com/pin/425238389793055053/>



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CEO Stark i3  
FICS Past Chair, Education Commission  
NWSU Past Director, Human Performance Center  
NWSU Past Coordinator, Sports and Rehabilitation Continuing Ed.



WE HELP ATHLETES ACHIEVE THEIR OPTIMAL PERFORMANCE NATURALLY

<https://fics.sport>

## Ipsative Challenge

- What joints make-up the shoulder complex?
- At what angle of glenohumeral abductions does the scapula start to move?
- Where does shoulder pain rank in regards to presentations to a primary care physician?
- What are the most common athletic shoulder injuries?
- What role does posture play in shoulder pathologies?
- When a shoulder dislocates, it is likely to dislocate what direction?
- True or False Doctors of Chiropractic may manage ANY non-surgical shoulder injury.
- What is more common in youth athletics; traumatic injuries or overuse injuries?
- Is a child athlete more likely to suffer a sprain or a strain?
- What does Apley's Assessment test?
- Describe your adjustment process for a PA restriction of the distal clavicle.



## Objectives

- Identify the most common acute and chronic injuries in sport.
- Highlight key components of athletic shoulder injuries
  - Epidemiology
  - Mechanisms of injury
  - Shoulder examination flow
  - Pediatrics
  - Injury risk mitigation
- Address Medico-legal concerns when faced with specific shoulder concerns in sport.
- Shoulder Chiropractic Manipulative Therapy and current literature.



## Anatomy

- Four joints
  - Sternal-clavicular Joint
  - Acromio-clavicular Joint
  - Glenohumeral Joint
  - Scapulo-thoracic
  
- Three bones
  - Scapula
  - Humerus
  - Clavicle
  
- Of course healthy shoulder mechanics require healthy spinal mechanics as well - See the Biomechanics module for deeper details.



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## FUNCTIONAL Anatomy

- All four joints are involved with any shoulder movement(s)
  - Sternal-clavicular Joint
  - Acromio-clavicular Joint
  - Glenohumeral Joint
  - Scapulo-thoracic
  
- Loads are tolerated by all three bones with any shoulder movement(s)
  - Scapula
  - Humerus
  - Clavicle
  
- Again, of course healthy shoulder mechanics require healthy spinal mechanics as well - See the Biomechanics module for deeper details.
  - Later in THIS module, we will address CMT and what evidence there may be to support spinal care when our athletes present with shoulder conditions.



Allsystemsgo.info



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## Foundation Information

Shoulder pain is responsible for approximately 16 percent of all musculoskeletal complaints, with a yearly incidence of 15 new episodes per 1,000 patients seen in the primary care setting



Healthcare.Utah.edu

Urwin M, Symmons D, Allison T, et al. Estimating the burden of musculoskeletal disorders in the community: the comparative prevalence of symptoms at different anatomical sites, and the relation to social deprivation. *Ann Rheum Dis.* 1998;57(11):649-655.

Van der Windt DA, Koes BW, de Jong BA, Bouter LM. Shoulder disorders in general practice: incidence, patient characteristics, and management. *Ann Rheum Dis.* 1995;54(12):959-964.

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## Foundation Information

An estimated 20 percent of the population will suffer shoulder pain during their lifetime

Pope DP, Croft PR, Pritchard CM, Silman AJ. Prevalence of shoulder pain in the community: the influence of case definition. *Ann Rheum Dis.* 1997;56(5):308-312.

Shoulder pain is second only to low back pain in patients seeking care for musculoskeletal ailments in the primary care setting

Steinfeld R, Valente RM, Stuart MJ. A common sense approach to shoulder problems. *Mayo Clin Proc.* 1999;74(8):785-794.



health.harvard.edu

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## Short list of possible conditions

- ▶ Sprain
- ▶ Strain
- ▶ Luxation-subluxation
- ▶ Fractures
- ▶ Tendonitis
- ▶ Contusion
- ▶ Infection
- ▶ Acute visceral referral
- ▶ Structure-related
- ▶ Myofascial disorders
- ▶ Nerve Entrapments
- ▶ Capsulitis
- ▶ Tendonosis
- ▶ Instability
- ▶ Arthritis
- ▶ Chronic visceral referral

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## History

**Table 1. History Findings and Associated Shoulder Disorders**

<i>History</i>	<i>Associated condition</i>
Age <sup>5,6,7</sup>	If younger than 40 years: instability, rotator cuff tendinopathy If older than 40 years: rotator cuff tears, adhesive capsulitis, glenohumeral osteoarthritis
Diabetes or thyroid disorders <sup>8,9</sup>	Adhesive capsulitis
History of trauma <sup>10</sup>	If younger than 40 years: shoulder dislocation/subluxation If older than 40 years: rotator cuff tears
Loss of range of motion	Adhesive capsulitis, glenohumeral osteoarthritis
Night pain <sup>0</sup>	Rotator cuff disorders, adhesive capsulitis
Numbness, tingling, pain radiating past elbow	Cervical etiology

Murrell GA, Walton JR. Diagnosis of rotator cuff tears [published correction appears in Lancet. 2001;357(9266):1452]. *Lancet*. 2001; 357(9258):769-770.

Neer CS II. Anterior acromioplasty for chronic impingement syndrome in the shoulder: a preliminary report. *J Bone Joint Surg Am*. 1972;54(1):41-50.

Yamaguchi K, Ditsios K, Middleton WD, Hildebolt CF, Galatz LM, Teefey SA. The demographic and morphological features of rotator cuff disease. A comparison of asymptomatic and symptomatic shoulders. *J Bone Joint Surg Am*. 2006;88(8):1699-1704.

Cakir M, Samanci N, Balci N, Balci MK. Musculoskeletal manifestations in patients with thyroid disease. *Clin Endocrinol (Oxf)*. 2003;59(2):162-167.

Smith LL, Burnet SP, McNeil JD. Musculoskeletal manifestations of diabetes mellitus. *Br J Sports Med*. 2003;37(1):30-35.

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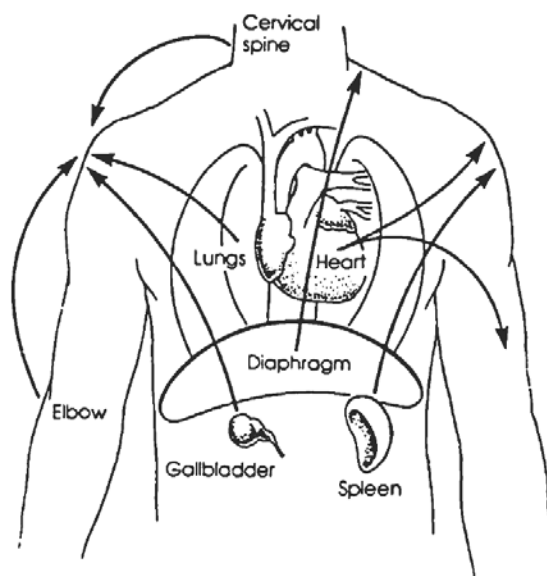
## History

Pain location	Anterior-superior shoulder pain associated with acromioclavicular joint pathology Diffuse shoulder pain in deltoid region associated with rotator cuff disorders, adhesive capsulitis, or glenohumeral osteoarthritis
Pain with overhead activity <sup>10</sup>	Rotator cuff disorders
Sports participation <sup>11</sup>	Shoulder instability associated with overhead sports (e.g., baseball, softball, tennis), and collision sports (e.g., football, hockey) Acromioclavicular joint pathology associated with weight lifting
Weakness	Rotator cuff disorders, glenohumeral osteoarthritis

Litaker D, Piro M, El Bilbeisi H, Brems J. Returning to the bedside: using the history and physical exam to identify rotator cuff tears. *J Am Geriatr Soc.* 2000;48(12):1633-1637.

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## History



Orthopedic Physical Assessment, 2<sup>nd</sup> ed., Magee DJ, Chapter 4 P125, 1992.

