The Stiff Wrist

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About Me!

- Upper limb ESP
- Musculoskeletal Practitioner
- Senior Physiotherapist- Manual Therapy MSc.
- Guest Lecturer Masters/Undergrad UoB
- Private Practice
- Increasing interest in research- Thoracic spine and shoulders, LBP, Exercise
- PTSD in Upper limb nerve injuries

What the Plan?

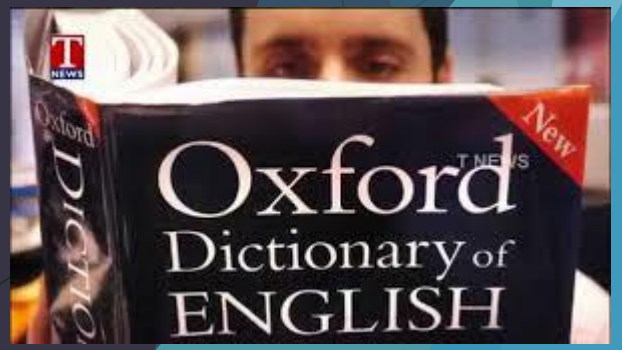
- Who, what, why of Stiffness
- How much movement do we need
- How can we restore movement
- The role of manual therapy
- Proposed mechanisms

- Facilitation!

Whose got a Stiffy?!

Oxford Dictionary Definition of Stiff

- Not easily bent or changed in shape; **rigid**: “a stiff black collar”
- **Viscous**; thick: “add wheat until the mixture is quite stiff”
- **Not moving** as freely as is usual or desirable; “a stiff drawer”
- Unable to move easily and without **pain**: “a stiff back”
- Not relaxed or friendly; **constrained**: “she greeted him with stiff politeness”
- A stiff measure of **brandy**!



Reworked Definition of a stiff wrist

- True stiffness

- Functional stiffness

Differential diagnosis

True Joint Stiffness	Functional Stiffness
Post Immobilisation (Fracture)	CRPS
OA	Instability
RA	Secondary to Swelling
Gout	Tenosynovitis
Tumour eg. Osteoid Osteoma	

-Capsular Pattern- Equal restriction in Flex/Ext
-Hard End Feel

-Non Capsular Pattern- Restriction in one direction more than 10˚
-Ax end feel

Poretto-Loehrke et al. 2016

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JHT Read for Credit Article #412.
Special Issue: Wrist

