Hand

History

- **Demographics**
  - Age
  - Occupation
  - Handedness
- **Pain**
  - Location
    - point to where it is
  - Radiation
    - does the pain go anywhere else
  - Type
    - Burning, sharp, dull
- How long have you had the pain?
- How did it start
  - Injury
  - Insidious
- Progression
  - Is it getting worse or is it remaining stable
- When
  - Mechanical
  - Rest
  - Nocturnal
- Aggravating & Relieving Factors
  - start up, mechanical
- Associated
  - Stiffness
  - Swelling
  - Deformity / Contracture
    - Age of onset
    - Progression
  - Click / clunk
  - Gives-way
- Numbness
- Weakness
- Paraesthesia
- Red Flags
- Risk Factors
  - Dupuytren's
    - Diathesis
      - Peyronies, Ledderhosen, Garrod's
    - Family History, racial origin
    - Diabetes, Alcohol, Smoke, Epilepsy
    - Work
  - RA
- **Function**
  - How has this affected your life
  - Home
    - Precision
      - Pens
      - Buttons
      - Keys
    - Gross motor
      - Turning taps
      - Carrying shopping bags
      - Rising from chairs
    - Bedroom
      - Dressing
    - Bathroom
      - Washing
      - Hygiene
    - Feeding
    - Dupuytren's
      - Clumsy, catching in pocket
  - Work
  - Sport
- **Treatment**
  - Nonoperative
    - Medications
      - Analgesia
      - How much
      - How long
    - Physio
    - Orthotics
      - Walking sticks
      - Splints
  - Operative
- Past Medical History
  - Family History

Any last questions

- what would you like done?

Situations / Conditions, requiring Hand Examination and structure History accordingly

1. Inflammatory
2. Painful
3. Neurological
4. Deformity

1 Pain:

1. Onset
2. Duration
3. Frequency
4. Type
5. Location
6. Remote injury
7. Aggravating factors
8. Relieving factors
9. Activity restrictions
10. Guarding of the wrist and hand

2 Swelling

1. Onset
2. Duration
3. Location
4. Flare ups (Frequency, Severity, Duration)
5. Aggravating factors
6. Relieving factors
7. Treatment
8. Association
9. Discoloration
10. Stiffness

3 Deformity

4 Loss of Function

1. Grasp
2. Pinch
3. Hook
4. Use limited to As a paper weight

5 Loss of Power

1. Strength
2. Dexterity

Wrist
History & Examination summary

- History
- pain
  - where, radiation, type
  - how long, progression, when, nocturnal
  - aggravating, relieving
- other
  - stiffness
  - instability
  - click, clunk, catch
  - numb, weakness, radiculopathy
- function
  - Home (ADLs)
    - Bedroom
      - Dressing, back pocket, rise from chair
    - Bathroom
      - toilet, opposite underarm, comb
    - Kitchen
      - Eat
  - Work
    - Lift, carry
  - Sport
    - throw
- past history
  - neck, treatment, injury, surgery, similar episodes
- Exam Neck, Shoulder & Wrist
- Exam
- look: swelling, wasting, deformity, scars, ulnar styloid, red
- feel: warmth, tenderness, bony landmarks
- move: crepitation, active & passive ROM (dorsiflexion, palmar-flexion, radial & ulnar deviation, supination & pronation)
- spec: Watsons Shuck, L/T ballot, midcarpal, piano key, TFCC load, Tinnel
- power, neuro, vascular: (incl. grip strength)

Examination of the Hand

Start examination by asking ” Do you have RA?”

Look

- Patient seated
- Hands on pillow

Dorsum

- Describe proximal to distal
  - Skin
    - Colour, scars, creases
      - distal web skin limit is the midpoint of the proximal phalanx
      - Creases on flexor surface are distal to the joint
      - on the extensor surface they are proximal to the joint
      - trophic changes (i.e. increased hair growth or altered sweat production)
        - can represent derangement of sympathetic nervous system
  - Wrist
    - Ganglions, synovitis, prominent ulnar head
  - Hand
    - Swelling
      - Tenosynovitis
      - Carpal bossing: benign bony prominences that form on dorsum of proximal ends of 2-3rd MC
    - Atrophy
      - of intrinsics
        - NB: test peripheral nerves
      - of first interosseus
        - Radial border of 2nd MC
        - Severe ulnar neuropathy
    - MCPJ
      - old Fracture’s, dropped knuckle
      - Carpal bossing (benign prominences at the proximal end of the 2nd/3rd metacarpals)
  - Digits
    - Heberden’s nodes (DIP)
    - Mucous cyst – DIP associated with degenerative changes of joints
    - Bouchard’s nodes – (PIP)
  - Fingernails: deformity, circulation
    - Clubbing (respiratory & cardiac disease)
    - Spoon nails (infection)
    - Fragmentation & pitting (Psoriasis)
    - Ridges (alcohol, vitamin deficiency)
    - Splinter hemorrhages
    - Onychogryposis –thick hook nails
    - Paronychia

