

Clinical Examination of the Shoulder Joint Complex

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I. Introduction

A. Clinical Examination

1. Vital to successful treatment of shoulder patients
2. Must be thorough and systematic
3. Establish chief complaint & contributing factors
 - a. Rule out & rule in
4. Main purpose is to establish underlying cause of symptoms
5. Also determines where to start with patient
 - a. Tolerance level \leftrightarrow aggressiveness of program

B. Components of clinical exam

1. Subjective history
2. Inspection / observation
3. Clearing the cervical spine
3. Active range of motion
4. Passive range of motion
5. Manual muscle testing
6. Accessory motion assessment

7. Laxity testing
8. Special tests
9. Palpation
10. Neurovascular assessment
11. Functional assessments
12. Imaging studies / radiographs
13. Ultrasound examination
14. Establish a differential diagnosis & treatment plan

II. Subjective Examination

- A. Most important part of the clinical exam
- B. Will direct the approach to the objective examination
- C. History of symptoms

1. What brings you here today?
 - a. Pain, weakness, instability, sensations, etc.
2. When did the symptoms begin?
 - a. Acute traumatic incident
 - b. Insidious onset
3. Where, when, & how?
4. What alleviates symptoms?
5. What reproduces symptoms?
6. Chief complaint (establish chief complaint)
“What is the problem you are having with your shoulder?”
 - a. Limitations in functional activities
 - b. Limitations in work activities
 - c. Limitations in recreational/athletic activities

Looking for “pattern recognition” of symptoms

III. Observation

- A. Symmetry
- B. Posture

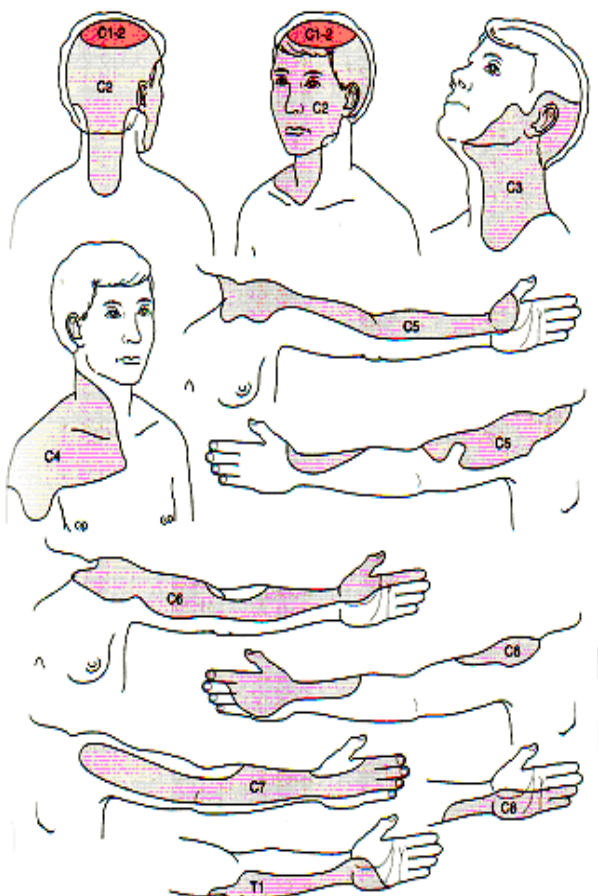
1. Head position
2. Shoulder position
3. Pectoralis position
3. Scapular position
4. Spine position

- C. Atrophy of muscle tissue
 D. Visible defects

1. Ecchymosis, edema, inflammation, deformities

IV. Clearing the cervical spine

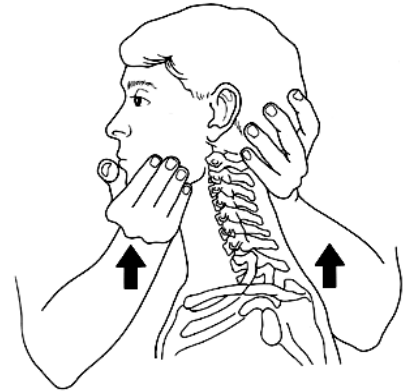
A. Dermatomes, myotomes, reflexes



LEVEL	MOTOR	SENSORY	REFLEX
C5	Deltoid Biceps (partial)	Lateral deltoid	Biceps
C6	Biceps ECRL and ECRB	Thumb	Brachioradialis Biceps
C7	Triceps Wrist flexors Finger extension	Middle finger	Triceps
C8	Finger flexors	Ulnar border Little finger	—
T1	Intrinsics	Medial side Proximal arm	—

ECRL, extensor carpi radialis longus; ECRB, extensor carpi radialis brevis.