Clinical manual assessment of the wrist

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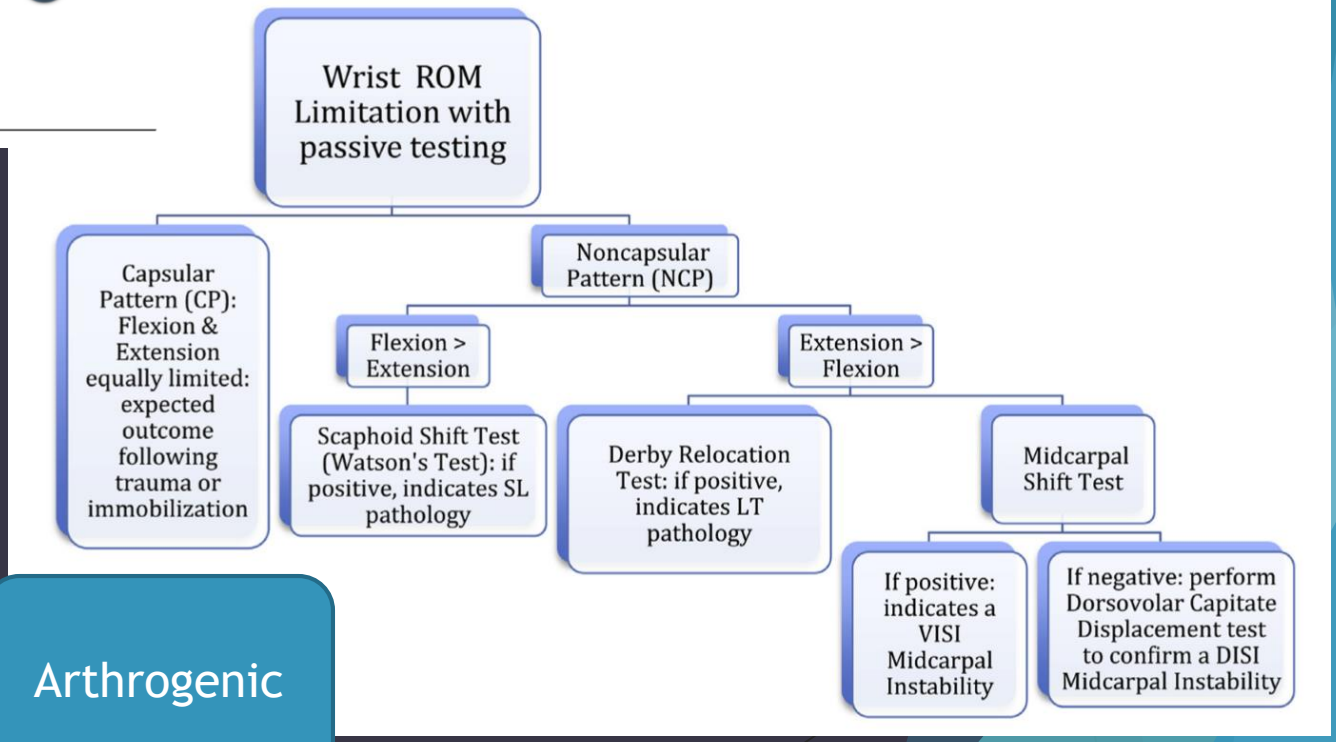
Who
What
When
Where
Why
What extent



Arthrogenic

Why does the hand or wrist stiffen?

- Swollen hand- all structures bathed in serofibrinous exudate- Fibrin deposition within tissue- Swelling- shortening and thickening- Fibrin fixes- Fibroblastic growth-turns everything into connective tissue (Boyes and Bunnell).
- Movement determines quantity, quality, alignment, strength and organisation of collagen- immobilisation in maturation phase (3-6 weeks)-collagen
bonds become stronger-increasing risk of permanent change.

How much movement do we need?

	Normal	Functional
Flex	78-85	20-30
Ext	60-85	30-45
Radial D	15-21	10-17
Ulna D	38-45	15-25
Pro	80-90	75
Sup	75-90	75

Hand Therapy magic?!

- Range of movement exercises
- Splinting- Dynamic, serial casting (fingers)
- Soft tissue work
- Scar tissue modification
- ?CPM- in literature

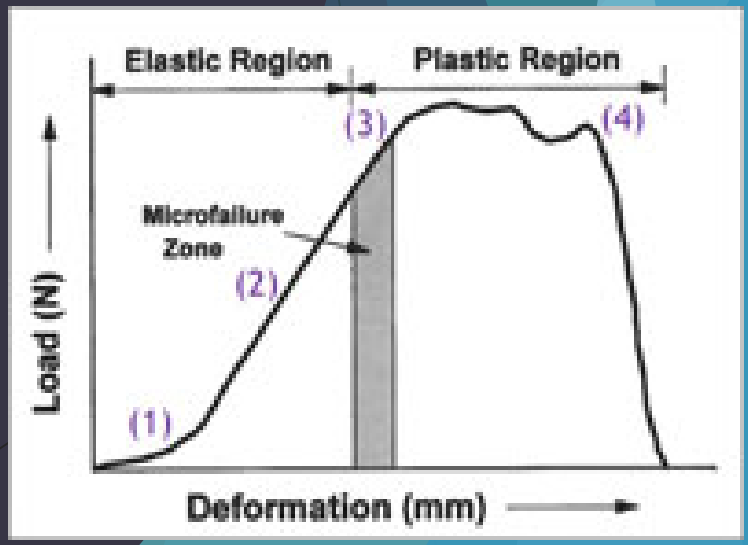
MANUAL THERAPY

- Kaltenborn mobilisations
- Cyriax
- Maitland
- Mulligan Mobilisations with movement