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## History

Shoulder pain is defined as chronic when it has been present for longer than six months, regardless of whether the patient has previously sought treatment

It can be divided into **six** diagnostic categories:

- (1) rotator cuff disorders, including tendinosis, full or partial thickness tears, or calcific tendinitis
- (2) adhesive capsulitis
- (3) glenohumeral osteoarthritis
- (4) glenohumeral instability
- (5) acromioclavicular joint pathology
- (6) other chronic pain, including less common shoulder problems and non-shoulder problems

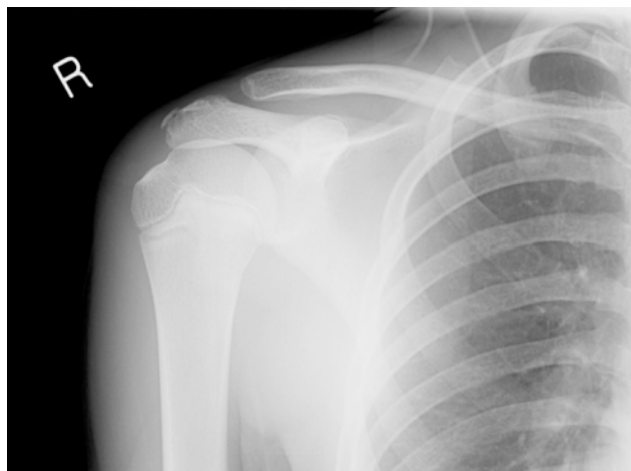
Self EB. Clinical guidelines for shoulder pain. In: Norris TR, ed. *Orthopaedic Knowledge Update: Shoulder and Elbow 2*. 2nd ed. Rosemont, Ill.: American Academy of Orthopaedic Surgeons, 2002:443-467.

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## Inspection

- ▶ Normal Anatomy



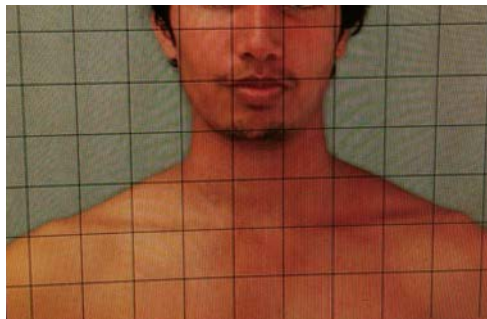
imageinterpretation.co.uk

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# Inspection

- ▶ Normal Anatomy

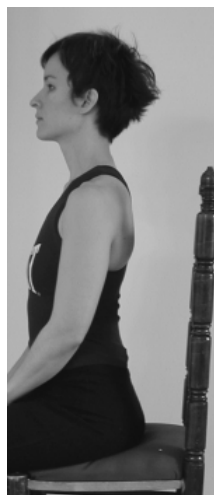
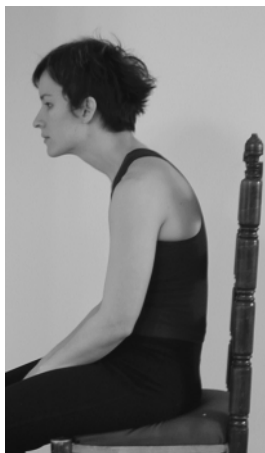


adlerdentistry.com

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# Inspection

- ▶ Clinical Observations



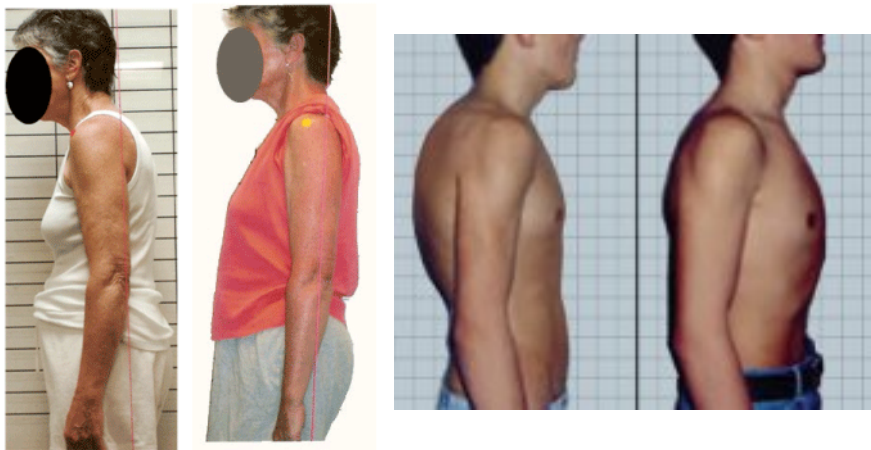
stumptuous.com

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# Inspection

- ▶ Clinical Observations



omicsonline.org

training.fitness.com

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# Inspection

- Clinical Observations:



Stark's library

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## Inspection

- Athletic/ergonomic Influences on posture:



[www.use.com](http://www.use.com)



[gracielamesaijijitsu.com](http://gracielamesaijijitsu.com)

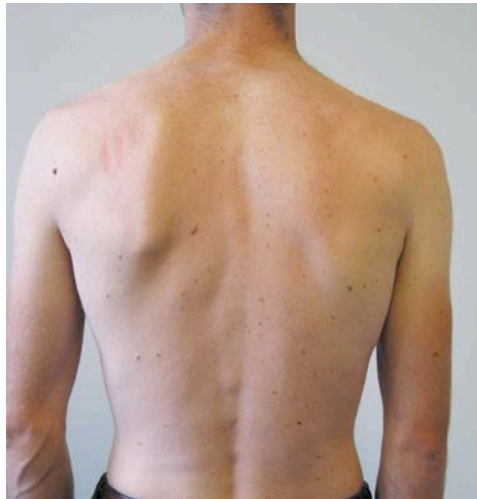


[www.coreconcepts.com.sg](http://www.coreconcepts.com.sg)

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## Inspection

- Clinical Observations:
  - What do we see?
  - What 'predictions' might we make in regards to muscle imbalances?



[nejm.org](http://nejm.org)

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# Inspection

- Clinical Observations:



[pediatrics.georgetown.edu](http://pediatrics.georgetown.edu)

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# Inspection

- Clinical Observations:
  - AC Sprain

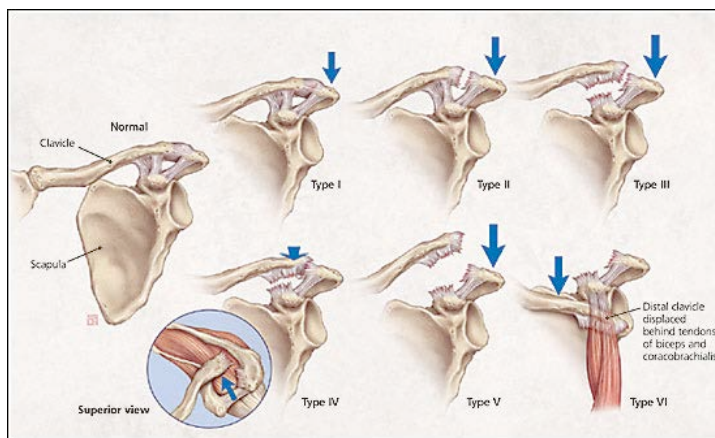


<http://www.airportcentralphysio.com.au>

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## Inspection

- Clinical Observations:
  - AC Sprain Grades

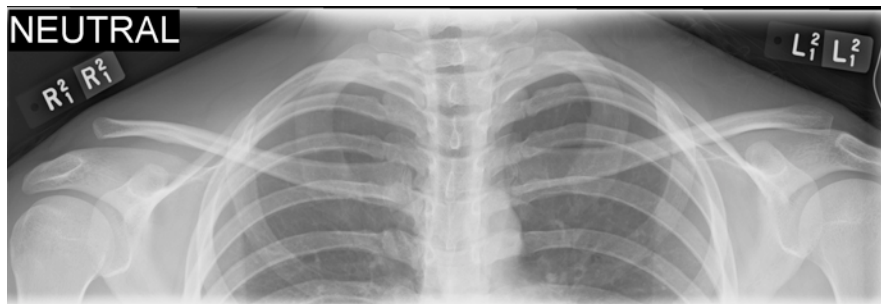


pages.uoregon.edu

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## Inspection

- Clinical Observations:
  - AC Sprain Grades



velonews.competitor.com

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## Inspection

- Clinical Observations
  - What do we see?
  - What would cause such a finding in such an athlete?
  
