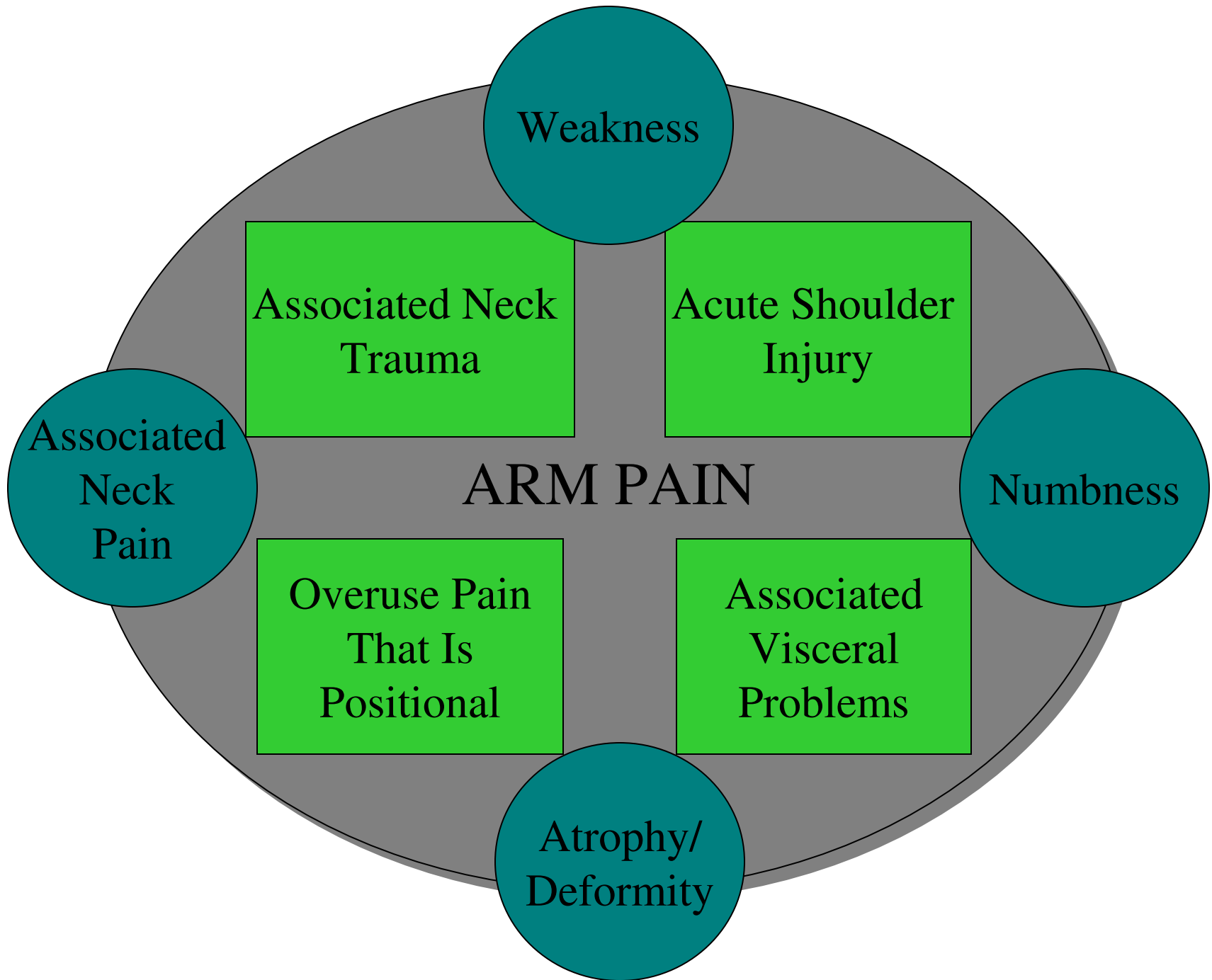


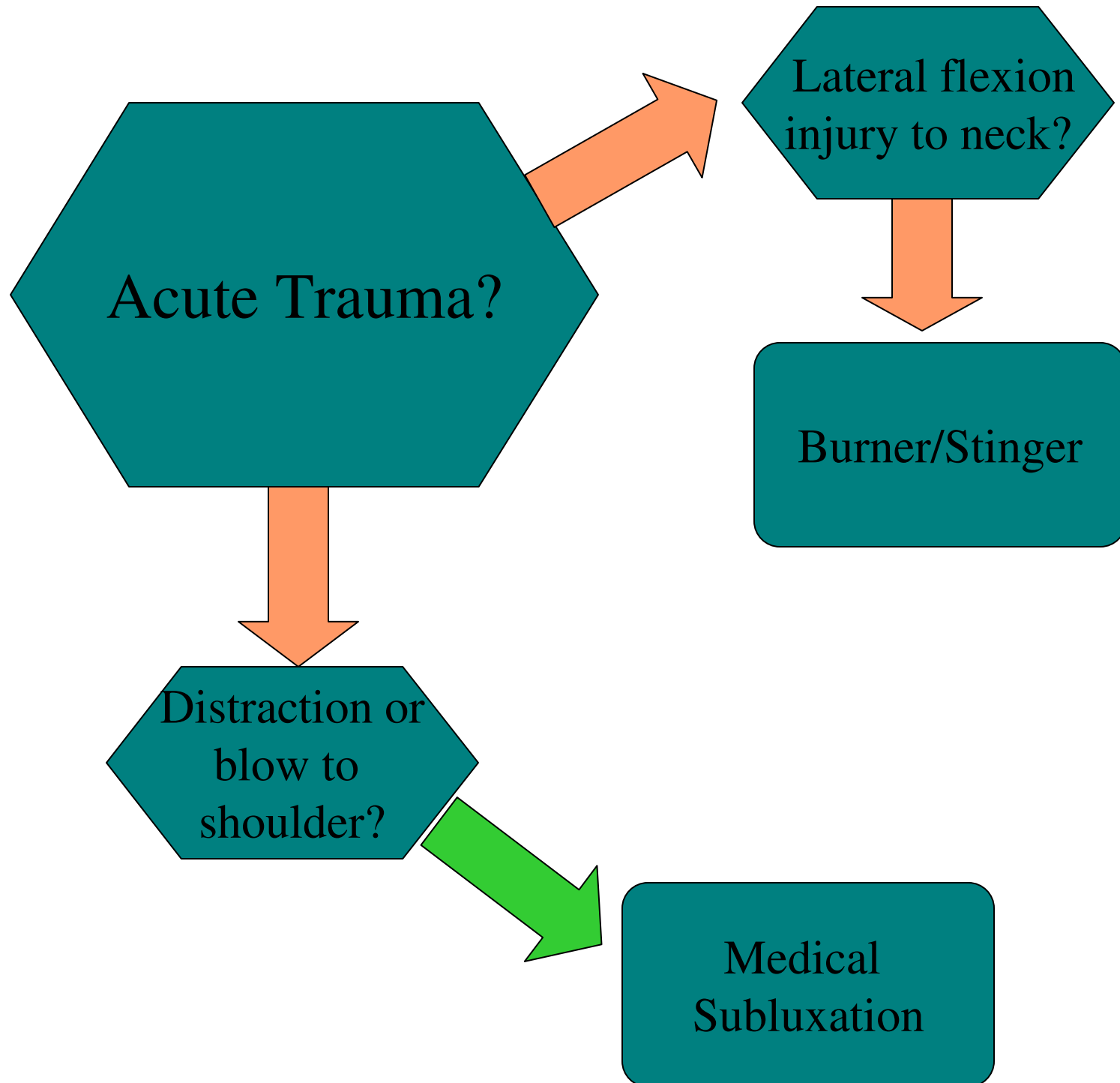
Case Presentations:

Shoulder Pain with Radiation



Highest on Differential List

- Radiculopathy
- Referred Pain (Sclerotogenous)
- Brachial Plexus Injury
- Thoracic Outlet Syndrome
- Peripheral Nerve Entrapment
- Visceral Referral



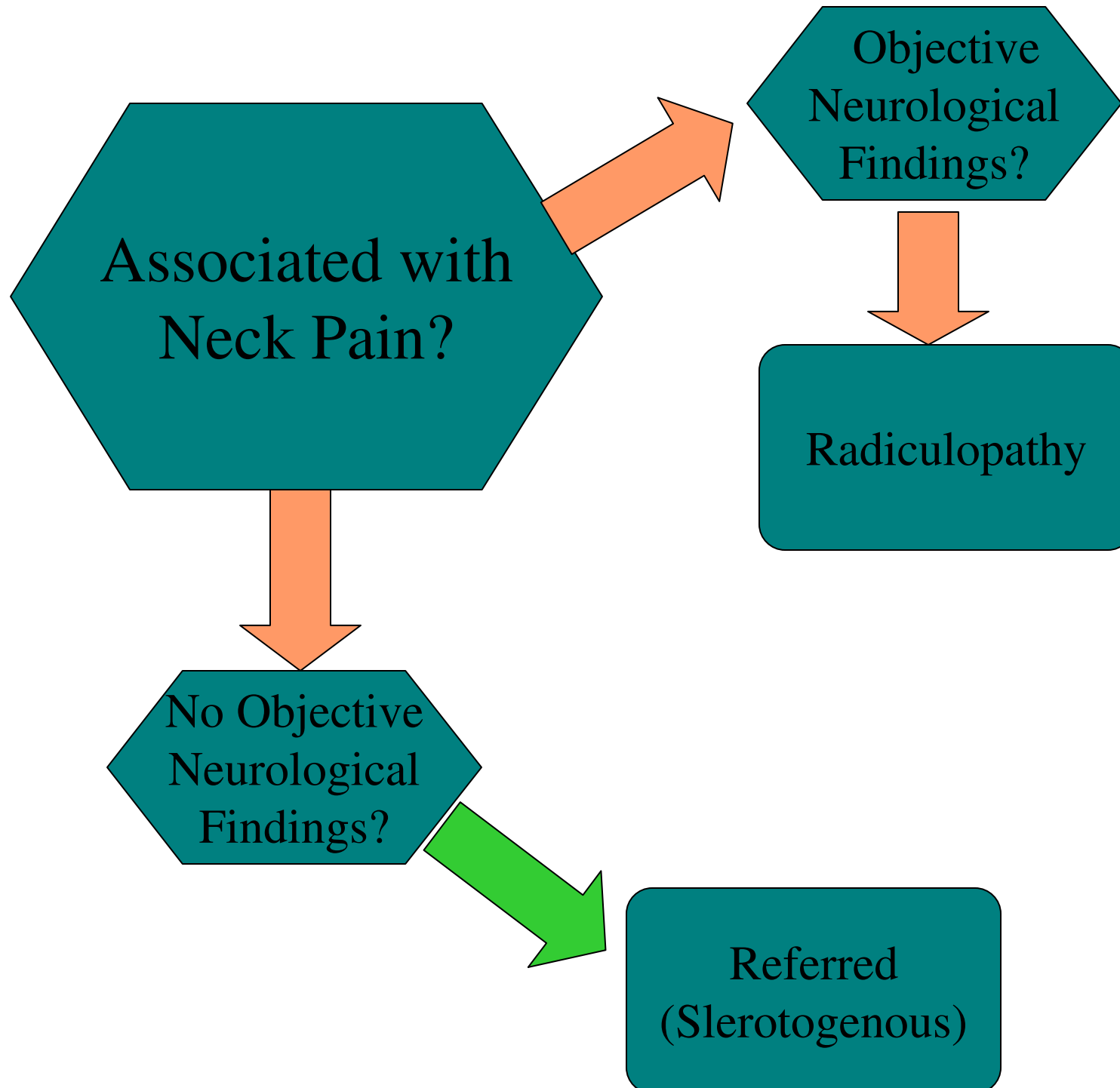
Burner/Stingers

Mechanism

- Sudden onset of arm pain and weakness following a lateral flexion injury of neck away from arm symptoms. Brachial plexus stretch injury.

