Where is the Pain Coming From:
Cervical Spine or The Shoulder

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Disclosures

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How do you differentiate the shoulder/cervical spine????
Cervical Spine Pain

• Can refer to the scapula, shoulder and arm regions (Schellhas et al 1996, Grubba and Kelly, 2000)

• Radicular: Neck, shoulder and whole length of arm (Slijper et al 1998)

• More than 90% of pts with cervical radiculopathy present with arm pain (Bokshan et al, 2016)

• Up to 24% of cervical radiculopathy pts may also have shoulder impingement (Dates, 1996)

Shoulder Pain

• Commonly diagnosed
• Often chronic
• Slow to respond to treatment
• Poor response to natural history
• Often misdiagnosed
• C5-6 are anatomically responsible for sensory and motor function for the shoulder
Prevalence of Shoulder Pain

Prevalence and incidence of shoulder pain in the general population: a systematic review
Luime JJ, Koes BW, Hendriksen IJM, Burdorf A, Verhagen AP

- Point prevalence 7% - 27% adult population
- 1 Year prevalence 5% - 46%
- Lifetime prevalence 7% - 67%

Shoulder Pain

- Around the GH joint and can be down the arm (Gerber et al, 1998), but does not generally refer proximally
- 1 in 10 pts referred for cervical radiculopathy have a comorbid shoulder pathology (Cannon et al, 2007)
- 16% of pts diagnosed with cervical spondylosis had an unrecognized shoulder disorder (Hyun-Jin et al, 2012)

Diagnosis ≠ Problem

- Tissue-specific diagnosis
- Poor reliability demonstrated in tissue-specific diagnosis (van der Windt et al, 1996)
- When diagnosis is incorrect, treatment may be inaccurate or fail
Is it the neck or the shoulder? Or Both??

Examination needs to be based on the symptomatic and mechanical response to mechanical loading.

Schneider G 1989
Patients who initially appeared to have a shoulder problem, with impairment at the shoulder, actually responded to cervical spine interventions (Slaven 2010; van der Windt et al. 1996; Hargreaves et al. 1989; Wells 1982; Schneider 1989).

Rosedale 2017 (submitted for publication)

* 54% of patients referred for shoulder pain were cervical in origin
What is the patient’s problem?

• Pain?
• Limited range?
• Functional impairment?
• Or is the problem the diagnosis?

Can we change the patient’s problem?

This leads to

The Patient’s Test

• What prompted you to seek care?
• What is guaranteed to produce your shoulder problem/pain?
• What can you do that tells you that you have a problem with your shoulder?
The Patient’s Test

- The patient’s test is a baseline measure
- Can this baseline be changed?
- This becomes an essential component of our assessment

McKenzie’s Solution

Classification on the basis of patient’s response to repeated movement testing

Validity of the System

- 30 therapists worldwide with data on 388 consecutive patients a similar proportion (64%) were classified with MDT syndromes.
- Classification: derangement 37%, articular dysfunction 10%, contractile dysfunction 17%, and other 36%.

(May and Rosedale, 2012)
Reliability of the System

- Kelly et al. (2008)
  A pilot study found 82\% agreement, kappa 0.70

- May S and Ross J (2009)
  Follow-up study with 97 experienced McKenzie clinicians evaluating 25 patient vignettes from clinical practice found 92\% agreement, kappa 0.83

- Heidarabady et al. (2014)
  Tested the inter-examiner reliability of the MDT assessment and classification specifically in the shoulder
  6 MDT diploma therapists reviewed and classified 54 clinical vignettes
  The overall agreement was 96\%, giving a kappa value of 0.90

MDT Evaluation
Aims of Assessment

• Is there spinal involvement?
• Is there a restriction of shoulder range?
• Is there a rapid lasting change in range after movement?
• Is shoulder movement painful?
• Does the pain occur during range or at end range of shoulder movement?

Aims of Assessment
Continued

• Is there weakness?
• Is the pain better, worse, or unchanged after testing?
• What is the effect of repeated movement in the opposite direction?

What does the history tell us?

• Location of symptoms
• Mechanism of onset
• Worse / better
• Sleeping
• Past History
What does the history tell us?

**Cervical Spine**
- Symptoms radiating up to neck and into the hand.
- Presence of sensory symptoms
- Symptoms worse in sustained postures / better moving
- Better lying on painful side
- Better with arm above head
- Symptoms produced with cough / sneeze

**Shoulder**
- Symptoms not above tip of shoulder or in hand
- No sensory symptoms
- Symptoms worse with movement / better still
- Worse lying on painful side
- Worse with arm above head

What does the physical examination tell us?

