Upper Limb Disorders: Causes and Management

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Plan

• Upper limb pain is common
• Low back pain
• SPECIFIC upper limb disorders
  • Of the shoulder and elbow
  • Of the forearm, wrist and hand
• Non-specific arm pain
• The ARM pain trial
• Conclusions
Upper limb pain is common

Self-Reported Prevalence of Musculoskeletal Pain in Past Three Months by Site of Pain, United States 2012

- Any Musculoskeletal Pain: 52.1%
- Hip: 6.9%
- Knee: 18.1%
- Lower Limb: 7.0%
- Shoulder: 8.4%
- Upper Limb: 11.2%
- Back w/Radiating Leg Pain: 10.3%
- Neck: 15.2%
- Lower Back: 28.6%

Rate per 100 Persons

Source: National Health Interview Survey (NHIS) Adult sample, 2012

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A history of low back pain...

• Back pain dates back throughout history (papyrus 1500 BC)
• 17th Century treatise from Smith papyrus on non-traumatic back pain
• Simple back pain dismissed as ‘rheumatics’ until 1900s
• New ideas in 1900s: back pain possibly due to injury
• May attract compensation
• Rest is the treatment of choice
Risk factors for low back pain
Occupational physical factors
OTHER risk factors for low back pain

- Psychological – mental and emotional
- Poor subjective health assessment
- Work dissatisfaction
- Psychological problems *precede* pain
- Poor education / poor income
Management of non-specific low back pain

- Paradigm shift for the management of mechanical back pain 1994
- Advice to remain active
- Movement away from terms like ‘injury’
- Movement away from making a diagnosis
- De-medicalisation
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SPECIFIC musculoskeletal disorders of the upper limb

- Heterogeneous group of conditions
- Diagnosed on the basis of a cluster of symptoms and signs
- Often no supporting investigations
- BUT: Widely accepted in medical practice – Codman, de Quervain, Cyriax, Ramazzini, Runge
- The most valid diagnoses are those for which aetiology is established
Conditions Classified by the HSE Delphi Workshop

- rotator cuff tendinitis
- bicipital tendinitis
- shoulder capsulitis
- lateral epicondylitis
- medial epicondylitis
- De Quervain’s disease
- tenosynovitis of the wrist
- carpal tunnel syndrome
- non-specific forearm pain
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Disorders of the shoulder and elbow

- Acromio-clavicular joint syndrome
- Shoulder capsulitis
- Impingement syndrome
- Bicipital tendinitis
- Olecranon bursitis
- Lateral and medial epicondylitis
- Referred arm pain (brachialgia)
Shoulder capsulitis

- Poorly understood, common disorder, older patients
- Term coined by Codman in 1934
- Shoulder pain associated with restriction of range of motion, night pain, functional loss
- Evolution through 3 phases: painful, adhesive and then resolution
- Capsule/extracapsular ligament – primary site supraspinatus tendinitis?
- Arthroscopic study suggested fibromatosis
- External rotation > abduction > internal rotation
- Diabetes, trauma, stroke, arthritis, PMR
Impingement syndrome

- Pain around the shoulder, upper arm, radiates down arm
- Night pain, functional disturbance
- Tendinopathy (?inflamed, torn)
- Tendon of the rotator cuff clinically definable by provocation testing?
- Women > men, 40-60 years
- Occupation – force, posture
Acromio-clavicular joint syndrome

- ACJ is a plane synovial joint between the clavicle and the scapula.
- Dysfunction causes local pain, tenderness and swelling, pain on full abduction.
- Pain on horizontal adduction of the arm (‘scarf test’).
- Degenerative? Manual workers?

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Bicipital tendinitis

- Anterior shoulder pain, upper arm pain
- Positive Speed’s and Yergason’s tests
- Trauma, swimmers, weight-lifters
- Often complicated by other shoulder pathology (rarely isolated)
The discrimination of shoulder disorders in clinical practice
Phase 1: 3 Consultant rheumatologists separately examined 26 patients with shoulder pain

- Make a diagnosis
- Suggest investigations
- Recommend treatment

Results collated by a fourth Consultant
Diagnosis

- Total agreement about diagnosis was reached in 12/26 patients (46%)

Adhesive capsulitis 9
Rotator cuff lesion 3
For the remaining 14 patients:

<table>
<thead>
<tr>
<th>Condition</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesive capsulitis</td>
<td>7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Rotator cuff lesion</td>
<td>3</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Biceps tendinitis</td>
<td>1</td>
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<td>0</td>
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<tr>
<td>Acromioclavicular joint disease</td>
<td>4</td>
<td>5</td>
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</tr>
<tr>
<td>Milwaukee shoulder</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

**Total:** 15, 20, 15
3 Consultant rheumatologists examined 18 patients with shoulder pain together

- Complete agreement about diagnoses in 14/18 patients (78%)

Adhesive capsulitis 6
Rotator cuff lesion 4
Referred neck pain 2
Rotator cuff plus acromioclavicular joint 1
Rotator cuff plus referred neck pain 1
Clinical diagnosis is reliable...