Evaluation

- Possible weakness of shoulder abduction, external rotation, and flexion.
- Require C-Spine radiographs to determine canal size
- May require EMG evaluation



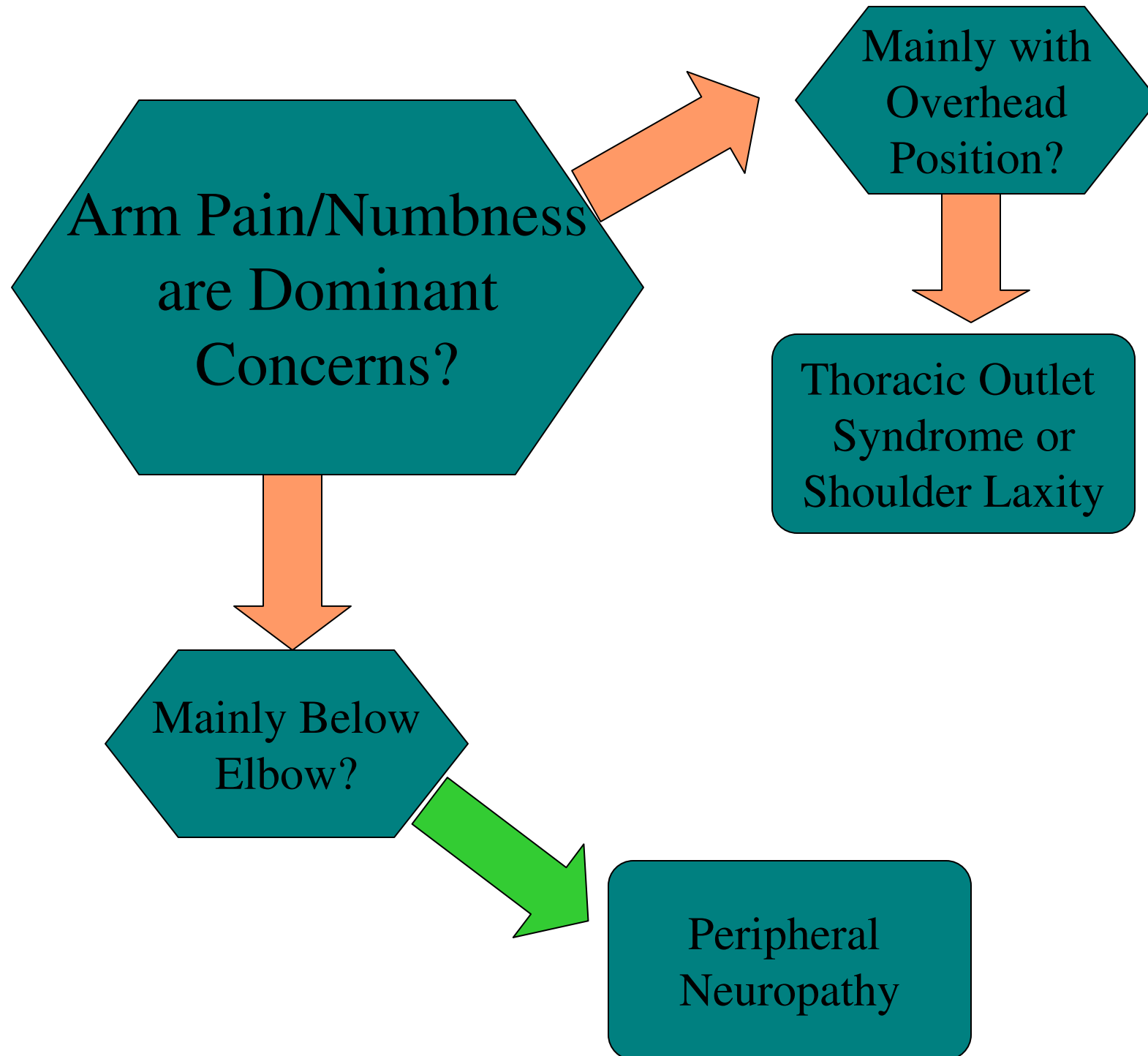
The Spurling Test and Cervical Radiculopathy

- Comparison of positive results with electrodiagnostic findings
- Comparison using 255 consecutive patients sent for electrodiagnostic studies
- Spurling test had a sensitivity of 30% and a specificity of 93%
- Not a sensitive test, therefore, not a good screening test, however, may be useful in confirming cervical radiculopathy

Tong HC, Haig AJ, Yamakawa K. Spine 27(2), 156-159, 2002

Differentiating Radiculopathy from Referred Pain

- Decreased or absent DTR, coupled with abnormal sensory findings in a dermatomal patch, and corresponding myotome weakness indicate a radiculopathy
- Similar patient complaints of pain, numbness/tingling, and even weakness are not confirmed by positive neurological findings