- Description of the case.



Stark: personal library

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## Inspection

- Clinical Observations
  - What do we see?
  - What would you do if this patient presented to you?



okelly-rugbyleague.wikispaces.com

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## Palpation

- ▶ Soft-tissue and osseous landmarks



<http://www.airportcentralphysio.com.au>

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## Percussion



[en.wikipedia.org](http://en.wikipedia.org)

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## Instrumentation

- Pain, proprioception, girth, etc.



optomo.com.au

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## Instrumentation

- ▶ Measure both shoulders as depicted.
- ▶ Asymmetry of measurement may indicate a shoulder dislocation of the larger measured shoulder (also considering history).



Evans, 3<sup>rd</sup> Edition; p. 254

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# ROM

- ▶ Biomechanics - Normal ROM



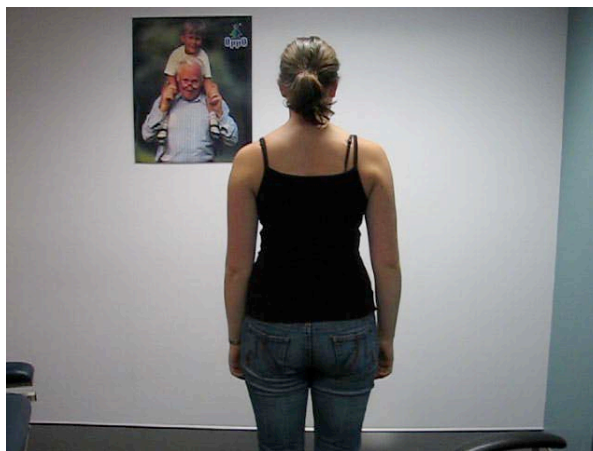
[advancedphysicaltherapist.com](http://advancedphysicaltherapist.com)

[rotatorcuffpain.hubpages.com](http://rotatorcuffpain.hubpages.com)

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# ROM

- ▶ Biomechanics - Scapular dyskinesia



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## Orthopedics

- “List of tests to focus on (for boards)”

### THE SHOULDER

Apley’s (Scratch) Test

Apprehension Test

Codman’s Sign (Drop Arm)

Dawbarn’s Sign

Impingement Sign

Supraspinatus Press Test

Yerguson’s Test

Speed’s

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## Best evidence for physical examination

Table 2. Selected Tests of the Shoulder

Examination maneuver	Associated condition	Sensitivity (%)	Specificity (%)	LR+	LR-
<b>Inspection</b>					
Supraspinatus or infraspinatus atrophy <sup>10</sup>	Chronic rotator cuff tear	56	73	2.07	0.60
<b>Palpation</b>					
Acromioclavicular tenderness <sup>16</sup>	Acromioclavicular joint OA or chronic sprain	96	10	1.07	0.4
<b>Range of motion</b>					
Restrictive active <sup>10</sup>	Rotator cuff disorder	30	78	1.36	0.90
<b>Provocative tests</b>					
Hawkins’ impingement <sup>15</sup>	Impingement/rotator cuff disorder	72	66	2.1	0.42
Drop-arm <sup>15</sup>	Large rotator cuff tear	27	88	2.25	0.83
Empty-can supraspinatus <sup>15</sup>	Rotator cuff disorder involving supraspinatus	44	90	4.4	0.62
Lift-off subscapularis <sup>17</sup>	Rotator cuff disorder involving subscapularis	62	100	> 25	0.38
External rotation/infraspinatus strength <sup>15</sup>	Rotator cuff disorder involving infraspinatus	42	90	4.2	0.64
Cross-body adduction <sup>18</sup>	Acromioclavicular joint OA or chronic sprain	77	79	3.50	0.29
Apprehension <sup>19</sup>	Glenohumeral instability	72	96	20.22	0.29
Relocation <sup>19</sup>	Glenohumeral instability	81	92	10.35	0.2

LR+ = positive likelihood ratio; LR- = negative likelihood ratio; OA = osteoarthritis.

NOTE: The recommended progression of shoulder examination maneuvers is inspection, palpation, range of motion and strength tests, and provocative tests.

Information from references 10 and 15 through 19.

J Gen Intern Med. 2002 August; 17(8): 647-650.

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# Neuro

► Muscle testing

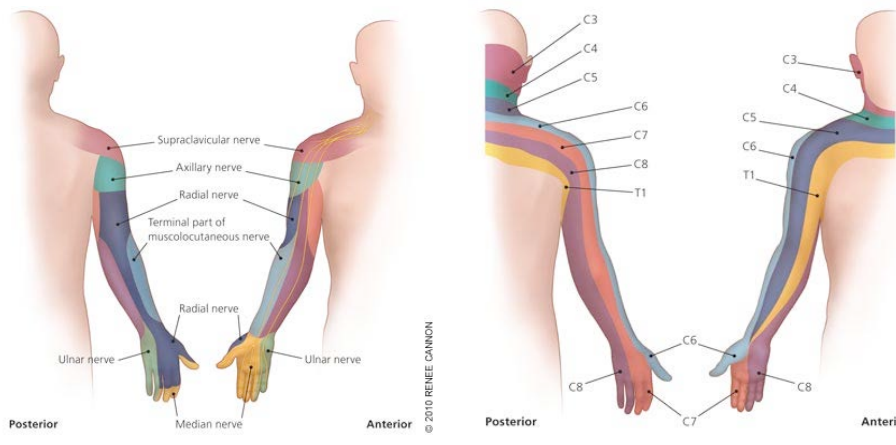
- Manual
- HHD



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# Neuro

► Sensation

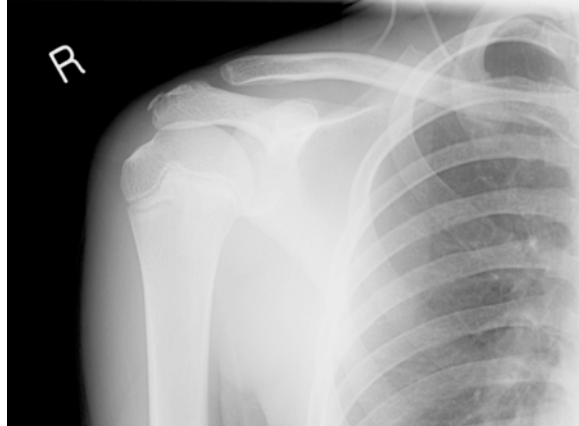


aafp.org

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## Imaging

- ▶ When will we use radiography?
- ▶ Why do we use radiography?



imageinterpretation.co.uk

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## Laboratory

- ▶ These tests will be performed when we believe there is a systemic condition causing the shoulder issue
  - ▶ Gout -
  - ▶ Infection - redness (rubor), warm, swollen
  - ▶ Apatite Deposition Disease -
  - ▶ Diabetes -
  - ▶ Rheumatoid Arthritis -

## Special Tests

- ▶ Motion Palpation
- ▶ Numerous special tests that have a more functional approach

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# Shoulder

## Common Conditions of the Athlete



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## Acromioclavicular (AC) Joint Injuries

- ▶ History
  - ▶ Acute trauma or overuse
  - ▶ FOOSH mechanism
  - ▶ "separated shoulder"
- ▶ Observation
  - ▶ Step deformity possible
  - ▶ Clavicles not level
- ▶ Palpation
  - ▶ Tender AC joint
  - ▶ AC laxity
- ▶ Examination
  - ▶ Xray; weighted and unweighted
- ▶ Management
  - ▶ PRICE - Acute injuries
  - ▶ Mechanical Support
  - ▶ Physiotherapies
  - ▶ Surgery generally does not result in positive results