B. Active ROM (w/ overpressure), quadrant test, compression/distraction



V. Range of motion

A. Active range of motion

1. Ability to raise arm, willingness to raise arm
2. Functional ER/IR
3. Assess several factors
 - a. Painful arc
 - b. Quality of motion
 - c. Quantity of motion

Active Motions I assess:

- Elevation in scapular plane
 - Functional ER
 - Functional IR
 - Horizontal abd/adduction
4. Scapulohumeral rhythm & Scapula Dyskinesis (Kibler)
 - a. 0-30° = setting phase; mostly GH movement
 - b. 30-90° = 2.0-2.75:1 ratio of GH:ST movement
 - c. 90-160° = 1:1 ratio of scapulohumeral movement
 5. Scapula movement & winging
 6. Scapular Dyskinesis
Kibler & Sciascia BJSM '10
 7. Scapular Dyskinesis Test (SDT)

McClure: JAT '09

B. Passive range of motion

Motion	AAOS	AMA	Boone JBS 79	End Feel
Flexion	180	150	166.7	Firm
Extension	60	50	62.3	
IR	70	90	68.8	Firm-hard
ER	90	90	103.7	Capsular
Abduction	180	180	184.0	

Motion	10-20 years Boone JBS 79	20-40 years Boone JBS 79	40-54 years Boone JBS 79	60-85 years Walker Phys Ther 84	61-93 years Downey Phys Ther 91
FLX	167.4	165	165.1	160	165
EXT	64	58	56.1	38	-
IR	70.3	66.5	68.3	59	65
ER	106.3	101	97.5	76	80.6
ABD	185.1	182.7	182.6	155	157.9

C. PROM in the athletic population

Motion	Baseball Players PROM Wilk AJSM 02 Wilk CORR '14	Baseball Players AROM Ellenbecker MSSE 02	
ER	125.6	103.2	
IR	59.7	42.4	
TROM	184.5	145.3	