**Cervical Spine**
- Cervical posture correction changes shoulder pain
- Neurological deficits
- Restricted cervical movement
- Repeated cervical movements improve shoulder symptoms and mechanics

**Shoulder**
- No neurological deficits
- No relevant restriction of cervical movement
- Repeated cervical movements don't alter shoulder symptoms or mechanics
- Shoulder movements - active / passive, resisted change shoulder symptoms or mechanics
Assessment
Sequence of Testing

• Perform patient’s test (baseline)
• Assess cervical spine:
  • Posture correction
  • Cervical movement loss
  • Cervical repeated movement testing
• Repeat patient’s test (recheck baseline)

Assessment

• Cervical assessment:
  • Does the patient’s test change following cervical repeated movement testing?
    • Yes – Cervical spine relevant
    • No – Cervical spine may not be relevant

Shoulder assessment

• Symptomatic baseline
• Mechanical baseline
• Functional baseline
Shoulder assessment
Continued

- Perform patient's test (baseline)
- Assess shoulder movement loss
  - Active range of motion
  - Passive end range overpressure

Movement loss
Shoulder

Loss present
Proceed with repeated movement testing

No loss present
Proceed with resisted movement testing

Repeated movement testing
Movement loss present

Possible outcomes
- Movement increases
- Directional preference
- Patient's test improves
Directional preference present

- Repeat movements in direction of preference
- Attempt to gain end range
- Overpressure may be needed
- Recheck patient's test
- Recheck movement baselines

Repeated movement testing Movement loss present

Possible outcomes

- Movement decreases
- Patient's test worsens

Assess movements in opposite direction

Repeated movement testing Movement loss present

Possible outcomes

- Movement increasing or decreasing with repeated movement testing strongly suggests the presence of derangement
Repeated movement testing
Movement loss present

Movement unchanged
Investigate possibility of articular dysfunction

Patient’s test unchanged

Possible outcomes

• Repeated movement testing revealing end range pain without a change in range of motion or lasting pain strongly indicates articular dysfunction

Shoulder assessment
No movement loss

• Symptoms reproduced by resisted testing together with absence of movement loss is suggestive of contractile dysfunction
Possible sources of the patients problem

- Cervical referral
- Postural syndrome
- Derangement
- Dysfunction
  - Articular
  - Contractile

Mechanical Diagnosis

- The system of classification in MDT for the spine is identical in the peripheral joints.
- MDT depends on symptomatic and mechanical responses to tissue loading primarily occurring at end range.
- Centralisation is not identified in the peripheral joints but frequently a response of localisation is seen.

Mechanical Diagnosis

- The hallmark sign of derangement is rapid/lasting change
- The hallmark of dysfunction is consistency under loading
- The hallmark of posture is the lack of pathology
Derangement Syndrome

- Internal displacement may cause a disturbance in the normal resting position of the affected joint resulting in pain
- Acute/subacute/chronic
- Pain may be constant or intermittent

Derangement Syndrome

- Obstruction to movement
- Rapid changes (pN/ROM/function)
- Localization vs peripheralization
- Spine: patient can tell B/W
  Extremity: pt can tell W, but usually not B
- Variable presentation

- AROM/PROM: both maybe limited, PROM maybe full, but PDM
- May hurt with resistance or have weakness
  - Neurological inhibition → weakness
The Dysfunction Syndrome

• Pain from the dysfunction syndrome is caused by mechanical deformation of structurally impaired soft tissues
• This abnormal tissue may be the product of previous trauma, or inflammatory or degenerative processes
• These events cause contraction, scarring, adherence or adaptive shortening. Pain is felt when the abnormal tissue is loaded

Dysfunction - articualr

When structural changes and or impairment affect joint capsules and other peri-articular structures, painful restriction of end range movements in one or more directions will be experienced.

Articular (periarticular structures, joint capsule)

• Consistent, chronic, intermittent
• >6-8 weeks
• P: NW ERP – No rapid change
• In 1 or more directions
• Loss of ROM
• PROM also P-NW
Dysfunction - contractile

When structural changes affect contractile tissue, pain will be felt during resisted movements or loading at any point through the range i.e. when the tissue contracts.

Pain may also be provoked when the tissue is stretched (not usually).

Contractile dysfunction

- Tendon degenerates after inflammation
- Lesions of musculotendinous tissue
- Rotator cuff pathology falls within the classification of contractile dysfunction

Contractile Dysfunction

- Consistent, chronic, intermittent
- Generally 6-8 weeks
- PDM
- Full ROM, loading problem, need resist
- Stretching does not cause pain
- Not “tendinitis”, no inflammatory cells
- Vascular and neuro ingrowth in painful tendinosis, but not in normal tendons (Alfredsson, 2005)
Contractile dysfunction

The diagnosis of contractile dysfunction of the rotator cuff is made by excluding other causes of shoulder pain.

Contractile dysfunction

Why is this tissue injured so often?

Possible explanations:

- Susceptibility to direct trauma
- Overuse trauma
- Inadequate vascularity
- High biomechanical demands
- High frequency of degenerated tissue within tendon

The Postural Syndrome

Only produced by sustained loading, which once avoided, the rest of the physical examination would be normal.

*Should never see a posture patient
The Postural Syndrome

Pain from the postural syndrome is caused by mechanical deformation of soft tissues or vascular insufficiency arising from prolonged positional or postural stresses affecting the articular structures or the contractile muscles, their tendons or the periosteal insertions.

- Pain from joint capsules or adjacent supportive ligaments – prolonged end-range loading
- Pain from contractile tissues – prolonged mid-range loading (may cause mechanical deformation of tissues or reduce blood flow → metabolite build up and ischaemia)

Other

Refers to failure to classify as one of the above mechanical syndromes and considered to be non-mechanical according to operational definitions, such as trauma, post-surgery or chronic pain state.
Thank You

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