Radial surface

Palms together

- Thenar eminence
- Z deformity of thumb
- Dorsum of thumb
    - Arthritis of basilar joint

Volar

Palms Up

- Creases
    - Distal = proximal limit of the retinaculum
    - Middle = Radio-carpal joint
    - Proximal = proximal limit of synovial flexor sheath
- Swellings
    - Ganglion
    - Flexor synovitis
- Fingers
    - Note the general resting posture, there should be increasing flexion from the index to 5th. ? contracture, ? tendon injury (arcade of flexion)
    - Swellings
        - generalized finger swelling vrs localized (joint)
        - Oslers nodes, small tender nodes in the finger pulp, from SBE
        - ganglions (flexor creases)
        - Phelon (pulp infection)
        - Epidermal inclusion cyst
    - Deformities
        - rotational (previous fracture) get patient to flex the fingers, all should point to scaphoid tubercle
- cascade sign
    - fingers converge toward the scaphoid tubercle when flexed at the MCPJ and PIPJ
    - if one or more fingers do not converge, then trauma to the digits has likely altered normal alignment
-
- ulna drift (RA)
- swan neck
    - follows an untreated mallet or DIPJ dislocation, or occurs
    - primarily in RA
    - After mallet/dislocation, the excessive extensor force causes gradual attenuation of the PIPJ volar plate
    - In RA, the synovitis erodes the volar plate & the hyperextension of the PIPJ cause DIPJ flexion
- Boutonnière
    - Central slip rupture
        - acute (Trauma) or chronic (RA)
- claw fingers
    - (loss of intrinsics or over-action of extrinsics)
- An extrinsic minus hand
    - shown by extending the MCPJ, then able to flex the DIPJ & PIPJ
- Mallet finger extensor insertion dysfunction (mobile), if fixed may be Osteoarthritis

Then bend elbows to look at **ulnar surface**

- elbow – scars or nodules
- benedectine
- ulnar clawing
- Best to see RA features, such as carpal subluxation & Caput ulnae

Feel

- Feel – area of interest – go for most pathological finger is multiple regions
- In general, palpate any swellings, scars or prominences & characterize any tender areas
- Feel for excessive warmth, sweating
- Proximal to distal, radial to ulnar
- Name each structure as you go
  - Dorsal
    - radial styloid
    - Anatomical snuff box
    - first dorsal compartment (De Quervain's)
    - Dorsal branch of radial artery
      - Distal to this is trapezium
    - Ganglion in 2nd dorsal compartment
    - lister's tubercle
      - SL ligament distal to this
    - DRUJ
    - Ulnar styloid
    - TFC
      - (just distal to ulnar head in a small depression, continue palpating during radial & ulnar deviation, feel a popping), L-T ligament is just distal to the TFC, & extensor tendons (synovitis-RA)
    - Remaining carpal bones & metacarpals
  - Palmer
    - Pulses
    - scaphoid tubercle
    - trapezium
    - Lunate
    - Scapho-trapezium joint
    - Trapezio-metacarpal joint
    - Pisiform & hook of hamate (end of FCU)
    - Palmer fascia
    - thenar & hypothenar eminencies (palpate eminencies whilst the patient presses the tips of the thumb & 5th fingers together)
    - flexor tendons (synovitis)
    - To feel the Palmaris longus
      - press tips of thumb & 5th together, wrist
      - slightly flexed, palpate to the ulnar side of FCR. (Between PL & FCR is median nerve)
    - Fingers & thumbs
      - Palpate swellings & joints