D. Assess several factors during PROM

1. Quality & quantity of motion
2. Crepitus
3. End feel (overpressure)
4. Pain

E. **Assess Total Rotational ROM (TROM)**

1. ER + IR = TROM
Wilk et al: AJSM '02

F. Humeral Retroversion Assessment

1. imaging studies
2. Ultrasound assessment
3. Manual technique

VI. Accessory Motion Assessment

A. Assess glenohumeral joint play

1. Inferior glide
2. Posterior glide
3. Anterior glide
4. Lateral glide

VII. Neuromuscular system

A. Resisted manual muscle testing

<i>MUSCLE</i>	<i>INNERVATION</i>	<i>MYOTOMES</i>	<i>TECHNIQUE FOR TESTING</i>
Shoulder			
Trapezius	Spinal accessory	C2–C4	Patient shrugs shoulders against resistance.
Sternomastoid	Spinal accessory	C2–C4	Patient turns head to one side with resistance over the opposite temporal area.
Serratus anterior	Long thoracic	C5–C7	Patient pushes against a wall with an outstretched arm. Scapular winging is observed.
Latissimus dorsi	Thoracodorsal	C7–C8	Downward/backward pressure of the arm against resistance. Muscle palpable at inferior angle of the scapula during cough.
Rhomboids	Dorsal	(C4) C5*	Hands on hips pushing elbows backward against resistance.
Levator scapulae	Scapular		None
Subclavius	Nerve to subclavius	C5–C6	None
Teres major	Subscapular (lower)	C5–C6	Similar to lat. dorsi; muscle palpable at the lower border of the scapula.
Deltoid	Axillary	C5–C6 (C7)	With arm abducted 90 degrees, downward pressure is applied. Anterior and posterior fibers may be tested in slight flexion and extension.
Subscapularis	Subscapular (upper)	C5	Arm at side with elbow fixed to 90 degrees. Examiner resists internal rotation.
Supraspinatus	Suprascapular	C5 (C6)	Arm abducted against resistance (not isolated). With arm pronated and elevated 90 degrees in plane of scapula, downward pressure is applied.
Infraspinatus	Suprascapular	C5 (C6)	Arm at side with elbow flexed 90 degrees. The examiner resists external rotation.
Teres minor	Axillary	C5–C6 (C7)	Same as for the infraspinatus.
Pectoralis major	Medial and lateral pectoral	C5–T1	With arm flexed 30 degrees in front of the body, the patient adducts against resistance.
Pectoralis minor	Medial pectoral	C8, T1	None
Coracobrachialis	Musculocutaneous	(C4) C5–C6 (C7)	None
Biceps brachii	Musculocutaneous	(C4) C5–C6 (C7)	Flexion of the supinated forearm against resistance.
Triceps	Radial	(C5) C6–C8	Resistance to extension of the elbow from varying positions of flexion.

*Numbers in parentheses indicate a variable but not rare contribution.

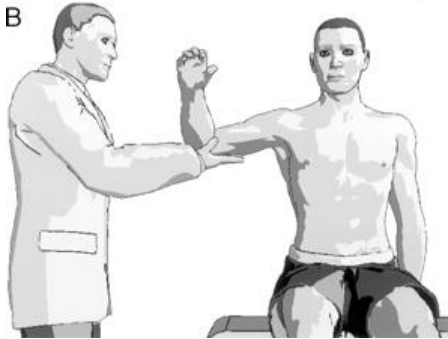
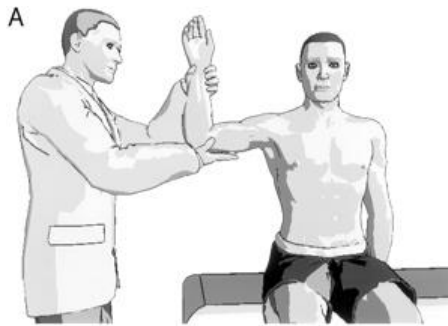
1. ER
2. IR
3. Abduction
4. Flexion
5. Scapular retraction
6. Scapular protraction
7. Scapular depressors
8. Scapular elevators

B. Rotator cuff integrity (??)

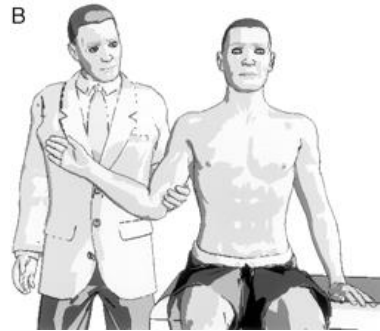
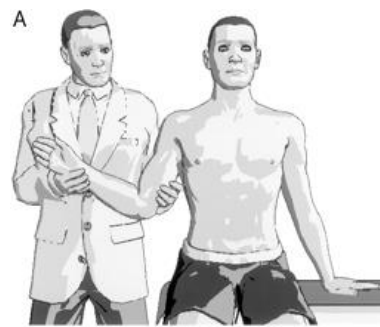
1. Full can test
Kelly, AJSM '96

