Strengthening your musculoskeletal assessment of common complications of the cervical spine and upper extremity

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At the end of this program the participant will:
- Identify common musculoskeletal problems in the acute and primary care setting
- Understand differential diagnosis of specific boney or musculoskeletal complaints
- Utilize specialty tests to unearth differential
- Provide appropriate treatment
- Refer as necessary

Musculoskeletal examination
- Moving from overt pessimism
  - Educational prep
  - Know your anatomy
  - Develop relationship with Ortho
  - Practice, Practice, Practice
- Review basic physical examination
  - Essentials of Musculoskeletal Care, Snider
  - Physical Examination of the Spine and Extremities, Hoppenfeld
  - Diagnostic Exam, Degowin and Degowin
- Physical rehab exercises
  - The Sport Medicine Advisor, Rouzier
History

- MOI/location of pain
- Chronicity of problem
  - Onset
  - Recent
  - Remote
- Trauma-details
  - Initial or altered biomechanical parts
  - Blunt/penetrating
  - Cumulative/acute
  - R/O Fx
- Quality of pain or swelling:
  - Duration
  - Precipitating
  - Relieving
  - Overuse
  - Decreased ROM
  - Degree of dysfunction
  - Locking
  - Referred pain
  - Preeruptive
  - Diabetic

History

- Neurological symptoms
  - Radiation, numbness, tingling
  - Weakness, paresthesia
- Symptoms in other joints
  - Systemic
- Associated constitutional symptoms
  - Fever, fatigue
- Previous injuries to affected or contralateral joint
- Tetanus status
- Effective treatment

History

- General health
- Previous
  - Injuries
  - Disability
  - Surgeries
  - Problem list
- Medications
- Risk factors: occupation, weight, anorexia, hobbies
With differential DX consider:

- Degenerative
- Injury
- Metabolic
- Synovial
- Tumor
- Infection
- Circulation
- Congenital

Remember these Pearls

- Check: NV status distal to injury before manipulation of joints
- Compare affected to unaffected side
- Children: epiphysis injury, investigate back pain
- Radiculopathy: vascular, CNS, neuropathy
- RICE is very nice
- Evaluate for underlying injuries
- Systemic disease: multiple joints
- Tenderness: infection, neoplasm, occult trauma

Physical examination

- General appearance
- VS
- Gait/Posture
- Inspection
- Palpation
- Range of Motion
  - Joint above and below
- Motor, sensory, reflex testing
- Specialty tests
In General

- Treatment of overuse syndromes
- PRICE
- Protection
- Rest
- Ice
- Compression
- Elevation
- Medication
- Modality

Cervical spine

- 7 vertebrae
- 8 cranial nerves
  - CN 6 from C5-6
  - C1-2 strong ligaments
    - rotation
- C5-6 = 90% disc lesions
- C7 prominent spinous process = landmark
Cervical spine

Cervical ROM

<table>
<thead>
<tr>
<th>C spine</th>
<th>Degrees</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexion</td>
<td>60-90</td>
<td>Chin to chest</td>
</tr>
<tr>
<td>Extension</td>
<td>50-70</td>
<td>Ceiling gaze</td>
</tr>
<tr>
<td>Rotation</td>
<td>80-90</td>
<td>Chin to shoulder</td>
</tr>
<tr>
<td>Lateral flexion</td>
<td>45-55</td>
<td></td>
</tr>
</tbody>
</table>

Diminished ROM
Altered biomechanics

Cervical impingement

<table>
<thead>
<tr>
<th>Nerve root</th>
<th>Radiation</th>
<th>Motor</th>
<th>Sensory</th>
<th>Reflex</th>
</tr>
</thead>
<tbody>
<tr>
<td>C5</td>
<td>Lower neck, shoulder</td>
<td>Weak deltoid, biceps</td>
<td>Deltoid</td>
<td>Biceps</td>
</tr>
<tr>
<td>C6</td>
<td>Neck, scap, shoulder, lat arm, dorsum forearm</td>
<td>Biceps, EPL, Wrist ext</td>
<td>Dorsolat thumb, index finger</td>
<td>Biceps, Brachirad</td>
</tr>
<tr>
<td>C7</td>
<td>As above, but med scap</td>
<td>Triceps, Wrist ext, fing ext</td>
<td>Dorsal index, mid finger</td>
<td>Triceps</td>
</tr>
</tbody>
</table>
The cervical vertebrae are normally aligned with some straightening through the mid and lower cervical spine. There is disc space narrowing at C5-6 and severely at C6-7 consistent with underlying degenerative disc disease. There are anterior osteophytes at C5, C6, and C7. There is a small post-osteophytic ridge at C5-6.
Acute cervical strain