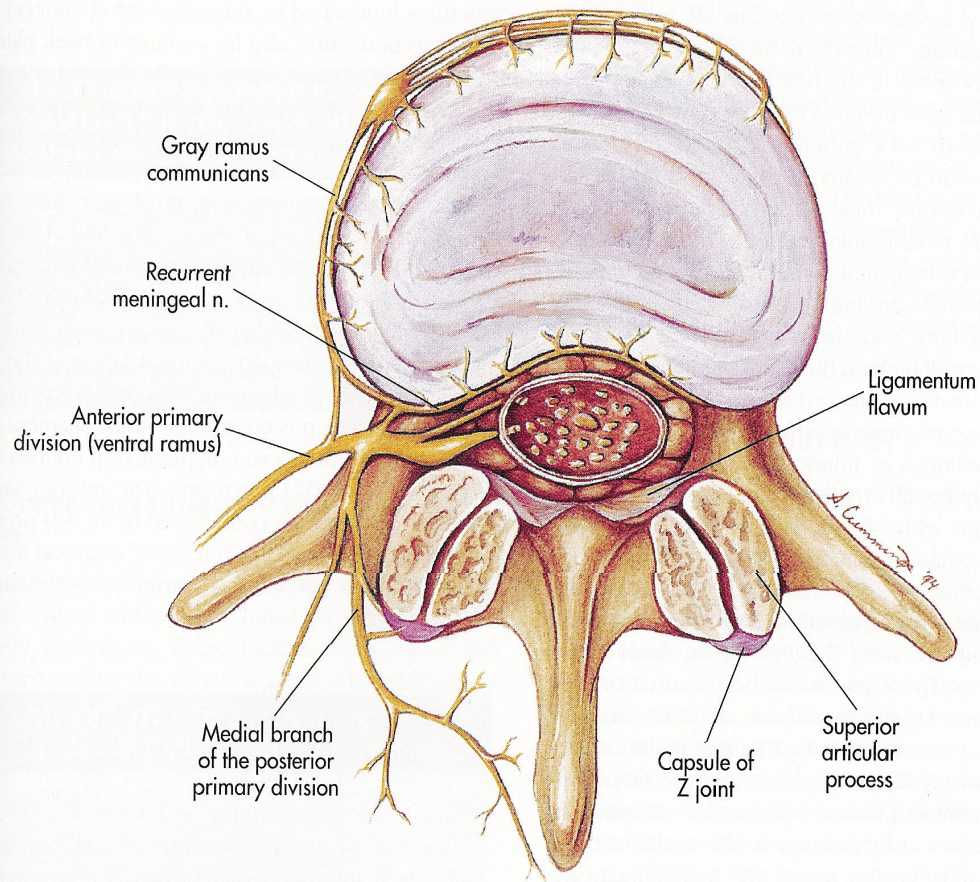
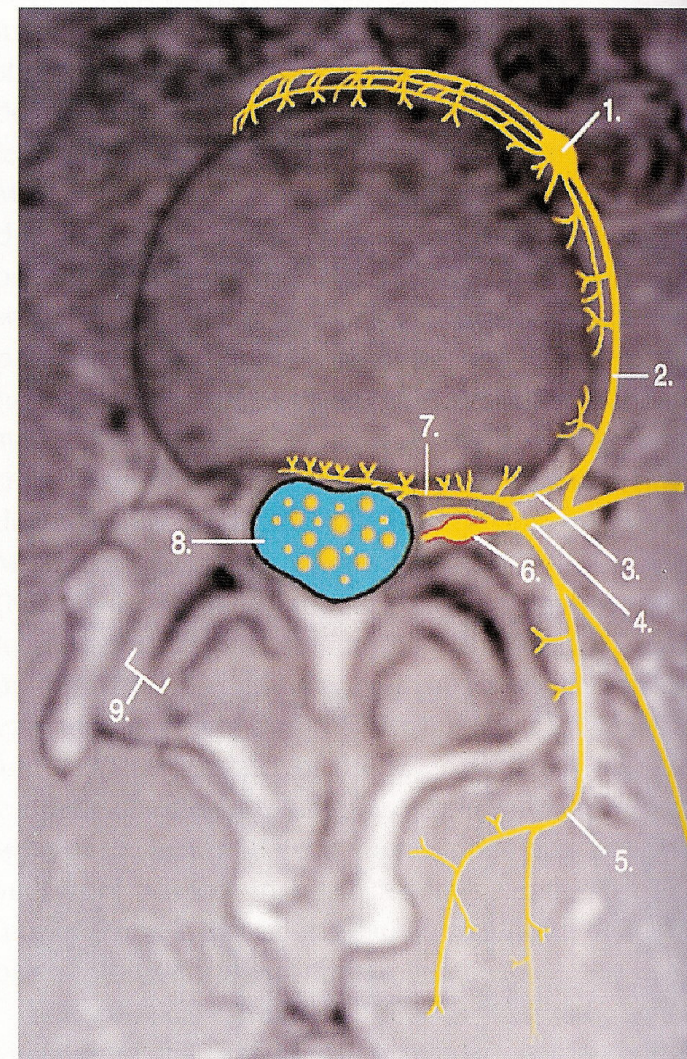
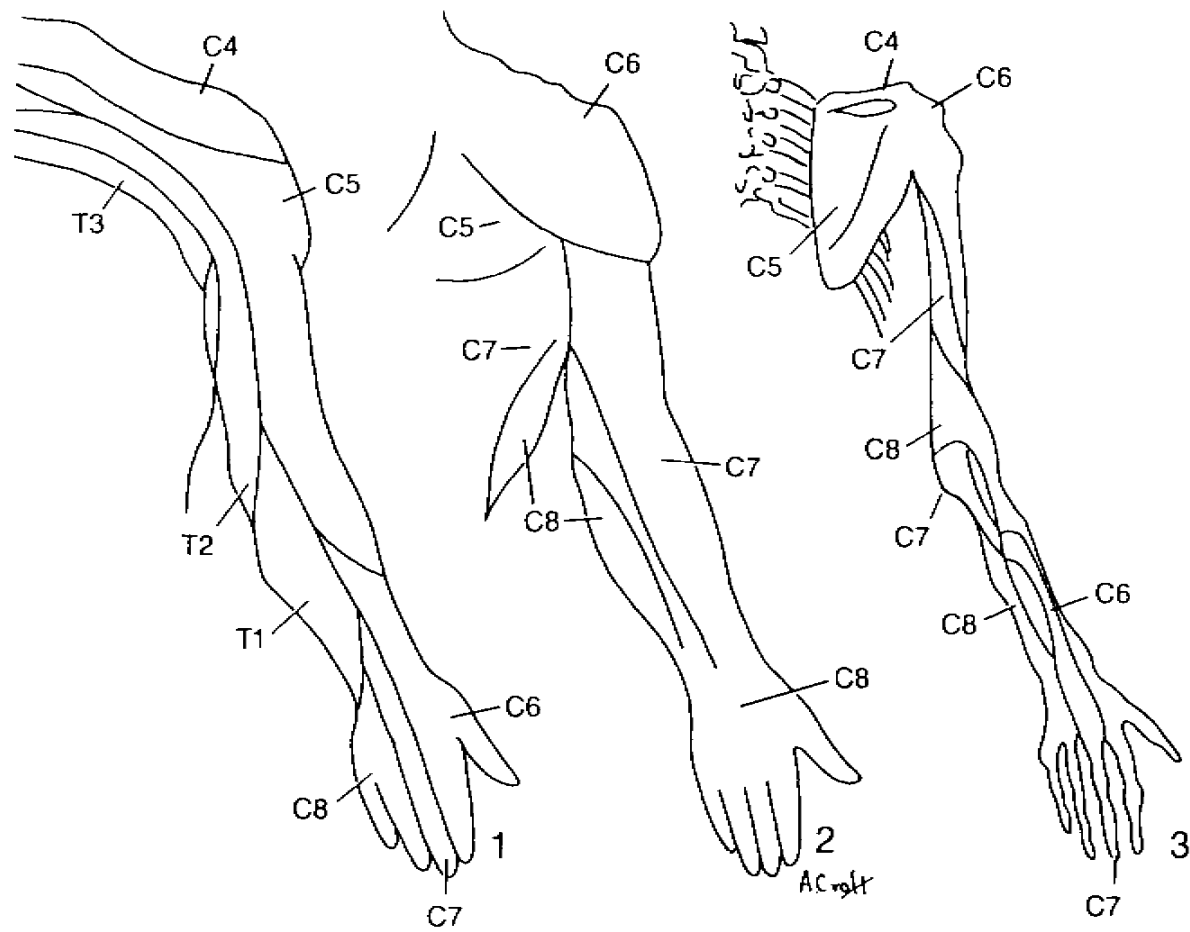
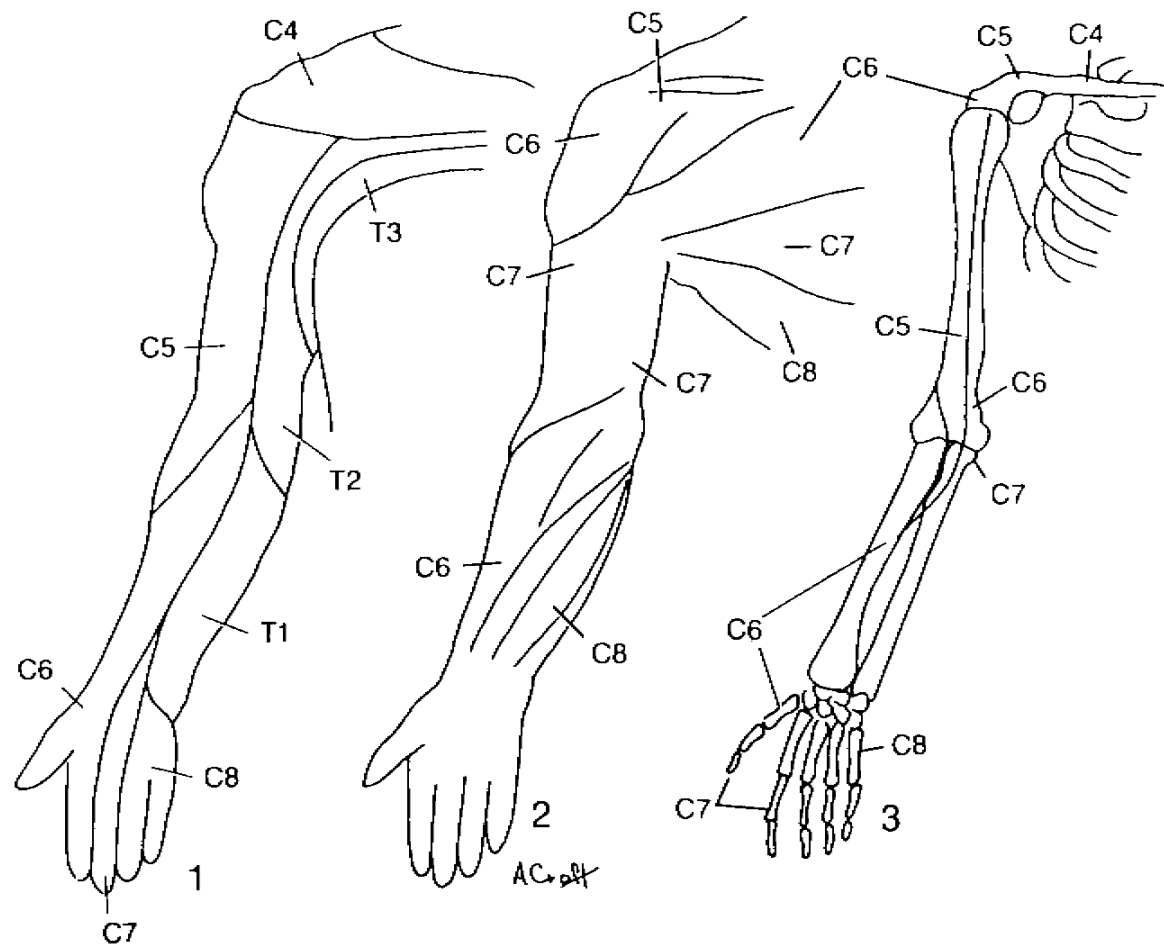
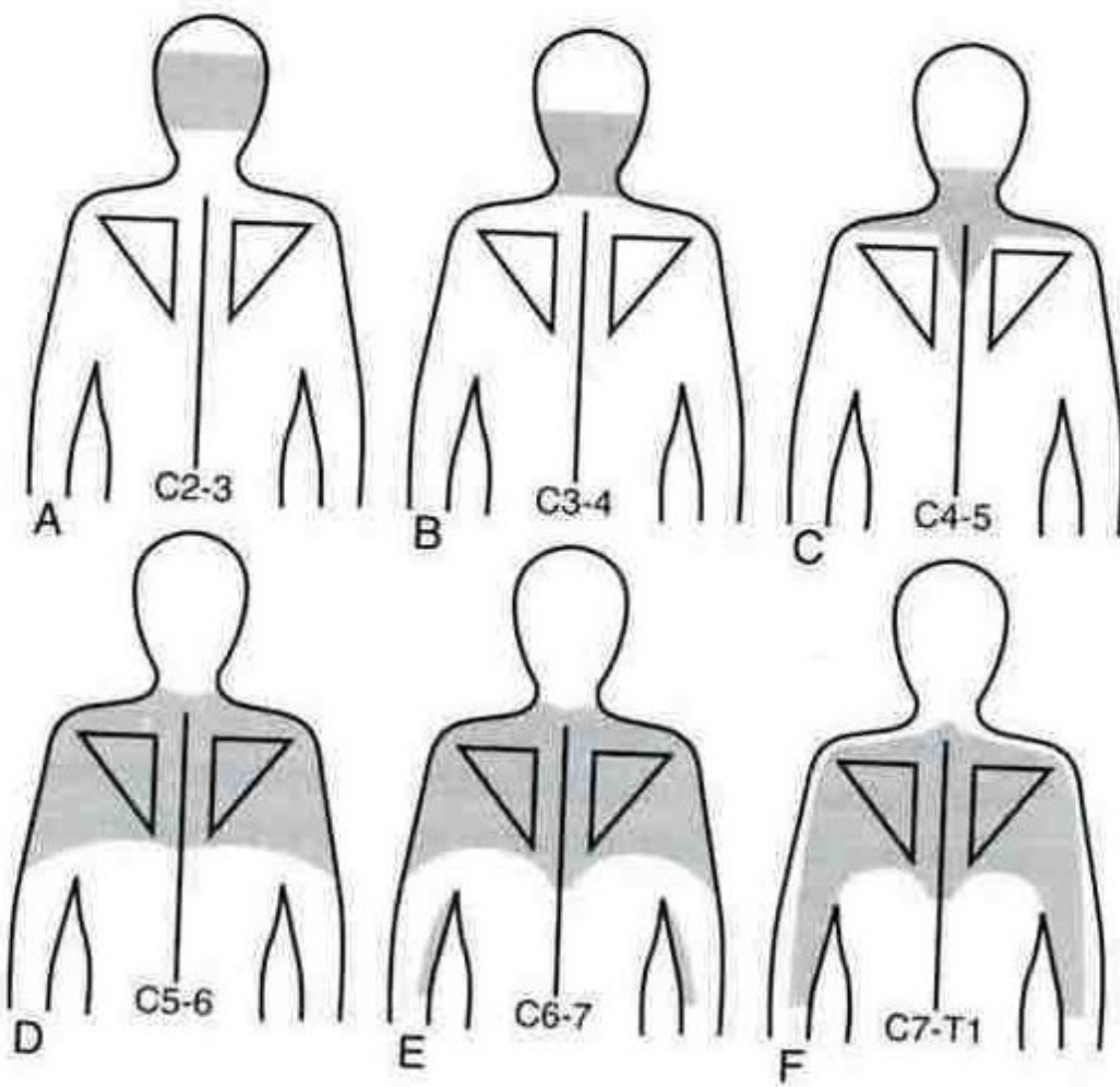


FIG. 11-1 Horizontal view of a lumbar vertebra, the intervertebral foramina, the vertebral foramen, and the nerves associated with this region. Notice the innervation to the zygapophyseal joint by the medial branch of the posterior primary division. Also notice the recurrent meningeal nerve innervating the posterior aspect of the intervertebral disc. The recurrent meningeal nerve also innervates the posterior longitudinal ligament and the anterior aspect of the spinal dura mater.









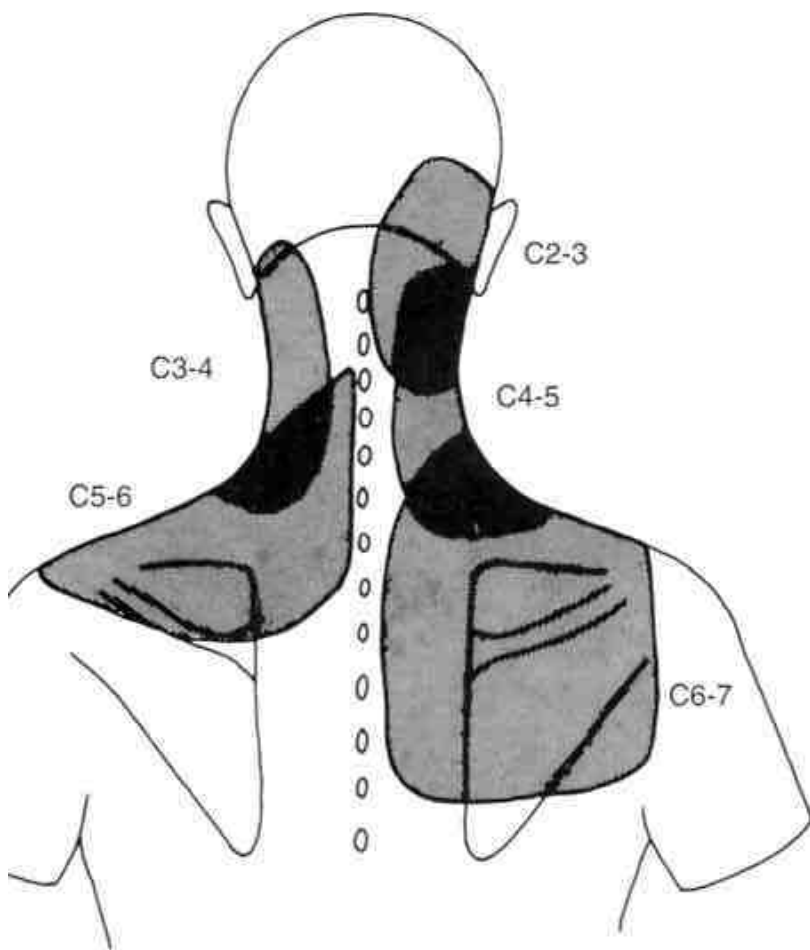


FIGURE 5-19 Referred pain patterns from specific cervical facet joints. (From Dwyer A, Aprill C, Bogduk N: *Cervical zygapophyseal joint pain patterns: 1. A study in normal volunteers*, Spine 15:453, 1990.)

