Shoulder

Additional scientific considerations on musculoskeletal medicine

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Recommended literature

"A practical approach to musculoskeletal medicine ; assessment, diagnosis and treatment" Elaine Atkins et al., 5th edition, 2024, Elsevier

"A system of orthopaedic medicine" Ludwig Ombregt, 3rd edition, 2013, Churchill Livingstone, Elsevier

A elevation

Kapandji, 2019

Abduction; from 0 – 60° glenohumeral joint

From 60 – 120° scapulathoracic joint

From 120 – 180° glenohumeral and scapulathoracic joints + side flexion of the trunk to the opposite side

Diabetic patients are five times more likely to develop frozen shoulder compared to non-diabetic patients

Hypothyroidism can cause aching, tenderness and stifness, especially in the shoulders and hips

Zreik et al., 2016; Owens-Burkhart, 1991; Clarnette and Miniaci, 1998 “A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p125

Are resisted shoulder tests really specific?

"The anatomical interdigitation of the tendinous insertions of the rotator cuff tendons means that the resisted tests described ***may not definitively incriminate one tendon****; subsequent palpation of the structures implicated will help to identify the lesion."*

"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p132

Labrals tears?

Several tests have been described, but non of them is highly sensitive or specific

"Gold standard" is arthro MR

Guanche and Jones, 2003; Dessaur and Magarey, 2008; Cook et al., 2012
"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p132

Classification of ACJ injuries

Type I

- Sprain of acromioclavicular ligament
- no radiographical abnormality

Type II

- Disruption acromioclavicular ligaments and joint capsule
- Coracoclavicular ligaments are sprained but intact
- A vertical subluxation of up to 50% of the distal clavicle is observed

Type III

- Disruption acromioclavicular ligaments, joint capsule and coracoclavicular ligaments
- 100% superior displacement of the distal clavicle

Cailliet, 1991; Hartley, 1995; Beitzel et al., 2014
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p142

Subacromial pain syndrome (SAPS)

- Rotator cuff tendons and bursa can be involved
- About 36% - 48% of all types of shoulder pain
- Negligible reduction in pain with surgical acromiohumeral decompression in comparison to placebo!
- Correlation between a narrowed coracohumeral distance and subacromial pain

Park et al., 2020; Di Mario and Fraracci, 2005
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p144

What about increased thoracic kyphosis?

in combination with shoulder instability

- Possible mechanism for the development of SAPS, especially in younger athletes

Mobilisation of the thoracic spine can also be included within the general management of SAPS

Hanchard et al., 2004; Brukner et al., 2017; Meadows et al., 2020
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p144

A painful arc on abduction?

- Is seen in 44% to 66% of all complaints of shoulder pain

Brukner et al., 2017; Michener et al., 2004
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p144

What about diagnostic injections in case of SAPS?

Subacromial anaesthetic injection is more reliable in giving a definitive diagnosis of a lesion within the subacromial space (in comparison to clinical testing)

Alvarez-Nemegyei and Canoso, 2003
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p145

Rotator cuff tendinopathy treatment

Progressive exercise is recommended

- But…there is little agreement on the optimal exercise program to follow

"A specific exercise program is favoured over a non-specific program, with better long-term outcomes"

- What is the definition of "specific"??

Haik et al., 2016; Björnsson Hallgren et al., 2017
"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p148

Corticosteroid injection at teno-osseus junctions of the tendon?

- Produces short-term relief of pain
- Mechanisms of pain relief are currently not known
- Controversial
  - A direct link with tendon rupture has been proposed but not proven yet.

Khan and Cook, 2000
"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p149

ESWT?

- Appropriate treatment for calcific tendonitis and tendinopathies
- It enhances neovascularisation at the tendon-bone-junction with early release of growth and proliferating factors
  - Improved blood supply and tissue regeneration

Hsu et al., 2008; Scott et al., 2013
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p149

Elbow

Osteochondrosis dissecans in adolescents → loose body formation

"Repeated compressive forces cause microtrauma between the radial head and capitulum and focal degeneration results in fragmentation and the formation of loose bodies"

Patten, 1995; Steinbach et al., 1997
"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p172

Loose bodies in the working-aged or elederly group

Fragments of cartilage or bone, or both (osteochondral)

Often associated with degenerative changes

Stable loose body

- Fixed in the synovial recess, bursa, or attached to the synovial membrane

Unstable loose body

- Can move freely in the joint, where they can become trapped at irregular intervals

Saotome et al., 2006; Adla and Stanley, 2011; Bianchi and Martinoli, 1999
"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p172

Loose bodies and imaging?

MRI is more sentitive than radiography, especially when the loose bodies are nonossified

Simonson et al., 2010

Tennis elbow - tendinopathy

- In 95% of the cases: superficial extensor carpi radialis brevis tendon (type II)
- 35% to 64% are associated with work-related activities ; tennis players represent 8%
- 5-8x more common than golfer elbow

Keijsers et al., 2019; Coonrad and Hooper, 1973; Gellman, 1992; Gabel, 1999
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p176

Tennis elbow treatment

- In most cases the condition is self-limiting
  - 80% resolve within 6 months and 90% after 1 year
  - Some recalcitrant cases can persist > 2 years

- 24 (!) different treatment modalities have been described in literature
  - Absence of evidence for those treatments
  - The outcome of treatment can be disappointing
  - Weak evidence of benefit of DF + Mill's (lack of standardisation)

Keijsers et al., 2019; Greenfield and Webster, 2002; Schmidt et al., 2002; Nimgade et al., 2005; Bisset et al., 2006; Joseph et al., 2012 "A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p177

Exercise?