Move

- Active & if any limited add passive
- Test passive & active movement, evaluate the end feel
- Wrist
  - Whilst elbows are bent do
    - Flexion (60-80°)
    - Extension (70-90°)
  - Brings hands down
    - Radial (20°). & ulnar deviation(30-40°)
  - Keep your elbows by yourside
    - Supination
    - Pronation
- Thumb
  - Lateral abduction
  - Palmar abduction
  - Opposition
  - Extension
  - Retropulsion
  - thumb to LF base
  - thumb to IF(tip to tip,pulp to side)
- Hand / Fingers
  - Check arcade of flexion
  - Extend fingers
- Fingers
  - Flexion, extension, abduction (measure span between fingers) & adduction.
  - tendon ruptures
    - EPL post Colles
    - EDC in RA (Vaughan-Jackson lesion)
    - If finger PIPJ flexion limited, perform Bunnel test.
  - Extension
    - Passive MCPJ extension (70-80°) is always > active (0-20°)
    - Can grossly assess flexion by distance of finger tips from the palm
    - Note any triggering
- Thumb
  - Opposition (distance between fingers)
  - abduction (with reference to the palm)
  - adduction
  - radial abduction = opening up web.
- Stress
  - Collateral ligaments of the fingers & thumbs
    - IPJ's in extension or 30°
    - MCPJ's in 90°

RANGE OF MOTION

- Active and passive
- Finger
  - MCP: 0° extension to 85° of flexion
  - PIP: 0° extension to 110° of flexion
  - DIP: 0° extension to 65° of flexion
- Wrist
  - 60° flexion
  - 60° extension
  - 50° radioulnar deviation arc

Functional Assessment / Grips

- Power Grip – squeeze my fingers
- Hook Grip – hook my hand
- Precision Grip hold pen
- Lateral Pinch Grip – key grip
- Tip Pinch – pick up coin
- Function
  - Power grip
    - extrinsic muscles 50% hand function
      - hook (holding bag)
      - cylinder & spherical
  - Precision
    - Intrinsic muscles, 45% hand function
    - pinch grips e.g. holding a key, pen
  - Paper weight
    - Most basic function, 5%, requires limit strength & fine motor
  - Also try doing up a button & tracing a diagram
  - 45% grasp
  - 45% pinch
    - side pinch (key pinch)
    - tip pinch
    - chuck pinch
  - 5% hook
  - 5% paper weight

Screening Series

ask patient to

- Neck side to side
- full abduction to over head position
- touch hands on head – check axilla & elbows for scars
- behind head
  - flex elbows
  - extend elbows
- behind lower back
- then pronation & supination with thumb up & elbows by side
- then make fist with thumb in & out
- spread fingers
- then wrist flexion & extension

Special Tests

NERVE PALSY EXAMINATION

Deformities

- APE HAND
  - Thenar wasting, thumb held in line with fingers (ext tendon pull)
  - Median N palsy
- BISHOPS HAND
  - Also called benediction hand
  - Hypothenar wasting, intrinsic wasting, partial claw of the ulna side
  - indicates ulnar nerve lesion
- Ulnar paradox
  - higher the lesion the less the claw
- CLAW HAND
  - Due to combined median & ulnar nerve palsy
  - All fingers clawed
- WRIST DROP
  - Radial Nerve lesion

Motor

- PosteriorInterosseous
  - ECU, EI, EDC, EPL, EPB, APL (radial thumb abduction)
- Radial
  - ECRL, ECRB
- Median
  - FCR, FDP2,3, FDS, FPL, APB (palmer thumb abduction)
  - Opponens (press thumb/5th tips together, check strength & that the thumb is opposing-rotating)
- Ulnar nerve
  - FCU, FDP4,5, Intrinsics, Adductor policis

Sensation

- Median
  - Palmer thumb & 1 • fingers & tips of fingers
  - Palmer cutaneous nerve base of thumb
- Ulnar
  - Ulnar 1 • fingers
- Radial
  - Dorsal fingers/hand over median nerve fingers

Nerve tests

Froment's sign

- Grasp paper between index & thumb of both hands, pull out paper. If the thumb IPJ flexes, then it is an isolated ulnar nerve palsy

Phalen's test

- Hold the wrist flexed for 1 minute. Symptoms of median Nerve indicate CTS

Tinnels test

- Tap over the median nerve, pins & needles indicates CTS

Compression test

- press for 1 minute on median nerve at the distal palmer crease as it enters the CT, pins & needles is positive

