Pain and dysfunction in the wrist and hand is a common presentation in the primary care setting. The physiotherapy musculoskeletal subjective examination approach details history of onset of symptoms, whether acquired or traumatic, presence of related painful areas and signs of local or systemic inflammation. Local dysfunction of the wrist and hand may be traumatic, such as a fall on an outstretched hand, or a ball bouncing off a finger tip, or of gradual onset, usually related to cumulative activities of task or work origin. Wrist and hand presentations can be categorised as **articular, soft tissue**, or **neuropathic**.

In all cases hand physiotherapy concerns restoration of the normal kinematics of the hand, restoration of the five specific grips, restoration of manual dexterity and strength resolution with the aim of restoring full painless function.

**Articular**

Articular presentations of the wrist and hand relate to fractures, articular degeneration/osteoarthritis (OA) and specific articular hypomobilities impacting function. A simple non-articular fracture has sufficient bony union in 4-6 weeks to allow removal of cast with minimal physiotherapy intervention other than education in a graduated exercise regime for mobility, strength and function. Comminuted, displaced or intra-articular fractures of wrist or phalanges require physiotherapy as a priority post immobilisation.

In the wrist region, the traumatic bony lesion may cause significant exudate to lodge between the intercarpal bones. Examination by palpation will demonstrate significant loss of radio-carpal and intercarpal mobility with loss of normal gliding actions of the small bones. Scapho-luno-capitate hypomobility compromises hand function and grip. Specific mobilisation can often yield dramatic improvement in both wrist and finger function.

Intra-articular phalangeal fractures demand restoration of normal joint kinematics via manual mobilisation for restoration of full range of motion and hand function.

Individual metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joints are liable to acute degeneration in mid to later life. When acute the affected joint is painful, hot and oedematous. Hand function is compromised in terms of finger flexion and general manual strength. Due to location of these joints directly under the skin, regular local topical application of NSAID gel can yield rapid substantive symptom improvement.

Physiotherapy techniques for finger joint degeneration include electrotherapy, acupuncture and manual joint mobilisations for pain relief and functional recovery. Taught self mobilisations allow the individual to continue treatment at home.
Soft Tissue

Traumatic finger tendon dysfunctions that are not amenable to physiotherapy (see table below), requiring speedy orthopaedic referral for optimal long term success.

Table 1. Common tendon dysfunctions of the Fingers and Hand & amenability to physiotherapeutic management

<table>
<thead>
<tr>
<th>Condition</th>
<th>Physical signs</th>
<th>Amenable to Physiotherapeutic Management</th>
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</thead>
<tbody>
<tr>
<td>Mallet Finger</td>
<td>Inability to actively extend DIP due to extensor tendon avulsion</td>
<td>No</td>
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<tr>
<td>Jersey Finger</td>
<td>Inability to flex the DIP due to flexor digitorum profundus rupture</td>
<td>No</td>
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<tr>
<td>Skier’s Thumb</td>
<td>Hyperextension injury of the 1st MCP joint with ulnar collateral ligament rupture</td>
<td>No</td>
</tr>
<tr>
<td>Swan-neck Deformity</td>
<td>DIP flexion with PIP hyperextension, various causes including volar plate disturbance or muscle incompetence</td>
<td>No</td>
</tr>
<tr>
<td>Trigger Finger</td>
<td>Finger locking in active flexion motion due to adherence or thickening of the flexor tendon</td>
<td>No</td>
</tr>
<tr>
<td>Boutonneire Deformity</td>
<td>Flexion of PIP with extension of MCP and DIP due to rupture of central slip of extensor digitorum comminus tendon over the PIP.</td>
<td>Yes</td>
</tr>
<tr>
<td>Dupuytren’s Contracture</td>
<td>Development of fibrous tissue nodules and cysts in the palmar and digital fascia of the hand, leading to flexion contractures especially of the 5th and 4th digits.</td>
<td>No</td>
</tr>
<tr>
<td>DeQuervain’s Tendonitis</td>
<td>Inflammation of the tendons and synovium of thumb extensors, specifically abductor pollicis longus and extensor pollicis longus</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Immediate splinting in the first 24 hours and early surgical consult is best practice for acute jersey finger, mallet finger and skier’s thumb presentations, with poor outcomes if chronic. Trigger finger responds to local steroid infiltration to regain smooth tendon gliding. Occasionally manual therapy in the form of gentle soft tissue release may assist outcome. DeQuervain’s tendonitis is diagnosed on observation of the classic sausage swelling of the dorsal distal forearm, positive Finkelstein’s Test (thumb crossed in the palm, covered by full finger flexion, and passive wrist ulnar deviation) and palpation of crepitus along affected synovial sheaths. Positive conservative intervention can include steroid infiltration and/or physiotherapy in the form of manual soft tissue gliding techniques, stretches and progressive local muscle strengthening. Work ergonomics and leisure activities should be addressed to prevent exacerbation.