Measuring Internal Rotation

- Two recent studies evaluated the methods used to determine internal rotation
- The behind-the-back ROM approach does not accurately reflect active internal rotation ROM in patients with shoulder pain
- Using the vertebral level as an indicator is inaccurate because above the sacrum much of the increase is due to elbow flexion

Ginn KA, Cohen ML, Herbert TD. Does hand behind-back range of motion accurately reflect shoulder internal rotation? *J Shoulder Elbow Surg.* May-Jun 2006;15(3):311-314.

Wakabayashi I, Itoi E, Minagawa H, et al. Does reaching the back reflect the actual internal rotation of the shoulder? *J Shoulder Elbow Surg.* May-Jun 2006;15(3):306-310.

Cyriax Testing

- **CONCLUSIONS:** Based on 2 physical therapist evaluators with previous education in the selective tension system and an additional 6 hours of formal training on the methods, intrarater reliability of resisted tests was generally acceptable for the knee but not for the shoulder.
- Interrater reliability of these tests, however, was generally not acceptable.

Hayes, K. W, Petersen, C. M. Reliability of classifications derived from Cyriax's resisted testing in subjects with painful shoulders and knees. J Orthop Sports Phys ther 2003;33:235-246.

Cyriax Testing

- Results were limited by subjects who were younger and had mostly chronic conditions that were mildly to moderately severe and by the small subject samples in the analyses.
- Reliability might be improved by more intensive training of the evaluators and by standardizing the magnitude of the applied resistance and stabilization of the subjects.

More General Mistakes

- Muscle testing that uses the position and rating for myotome testing is the same as that used for muscle/tendon injury
- Radiography and special imaging findings are confirmations of a patient's problem
- Mistaking TOS for instability
- Mistaking bursitis for Parsonage-Turner syndrome
- Missing diagnosis of posterior dislocations

Shoulder Orthopedic Test Mistakes

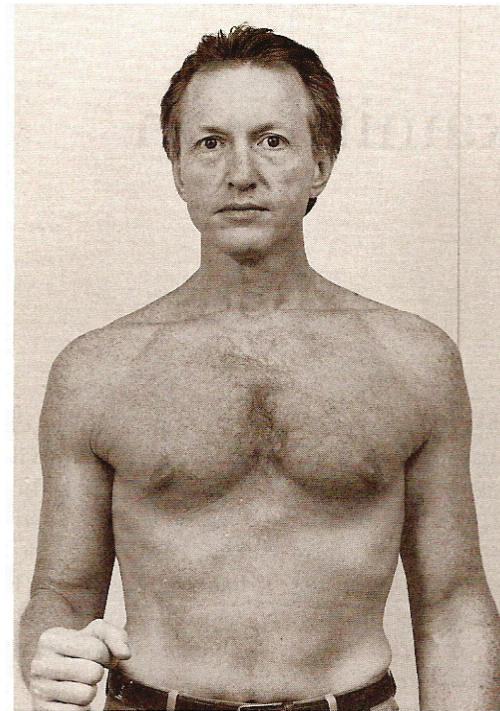
- Specifically with the shoulder:
 - Transverse ligament issue
 - Impingement is anterior
 - The main cause of impingement is structural compression due to a hooked acromion
 - With impingement not holding down the AC joint while performing tests
 - Humeral to scapular ratio is 3:2

The Positional Approach to Shoulder Evaluation

- Using four key base positions, all testing can be performed in an expedient fashion
- Each position is taken advantage of to perform as much observation, palpation, and resisted testing as possible
- This is not a condition-based approach, yet is a screening approach that will provide a comprehensive overview of the patient's shoulder

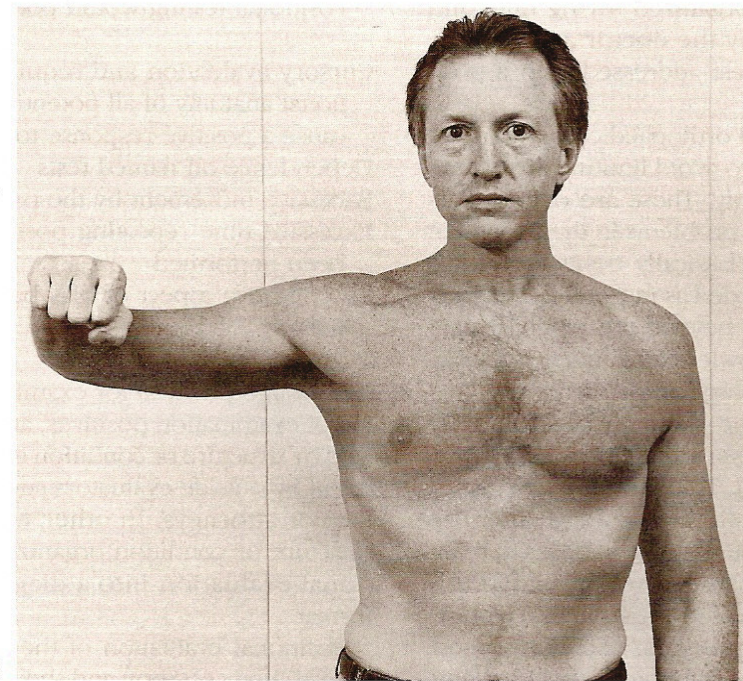
Position 1 – Arm at Side

- Observe for deformity
- Load and Shift testing - instability
- Palpation for biceps and anterior capsule
- Yergason's
- Resisted internal (subscapularis) and external rotation (teres minor/infraspinatus)
- Sulcus sign (inferior/multidirectional instability)



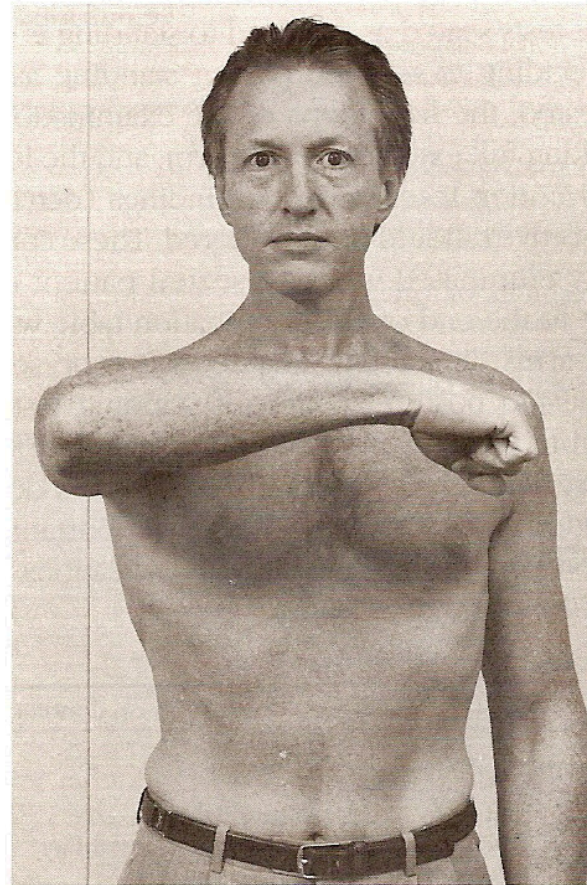
Position 2 – Abduction to 90 Degrees

- Resisted internal (subscapularis)/external rotation (teres minor/infraspinatus)
- Passive internal/external rotation
- Resisted abduction - deltoid
- With elbow extension/internal rotation of shoulder resist abduction with shoulder in scapular plane - supraspinatus



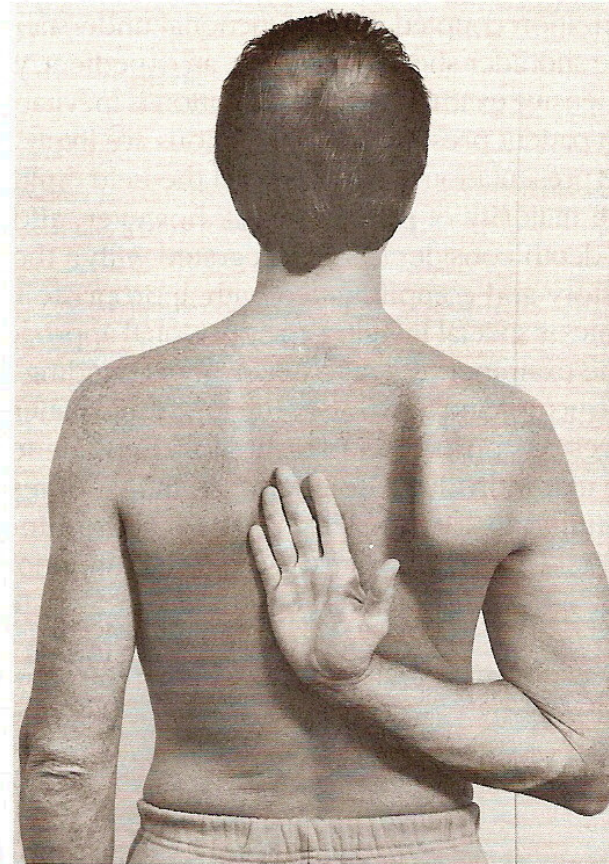
Position 3 – Abduction, Horizontal Adduction

- Palpation of teres minor and infraspinatus
- Passive end-range – AC joint
- Passive internal rotation – anterior pain = Kennedy/Hawkin's for impingement; posterior pain = external rotator stretch
- With elbow extended, resisted flexion – Speed's for biceps
- With elbow extended, internal rotation, resisted flexion – O'Brien's for labrum vs AC



Position 4 – Arm Behind Back

- Palpation for supraspinatus
- Passive internal rotation
- Lift-off test – subscapularis tear
- Lag sign – subscapularis tear
- Hand on hip – Anterior slide test for SLAP lesion