- 120 subjects presenting in primary care were assessed by 18 GPs
- All GPs had been taught a standardised system of assigning pre-defined diagnoses
- The GP diagnoses were compared with those of 13 Physiotherapists taught the same system
- Inter-observer agreement in 63% ($\kappa = 0.31$)

Liesdek et al, Physiotherapy, 1997
Clinical diagnosis is reliable...

• 2 Physiotherapists examined 201 patients with shoulder pain, using a standardised system of pre-defined diagnoses
  Agreement in 59%, $\kappa = 0.45$

  *De Winter et al, Ann Rheum Dis, 1999*

• 2 Physiotherapists examined 21 patients using pre-defined criteria and proforma
  Agreement in 91%, $\kappa = 0.88$

  *Pellecchia et al, J Orthop Sports Phys Therapy, 1996*
Why make a diagnosis?

- Separate states of disease with different causes, response to treatment or prognosis
Treatment of shoulder disorders

Intra-articular corticosteroid injections recommended in the management of:

- rotator cuff tendinitis
- adhesive capsulitis
- Sub-acromial bursitis
- partial rotator cuff tears
- full thickness rotator cuff tears (in elderly or less active patients) (after 4-6 weeks)

_The Shoulder: Klippel & Dieppe, chapter 4.7.11_
Long-term follow-up of shoulder disorders

- Natural history?
- 108 elderly patients reviewed at 3 years: one-third still disabled; 21% unable to perform personal care
- Same in those with and without injections

Vecchio et al, B J Rheumatol 1995
Clinical diagnosis of shoulder disorders in practice

- Difficult to do in primary care setting
- Much easier in orthopaedic clinics!
- Imaging also helps
- In practice, aim to rule out unusual pathology..
- Otherwise, painful, stiff shoulder
- May be aggravated by lifting, working with arms above shoulder height, sustained abnormal posture, forces, pushing/pulling
- Physiotherapy and steroid injections
Lateral and medial epicondylitis

- Tendinopathy of the common extensor tendon (lateral) or the common flexor tendon (medial)
- Local pain and tenderness increased by gripping
- Provocation tests aggravate pain
- Men = women, 40-60 years
- Tennis players, manual workers
Risk factors for lateral and medial epicondylitis

• Lateral epicondylitis associated with manual work (OR 4.0, 95% CI 1.9-8.4).
• Repetitive bending/straightening elbow > 1 hour day was independently associated with lateral (OR 2.5, 95% CI 1.2-5.5) and medial epicondylitis (OR 5.1, 95% CI 1.8-14.3).
• 5% of adults with epicondylitis took sickness absence because of their elbow symptoms in the past 12 months (median 29 days).

Walker-Bone, 2011
Olecranon bursitis

- Common bursitis
- Pain, swelling, tenderness around posterior elbow
- Thickened bursa palpable
- History of trauma – blow or friction
- Septic, gout, arthritis
- Students, miners
Referred arm pain (brachialgia)

- ‘Sciatica’ of the arm
- Dermatomal distribution of pain, sensory disturbance
- Associated with neck pain/restriction
- May be aggravated by some postures of the neck
- Neurological signs detectable
- Sensory disturbance
- History of trauma?
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SPECIFIC disorders of the forearm, wrist, and hand

- Raynaud’s syndrome / Vibration white finger
- Ganglion
- Dupuytren’s contracture
- Trigger digit
- Carpal tunnel syndrome
- De Quervain’s disease
- Tenosynovitis
Raynaud’s / Vibration white finger

- Raynaud’s phenomenon
- Common in the general population
- Benign symmetrical coldness, dysaesthesiae of fingers
- Onset in teenage years
- Family history
- Girls > boys
- Fingers turn white then blue then red, induced by emotion / cold
Red flags

- Onset in adulthood
- Asymmetry
- Males
- Recent-onset
- Joint pains, swelling, nailfold capillary abnormalities, carpal tunnel syndrome, positive autoantibodies – connective tissue disease
Vibration white finger

- Use of vibrating tools – jack hammers, power tools, saws
- Probably dose-related
- Usually asymmetrical
- Aggravated by cigarette smoking
- People may apply for Industrial Injuries Disability Benefit
- BUT: although two International schemes for classification, experts disagree on diagnosis
Ganglia

- Localised cystic swellings containing gelatinous fluid – tense but usually painless
- Communicate with an adjacent tendon sheath or joint capsule
- Common at the wrist
- Women > men, middle years, history of trauma common
- Some resolve spontaneously but can be injected or removed surgically – often recur
- ? Relationship with occupational factors
Dupuytren’s contracture