Ulnar nerve compression test

- Guyon's canal beneath the pisio-hamate ligament, through here runs the ulnar nerve & artery. Compression just radial to the pisiform for 1 minute, positive test is neurological symptoms

Flexor tendon tests

- Anchor DIPJ's to assess FDS
- Note index is unreliable to test for FDS, here check pinch grip gets hyperextension of DIPJ, also flex & hold PIPJ at 90°, check DIPJ for contraction

Finkelsteins test – De Quervain's

- Make a fist with the thumb in the palm, Ulna deviate the wrist
- A positive test has pain over the abductor & EPB tendons

Bunnel-Littler test – tight intrinsics

- Extend the MCPJ's & try to passively flex the PIPJ
- If you are unable to do this, then this may mean a PIPJ contracture or tight intrinsics.
- Thus flex the MCPJ (to relax the intrinsics), if this allows further flexion, then it is intrinsic tightness.
- If flexing the MCPJ causes no change in PIPJ flexion, then it is a joint contracture.
- If PIPJ flexion is ↓ with MCPJ flexion, then it is an extrinsic contracture of the long finger extensor tendons.
- Tight retinacular ligament of Lansmere
- Extend PIPJ, if unable to passively flex the DIPJ then this is either a tight ligament or joint contracture.
- Thus flex the PIPJ, if this allows flexion at the DIPJ then the oblique ligament is tight.

- Bunnel's test
  - examiner passively flexes PIPJ twice
    - first with MCP in extension
    - next with MCP held in flexion
  - intrinsic tightness present if PIP can be flexed easily when MCP is flexed but NOT when MCP is extended
  - extrinsic tightness present if PIP can be flexed easily when MCP is extended but NOT when MCP is flexed

- Wartenberg's sign
  - tests ulnar nerve motor weakness
  - patient asked to hold fingers fully adducted with MCP, PIP, and DIP joints fully extended
  - positive if small finger drifts away from others into abduction

- Jeanne's sign
  - tests for ulnar nerve motor weakness
  - ask patient to demosntrate key pinch
  - positive finding if patients first MCP joint is hyperextended

Instability tests

Shear test

- triquetrum is stabilized by applying palmer pressure over the pisiform & dorsal pressure over the triquetrum. The lunate is the manipulated relative to the triquetrum by gripping the lunate with the thumb & index finger of the other hand over the dorsal & palmer poles of the lunate respectively.
- Discomfort or excessive translation as compared to the other side is positive.
- Assesses the L-T ligament.

Kirk Watson test – S-L instability

- ref: Watson & Black "Instabilities of the Wrist" Hand Clin 3: 103, 1987.
- Distal pole/tubercle of scaphoid is stabilized with your thumb, to restrict its palmer flexion, whilst the wrist is moved from ulnar deviation in extension to radial deviation in flexion.
- If there is a S-L disruption, then the scaphoid will sublux dorsally when the wrist is in radial deviation & flexion, & pain will result.
- A popping sensation may be felt as the scaphoid subluxes over the dorsal rim of the radius.
- Releasing your thumb should allow the scaphoid to reduce & relieve pain.

Midcarpal instability

- Axially load the wrist as you move it from radial to ulnar deviation.
- Jumping, catching or clunking is a positive result.
- DRUJ instability
- Translation of ulnar relative to radius in lateral plane
- Clicking, popping or pain may be produced.

Shuck test

- Test for thumb CMCJ subluxation/instability (usually Osteoarthritis).
- Grasp the thumb MC between your index & thumb, push & pull along the thumb axis.
- Grinding of this joint causing pain is usually from Osteoarthritis.

TFC injuries

- Press test
- Supposed to be 100% sensitive for TFC tear. Push up from chair with an extended wrist. Pain at ulnar-carpal joint is indicative of a tear.

Compression test

- Axially load the wrist in maximal ulnar deviation, in neutral, pronation & supination.
- Production of pain distal to the ulnar is indicative of a tear
- Clicking & popping may be felt.