- 1:10 Neck pain at any time
- Majority recover with conservative tx within 3 weeks
- Whiplash, neck sprain, myofascial neck pain
  - Not neurological: Self-limiting non-radicular neck and shoulder pain
- Pt HX:
  - Hyperextension force
  - Gradual onset of pain: hrs later
  - Generalized to neck and shoulder
  - Occipital nerve: nausea, tinnitus, blurred vision

Cervical strain

- Physical Findings:
  - Tenderness of sub occipital area to upper thoracic vertebrae
  - Trapezius/ SCM spasm/torticollis
  - Decreased ROM in any of the areas esp. extension
  - Normal neuro exam
  - Spurling's test negative
  - X-ray: loss of lordosis on lateral view
- Differential cervical fracture, disc herniation, radiculopathy

Cervical strain

- Treatment
  - Goals
    - Reduce pain, muscle sensitivity and spasm and return to normal function
  - Symptoms> 6 weeks, radiological studies, ? others
  - Posture
    - Straight sitting, shoulders back
    - Driving: arms on rests, slightly shrugged
    - Avoid shoulder loads, backpacks
    - Sleep: small neck pillow, pillow under knees
    - Sedentary: head set, limit computer time
Cervical strain

- Medication
  - Mild-moderate pain: Acetaminophen, NSAID’s
  - Severe pain in acute phase: moderate opioids or tramadol
  - Spasm: Cyclobenzaprine 5mg daytime use
    - 10 mg at HS if sleep problematic
    - Adding to high dose Ibuprofen in 1st 48 hrs does not increase relief

- Home exercises: B.I.D. with heat first
  - 10 repetitions, held 5 seconds
  - Neck rotation: Chin towards shoulder, “finger press” for mild stretching
  - Neck tilt: Ear to shoulder, apply tension on temple
  - Neck bend: Neck bending, deep breathing between flexing
  - Shoulder rolls: Sitting or standing, rowing movement

Cervical radiculopathy

- Sharp/referred nerve pain along the nerve pathways
  - With or without changes in sensation or paresthesias
  - Extremity pain

- Etiology
  - Disc herniation
  - Spinal stenosis
  - Lateral foramen narrowing
  - Spondylolisthesis
Cervical radiculopathy

Specialty tests
- Spurling's test: evaluates nerve root compression
  - Spondylosis, disc herniation, foramen narrowing
  - Extension of head
  - Rotation to affected shoulder
- Axial load
  - Pt is standing, compression of head
  - If L-S pain, think nonorganic cause
- Positive test: evaluate for bony/soft tissue

Cervical radiculopathy
- Treatment:
  - Many imperfect studies about multiple modes of therapy, biofeedback, Tens, trigger point injection
  - Pain and sleep: TCA's amitriptyline 10-30 mg HS
  - Coexisting depression: Duloxetine or venlaxafine
  - Gabapentin: stronger for neuropathic pain, utilized in pain clinics
  - Neuromx evaluation
  - Pain relief
Shoulder

- Rotational joint with decreased stability
- Muscles: RTC
- Referred: GB, Cardiac
- Capsule: Ligaments
- Osseous: Trauma, stenosis
- Articular: Systemic conditions
- Tendons: Biceps
Subacromial Arch

Shoulder ROM

<table>
<thead>
<tr>
<th>Shoulder</th>
<th>Degrees</th>
<th>Restricted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexion</td>
<td>180</td>
<td>&lt;160</td>
</tr>
<tr>
<td>Extension</td>
<td>50</td>
<td>&lt;40</td>
</tr>
<tr>
<td>Abduction</td>
<td>180</td>
<td>&lt;160</td>
</tr>
<tr>
<td>Adduction</td>
<td>50</td>
<td>&lt;30</td>
</tr>
<tr>
<td>External rotation</td>
<td>90</td>
<td>&lt;60</td>
</tr>
<tr>
<td>Internal rotation</td>
<td>90</td>
<td>&lt;60</td>
</tr>
</tbody>
</table>