- Nodular thickening of palmar fascia
- Drawing fingers into flexion at MCP joints
- Men > women
- Increased with age
- Bilateral – dominant hand in unilateral
- Diabetes mellitus, heavy alcohol, epilepsy, heavy smoking, family history
Trigger digit (stenosing tenosynovitis)

- Narrowing of the lumen of tendon sheath or expansion of tendon diameter
- Pain, reduced function, ‘triggering’, ‘catching’, ‘clicking’
- Palpable nodule proximally
- Increases with age
- Dominant hand thumb, middle, ring fingers
- Women > men, 50-60 years, (congenital)
- Manual workers, diabetes
Trigger finger - treatment

- Systematic review
  - Randomised controlled trials
  - Corticosteroid injection
  - Tenosynovitis (trigger finger)

- Results
  - Four trials
    - Two trials – injection / placebo
  - 285 patients (297 digits)
  - Methodological limitations
  - Evidence of efficacy

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Carpal tunnel syndrome
Clinical features of carpal tunnel syndrome

- Pain, tingling and dysesthesia in the palmar aspect of the hand, in a ‘median nerve distribution’
- Nocturnal exacerbation
- Weakness of grip
- Tinel’s sign, Phalen’s sign, weakness and wasting thenar eminence, sensory disturbance
- Nerve conduction studies – BUT not ‘gold standard’
- Women > men, 45-54 years, obesity, family history, hormonal factors, hand/wrist arthritis, endocrine disease, the pill, HRT, pregnancy
- Prevalence around 5%, but increased in ‘high risk’ industries: repetitive work, forceful work, adverse wrist posture, ?keyboard users
Treatment of carpal tunnel syndrome

- Conservative
  - Nocturnal splints
  - Diuretics
  - Oral corticosteroids
  - Corticosteroid injections
Non-surgical treatment of Carpal Tunnel Syndrome

- Systematic review
  - 2 systematic reviews
  - 16 randomised controlled trials
- Non-surgical management
- Carpal tunnel syndrome

- Results
  - Corticosteroid injections
    - Short-term relief
  - Oral corticosteroids
    - Lesser effect

What Can Family Physicians Offer Patients With Carpal Tunnel Syndrome Other Than Surgery? A Systematic Review of Nonsurgical Management

**ABSTRACT**

**BACKGROUND** We undertook a literature review to produce evidence-based recommendations for nonsurgical family physician management of carpal tunnel syndrome (CTS).

**METHODS** Study design was systematic review of randomized controlled trials (RCTs) on CTS treatment. Data sources were English publications from all relevant databases, hand searches, and guidelines. Outcomes measured were nonsurgical management options for CTS.

**RESULTS** We assessed 2 systematic reviews, 16 RCTs, and 1 before-and-after study using historical controls. A considerable percentage of CTS resolves spontaneously. There is strong evidence that local corticosteroid injections, and to a lesser extent oral corticosteroids, give short-term relief for CTS sufferers. There is limited evidence to indicate that splinting, tenosynovial steroid, and therapeutic ultrasound may be effective in the short to medium term (up to 6 months). The evidence for nerve and tendon gliding exercises is even more tentative. The evidence does not support the use of nonsteroidal anti-inflammatory drugs, diuretics, pyridoxine (vitamin B6), chiropractic treatment, or magnet treatment.

**CONCLUSIONS** For those who are not able to get surgery or for those who do not want surgery, there are some conservative modalities that can be tried. These modalities include ones for which there is good evidence. It would be reasonable to try some of the techniques with less evidence if the better ones are not successful. Recomendation of surgery must always be kept in mind to avoid permanent nerve damage.

**INTRODUCTION**

Carpal tunnel syndrome (CTS) is the most commonly occurring peripheral nerve compression syndrome, with a 10% lifetime risk of developent. Most often occurs after the age of 50 years, with women affected more than men by a factor of 3 to 1. A US study of 1,016 patients at the Mayo Clinic found an incidence (cases per 100,000 person-years) of 99 (IQR) overall. The age-adjusted rates were 52 per 100,000 men, 149 per 100,000 women, and 105 per 100,000 for both sexes combined. CTS involves median nerve compression at the level of the wrist. Median nerve entrapment can result in sensory and motor impairment, as well as pain in the hand and arm. There is no single reference standard for diagnosis of the syndrome, and a combination of symptoms, signs, and tests should be used to characterize the disorder. Distinction should be made between CTS (a clinical syndrome involving a cluster of symptoms)
Carpal tunnel release surgery

- Technical variations e.g. open vs endoscopic
- Sutures?
- Splinting post-op NOT recommended
- When safe to return to work post-op?
- Safe to return to work including vibration?
De Quervain’s disease