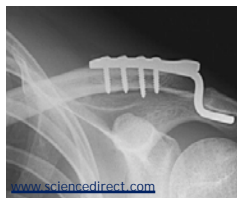
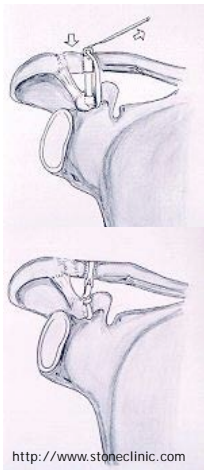


[www.tartanortho.com](http://www.tartanortho.com)

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## Acromioclavicular (AC) Joint Injuries

► AC Surgical Correction

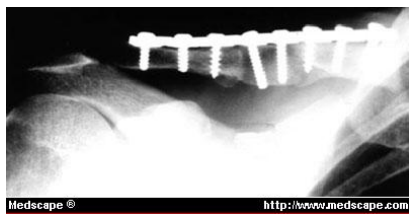


► Protective pad



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## Clavicle Fractures



[bonefracturetreatment.com](http://bonefracturetreatment.com)

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## Glenohumeral Instability

- ▶ History
    - ▶ Unidirectional or multidirectional
      - ▶ TUBS
      - ▶ AMBRI
    - ▶ Anterior/inferior most common
    - ▶ Excessive ROM mechanism or FOOSH
    - ▶ Easily becomes chronic
    - ▶ "Dead Arm Syndrome"
    - ▶ Reports a pop
    - ▶ Subluxation->luxation
  - ▶ Observation
    - ▶ Guarded presentation
    - ▶ Xray
      - ▶ Bankart lesions
      - ▶ Hill-Sachs lesions
  - ▶ Palpation
    - ▶ Tender at RC insertions
    - ▶ Assess instability direction
    - ▶ Check radial pulse and sensation
- 

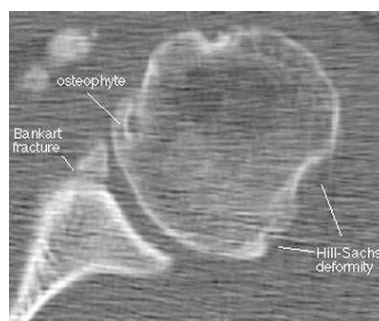
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## Glenohumeral Instability Dislocation Reduction

- [http://www.youtube.com/watch?v=L\\_DaAhAto2k](http://www.youtube.com/watch?v=L_DaAhAto2k)
    - Not the best attempt...
  - <http://www.youtube.com/watch?feature=endscreen&NR=1&v=GLEKICEKyx4>
    - Hippocratic maneuver
    - Again, not the best...
  - <http://www.youtube.com/watch?v=x2fi3UKcZJU&feature=related>
    - Typical response of the patient
    - Horrible patient movement, etc.
    - Why a folding table!?
  - <http://www.youtube.com/watch?v=AQf kf5DtRxM&feature=related>
    - Cunningham, also called Kocher and is a better technique
    - My preferred approach
- 

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## Glenohumeral luxation Potential complications



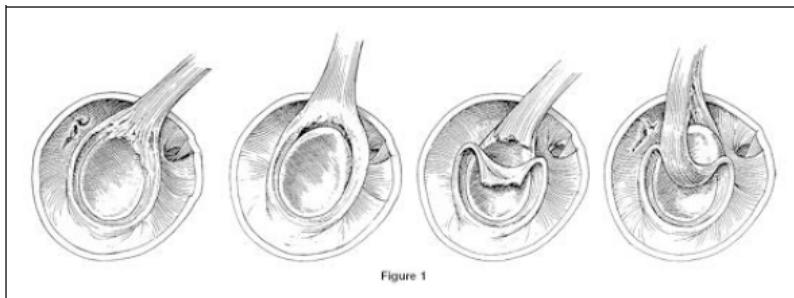
shouldersurgeon.com

e-radiography.net

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## SLAP Lesions

- Superior *L*abrum *A*ntero *P*osterior lesion
- Long head biceps tendon origin is often involved
- Pain worsens with eccentric biceps work

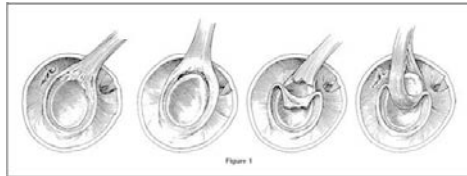


sportsarthroscopy.com

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## SLAP Lesions

- Management
  - PRICE
  - Surgery for later grades of tears
  - MRT (myofascial release) of biceps
  - Physiotherapy through shoulder and for biceps
  - Shoulder stabilization rehabilitation



sportsarthroscopy.com

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## Biceps Tendonopathy

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>▶ History:               <ul style="list-style-type: none"> <li>▶ PMH~RC pathology</li> <li>▶ Overuse or acute onset</li> <li>▶ Forced ROM (ER or Ext) with elbow extension                   <ul style="list-style-type: none"> <li>▶ <u>Eccentric</u> or Concentric</li> </ul> </li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>▶ Palpation:               <ul style="list-style-type: none"> <li>▶ Tender at bicipital groove                   <ul style="list-style-type: none"> <li>▶ Transverse ligament</li> </ul> </li> <li>▶ Subluxation of biceps tendon</li> </ul> </li> </ul> |
| <ul style="list-style-type: none"> <li>▶ Observation:               <ul style="list-style-type: none"> <li>▶ Altered mechanics</li> <li>▶ Inflammation</li> </ul> </li> </ul>   | <ul style="list-style-type: none"> <li>▶ Examination:               <ul style="list-style-type: none"> <li>▶ Decreased manual muscle testing strength in biceps</li> <li>▶ Orthopedics</li> </ul> </li> </ul>   |

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## Rotator Cuff Tendonopathy

- ▶ History:
    - ▶ Slow onset
    - ▶ PMH~impingement or instability
  - ▶ Observation:
    - ▶ Decreased AROM
    - ▶ Guarded presentation
    - ▶ Possible atrophy
  - ▶ Palpation:
    - ▶ Subacromial space
    - ▶ Posterior pain possible
    - ▶ RC insertions painful
  - ▶ Other Examination:
    - ▶ Orthopedics
  - ▶ Management:
    - ▶ Similar to non-surgical rotator cuff tears
- 

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## Rotator Cuff Strains

- ▶ History
  - ▶ Excessive eccentric motions
  - ▶ Excessive ROM
  - ▶ Luxation/subluxation
  - ▶ PMH of RC tendonitis
- ▶ Observation
  - ▶ No significant swelling
  - ▶ Altered posture
  - ▶ Overhead motions painful
  - ▶ Painful arc
- ▶ Palpation
  - ▶ Tender at RC insertions
  - ▶ Possible posterior pain
  - ▶ Crepitus possible



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## Rotator Cuff Strains

- ▶ Cederqvist S, et al. Ann Rheum Dis 2020;0:1-7.
    - ▶ RCT with 2-year follow-up
    - ▶ How might this impact on clinical practice or future developments?
      - ▶ Our study shows that the outcome of non-surgical treatment is equivalent to surgical treatment in RCD without full-thickness tendon tear even after unsuccessful initial rehabilitation. However, surgery yields superior improvement in pain and function in patients with full-thickness rotator cuff tear if initial non-surgical treatment is unsuccessful.
  - ▶ Management
    - ▶ PRICE
    - ▶ Surgery for 'large' complete tears (>3cm)
    - ▶ Gain and/or maintain mobility
    - ▶ MRT of the region
    - ▶ Shoulder complex CMT (esp. SC, AC, Scapula)
    - ▶ Physiotherapies
    - ▶ Shoulder stabilization rehabilitation
- 

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## Shoulder Impingement

- ▶ History:
    - ▶ Usually chronic
    - ▶ Common with overhead sports
  - ▶ Observation:
    - ▶ Limited AROM
    - ▶ Painful arc
    - ▶ Altered mechanics
    - ▶ Usually no obvious inflammation
  - ▶ Palpation:
    - ▶ Possible crepitus
    - ▶ Tender RC insertions
    - ▶ Possible bicipital groove pain
    - ▶ Acromion edge tenderness
  - ▶ Other Examination
    - ▶ Orthopedics
- 