AC separation

- Disruption of AC joint, coracoid ligaments, and or clavicle
- MOI
  - Direct force
  - Direct fall to superior aspect of adducted shoulder
  - Fall onto outstretched hand
- Pt c/o
  - Pain with AC joint palpation
  - Arm elevation painful, occ. impossible
  - Deformity, instability, cosmetically unacceptable
AC separation

- Physical examination
  - Check clavicle for fracture
  - Deformity: comparison
  - Tender to palpation
  - Pain to passive abduction 90-180 degrees
  - + Crossover test: pain passive adduction in horizontal plane
- AC arthritis
  - Crepititus with dorsal/ventral glide

AC separation

- Diagnosis: Weighted comparison AP view of shoulders
- Treatment:
  - Minor: Rest, Ice, Anti-inflammatory
  - ? Sling: 2 days if it relieves pain
  - RTW/RTP: @ 2 weeks, ROM is painless

Coracoacromial Ligament injury
AC separation

Biceps tear

- > common than tendonitis
- Intra-articular tendon exposed to shearing forces
- Tear of the proximal aspect long head
- MOA
  - Male > 40 y.o.
  - Trivial event superimposed upon chronic impingement syndrome
  - Younger: weight lifting

Biceps tear

- Pt c/o
  - Sharp snapping pain
  - Sudden biceps retraction, bulging near antecubital space
  - "Popeye" sign
- Physical examination
  - Apparent deformity, possible ecchymosis
  - 10° internal rotation of humerus/palpation bicipital groove=pain
  - 10% loss of supination
# Biceps Tear

- Specialty tests
  - Ludington's sign: ext. rotation/abduction, flexion of biceps
  - Speed's test: extended forearm, resisted flexion
- Diagnostic test
  - Radiograph r/o fx
  - MRA: look for RCT
- Treatment
  - Conservative
  - Heavy laborer: Orthopedic referral

## Biceps Tendonitis Specialty Test

<table>
<thead>
<tr>
<th>Instability</th>
<th>Yergason</th>
<th>Elbow 90° pronation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed's maneuver</td>
<td>Elbow 20-30° flexion, forearm supination</td>
<td></td>
</tr>
</tbody>
</table>

## Impingement Syndrome

- Persistent symptomatic compression of the RTC and subacromial bursa between the acromion and the humerus
  - 3 primary complications
  - RTC tendonitis
  - RTC tear
  - Subacromial bursitis
**Rotator Cuff**
- Trading stability for rotation
- 4 SITS muscles
  - Supraspinatus
    - Most commonly injured
    - Abduction
  - Infraspinatus
    - Ext rotation
  - Teres Minor
    - Ext rotation
  - Subscapularis
    - Internal rotation
- Concept: Pain vs weakness
  - Pain: inflammation, edema
  - Weakness: tear

**Rotator cuff problems**
- Causes of impingement of RTC
  - Hooked acromion
  - Glenohumeral instability
  - Weak scapula muscles, narrow subacromial space
- Pt Hx
  - Occupation/advocation
  - Gradual onset of pain
  - Pain overhead reach
  - Anterior lateral shoulder pain
  - Progressive weakness

**Age is a determinant**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Instability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger &lt; 30 yo</td>
<td>Instability</td>
</tr>
<tr>
<td></td>
<td>AC separation</td>
</tr>
<tr>
<td></td>
<td>Rarely RTC</td>
</tr>
<tr>
<td>Middle aged 30-50 yo</td>
<td>As above</td>
</tr>
<tr>
<td></td>
<td>RTC, impingement</td>
</tr>
<tr>
<td></td>
<td>Frozen shoulder</td>
</tr>
<tr>
<td>Older 50 yo</td>
<td>Complete RTC tear</td>
</tr>
<tr>
<td></td>
<td>Degenerative arthritis</td>
</tr>
</tbody>
</table>
Rotator cuff tendonitis