Wrist Instability

Wrist popping, clicking/clunking and positional weakness are symptoms associated with instability of the ulnar aspect of the wrist. Trauma can lead to disruption of the triangular fibrocartilage complex (TFCC) with complete rupture of the ulnar collateral ligament (UCL), while cumulative sustained wrist extension, such as poor hand positioning at a keyboard may lead to wrist instability. With wrist instability, short wrist muscles inserted on the
carpus are weak and unable to position the wrist for function, leading to dominance of the finger muscles. Restoration of local wrist stability in the long term will only occur by strengthening specific local wrist muscles. Rehabilitation focuses on specific strengthening of the short ulnar wrist flexor (FCU) and extensor (ECU) muscles, progressing to motor control patterning to optimise functional wrist and hand activities including the demands of specific sports.

Taping is a short term technique to reduce pain and dysfunction. Occasionally an unstable wrist may require bracing for sport. However bracing in the absence of specific muscle strengthening is not advised as frequent use of external support is believed to contribute to ongoing inhibition of wrist specific short joint stabilising muscles.

**Nerve presentations of the wrist and hand**

Nerve lesions in the hand can present from peripheral nerve lesions either in the upper limb proximal to the wrist, or from cut lesions in the wrist and hand. In the presence of motor loss, physiotherapy offers splinting to prevent excessive work of the functionally unopposed muscle group, stretching to maintain joint and soft tissue mobility and electro-stimulation to speed recovering muscle function. Muscle re-education and strengthening is added as nerve recovery takes place.

Local nerve presentations in the wrist and hand can be differentiated into Carpal Tunnel Syndrome (CTS) or may present as non-specific arm pain syndrome (NSAP), isolated to the hand region or may form part of a whole limb.

CTS is more common in women, often occurring in pregnancy or peri-menopausal. Classic CTS symptoms of paraesthesiae with or without weakness in the fingers in the distribution of the median nerve, worse at night, with a female: male aetiology of 3:1. This assists in differential diagnosis. Diagnostic confirmation of CTS is by positive EMG findings. Early or non-severe CTS responds to conservative management via pharmacology, night splinting and physiotherapy.

Neuropathic hand pain in the absence of CTS is an increasingly common presentation apparently related to computer based work environments. This condition known as non-specific arm pain (NSAP) is a subset of the wider groups of symptoms collectively referred to as work related upper limb disorder (WRULD). Symptoms of NSAP include pain, aching or discomfort in a non-dermatomal distribution, fluctuating in nature. Symptoms can be reported over either or both dorsal or palmar regions of the forearm and hand, and often do not follow a clear 24 hour pain pattern. In taking a pain history, unprompted use of the following pain descriptors often generates a neuropathic diagnostic hypothesis.

**Neuropathic Pain Descriptors**

- burning
- shooting
- crawling sensations
- electric shock sensations, tingling, paraesthesiae,
- sensation disturbance in terms of reduced touch sensation,
- reduced or increased cold response,
- sensations of heaviness, numbness, deadness
- hand feeling swollen or fat

Seeking to identify neuropathic symptoms in the primary care setting is important, principally as neuropathic pain can lead to chronic pain if undertreated. Haanpaa reports a poor response to NSAID as a cardinal sign of
neuropathic pain, when allied with subjective pain descriptors and suggests early intervention in the primary care setting with other drug classes such as anticonvulsants and antidepressants in effort to prevent chronicity. Clinical signs of NSAP include hypomobility of the ipsilateral cervico-thoracic articular pillar or myofascia e.g. tight scalenes, pectoralis minor etc from poor posture with pain reproduction of emerging nerve root signs on the painful side. Positive palpation findings of nerve hypersensitivity along the length of the affected median nerve has been demonstrated\textsuperscript{14}

The physiotherapy techniques of manual therapy are appropriate to address hypomobility at sites where nerves are closely associated with underlying joints including the cervico-thoracic spine, superior and inferior radio-ulnar, radio-carpal and intercarpal joints or neural interfaces with areas of myofascial restriction. Physiotherapists also address positional issues including workplace ergonomic set-up, proper keyboard technique and good supported sitting posture is advisable.

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