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## Thoracic Outlet Syndrome

- ▶ History:
    - ▶ C7
      - ▶ cervical rib
      - ▶ elongated TP's
    - ▶ Neurovascular complaints as structures are compressed
    - ▶ Sx's may start with ulnar nerve paresthesias
  - ▶ Observation:
    - ▶ X-rays indicates cervical rib/elongated TP
    - ▶ Poor posture (rounded shoulders, forward head)
  - ▶ Palpation:
    - ▶ Decreased pulse
    - ▶ Altered sensation/temperature
    - ▶ Joint edema possible
  - ▶ Other Examination
    - ▶ Orthopedics
- 

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## Thoracic Outlet Syndrome

- ▶ Management
    - ▶ PRICE
    - ▶ Determine if the true underlying cause is manageable via non-surgical efforts
      - ▶ MRT and other lengthening interventions of soft-tissues, e.g. pectoralis minor
      - ▶ CMT of C/T Jxn, 1<sup>st</sup> rib, scapula...
      - ▶ Physiotherapies
      - ▶ Shoulder complex stabilization rehab
- 

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Pediatrics - Orthop Clin N Am 47 (2016) 749-762

•Overuse Injuries

- They predominate over traumatic injuries.
- 60% of ALL sports injuries in youth are from overuse.
  - Osseous and/or soft-tissue injuries are likely.
  - Radiographs should be considered to rule-out physis trauma.
    - Bi-lateral films may be necessary for comparison
- More likely to be appreciated in female athletes.
- 50% of them could be prevented!!
  - Volume of activity may be the greatest predictor of such injuries.
  - SSx predictors include
    - Shoulder pain
    - Fatigue
    - Decreased velocity
  - Little League Shoulder - Fig. 2
  - Anterior instability
  - Multidirectional instability

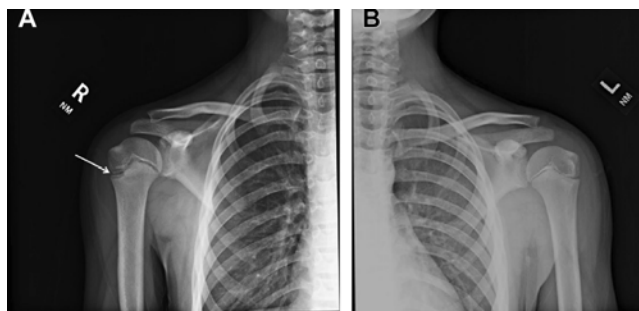


Fig. 2. (A) A 12-year-old boy with shoulder pain at the beginning of the baseball season. Radiograph of shoulder of throwing arm at presentation. White arrow shows widening of the proximal humeral physis. (B) Left shoulder radiograph taken for comparison at initial presentation.

Pediatrics - Orthop Clin N Am 47 (2016) 749-762

•Acute Injuries

- More likely to see sprains and fractures in young athletes v. strains and other muscle injuries.
- Proximal humerus fractures - Fig. 6
- Clavicle fractures
  - The clavicle is the final bone in the body to fully ossify (23-25 y.o).
  - The medial & lateral clavicle are well stabilized via strong ligamentous structures.
  - Hence, the middle of the clavicle is the most likely spot for fractures to occur.
  - MOI is usually from a fall on the shoulder v FOOSH
- Acromio-clavicular injuries
- Sterno-clavicular injuries

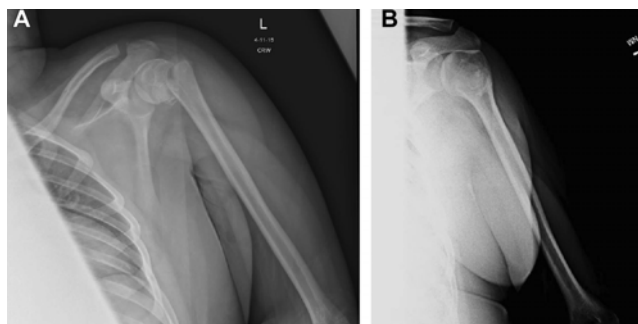


Fig. 6. (A) A 16-year-old boy with Salter-Harris II fracture of proximal humerus who fell while playing basketball. (B) Appearance of shoulder after 3 months of conservative treatment, including hanging-arm cast. Function was normal at final follow-up.



## Shoulder Functional Assessment & Rehabilitation

Image - <https://ar.pinterest.com/pin/425238389793055053/>

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## Outline

- ▶ Assessment Tiers 1-5
  - ▶ Outcome forms
  - ▶ Posture
  - ▶ Functional Assessments
- ▶ Rehabilitation Tiers 1-5
  - ▶ Remove the Negatives
  - ▶ Static Stabilization + Cardio
  - ▶ Dynamic Stabilization
  - ▶ Mobilizer Conditioning
  - ▶ ADL's

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## Basis of this protocol and testing

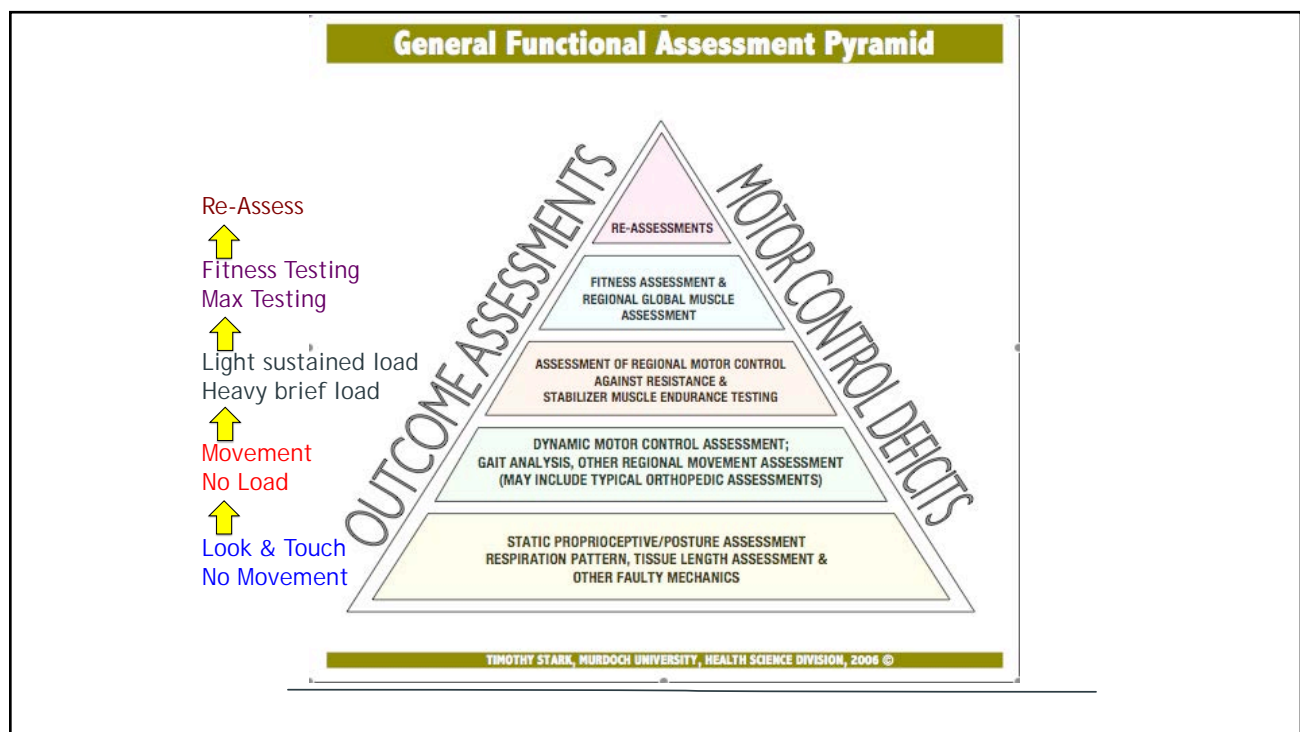
Chiropr Osteopat. 2006 Jun 8;14:9.  
*Introduction of a pyramid guiding process for general musculoskeletal physical rehabilitation.*

Stark TW.