- Pain 45° abduction-severe impingement
- 90° abduction-mild impingement
- Pain flexion and internal rotation
- Subacromial tenderness
- Normal strength
- With time muscle atrophy

Subacromial bursitis

- Pt hx:
  - Repetitive overhead activities
  - Pain increased with activity
  - Unable to sleep on affected side
- Physical examination
  - Marked pain with abduction
  - Erythema
  - Edema
  - Extension of shoulder palpate bursa + pain

Subacromial bursitis

- Diagnostic
  - Joint aspiration for evaluation of synovial fluid
    - Crystal analysis: Gout
    - R.A.
    - Lyme
    - Infectious
- Treatment
  - Steroid injection
Treatment of Impingement syndrome

- Limited research, common practice
- PRICEM
- Avoid overhead activity
- Gentle weighted pendulum exercises
  - For all shoulder problems except AC problems
- P.T. for strengthening, flexibility, joint mobilization
  - Recheck 3-4 weeks for adherence to program
- M.R.I. for continued weakness
- Orthopedic referral

Adhesive capsulitis

- Frozen shoulder: Contracted soft tissues, joint capsule
- Pt c/o
  - Progressive loss of ROM
  - No injury
  - Nondominant hand
- Pt hx
  - Post M.I., hypothyroidism, diabetes, parkinsons, post neuro or breast sx

Adhesive capsulitis

- Physical examination
  - 3 phases: painful, loss of ROM, resolution p 2 yrs
  - Apley's scratch test: Unable to comb hair
  - Unable to put hands in praying position
  - Firm end point with ROM testing
    - Pt will abduct with shoulder shrug
Julia
- H.P.I. One month ago in 65 y.o. female received 80mg depo-medrol for bursitis in left shoulder due to incomplete pain relief from Tramadol. Notes limited ROM. Arthrogram no full thickness RTC tear.
- P.E. Limited active flexion and abduction to 90 degrees. Passively examiner can only extend these movements another 10 degrees with firm end point.
- Dx Subacromial bursitis resulting in decreased ROM, then adhesive capsulitis.

Osteoarthritis

Pt Hx
- Pain localized to shoulder and upper arm
- Pain increases with activity
- Poor sleep quality
- Progressive loss of ROM and ADL

Physical examination
- No swelling
- Crepitus with flexion and rotation
- Radiograph: flattening of humeral head, osteophytes
Separating the physical findings

<table>
<thead>
<tr>
<th>RTC tendonitis</th>
<th>Subacromial tenderness</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT Tear</td>
<td>Loss of strength</td>
</tr>
<tr>
<td>Bursitis</td>
<td>Tender, bursa with extension of shoulder</td>
</tr>
<tr>
<td>Biceps tendonitis</td>
<td>Pain against supination or bicepital groove</td>
</tr>
<tr>
<td>Adhesive Capsulitis</td>
<td>Decreased active or passive ROM</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>Grinding flexion, extension</td>
</tr>
</tbody>
</table>

Specialty tests

<table>
<thead>
<tr>
<th>RTC tendonitis tear</th>
<th>Apley scratch test</th>
<th>Superior/inferior reach of opposite scapula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impingement</td>
<td>Neer's</td>
<td>Arm 180° forced flexion</td>
</tr>
<tr>
<td>Supraspinatus tendon/impingement</td>
<td>Hawkin's</td>
<td>90° elevation, internal rotation</td>
</tr>
<tr>
<td>RTC tear</td>
<td>Drop arm</td>
<td>180° abduction passive lowering False + above 90°</td>
</tr>
</tbody>
</table>

Elbow Anatomy

- Purpose: position hand to mouth
- Humerus/ulna=hinge joint
- Humerus/radius=hinge and rotation
- Proximal radius/ulna=rotates with sup/pron
- Collateral ligaments stabilizes medial and lateral aspects
- Annular ligament: encircles radius, placement in the radial notch
- Flexors: biceps, brachioradialis, brachialis muscles
- Extensors: triceps
- Supinators: supin/biceps brachii
- Pronators: FCR, pronator quadratus and teres
- Nerves: Median/radial, ulna
Elbow radiograph