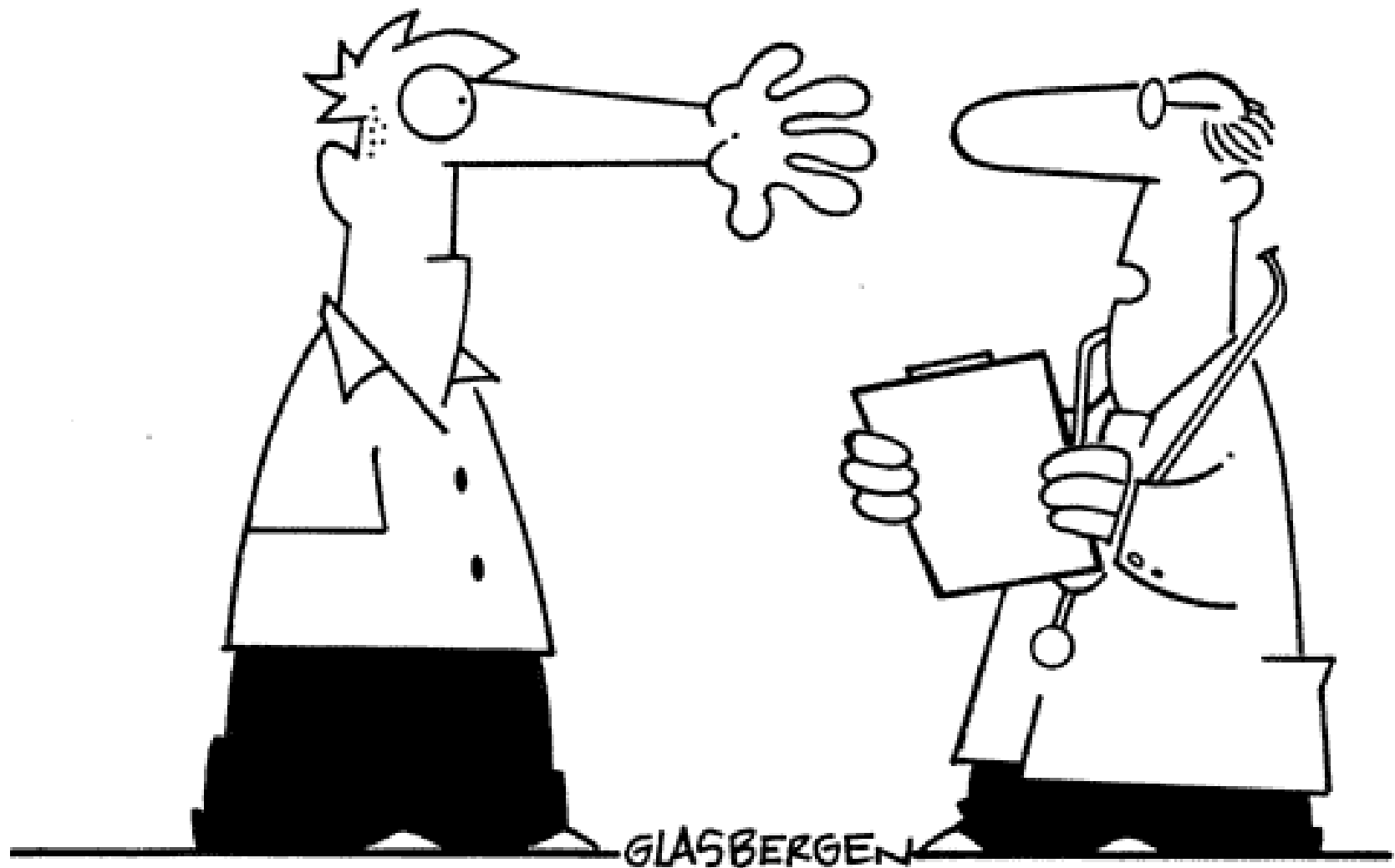
Management Mistakes

- Treating adhesive capsulitis with forceful mobilization or manipulation
- Use of Codman exercises: starting as active instead of passive; use in all shoulder conditions
- Giving too many exercises
- Adjusting superiorly with impingement
- Adjusting a dislocation back into place
- Replacing a biceps tendon into the intertubercular groove
- Not paying attention to the cervical spine as a pain source; mechanical or neurological association

Common Medical Management Mistakes

Medical Management Concerns

- Use of acromioplasty as solution for impingement problems
- Capsulorhaphy
- Surgery for 3rd degree AC tears



**“I’ll have to do some x-rays to be sure,
but I’m guessing you dislocated your shoulder.”**

Risk Factors for Early Failure of TACS

- Follow-up study of 106 patients receiving TACS procedure
- Concomitant procedure at time of TACS was not associated with failure
- TACS may have limited value for:
 - Those who have had prior operations
 - Those with multiple dislocations
 - Those with multidirectional instability
 - Those involved in contact sports

Postural Clues to Common Shoulder Syndromes

Posture and Movement

- If the spine is unable to move properly, some motion is either lost in the arms or legs or compensated by abnormal movement
- Best example is forward head position
- Position with head and neck pushed forward; turn your head; repeat with head pushed back

Muscle Imbalance

- Condition in which muscles become either:
 - a) lengthened, tight, and weak (inhibited)
 - b) shortened, tight, and contracted

Muscle Imbalance

Pattern development

- is not random
- can be predicted clinically
- Because muscle imbalance precedes pain syndromes, an examination may allow undertaking of preventative measures



Extension: Not the Key to Survival but the Key to Healthy Living

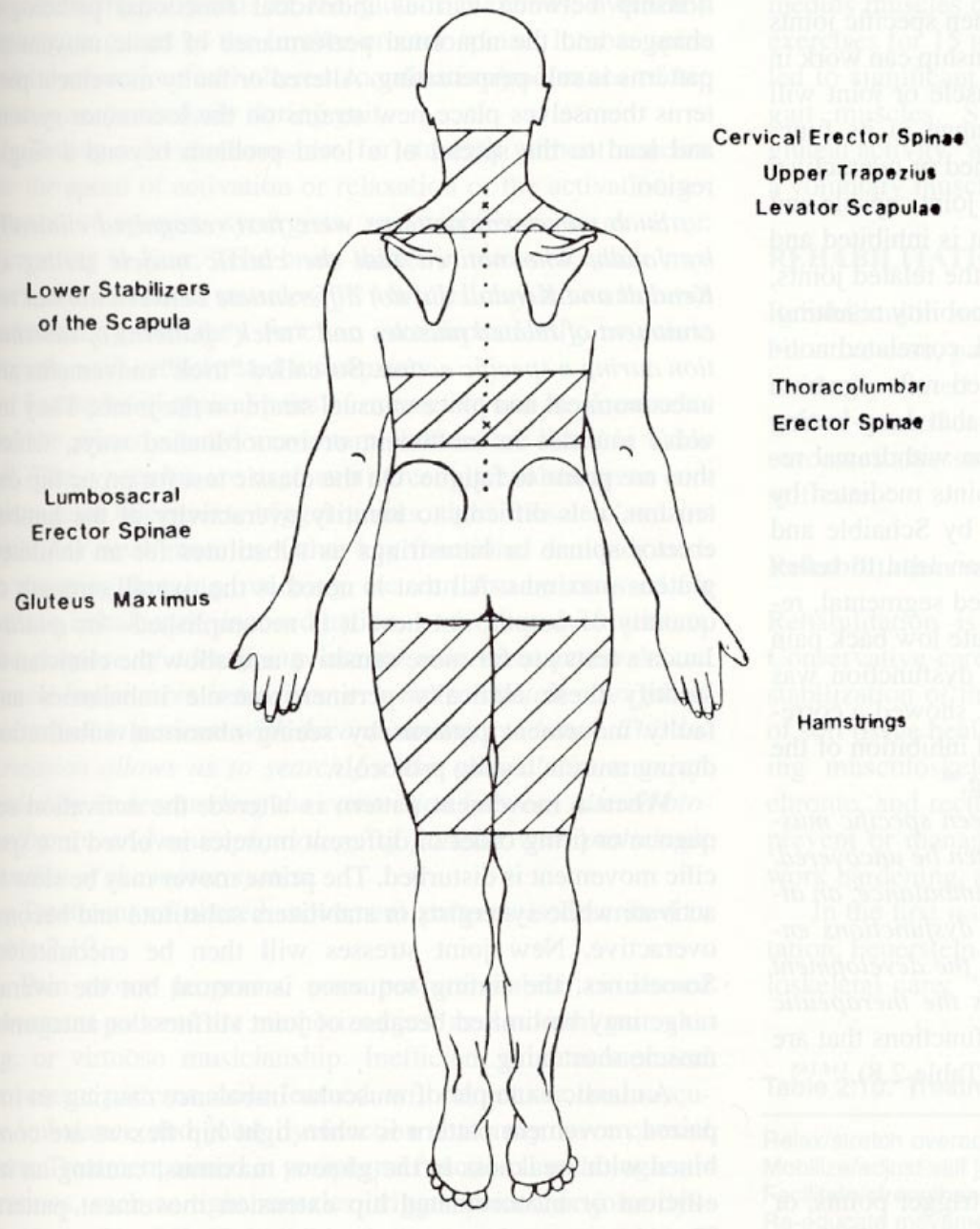
- Muscles that assist in grasping or grabbing are naturally bigger and stronger; commonly addressed in strength training
- Those that help stabilize joints are generally smaller, deeper, and underdeveloped/under-trained; need to be addressed primarily through endurance training

Muscle Imbalance

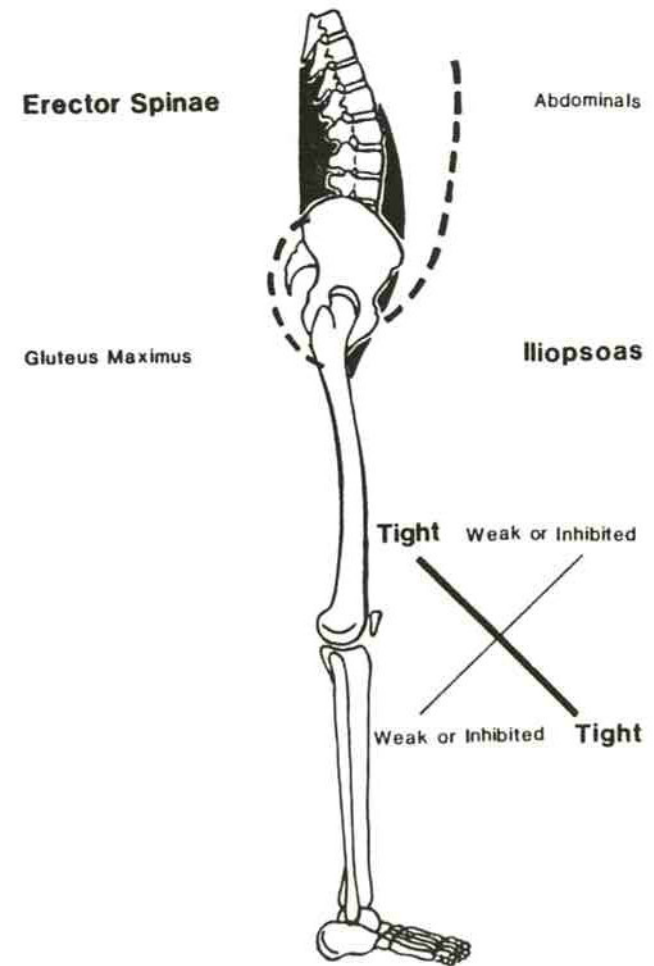
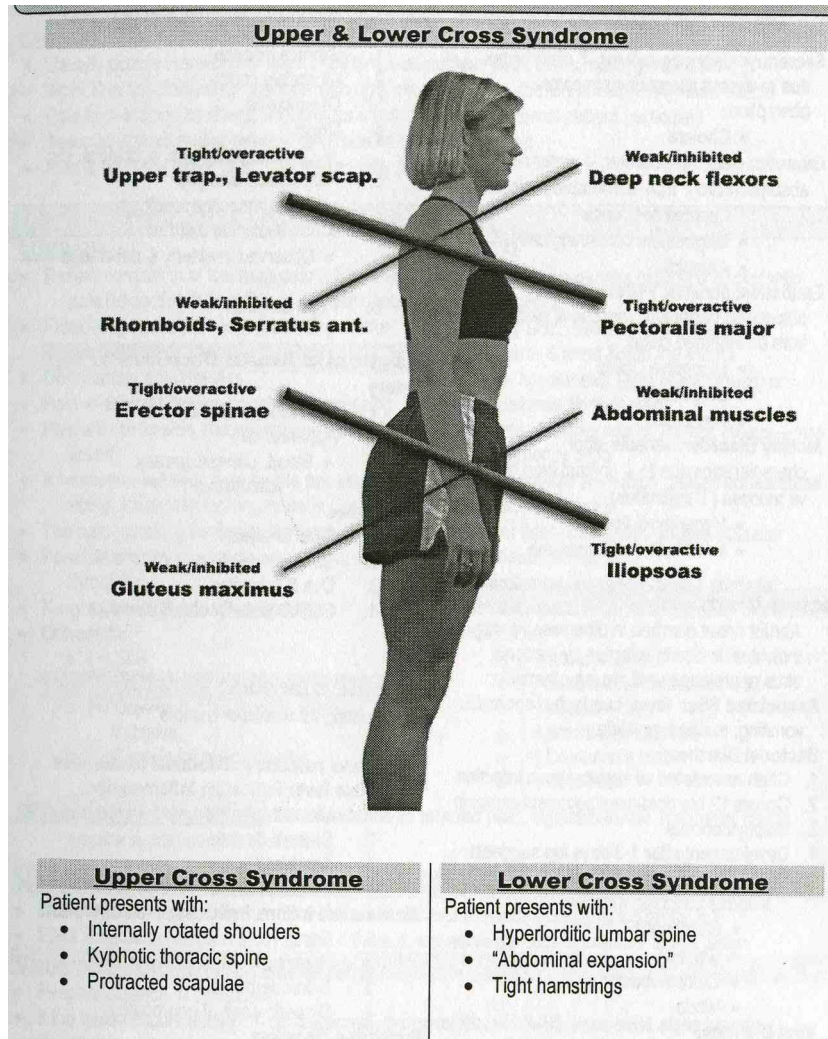
- Tends to begin in:
- shoulder girdle/neck = upper crossed syndrome
- pelvic region = lower crossed syndrome