2. Drop arm test

3. Lag Signs
Hertel: JSES '96
Supraspinatus



- Infraspinatus/Supraspinatus*



4. Lift-off Sign & Belly Press

Gerber: JBJS '91



5. Internal impingement sign – Meister: AJSM '00



C. Impingement

1. Impingement sign
Neer: Orthop Clin NA '77

2. Hawkins test
Hawkins: AJSM '80



D. Biceps provocation

1. Static Speed's test

2. Dynamic Speed's test

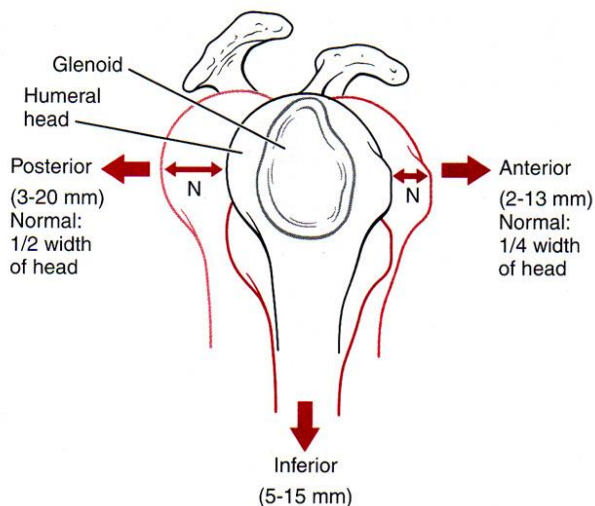


3. Yergason's test
Yergason: JBJS '31

VIII. Laxity assessment

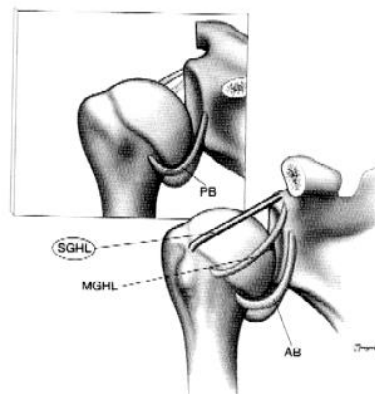
A. Grading of humeral head translation – What is normal?

Grade	Diagrammatic	Clinical Feel
0 None		No translation
1 Mild		Humeral head moves slightly up face of glenoid (0-1 cm translation)
2 Moderate		Humeral head rides up glenoid face to but not over the rim (1-2 cm translation)
3 Severe		Humeral head rides up and over the glenoid rim • Usually reduces when stress removed • May remain dislocated when stress removed (rare) (>2 cm translation)



B. Seated position

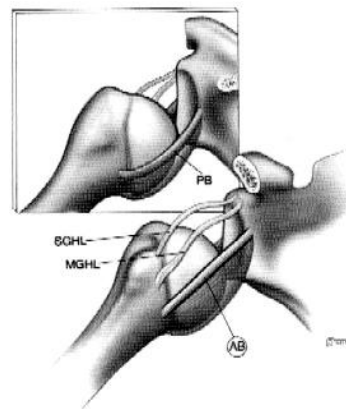
1. Sulcus sign – inferior laxity - *Neer & Foster JBSJ '80*



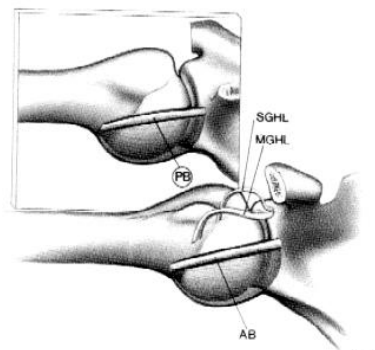
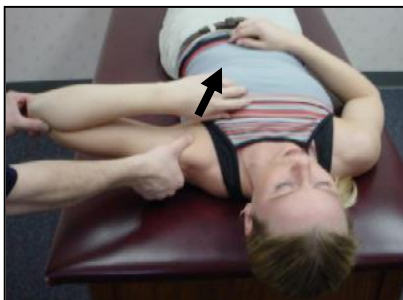
2. Load & shift – gross instability
Sillman & Hawkins CORR '93

C. Supine Position - Anterior instability

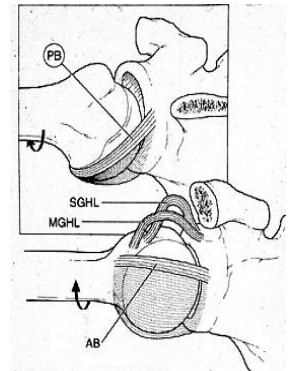
1. Anterior drawer @ 45° - *Wilk: JOSPT '97*