History: Overuse syndrome

<table>
<thead>
<tr>
<th>Activity</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowling</td>
<td>Biceps tendonitis, radial nerve</td>
</tr>
<tr>
<td>Friction sports:</td>
<td>Olecranon bursitis</td>
</tr>
<tr>
<td>Golf</td>
<td>Medial epicondylitis, radial nerve</td>
</tr>
<tr>
<td>Gymnastics</td>
<td>Biceps/triceps tendonitis</td>
</tr>
<tr>
<td>Racketball</td>
<td>As above + ulna nerve</td>
</tr>
<tr>
<td>Throwing</td>
<td>As above, epiphysis injury, fx</td>
</tr>
<tr>
<td>Weight lifting</td>
<td>Biceps, triceps tendonitis, nerve entrapment</td>
</tr>
</tbody>
</table>
Elbow

<table>
<thead>
<tr>
<th>Elbow</th>
<th>Degrees</th>
<th>Restricted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexion</td>
<td>140-150°</td>
<td>130°</td>
</tr>
<tr>
<td>Extension</td>
<td>1-10°</td>
<td>&gt;10°</td>
</tr>
<tr>
<td>Supination</td>
<td>90°</td>
<td>60°</td>
</tr>
<tr>
<td>Pronation</td>
<td>80-90°</td>
<td>70°</td>
</tr>
</tbody>
</table>

Nursemaid’s elbow

- Subluxed radial head, annular ligament displacement
- Radius slips under the annular ligament
- Pt Hx:
  - Children carried by wrist with elbow extended and axial traction
  - I.E.: pulled over an obstacle
- Physical examination
  - Child refuses to use arm and fussy
  - Avoids supination and elbow flexion

Nursemaid’s elbow

- Treatment
  - First do no harm
  - Goal return annular ligament and radial head to anatomic position
  - Radiographs: useful if suspecting fx
  - Review hx if uncertain obtain
  - Maneuver: Work with ortho first
    - Immobilize elbow
    - Palpate radial head, pressure on radial head
    - Axial compression at the wrist with full supination of forearm while flexing the elbow.
    - Clicking or snapping of radial head + indicator of reduction

http://www.emedicine.com/emerg/topic392.htm
Olecranon bursitis

- Synovial lined sac over the olecranon process
- Marked inflammation between the olecranon & ulna

Onset
- Gradual: Secondary to overuse or pressure
- Acute inflammation
  - Trauma
  - Rarely infection: staph aureus

Pt Hx
- Male, laborer 50's, etoh
- Pain varies, mass prevents flexion

Physical examination
- Skin dry, abraded
- Erythematous or painful if infection or acute trauma
- Large mass often > 6 cm

Diagnostic
- Aspiration
  - Blood: trauma
  - Crystals: gout
  - Culture cloudy fluid

Treatment
- They recur. Aspiration, compression, elbow protection
Lateral epicondylitis

- Tennis elbow, most common
- Inflammation or tissue degeneration of wrist extensors at lateral epicondyle
- Tendonosis
- Pt hx
  - 30-60 yo, peak age 40 yo
  - Repetitive wrist extension, pronation or supination of forearm
    - Occupational
    - Recreational: tennis backhand
  - Lifting with palm in pronation, holding a cup painful

Physical examination
- Pain to pressure one cm under lateral epicondyle
- Losee position
  - Elbow 90°, across abdomen
  - Palm up
  - Isolates the extensor carpi radialis brevis
- Diagnostic
  - Radiograph: r/o radial head arthritis

Tx: eliminate offending activities, NSAID's 10-14 days

Medial epicondylitis

- Golfer's elbow, 2nd most common
- Injury to pronator teres and flexor carpi radialis muscles secondary to wrist snapping and pronation
  - Forceful, rapid flexion
  - Tennis serve, end phase acceleration of pitchers, hammering
  - If nerve symptoms=ulna nerve entrapment
Golfer’s elbow

- Physical examination
  - Inability to straighten elbow
  - Local tenderness 1 inch below medial epicondyle, along the pronator teres, flexor carpi radialis
  - Pain with elbow extended, forearm supinated, with resisted wrist flexion
  - Pain with resisted pronation