Muscle Hypotrophy

Muscle Hypertrophy



Crossed Syndromes



Muscles Prone to Develop Tightness

- Erector Spinae
- Pectoralis major and minor
- Upper trapezius
- Levator scapulae
- SCM
- Deep neck extensors
- Flexors of upper extremity



Muscles Prone to Develop Inhibition

- Abdominal muscles
- Lower stabilizers of the scapulae
- Deep neck flexors
- Extensors of the upper extremity



Evaluation of Muscular Imbalance - Vladimir Janda
Rehabilitation of the Spine - Ch. 6

Upper Crossed Syndrome

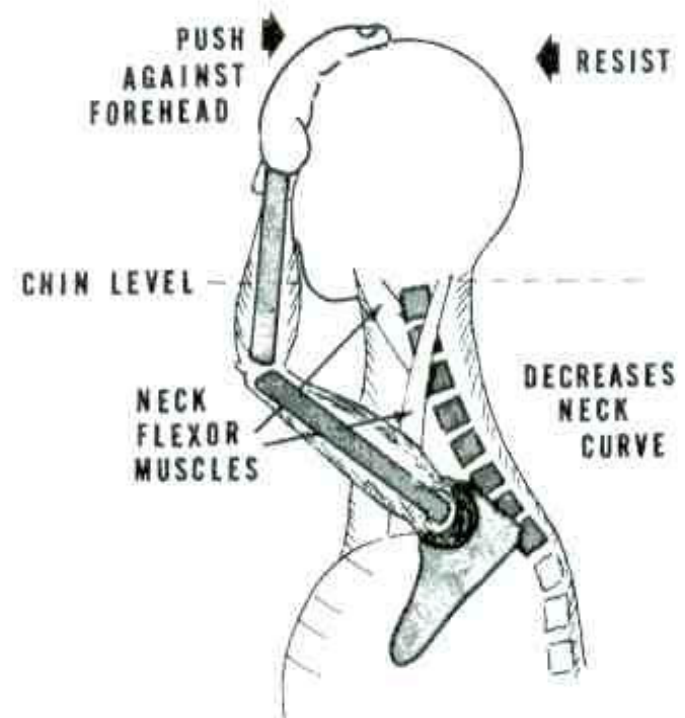
- Tightness in:
 - Upper trapezius
 - Levator scapulae, Scalenes, SCM
 - Pectoralis major and minor
- Inhibition of:
 - Deep neck flexors
 - Lower stabilizers of scapulae

The Doctor's Approach

- Observation for postural indicators
- Observation of movement patterns for dysfunction in sequence and quality
- Testing for joint mobility
- Palpation for myofascial components

Neck Toning

- Focus on keeping head straight
- Push lightly (25% effort) against hand and hold for 5-7 seconds; repeat 4-5 times
- Repeat throughout the day



The Common Culprits

- Weakness that is “programmed” then exaggerated by gravity, habit, and lack of training
- Eccentric weaknesses

Thoracic Spine

- Tight chest muscles combined with weak muscles between the shoulder blades leads to slumped/fatigued posture
- Stretch chest first, then
- Strengthen the back muscles

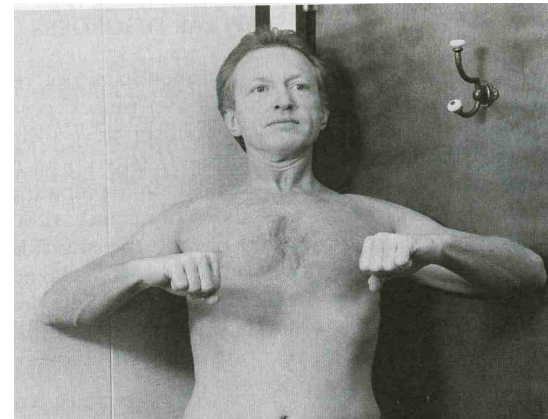
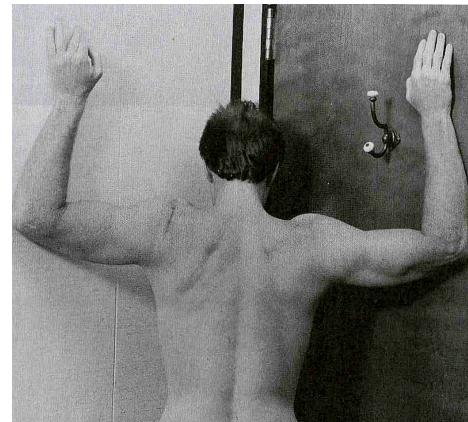
Pectoralis Minor Stretching

- Three stretches were evaluated for effectiveness the unilateral corner/door self-stretch, the sitting manual stretch, and the supine manual stretch
- The unilateral self-stretch was most effective (2.24 cm) followed by the supine (1.69 cm), then finally the sitting stretch (0.77 cm)

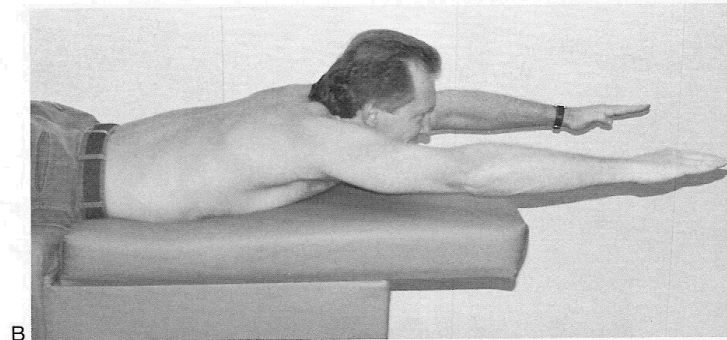
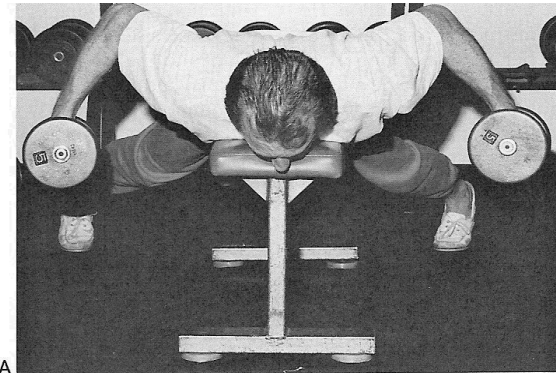
Borstad JD, Ludewig PM. Comparison of three stretches for the pectoralis minor muscle. *J Shoulder Elbow Surg.* May-Jun 2006;15(3):324-330.

Mid-Back Toning

- Stretch in corner first keeping back straight (20-30 sec.)
- Turn around and contract the muscles between your shoulder blades causing the chest to push forward

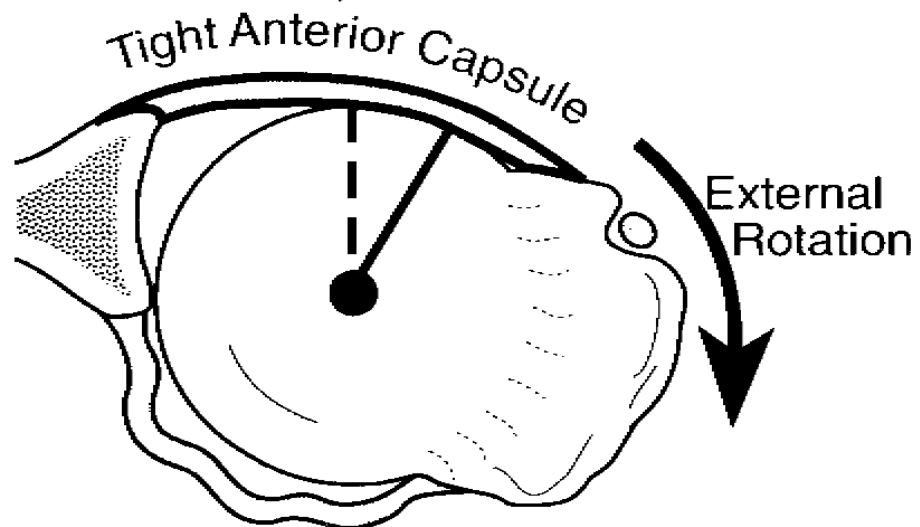
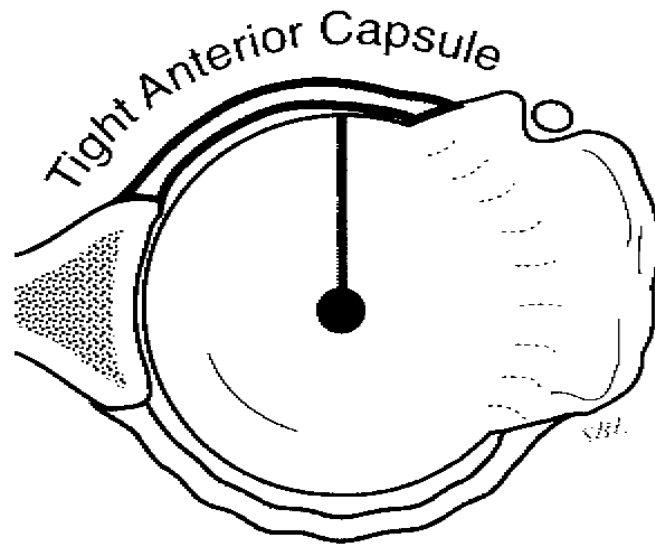


- With weights, bilateral training prevents rolling and use of other muscles
- Superman exercise for lower thoracic kyphosis



Capsular Tightness and Excessive Accessory Motion

- Translation is a normal movement due to capsular tightening at end-range
- Normal translation does not occur in lax and pathologic joints
- Tightening of the capsule causes an increase in normal translation, usually on the opposite side: posterior tightness = increased anterior translation
- Muscular contraction cannot prevent this excessive movement



Obligate Posterior
Translation

Evaluating Posterior Capsular Tightness in the Shoulder

- Patients with impingement of the non-dominant arm had posterior capsular tightness and restrictions in both internal and external rotation as compared to the control group
- Patients with impingement of the dominant arm had posterior capsular tightness and limitation in internal rotation only as compared to the control group
- A test to measure capsular tightness will be described

Tyler TF, et al. Am J Sports Med: 28(5), 668-673, 2000

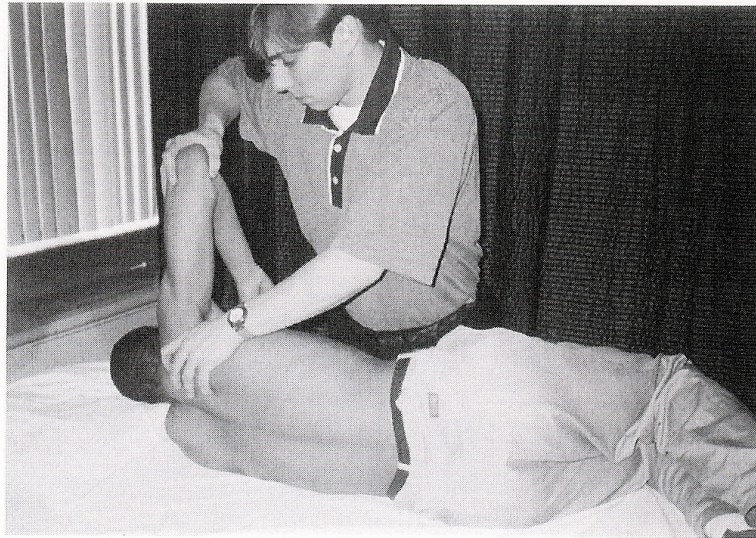


Figure 1. The starting position for the posterior capsule flexibility measurement with the subject positioned correctly on his side.