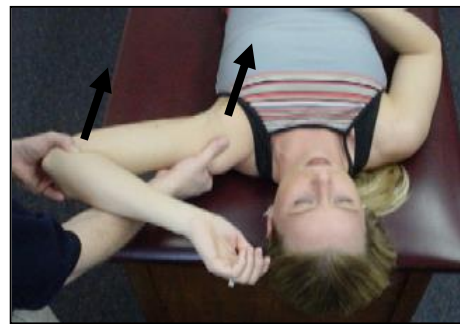
2. Anterior drawer @ 90° - *Wilk: JOSPT '97*



3. Anterior fulcrum – Andrews '95



4. Andrew's Lachman of the shoulder
Andrews '95



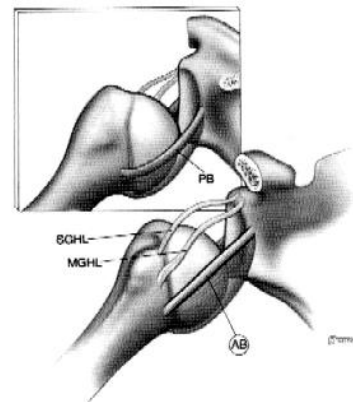
5. Relocation test
Jobe Orthop Rev '89



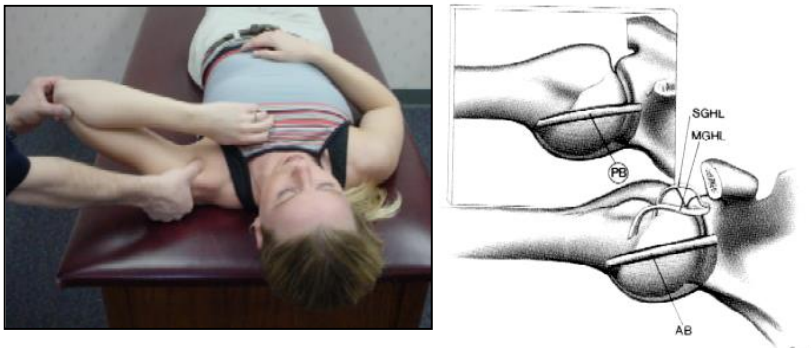
6. Apprehension test

D. Supine Position - Posterior instability

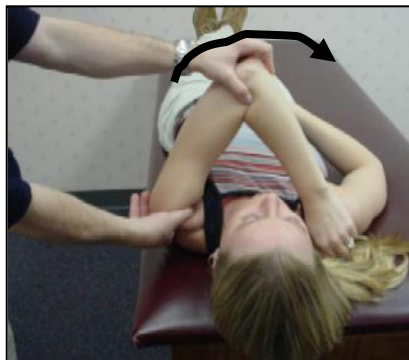
1. Posterior drawer @ 45° - Wilk: JOSPT '97