• At the common tendon sheath of extensor pollicis brevis and abductor pollicis longus
• ‘washerwoman’s wrist’
• Pain radial wrist on gripping, pinching, poor thumb function
• Finkelstein’s test
• Women > Men, 40-60 years
• Rowers, manual workers
Tenosynovitis of the hand/wrist

- Inflammation of the tendon sheath of one or more tendons (flexor/extensor)
- Swelling, local pain, warmth, redness, tenderness
- Pain on resisted movements
- Women > men, 40-60 years
- Manual workers: force, repetition, awkward posture
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Non-specific forearm pain

- Pain, allodynia, sensory disturbance, hyperaesthesiae
- No physical signs of other conditions
- Women > men
- Higher social classes
- Younger patients
- Clerical workers
- Mechanism unknown
Independent Risk Factors

- Repetitive wrist movements < 2 hours vs. ≥ 2 hours
- Monotonous work: Never / occasionally vs. > 1/2 the time
- Working with arms elevated < 15 minutes vs. ≥ 15 minutes

OR (95% CI) for new onset forearm pain
Beliefs about arm pain generally

- Physical activity may harm
  - No
  - Yes

- Will still be a problem in 3 months
  - No
  - Yes

- Neglect may lead to permanent harm
  - No
  - Yes

- Should see GP as soon as possible
  - No
  - Yes
Health versus Prognosis

Self-rated health
- Excellent
- Good / very good
- Fair / poor

Somatisation score
- Low
- Intermediate
- High

General health (SF-36)
- High
- Intermediate
- Low

OR (95%CI) for arm pain at follow-up
... Is non-specific arm pain like low back pain?

- Mechanical and psychosocial risk factors
- ‘Epidemics’ in workplaces – beliefs are important
- Is medicalisation unhelpful?
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Among patients referred to physiotherapy with an episode of distal arm pain, advice to remain active and maintain usual participation results in a long-term reduction in arm pain and disability, compared with advice to rest the arm.
Physiotherapy referral

Pre-trial assessment

Advice to remain active

Advice to rest

Fast-track physiotherapy

Physiotherapy (optional)

Follow-up 6, 13 and 26 wks
Physiotherapy referral

Pre-trial assessment

Advice to remain active

Advice to rest

Physiotherapy (optional)

Follow-up 6, 13 and 26 wks

Fast-track physiotherapy
Treatment: Group 1

Advice to remain active

- Upper limb pain is common
- Early RTW is (probably) helpful
- Lasting damage is rare
- Recovery can be expected
- Many cases settle with self-management
- Maintaining activity is (probably) helpful

ARM PAIN

how to deal with it:

→ keep active to recover quickly

Burton et al. HSE Research Report RR596; 2008
Treatment: Group 2

Material available via NHS-Direct

- Advice to rest
  - Biomedical “injury-diagnosis-treatment” model
  - Advice about rest and avoidance of activity

- Similar in length and format
ARM pain trial: the results

- 539 patients recruited
- Randomised evenly to three groups
- Mean age 49 years (SD 13.6)
- 54.5% female
- 87.6% right-handed
- Equal distribution of pain in elbow, hand/wrist or both
- Pain most common in dominant arm (45.5%) or bilateral (24.7%)
The arm pain trial: Disabilities of the Arm, Shoulder and Hand (DASH)

- Advice (active)
- Advice (rest)
- Fast-track physiotherapy

Proportion with mDASH = 0

Time (weeks)

0 6 13 26 40 20 10 0 30 50

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Results (3)

- Advice to rest associated with a 0.56 odds of (95% CI 0.36, 0.87) meeting the primary outcome at 26 weeks
Conclusion

- Upper limb pain is common
- Specific disorder or non-specific pain?
- In the workplace, our role must focus on excluding serious pathology through history and examination
- Try to de-medicalise, reassure, pain relief
- Explore psychological and psychosocial factors
- Avoid workplace activities
- Try to keep in the workplace
- Role for CBT, early physiotherapy..
- Prof Nigel Arden
- Dr Neil Basu
- Prof Steve Bevan
- Prof Anthony Bull
- Prof Kim Burton
- Prof Susan Cartwright
- Prof David Coggon
- Prof Cyrus Cooper
- Ms Stefania D’Angelo
- Mr Maciek Dobras
- Prof Nicola Fear
- Mr Stephen Duffield
- Prof John Goodacre
- Dr Nicky Goodson
- Prof Alison Hammond
- Dr Clare Harris
- Prof Elaine Hay
- Prof Markus Heller
- Dr Richard Heron
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- Ms Cheryl Jones
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- Dr Cathy Linaker
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- Prof Gary Macfarlane
- Dr Ira Madan
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- Prof Rob Moots
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- Ms Georgia Ntani
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- Prof Keith Palmer
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- Dr Elaine Wainwright
- Mr Daniel Whibley
- Dr Gwen Wynne-Jones