- Early stage of tennis elbow may respond to a progressive loading program
- The more degenerative stage → a combination of eccentric strenghtening and stretching exercise
  - Combined with modalities that aim to stimulate cell activity, increase protein production and **restructure** the matrix

Cook and Purdam, 2009
"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p178

Wrist and hand

Fractured scaphoid

- Localized pain and tenderness in the snuffbox
- X-ray may be negative for several weeks
- Mostly visible at 2 weeks, but 2% to 5% of scaphoid fractures are missed on initial presentation
- MRI / bone scan should be considered

Livengood, 1992; Pillai and Jain, 2005
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p201

When to use imaging if a fracture is suspected?

- The Amsterdam wrist rules (developed in 2015)
  - Clinical decision making in determining which patients need imaging following trauma
  - The aim is to reduce unnecessary imaging and patient exposure to radiation

Mulders et al., 2020
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p208

Ganglia?

Kulinski et al., 2019; Gregush and Habusta, 2020
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p202

Mucus-filled cysts

At the dorsum of the wrist in 70% of the cases

Approx. 20% on the palmar side

Ganglion cysts account for 60% to 70% of soft tissue masses in the hand/wrist

Most commonly in women between the age of 20 and 50

Osteoarthropathy at the first carpometacarpal joint

Axial compression test

- Sudden sharp pain at the base of the thumb
- Occasionally crepitus

This test is negative in case of a De Quervain tenosynovitis

Anakwe and Middleton, 2011; Choa et al., 2014; Hattam and Smeatham, 2020
"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p210

Carpal tunnel syndrome

"Mechanical and vascular factors are believed to be involved, with inflammation increasing the size of the structures lying within the tunnel, causing swelling and compression, or with scarring affecting the perineural circulation"

Anderson and Tichenor
"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p215

Symptoms CTS

About 70% of patients: numbness at night

40% have radiating pain into the lower forearm, with simultaneous paraesthesia in the fingers

Patients may wake at night – gain relief by shaking or rubbing the hands

Loss of dexterity and sensitivity ; clumsiness of hand function

Smith and Wernick, 1994; Cailliet, 1990
"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p216

CTS tests?

Hattam and Smeatham, 2020; Hoppenfeld, 1976; Cailliet, 1990; Vargas Busquets, 1994; Hartley, 1995; Ekim et al., 2007
"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p217

Tinel's sign (tapping the flexor retinaculum) and Phalen's test are most popular

- But…these tests are not perfect diagnostic indicators

Phalen's test

- Maintaining max. wrist flexion
- In normal situation paraesthesia appear after 10'
- In case of CTS: within 1' to 2' : pain, numbness and tingling
- Test is negative if symptoms are not reproduced within 3'

The “reverse Phalen’s test”

Physiopedia, 2021
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p217

Maintaining a position of full wrist and finger extension for 2’

- Pressure on the carpal tunnel increases after 10’’ (compared to 20’’to 30’’ for the standard Phalen test
- Average pressure change for Phalen’s test was 4 mmHg in 2’, versus 34 mmHg at 1’ and 42 mmHg at 2’ for the reversed version

→ may be a better test for compressing the carpal tunnel

Corticosteroid injection for CTS?

3 high-quality Cochrane studies

- Strong and moderate evidence for the effectiveness of corticosteroids (oral or injection)
- However,…up to 50% of patients who received injection, have symptom recurrence

So, only good short and medium term positive results

Connor et al., 2003; Marshall et al., 2007; Verdugo et al., 2008; Wong et al., 2001; Atroshi et al., 2013; Peters-Veluthamaningal et al., 2010; Huisstede et al., 2010
"A practical approach to musculoskeletal medicine", Atkins et al., Elsevier, 2024, p217

Fibrocartilage tears and meniscal lesions?

Rettig, 1994; Al-Shihabi et al., 2015 “A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p218

A **triangular fibrocartilaginous disc complex** is related to the distal radioulnar joint inferiorly, and a fibrocartilaginous meniscus projects into the wrist joint from the ulnar collateral ligament

- Degenerative changes, tears and occasionally displacement because of trauma or repetitive joint overloading
- Pain and clicking on the ulnar side of the wrist

Tests?

Palpate the wrist while pronating and supinating the forearm – clicking

Passive ulnar deviation may be positive

Tenderness on palpation, distal to the ulnar styloid

Place the wrist into extension and ulnar deviation, apply axial compression to the ulnar side of the wrist, while the wrist is passively circumducted

Subluxation of the extensor carpi ulnaris tendon from the groove between the head of the ulna and the styloid process?

- Pain and clicking on the ulnar side of the wrist

- When the extended wrist is actively taken from radial to unlar deviation, the subluxation of the tendon can be observed
  - This is helpful to differentiate the condition from a triangular fibrocartilage complex or meniscal lesion

Rettig, 1994; Livengood, 1992
“A practical approach to musculoskeletal medicine”, Atkins et al., Elsevier, 2024, p222