2. Posterior drawer @ 90° - *Wilk: JOSPT '97*



3. Posterior fulcrum
Wilk JOSPT '97



4. Push-pull test
Matsen: '90

IX. SLAP tests

A. Speed's tests



B. Grind test
"Compression-Rotation"
Snyder: Arthroscopy '90



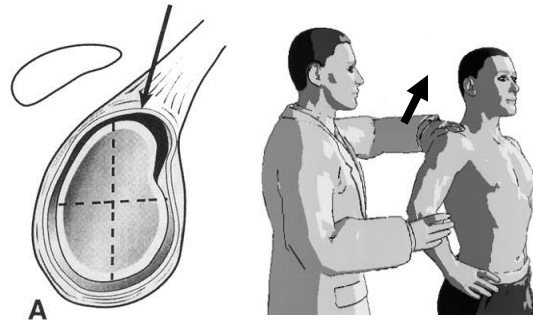


C. Clunk test
Andrews: Inj. Baseball '85

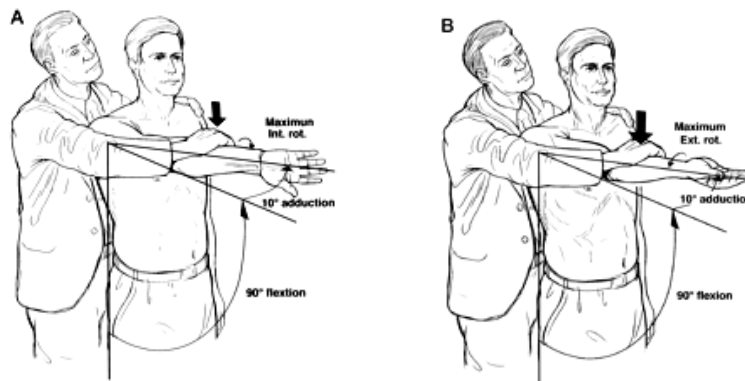


D. Crank test
Liu: AJSM '96

E. Anterior slide
Kibler: Arthroscopy '95

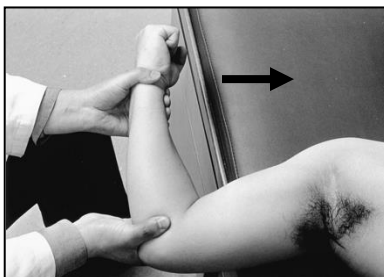


F. Active compression test – *O'Brien: AJSM '98*

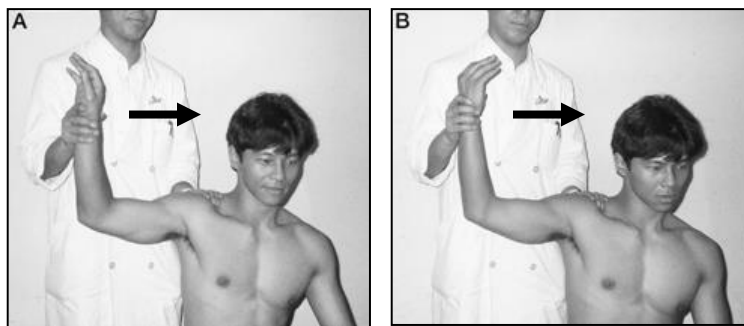
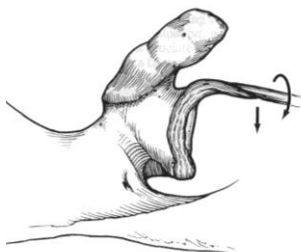


G. Biceps Load I & II – *Kim: AJSM '99 & Arthroscopy '01*





H. Pain Provocation – *Mimori: AJSM '99 – Increased pain in pronation*



I. Resisted Supination External Rotation Test (RSET)
Myers et al: AJSM '03

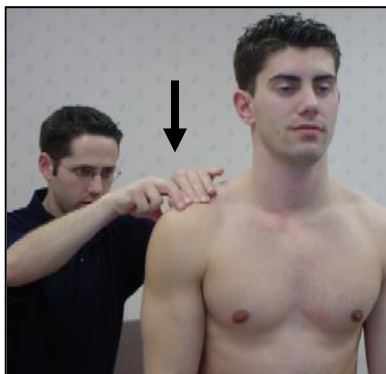
J. *My favorite SLAP test (KW)*
1. max ER with pronation then resist elbow flexion

SLAP Tests – Many Tests Available to the Clinician
What Type of Patient are you assessing, mechanism of injury, symptoms

Overhead Athlete ↔ Contact Injury or Other Mechanism

X. Acromioclavicular joint

A. Spring sign



B. Shear test



Davies: Phys Sports Med '81



C. Horizontal adduction



D. O'Brien's test
O'Brien: AJSM '98

XI. Neurovascular

A. Neurological function

1. Upper limb tension test (ULTT) – *Magee '97*

Upper Limb Tension Tests Showing Order of Joint Positioning and Nerve Bias

	ULTT1	ULTT2	ULTT3	ULTT4
Shoulder	Depression and abduction (110°)	Depression and abduction (10°)	Depression and abduction (10°)	Depression and abduction (10 to 90°), hand to ear
Elbow	Extension	Extension	Extension	Flexion
Forearm	Supination	Supination	Pronation	Supination
Wrist	Extension	Extension	Flexion and ulnar deviation	Extension and radial deviation
Fingers and thumb	Extension	Extension	Flexion	Extension
Shoulder	—	Lateral rotation	Medial rotation	Lateral rotation
Cervical spine	Contralateral side flexion	Contralateral side flexion	Contralateral side flexion	Contralateral side flexion
Nerve bias	Median nerve, anterior interosseous nerve, C5, C6, C7	Median nerve, musculocutaneous nerve, axillary nerve	Radial nerve	Ulnar nerve, C8 and T1 nerve roots