Chiropr Osteopat. 2007 Nov 13;15:17.  
*Severe aberrant glenohumeral motor patterns in a young female rower: a case report.*

Stark TW, Seebauer J, Walker B, McGurk N, Cooley J.

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60

## Tier 1 *Looking and touching, no movement*

- ▶ Paradoxical breathing
- ▶ Faulty Mechanics
- ▶ Static Posture
  - ▶ Lengthened Tissues
  - ▶ Shortened Tissues
    - ▶ Tissue Tone Assess



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## Tier 2 *Movement but no load*

- ▶ Shoulder complex ROM



- ▶ Active first
- ▶ Passive w/ over pressure

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## Tier 2 *Movement but no load*

- ▶ Combine ROM = Apleys Scratch Test



- ▶ Don't forget to look for scapula winging variances
- 

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## Tier 2 *Movement but no load*

- ▶ Shoulder complex IR ROM for the posterior capsule



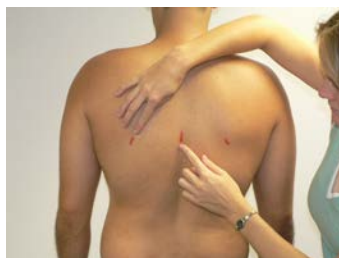
64



## Tier 2

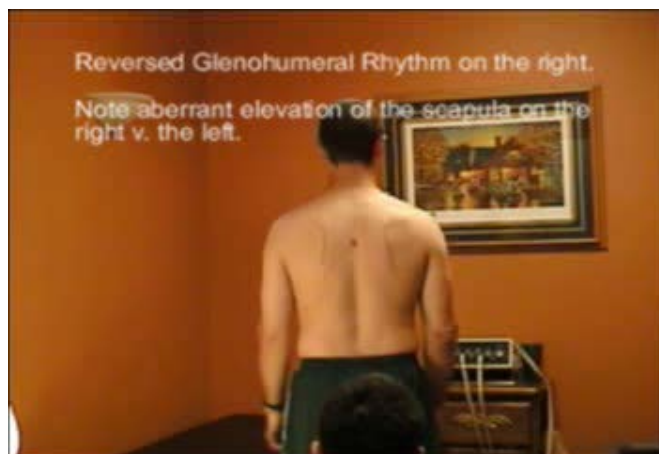
*Movement but no load*

- ▶ Static and Dynamic GH/Scapular Rhythm



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## Tier 2

*Movement but no load*

66

## Tier 2

*Movement but no load*

## ▶ Shoulder Case

▶ <http://www.chiroandosteo.com/content/15/1/17>

▶ AROM with co-contraction

---

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## Tier 2

*Movement but no load*

## ▶ Upper Body Flexibility Test

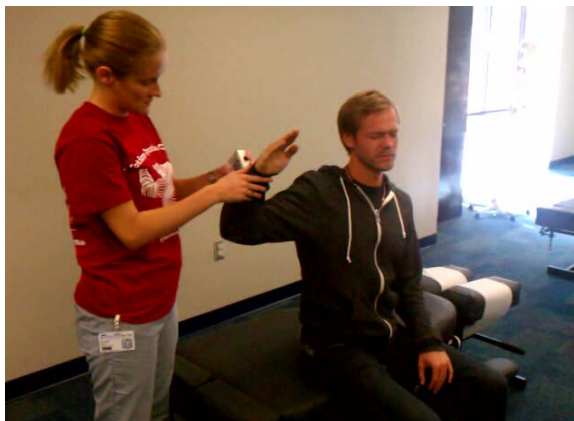


68

## Tier 2

*Movement but no load*

- ▶ Dynamic Proprioception
- ▶ Dover G, Powers ME. Reliability of Joint Position Sense and Force-Reproduction Measures During Internal and External Rotation of the Shoulder. J Athl Train. 2003;38:304-310

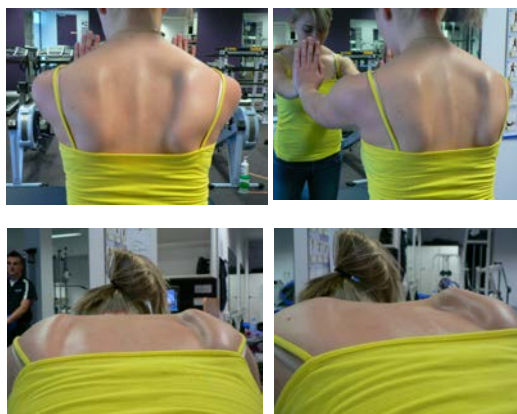


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## Tier 3

Light sustained or heavy brief load

- ▶ Scapular Stability Assessment



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### Tier 3

#### ► Scapular Stability Assessment



1.) 4-point position  
Loaded



2.) Conscious co-contraction  
Unloaded



3.) Re-loaded in 4-point position



71

### Tier 3 Light sustained or heavy brief load

#### ► Muscle testing; HHD

Stark T, Fejer R, Walker B. Hand-held dynamometry, a valid and practical diagnostic instrument when compared to isokinetic testing; a systematic review. Physical Medicine and Rehabilitation. 2011 May 18.



72

## Tier 4 Fitness and maximum testing

### ► Muscle Endurance Testing



73

## Tier 4 Fitness and maximum testing

### ► Testing for Upper Extremity Power

#### ► Three-step medicine ball throw;



#### ► Standing medicine ball throw;

► <http://www.youtube.com/watch?v=AhRoD7Huiu0>

74

## Tier 5 Re-Assess!

- ▶ Reminder for Re-Assessments
    - ▶ Same visit
    - ▶ Each visit
    - ▶ Periodic testing
    - ▶ Discharge
  
  - ▶ **Hahne A., et al 2004 J Physiotherapy**
    - ▶ **Intra-session reassessment was shown to predict Inter-session improvement**
    - ▶ **If post-tx assessment showed improvement those pts were 3.5x's more likely to have inter-session improvement**
- 

75

## Shoulder Injury Prevention!?

- ▶ [Asker M, Brooke HL, Waldén M, et al. Br J Sports Med 2018;52:1312-1319. Syst. Rev.](#)
    - ▶ Limited evidence supporting modifiable measures to prevent or mitigate injuries to the overhead athlete.
  
  - ▶ [Cools AM, Johansson FR, Borms D, Maenhout A. Prevention of shoulder injuries in overhead athletes: a science-based approach. Braz J Phys Ther. 2015 Sept-Oct; 19\(5\):331-339.](#)
    - ▶ NOT included in the 2018 Asker Syst Rev.
    - ▶ Three potential risk factors
      - ▶ Decreased glenohumeral internal rotation
      - ▶ Rotator cuff strength, especially external rotation
      - ▶ Scapular dyskinesis
- 

76



Common approaches to tendon rehabilitation; Ebonie Rio et al. Br J Sports Med 2016;50:209-15.

-  Passive intervention (injection into tendon)
-  NO strength training Resulted in insufficient muscle capacity to perform tasks
-  NO motor control Inability to control muscle to perform tasks
-  RESULT - Undesired outcome (pain, performance, recalcitrance, etc.)

77

Common approaches to tendon rehabilitation; Ebonie Rio et al. Br J Sports Med 2016;50:209-15.

-  Strength training only (most common approach) Sufficient muscle capacity to perform tasks
-  NO motor control Inability to control muscle to perform tasks
-  RESULT - Undesired outcome (pain, performance, recalcitrance, etc.)


78

Common approaches to tendon rehabilitation; Ebonie Rio et al. Br J Sports Med 2016;50:209-15.

	NO strength training	Insufficient muscle capacity to perform tasks
	Motor control	Ability to control muscle to perform tasks
	RESULT - Inability to perform tasks	

79

Common approaches to tendon rehabilitation; Ebonie Rio et al. Br J Sports Med 2016;50:209-15.