Mobilisation of the healing hand

- Consider stage of healing appropriate stress- stress/strain
- What is the effect of what you are doing
- MT controversial in hand therapy literature
- Michlovitz et al (2004) SR- 2 Cohort not beneficial after distal radius # versus 1 beneficial.
- Concerns MT- risk increase pain and swelling resulting in increased scar tissue formation- further stiffness. (Glasgow, 2010)

BUT- MT is a generic term- huge variation, needs clinical reasoning



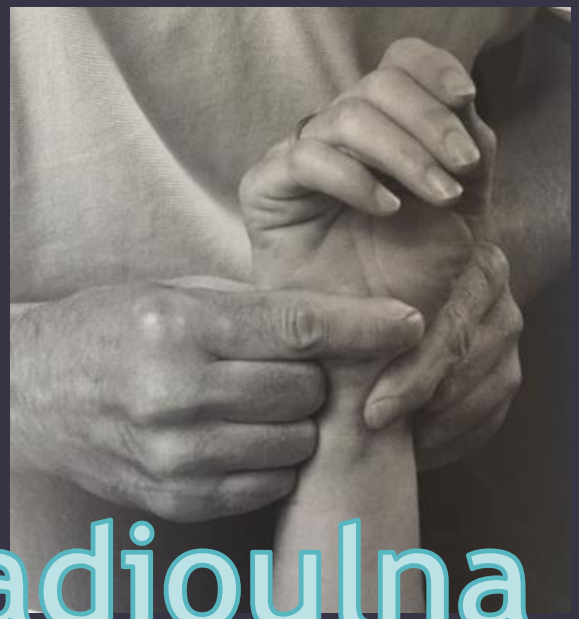
Supination as an example

- What movements happen in supination?

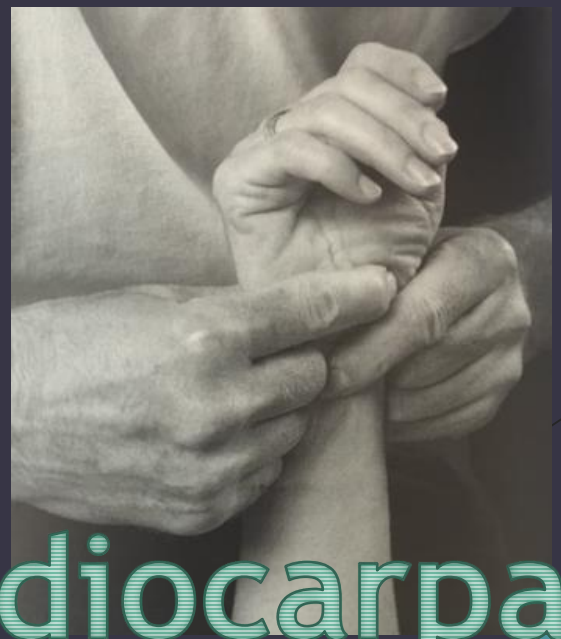
Distal Radioulnar joint	Dorsal glide of radius on Ulna Outward rotation of the radius on ulna Volar glide of Ulna on radius Inward rotation of ulna on radius
Radiocarpal Midcarpal Carpo-metacarpal	Rotation
Ulnameniscotriqueteral Joint	Disc moves with radius and carpals- sweeps around Ulna

Maitland Approach to supination

- Establish where the restriction is coming from
- Assess the movement of supination
- Use passive mobilisation to bias/offload different structures
- Treat most restricted movement



Radioulna Bias



Radiocarpal Bias

Mobilisation with movements for supination

- Pain Free
- Through ROM
- Over pressure

Symptom modification approach to MT

- Use your Ax to guide your Rx
- Identify the most restricted or problematic movements
- Add small accessory glides- obliterate pain
- Can treat severe pain but…Keep in mind irritability
- Use mini Rxs
- RE-ASSESS- regularly- VAS
- Ensure your HEP mimics your clinic Rx

How does manual therapy work?