Lunotriquetral ballotment test (Reagan test)

- Lunotriquetral (LT) instability – dynamic
- tests for lunotriquetral ligament tear
- examiner secures the pisotriquetral unit with the thumb and index finger of one hand and the lunate with the other hand
- anterior and posterior stresses are placed on the LT joint
- positive findings are increased laxity and accompanying pain

Kleinman shear test

- LT instability - dynamic

Lichtman test

- Midcarpal instability – dynamic
- examiner stabilizes distal radius and ulna with non-dominant hand and moves patients wrist from radial deviation to ulnar deviation, whilst applying an axial load
- a positive test occurs when a clunk is felt when the wrist is ulnarly deviated

TFCC grind

- TFCC pathology

ECU snap test

- ECU instability

Piano key sign

- DRUJ instability

Fovea sign

- TFCC pathology or ulnotriquetral ligament split tear

Circulation

Allen's test

- Open & shut the hand a few times, then occlude both arteries. Next open the hand & notice the blanched palm. Release one of the arteries (usually the ulnar) & look for the return of colour.
- Allen test for digital arteries
- Tests the prescience of two vessels. Flex the finger & compress these, release one at a time with the finger extended. Look for return of colour.

Capillary refill

- Press on nails & compare
- Must assess the elbow =/- the shoulder as well
- Check normal Arcade of Flexion
- Avulsion of flexor digitorum profundus (Jersey finger)
  - It occurs when the fingers of a football player are pulled into extension as he attempts to grasp the jersey of an opponent
  - Common in ring finger
  - Leads to abnormal resting arcade
    - Affected finger is in relatively extended position
- Lacerations
  - FDP
    - Abnormal resting arcade

    - FDS
        - Only slight break in resting arcade because of pull of FDP
    - FDP / FDS
        - Loss of ability to flex DIP & PIPJ
        - Affected finger is straight
- Finger tips
    - Felon: closed space infection of fingertip
- Flexor tendon sheath infection
    - 4 cardinal signs of Kanavel
        - fusiform swelling extending along the middle & proximal phalanges into the distal palm
        - tender
        - finger is held in flexed position at rest
        - passive extension of finger exacerbates the patient's pain
- Epidermal inclusion cysts
- Ganglion of flexor tendon sheath

ECU: Wrist Extension, Ulnar deviation
EIP: Extension of 2nd MCPJ + IPJ
EDC: Extension MCPJ + IPJ + Wrist
EPL: Extension & Adductin Thumb MCPJ + IPJ
EPB: Extends Thumb MCP + CMC, ABDuct thumb
APL: Thumb ABDuction, Extension of 1st CMCJ
ECRL: Wrist extension, ABDuction, Radial Deviation; Flexion of elbow; Fist Clenching
FCR: Wrist Flexion, Hand & Wrist ABDuction, Scaphoid Stabilizer
FDP: Flexion MCPJ+DIPJ of II, III, IV, V digits
FDS: Flexion PIPJ of II, III, IV, V digits
FPL: Flexion IPJ of distal phalanx of Thumb
APB: Thumb CMCJ ABDuction
Opponens Pollicis: Thumb Opposition at 1st CMCJ (Flex, ADDuction, Medial Rotation)
FCU: Wrist flexion + ADDuction

Thumb:
- Flexion: FPL, FPB
- Radial ABDuction + Extension: APL
- Palmar ABDuction: APB
- ADDuction: Adductor Pollicis
- Oppostion: OP, APB
- Froment's Test: Adductor Pollicis

Wrist:
- Flexors: FCR, FCU
- Extensors: ECRL, ECRB, ECU
- Radial Deviators: FCR, APL, ECRL, ECRB
- Ulnar Deviators: FCU, ECU

Finger:
- Flexors: FDP, FDS
- ABDuction: Dorsal Interossei (DAB)
- ADDuctors: Palmar Interossei (PAD)

Pre-requisites for Tendon Transfer:

1. Supple joints
2. 85% or 4/5 Motor power
3. straight line of pull
4. one tendon – one function
5. synergism
6. expandable donor: Not to cause morbidity
7. Tissue Equilibrium
    a. Subsided soft tissue induration
    b. No wound reactions
    c. Supple joints
    d. Soft scars
8. Pass tendon below subcutaneous fat, fascial sheath
9. Amplitude
10. Preserve neurovascularity
11. Insertion and tension close to original
12. Restore sensibility before
13. Arthrodesis or joint procedures before the transfer
14. Non progressive disorder
15. Minimum dissection
16. Meticulous haemostasis