Separating the physical findings

<table>
<thead>
<tr>
<th>Condition</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olecranon bursitis</td>
<td>Posterior ballotable cystic type swelling</td>
</tr>
<tr>
<td>Lateral epicondylitis</td>
<td>+ Cozen’s test</td>
</tr>
<tr>
<td>Medial epicondylitis</td>
<td>Pain with wrist dorsiflexion</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>Pain with wrist flexion</td>
</tr>
<tr>
<td></td>
<td>Decreased ROM</td>
</tr>
<tr>
<td></td>
<td>Crepitus</td>
</tr>
</tbody>
</table>

Elbow complications

- Treatment
  - Nontraumatic injury radiographs rarely necessary
  - Rest, Ice
  - Exercises: Improve strength
    - Outstretched arm, palm down, flex wrist hold 20 seconds, extend wrist 20 seconds x 5
    - Squeezing a tennis ball
  - Bracing: counterforce to affected muscles
  - Gradual return to activities
Hand and Wrist

- Get a grip with 8 carpal, 5 metacarpal, 14 phalanges
- 2 rows of carpal bones close to radius/metacarpals
- Scaphoid (carpal navicular bone) links 2 rows
  - Most common fracture, one artery, nonunion
- Pt Hx
  - Fall onto the outstretched hand
  - Pain base of the thumb

Scaphoid fracture

- Physical examination
  - Pt abducts and extends the thumb with hand pronated
  - + pain in the depression r/o fx of navicular and or radius
- Radiograph, even if negative thumb spica splint
- Repeat x-ray in 2 weeks
- Referral

Fracture navicular, radius
Carpal tunnel syndrome

- Most common neuropathy from repetitive wrist flexion and extension
  - 50% bilateral
- Median nerve compression
- Osteofibrous tunnel with 9 flexor tendons
- Think hypothyroid, pregnancy, R.A., arthritis
- Pt c/o
  - Nocturnal paresthesias of radial 3.5 fingers leading to weakness

Physical examination
  - Tinel's: + if tapping the volar wrist skin crease = paresthesias
  - Phalen's: + if complete flexion in 30-60 seconds = paresthesias
  - Sensory > 5 mm discrimination from 2,3rd fingers to 5th and compare to opposite hand
  - Motor: weak abd pollicus brevis
    - Oppose abducting thumb
    - Atrophied thenar eminence

CTS

- Treatment
  - Eliminate the cause
  - Splinting neutral position, OT or forearm wrist splint
  - NSAID's
  - Treat the disease
  - EMG
  - Referral
Ganglion

- Cystic area from synovial sheath or joint
- Volar: wrist crease
- Dorsal: over the lunate
  - Lunate location: ulna side mid radius/3rd metacarpal
- Pt c/o
  - Waxing and waning bump
  - Pain increases with extreme flexion or extension of the wrist
  - May increase with increased activity

Ganglion

- Physical examination
  - Smooth round nodule
  - More prominent with flexion or extension
  - Tender to touch
  - Rarely compression of radial nerve
- Treatment
  - Radiograph: r/o occult bone pathology
  - Aspiration, immobilize, reassure, refer if significant symptoms

Wrist tendonitis

- EPB and APL tendons cross distal radius
- Pt HX: Repetitive gripping/ulna and radial deviation
- P.E.
  - Pain with thumb movement
  - Pain with resisted extension
  - Localized tenderness distal radius/swelling
deQuervain’s

Wrist tendonitis

- Pain relief
- Ice 15 min q 4 hours
- Phonophoresis
- Thumb spica splint
- Buddy tape to index finger

Extensor tendon injury DIP joint

- Most common finger injury
- Mallet finger
  - Forceful flexion thus extensor tendon stretched or ruptured
  - Baseball hitting finger tip, jamming finger in basketball
- Physical examination
  - Swelling
  - Inability to actively extend DIP joint
- Treatment
  - Radiograph
  - Splint in neutral or slight hyperextension x 6 weeks
Mallet finger

Thank you

- Spend some time with your local N.P. or P.A. orthopedic specialist
- Jump start to optimism

Bibliography

- Anderson, BC. Office Orthopedics for Primary Care: Diagnosis and Treatment, 3rd Ed Philadelphia, W.B. Saunders, 2005.
Bibliography