- Biomechanical Theory
- Neurophysiological effects
  - Pain Gate
  - Opioid
  - Non-opioid

Biomechanical Theory

Plastic deformation

Stretch Reposition

Re-align

Reduce Subluxations

Hysteresis

MRI studies- show no change in joint mal-alignment following MT despite painfree following MWM- thumb trauma. (Hseieh, 2002)

Nansel 1990- Increase in ROM from cervical manip lasted 4 hours, no improvement at 48 hours.

Pain Gate Theory

- Low threshold A beta fibres (Mechano receptors) block a delta and c fibres (Pain receptors)

- This can only explain pain relief as it is being applied
- Eg transverse friction

Neurophysiology- Spinal research

- Manip could produce immediate **hypoalgesia** and concurrent **sympathoexcitory** effects compared to controls (Vicenzino, 95.96; Terret and Vernon, 1984, Vernon and Fisher, 1992)
- Grade III mobs to C5/6 can effect **HR** and **RR**, placebo couldn't. (Peterson 1995)
- Cspine mobilisation increases **skin conductance** by 60% in mobilisation 20% in control (McGuiness,1997)
- Manips/mobs increase **PPT** but not effect thermal pain threshold (Vicenzino, 95,96,98, Paungmali et al 2003)

Multi system response

Neurophysiology- Upper limb research

	MWM	Placebo	Control
PFGF	↑37.5% during, ↑47.5% following	No change	No change
PPT	↑ after MWM, not significantly indiv	No change	Slight ↓
Thermal Pain	No change	Slight ↓	Slight ↓
HR<BP, Skin cond	↑ after MWM	No change	No change

Elbow MWM-Tennis elbow

Hypoalgesia and Sympathoexcitatory effects of MWM for lat epic- Paungmali et al 03

Cspine Mobilisations in Lateral Epicondylitis

- Mob C5/6 in patients with unilateral lat epic- Vicenzino 95
- ↑ in mechanical pain threshold- 20%
- ↑ in painfree grip- 29%
- GHJ Abd in ULTT2 44%

- But also seen in painfree volunteers

Can't be just biomechanical

What could give this Response…PAG

Pain Inhibitory Systems

VPAG

- Opioid analgesia
- Used Serotonin
- Exhibits tolerance
- Antagonised by Naloxone
- Causes immob in rats (sympathoinhibitory)
- Peripheral noxious thermal stimuli

Analgesia, ↓HR, ↓BP, Hind limb vasodilation

DPAG

- Non-opioid analgesia
- Uses Nor-adrenaline
- Doesn't exhibit tolerance
- Not effected by Naloxone
- Fight/Flight mechanism in rats (sympathoexcitory)
- Peripheral noxious mechanical stimulation

Analgesia, ↑HR, ↑BP, Hind limb vasodilation, ↑RR

Upper limb – DPAG vs VPAG

Aatit Paungmali
Bill Vicenzino
2003-2004

Repetition: Painrelief after 6x mwms
Winner: DPAG

Sympathoexcitory Response: ↑HR, ↑ BP and SC
Winner: DPAG

Naloxone: Failed to block hyperalgesia
Winner: DPAG

BUT:
No longer term studies
None in Wrist
Some inconsistencies

So what…

- Do we need to mobilise site of the lesion- Possibly not
- Consider theory of marginal gains…Improve every thing you do by 1% and get considerable improvement. Start with obvious and then consider less obvious. Dave Brailsford GB cycling coach.

  - Eg Increased specificity of handling
  - Identify exact location of dysfunction
  - Add in spinal mobilisations to help with pain
  - Work to cause the required tissue response in line with healing
  - Educate your patient on your approach

Conclusion

- Stiff wrists occur for a number of reasons
- Classification into true or functional stiffness will help plan management
- Consider stage of healing and stress strain curve when applying your treatment
- Symptom modification allows treatment of severe pain without flare
- There is more to manual therapy than the biomechanical model

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