	Strength training	Sufficient muscle capacity to perform tasks
	Motor control	Ability to control muscle to perform tasks
	RESULT - Ability to perform tasks	

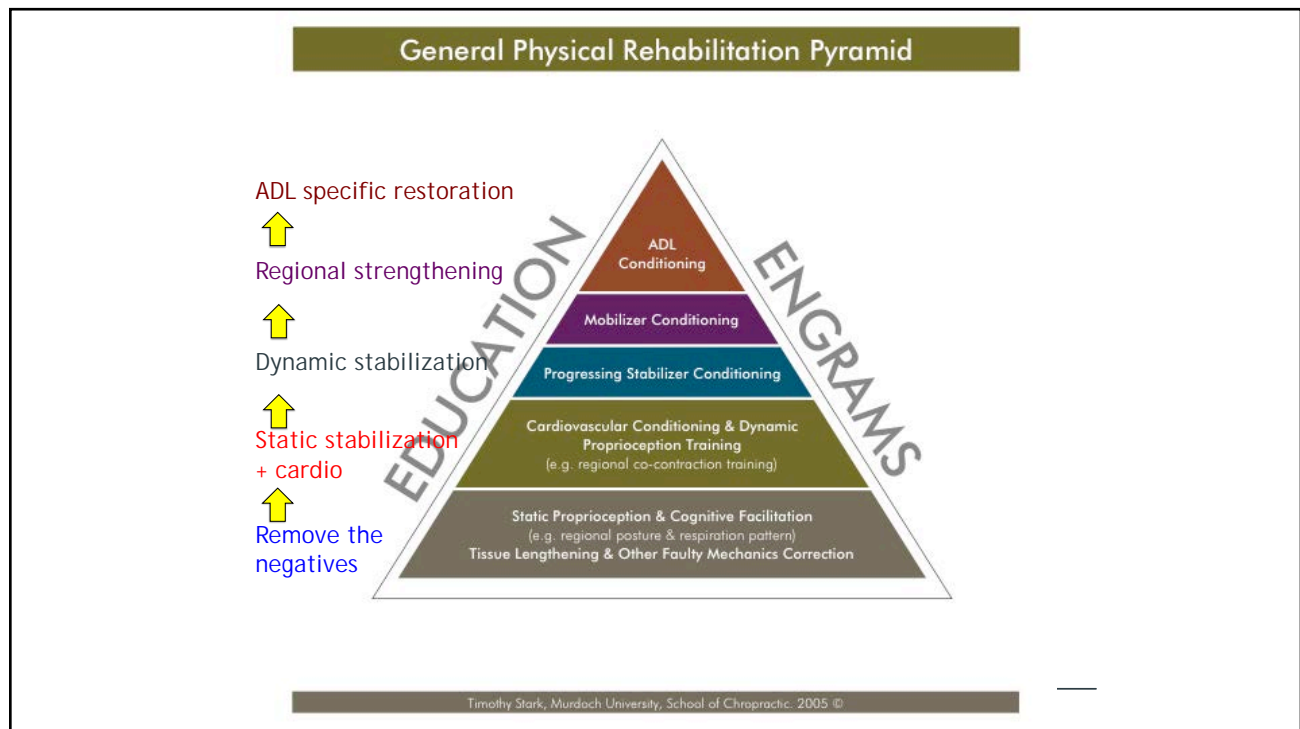
80



## Shoulder Rehabilitation

- Rehab for traumatic anterior GH jt. instability in 25 y.o. or less fails 60%-94% of the time resulting in continued instability (1-7).
- Traditional shoulder rehab. emphasizes strengthening and mobility, not stability.

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# Tier 1 - Remove the Negatives

- Inflammation & Nutrition
- Neuromotor facilitation
  - Cognitive Facilitation
  - Kinesiology/Dynamic/Rigid Taping
- Joint dysfunction/restrictions
- Tissue Lengthening
  - PNF
  - PIR
  - Myofascial Release Technique
  - Active lengthening

83



Tier 1 - Remove the Negatives

Strapping



84

## Tier 1 Inflammation, etc.

- ▶ Khana et al, 2008
  - ▶ Review of 16 intermittent pneumatic compression studies
  - ▶ "IPC expedites functional recovery following fracture & soft tissue injuries."
- ▶ Lessens Pain
  - ▶ J of Strength & Cond., 2014
- ▶ Increases ROM
  - ▶ J of Strength & Cond., 2014
- ▶ Speeds Lactate Clearance
  - ▶ J of Athletic Enhancement, 2013



85

## Tier 1 Nutrition

- ▶ Proteolytic enzymes
  - ▶ [Adv Ther. 2017 Dec 5. Shah D1,2, Mital K3.](#)
- ▶ Fish Oils (EPA/DHA)
  - ▶ J of Dietary Supplements, Sept. 2016.
  - ▶ Serhan CN. Nature. 2014;510:92-101
  - ▶ Spite et al. Cell Metab. 2014;19(1):21-36.

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## Tier 1 Cognitive Facilitation

- ▶ Posture Realization
  - ▶ Facilitation, not strengthening...
- ▶ "Sit Tall", etc.
- ▶ Brueggers.

87

## Tier 1 - CMT Evidence

- ▶ "There is a small amount of chiropractic research into upper limb conditions that is comprised mostly of case studies (level 4 evidence) and a small number of higher-level publications (level 1-3 evidence). Most treatments are multimodal in nature, which address both spinal and peripheral structures, with joint and soft tissue methods. There is a need for future research to be directed at higher-level evidence, in particular, randomized controlled trials for the chiropractic treatment of upper limb conditions."
  - ▶ Chiropractic treatment of upper extremity conditions: a systematic review. *J Manipulative Physiol Ther.* 2008 Feb;31(2):146-59.

88

## Tier 1 - CMT Evidence

- ▶ "The current evidence is inconclusive with respect to the beneficial effects of the combination of therapeutic exercise and joint mobilization versus therapeutic exercise alone for reducing pain, increasing ROM and function, and limiting disability in patients with shoulder dysfunction."
- ▶ The effect of therapeutic exercise and mobilization on patients with shoulder dysfunction : a systematic review with meta-analysis. J Orthop Sports Phys Ther. 2011 Oct;41(10):734-48.

89

## Tier 1 - CMT Evidence

- ▶ "This study found a level of B or fair evidence for manual and manipulative therapies (MMT) of the shoulder, shoulder girdle, and/or the functional kinetic chain (FKC) combined with multimodal or exercise therapy for rotator cuff injuries/disorders, disease, or dysfunction. There is a fair or B level of evidence for MMT of the shoulder/shoulder girdle and FKC combined with a multimodal treatment approach for shoulder complaints, dysfunction, disorders, and/or pain."
- ▶ Manipulative therapy for shoulder pain and disorders: expansion of a systematic review. J Manipulative Physiol Ther. 2011 Jun;34(5):314-46.

90

## Tier 1 - CMT Evidence

### ▶ Thoracic spine

- ▶ Theisen et al. 2010. Co-occurrence of outlet impingement syndrome of the shoulder and restricted range of motion in the thoracic spine - a prospective study with ultrasound-based motion analysis *BMC Musculoskeletal Disorders* 2010, 11:135
- ▶ Meurer A, et al. 2004. BWS-mobility in patients with an impingement syndrome compared to healthy subjects: an inclinometric study [in German]. *Z Orthop Ihre Grenzgeb.* 142:415-420.
- ▶ Boyles, R., et al. 2009. The short-term effects of thoracic spine thrust manipulation on patients with shoulder impingement syndrome. *Manual Therapy* 14:375-380


91

## Tier 1 - CMT Evidence

### ▶ Thoracic Spine

- ▶ The results suggest that lower thoracic manipulation techniques may be beneficial in reducing the lower trapezius muscle inhibition commonly associated with many postural syndromes. FAVORITE
  - ▶ Cleland, J., et al. 2004 Short-Term Effects of Thoracic Manipulation on Lower Trapezius Muscle Strength. *J of Man & Manip Therapy*; 12(2), 82-90.
- ▶ Thoracic and rib manipulation is effective in reducing pain, increasing ROM and function of shoulder in subjects with frozen shoulder.
  - ▶ Indian Journal of Health Sciences, 2013

92




Tier 1

Soft tissue manipulation

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93

Tier 1  
Posterior capsule stretch



Posterior capsule stretch

Home Prescription



Doctor Assisted

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94



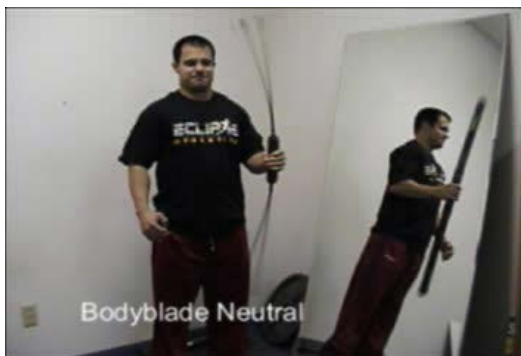
One objective  
for Tier 2  
Sports Med.  
2009;39(8):663-  
85.