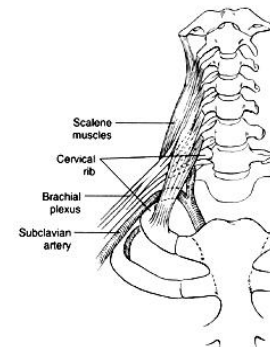
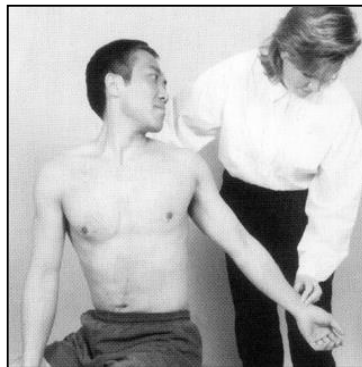
2. Tinel's sign – Landi '79

3. Dermatomes & Reflexes

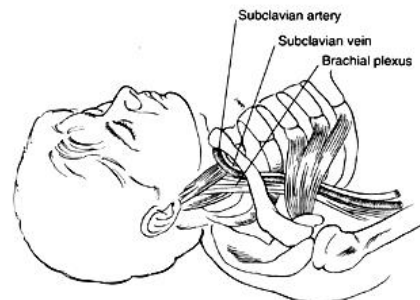
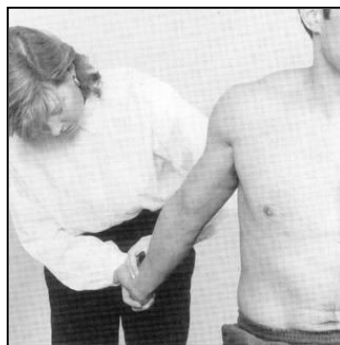
C. Thoracic outlet

1. Roos (EAST) test – Generalized compression
 Roos: *J Surg* '76

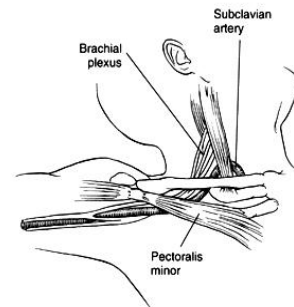
2. Adson maneuver – Compression between anterior & middle scalenes or between cervical rib and scalenes. Adson: *Ann Surg* '27



3. Costoclavicular (Military) test – Compression between 1st rib & clavicle in costoclavicular space. Magee '97



4. Allen test – Compression between pectoralis minor and ribs. *Allen: AJ Med Sci '29*



XII. Palpation

A. Specific structures

1. Greater tuberosity – rotator cuff insertion
2. Biceps brachii (proximal)
3. Coracoid process
4. Subacromial bursa
5. Anterior deltoid
6. Infraspinatus – internal impingement location
7. Quadralateral space
8. 1st rib
9. Acromioclavicular joint
10. Scapular mobility (crepitus, etc) during AROM

XIII. Functional Assessment

A. Specific shoulder assessment forms

1. American Shoulder Elbow Surgeon Form
Richards et al: JSES '94
2. KJOC Thrower's Subjective Score
Alberta et al: AJSM '11
3. UCLA Shoulder Form
4. Dash Form
Hudak et al: '96

5. Modified Athletic Shoulder Form – Reinold, Wilk, Andrews

XIV. Summary

A. Key Points

1. Systemic approach to shoulder exam
2. Logical progression
3. Knowledge of anatomy & biomechanics
4. Establish chief complaints
5. Correlate clinical findings to history

Establish Differential Diagnosis & Associated Lesions
Establish a Treatment Plan

KEW/MMR: Shldr Exam '11, '14, '16