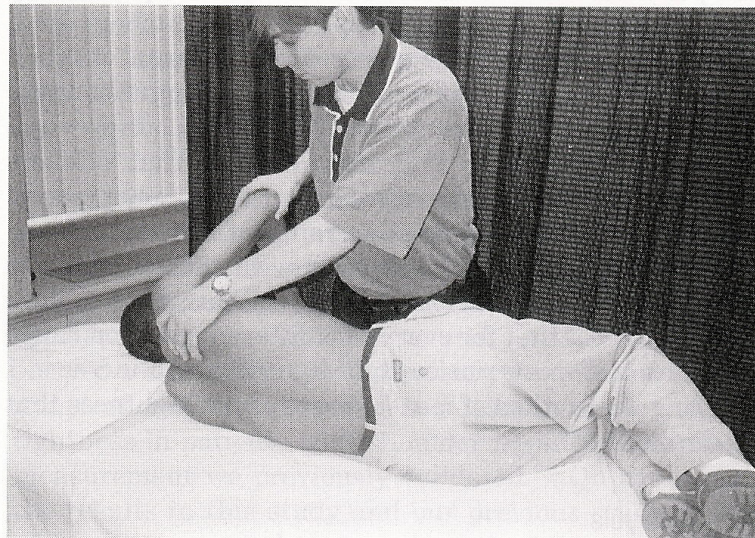


Figure 2. The maximum passive range of motion of the posterior capsule. Note the scapular stabilization with the torso perpendicular to the examination table.

Head Position and Shoulder Range of Motion

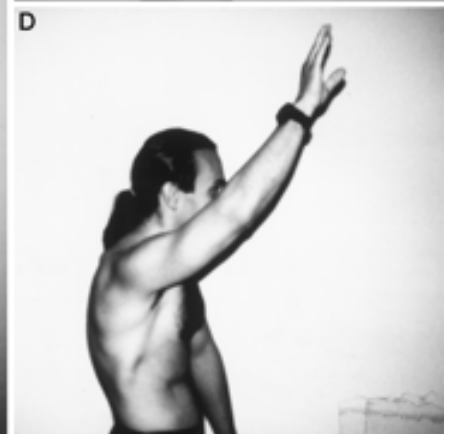
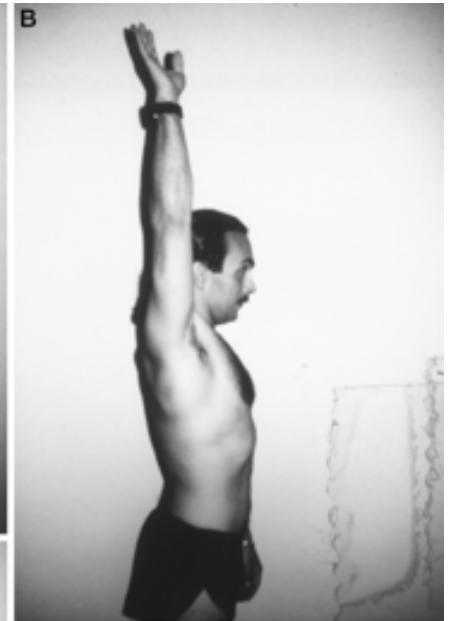
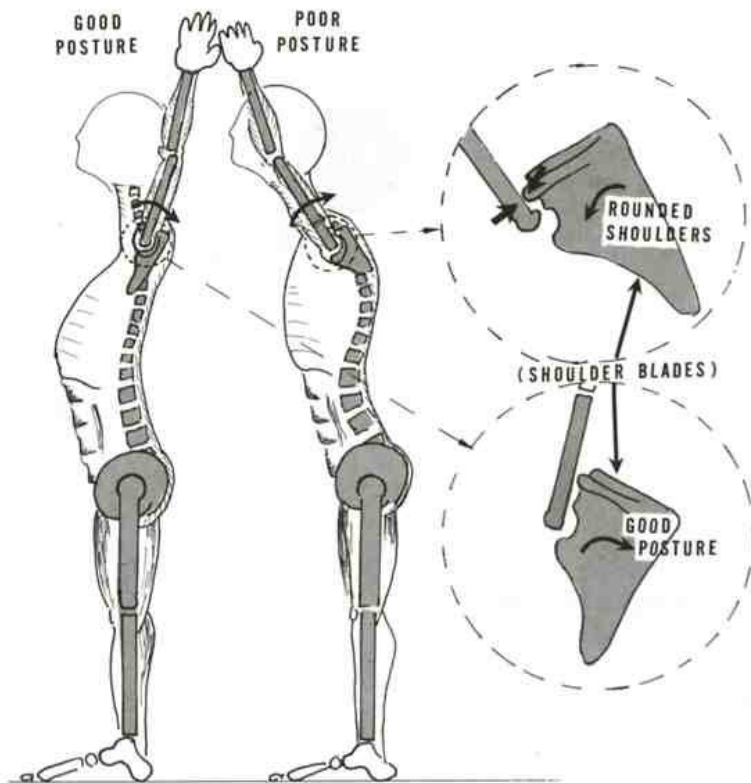




Figure 6 Normal scapular control in shoulder flexion. Check control in both ascending and descending positions.

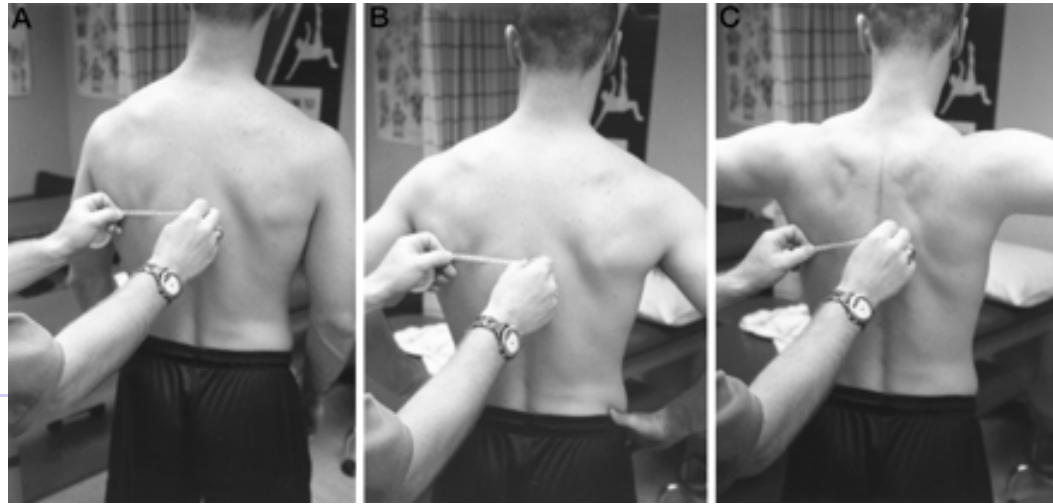
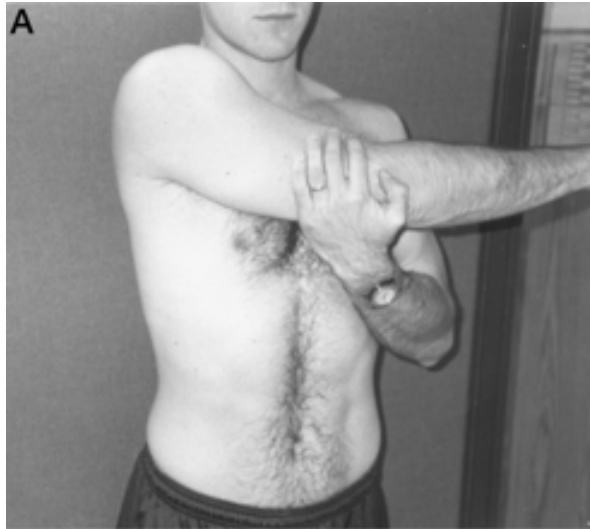


Figure 7 Lateral scapular slide measurement. A, the first position, with arms at side; B, the second position, with hands on hips; C, the third position, with arms at or below 90° abduction, with glenohumeral internal rotation.



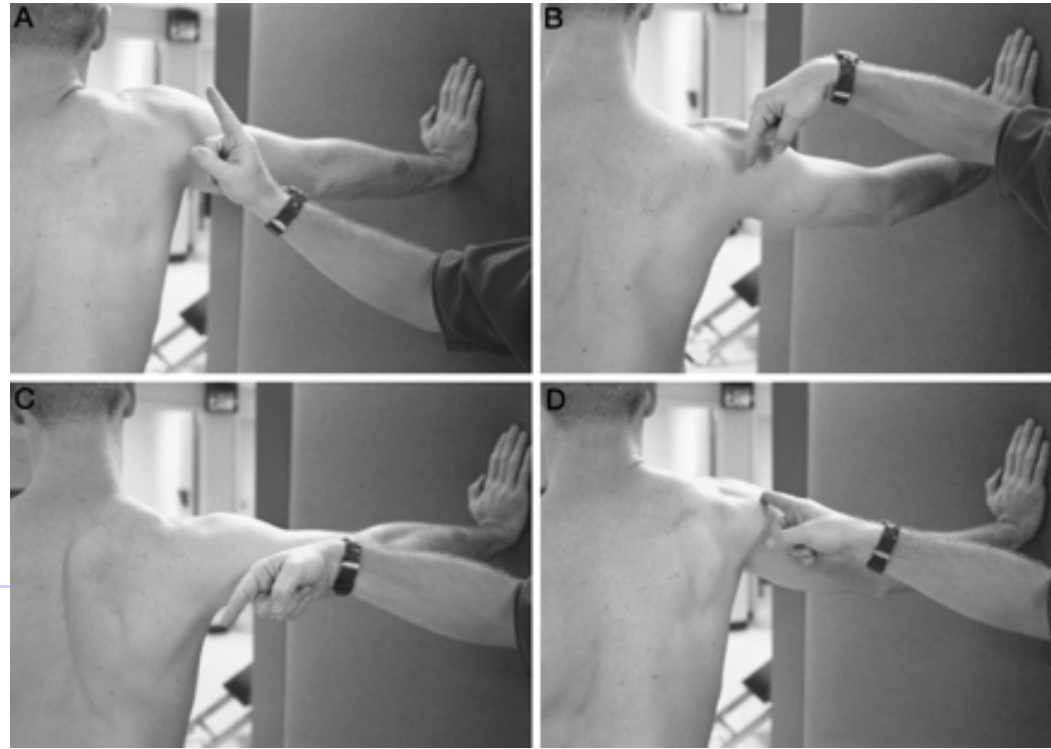


Figure 11 Closed-chain scapular exercises to simulate elevation (A), depression (B), retraction (C), and protraction (D).