- ▶ Establish STABILIZATION (centration) of the GH and Scapulo-thoracic joints
  - ▶ Rotator Cuff 'trained' as a GH stabilizer
  - ▶ Serratus Anterior as a Scapula stabilizer
    - ▶ SA causes scapula lateral rotation & posterior tilt
    - ▶ SA stabilizes the medial border and inferior angle to the thoracic cage
  - ▶ "Aberrant scapula position and humeral rotation can affect injury risk during humeral elevation."

95

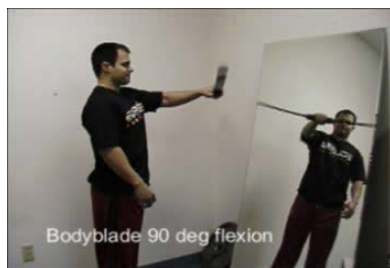
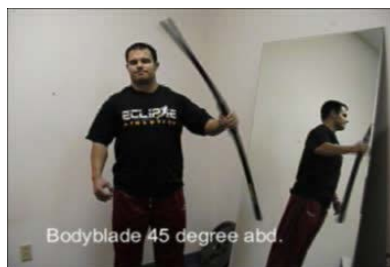


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## Tier 2 Body Blade

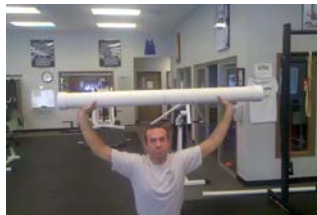
97



## Tier 2 BB progression

98

Slosh Bar stabilization:



Tier 2




99

## Tier 2 - Cardio

- ▶ Choose an exercise that the patient likes
- ▶ Choose an exercise that will not reinjure the patient
- ▶ Choose an exercise that will not promote aberrant motor patterns



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Bodyblade throwing/pitching

Bodyblade flexion/extension  
2X's normal speed

Tier 3  
BB with movement

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101



Tier 3  
Dynamic  
SLOSH bar

---

102

Slosh Bar:



Tier 3

103

## Tier 3

- ▶ Other moderate load oscillatory dynamic stabilization



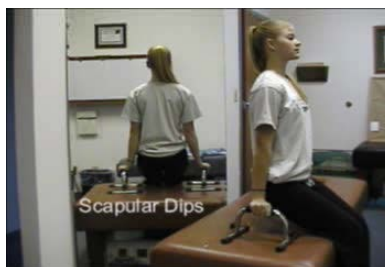
104

## Progressing to Tier 4 too fast!

- ▶ J of Str & Cond Res Jan. 2011
  - ▶ 88 females
    - ▶ 57 recreational weight lifters
    - ▶ 31 non-weight lifters
  - ▶ The weight lifters (p=.004)
    - ▶ Had diminished internal rotation
    - ▶ Had posterior capsule tightness
    - ▶ Increased anterior GH capsule laxity

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## Tier 4 Closed Chain Scapula Conditioning



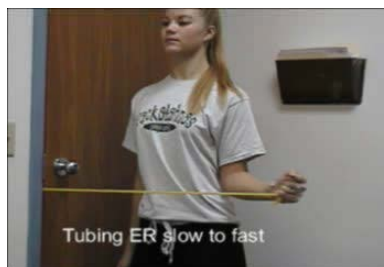
106



## Tier 4 Open Chain Scapula Conditioning

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## Tier 4 Resistance Exercises using tubing



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## Tier 4 Resistance Exercises using tubing

109

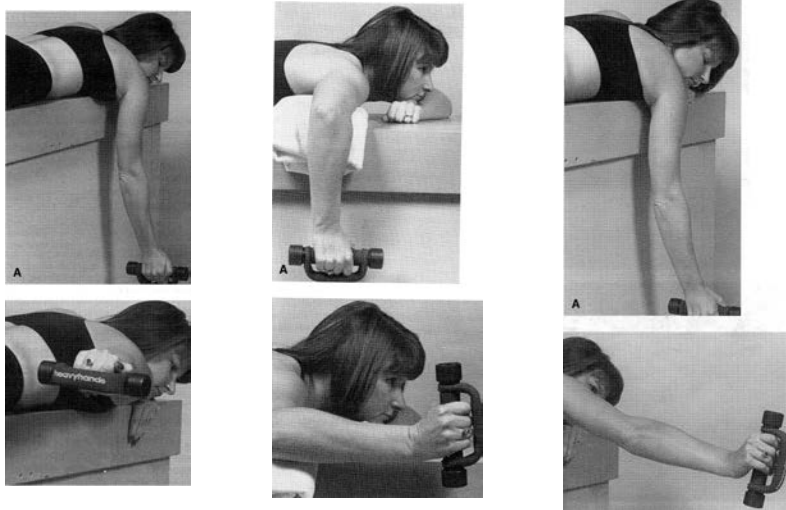


## Tier 4 Resistance Exercises for the Subscapularis



110

## Tier 4 Resistance Exercises



111

## S.A.I.D. Principle

S = Specific

A = Adaptations to

I = Imposed

D = Demands

Sport or activity specific conditioning.

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## Tier 5

- ▶ ADL Conditioning
  - ▶ Speed
  - ▶ Agility
  - ▶ Power...
  
- ▶ Returning the athlete to higher volume of training

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Joint Base Langley-Eustis

113

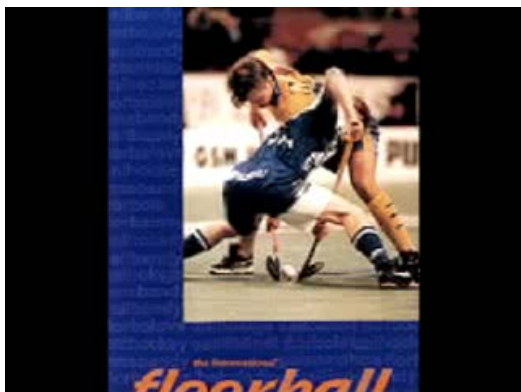
## GH stability in end-ranges of motion

- ▶ J Shoulder Elbow Surg 2005 Jan-Feb;14
  - ▶ Rotator cuff muscles play a significant role in gleno-humeral stability, even in end-ranges of motion.
  - ▶ If there is less rotator cuff muscle contraction and more mobilizer contraction (e.g. pecs, delts...), there is less joint centration.




---

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## Case Video

115

## References

- 1. RA Arciero, et al. Am J Sports Med 22 (1994), pp. 589-594
- 2. L Hovellus, et al. J Bone Joint Surg Am 65 (1983), pp 343-349
- 3. HL McLaughlin & DI MacLellan, J Trauma 7 (1967), pp 191-201
- 4. CR Rowe, et al. J Bone Joint Surg Am 66 (1984), pp. 159-168
- 5. WT Simonet & RH Cofield, Am J Sports Med 12 (1984), pp19-24
- 6. JH Wheeler, et al. Athroscopy 5 (1989), pp 213-217
- 7. J Labriola, et al. J Shoulder & Elbow Surg., 14 (2005) s62-68

116

Figures and Tables from

1. R. Evans; Illustrated Orthopedic Physical Assessment - 3<sup>rd</sup> Edition.
2. Neumann, Donald A.. Kinesiology of the Musculoskeletal System: Foundations for Rehabilitation.
2. VitalSource Bookshelf. Mosby, 122009, May 10, 2012.

Unless otherwise noted.

Thank you for your attention!



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