Spencer Technique

- Osteopathic approach which identifies restriction in a movement pattern
- The scapula is fixed to the thoracic wall
- Use isometric end-range contractions or by using reverse position testing to find positional release
- Seven positions suggested

Step 1



Step 4



Step 2



Step 5



Step 3

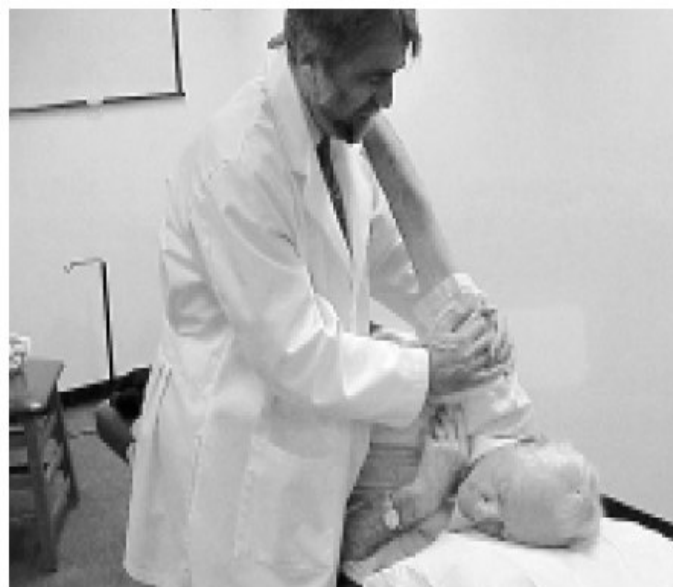


Step 6



Figure 1. The seven-step Spencer shoulder technique: Step 1—extension with elbow flexed; step 2—flexion with elbow extended; step 3—compression circumduction; step 4—circumduction with traction with elbow flexed; step 5—adduction with external rotation with elbow flexed; step 6—internal rotation; step 7—stretching tissues and pumping fluids with the arm extended.

Step 7



General Adjusting Cautions

- Never adjust superiorly when mechanical impingement is present
- Never adjust anteriorly or inferiorly when anterior instability is present
- Do not use aggressive adjusting maneuvers with adhesive capsulitis or other acute inflammatory conditions

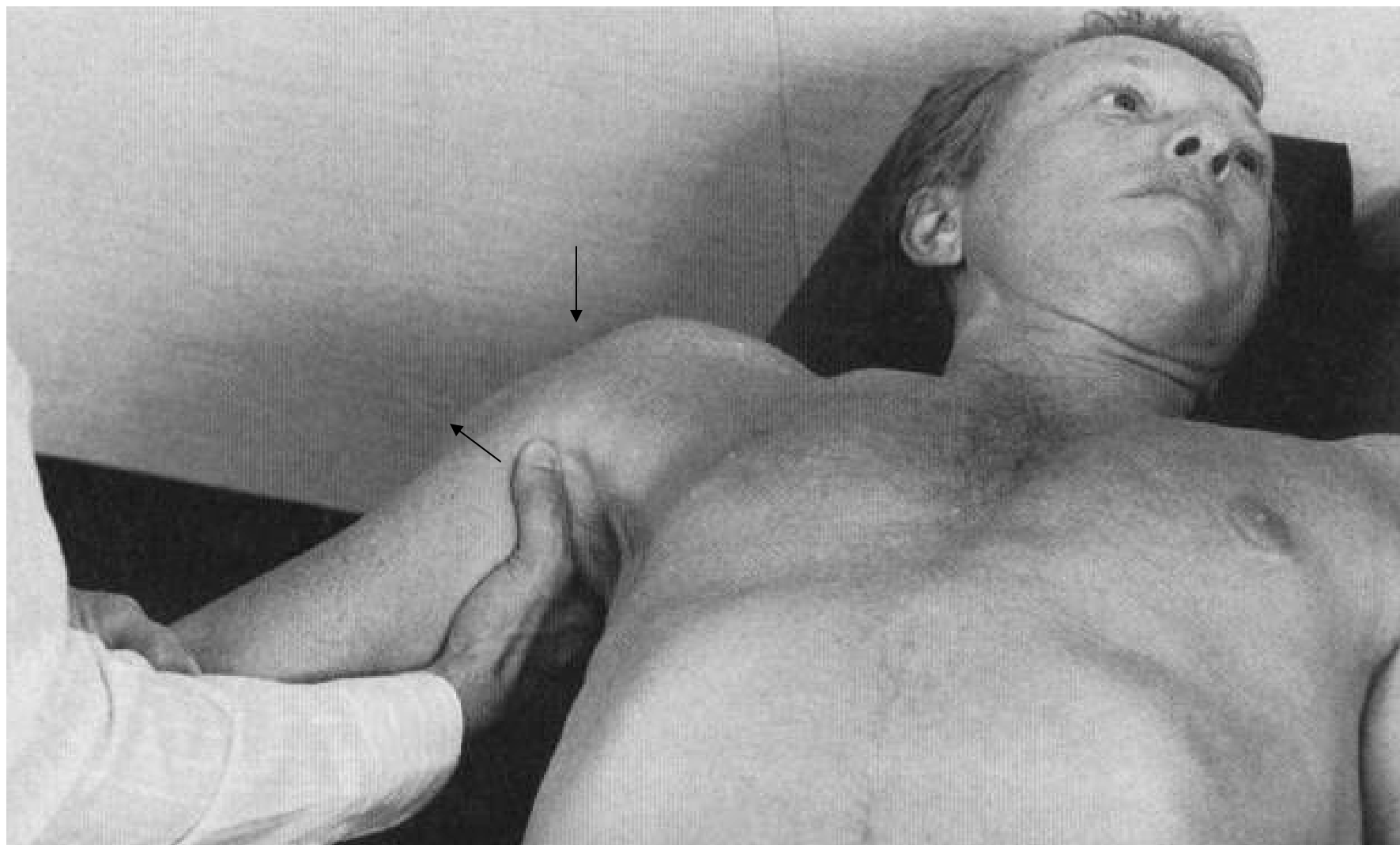
General Adjusting Principles

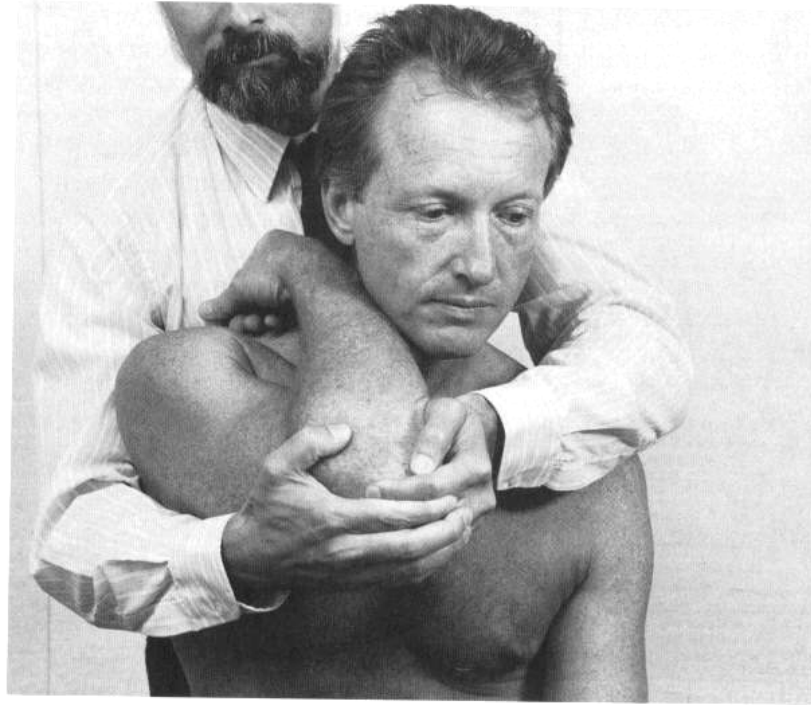
- When possible, add a distractive component to the adjustment
- Adjust into minor end-play restrictions
- Use short-lever approaches
- Use the least amount of movement and force necessary to accomplish the job

Contraindications to Shoulder Adjusting/Manipulation

- For all patients who have had recent (e.g. 12 months) surgery, or who have fracture, suspected fracture, dislocation, severe generalized or local osteoporosis, infection, tumor, or infection HVSA manipulation is contraindicated.
- For all patients, an evaluation for joint stability must be performed. Based on the findings, it is recommended that no HVSA manipulation be used for patients with medical subluxation, hypermobility syndromes (e.g. Marfan's, Ehlers-Danlos syndrome), or gross looseness indicating multidirectional instability.

- Mobilization such as applying a load-and-shift or Maitland grade 1-4 type of translational movement may be appropriate in these case settings.
- For patients with adhesive capsulitis or any acute inflammatory condition such as rheumatoid arthritis, active hemarthrosis or extensive swelling, rheumatoid variant disease, crystalline disease (e.g. gout), or acute bursitis it is recommended not to use HVSA





Mulligan Approach

- Mobilization with Movement is the primary concept
- A combination of simultaneous practitioner-applied accessory gliding with patient active and/or practitioner generated passive physiological movements
- Manual application or assistance provide by “belts”

Order of Application

- Accessory mobilization – no pain
- Physiological movement – no pain
- Pass physiological movement with overpressure – no pain
- Release of physiological movement – no pain
- Release of accessory mobilization
- Repetition in sets of ten with continued re-evaluation of the outcome

Compression Techniques

- Originally discussed by Maitland as an approach to pain relief
- If a combination of compression and movement in a synovial joint causes reproduction of patient complaint, repeat the pain-provoking combination for up to 20 seconds
- If pain disappears in 20 secs. Use as approach to pain reduction

Pain Release Phenomenon

- Various gentle synovial joint position or light muscular contractions that reproduce the patient's complaint may be used as a pain relief approach
- If the position or contraction reproduces the pain and if the pain is fully relieved in 20 seconds of application, use as pain-relief approach

Application to Shoulder

- Application of pressure for posterior glide prior to movement
- Application of pressure for posterior/inferior glide at end-range elevation
- Application of inferior glide to assist with internal rotation

Taping Approaches

- Stabilization taping
 - Testing for instability as cause
 - Pain relief
 - Activity assistance
- Proprioceptive taping
 - Pain relief
 - Stimulation of reflex muscular contraction

Types of Tape

- White tape – rigid but supportive; best used for closing off ends of tape job
- Elastic tape – two types (Elastoplast and Elastikon) flexible, easier to apply, stretches with movement
- Leukoplast (strapping or brown tape) – good for Brown approach to proprioceptive taping with somewhat rigid support
- Kinesiotape – flexible, easily conforms to all surfaces, may have a pumping effect with movement

Stabilization

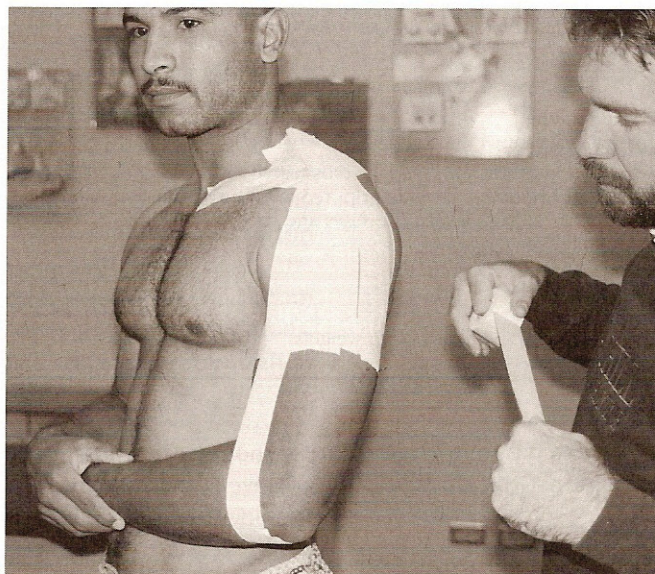
- Basic principle is to mimic rotator cuff
- Apply with compression from anterior to posterior and superior to inferior
- Effective for both glenohumeral laxity and AC separations
- Adds an element of proprioceptive stimulation



A



B



C