Early detection of shoulder pathology in the overhead athlete

A clinical reasoning algorithm

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Impingement symptoms

External Subacromial impingement

Primary Impingement

- Rotator cuff pathology

Secondary Impingement

- Scapular dyskinesis

Internal (posterior) impingement

- Instability
- SLAP
- G.I.R.D.

(Cools et al. BJSM 2008)
Confirming impingement symptoms

- Use “impingement”-tests
- Only to confirm the presence of impingement-related symptoms and to define possible biomechanical process (location of impingement)
- Not to diagnose underlying pathology
- In general high sensitivity, low specificity
- Very limited diagnostic value
Impingement tests

- Jobe test
Impingement tests

- Hawkins test
Impingement tests

- Neer test
Impingement symptoms

External Subacromial impingement

- Primary Impingement
  - Rotator cuff pathology

- Secondary Impingement
  - Scapular dyskinesis

Internal (posterior) impingement

- Jobe + Neer + ant Hawkins +
- Jobe – Neer + post Hawkins –

(Cools et al. BJSM 2008)
Confirming impingement symptoms

- Limited information on internal impingement
- No information on the cause of the problem (primary versus secondary)
- Use “instability” tests
- Interpretation on “pain” in stead of “instability symptoms” (Meister 2004)
- Pain as criterion: low specificity in diagnosing instability (Speer 1994)
Testing shoulder instability

A. Provocation tests
- Apprehension
- Relocation
- Release

B. Laxity tests
- Load & Shift (anterior drawer)
- Sulcus sign
- Posterior subluxation test – Jerk

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Instability tests

- Apprehension – Posterior Impingement Sign (Meister 2004)
Instability tests

- relocation

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Instability tests

- Release test
Impingement symptoms

External Subacromial impingement
- Jobe +
- Neer + ant
- Hawkins +
- Apprehension + (pain) ant
- Relocation -
- Relocation +
- Release + (pain)

Primary Impingement
- Rotator cuff pathology

Secondary Impingement
- Scapular dyskinesis

Internal (posterior) impingement
- Jobe -
- Neer + post
- Hawkins -
- Apprehension + (pain) post
- Relocation +
- Release + (pain)

- Stability
- Biceps SLAP
- G.I.R.D.

(Cools et al. BJSM 2008)
Rotator cuff involvement?

- Empty can: testing of SS (Jobe 1987) AND impingement provocation
- Use test for SS with less impingement provocation
Rotator cuff tendinopathy?

(Reinold et al. JOSPT 2009)

- Full can test
Full Cann (versus empty can) (Reinold et al. 2009):

- **Muscle activity**: Similar SS activity as empty can, but lower amount of middle and posterior deltoid (Reinold et al. JAT 2007)

- **Biomechanics**: Resultant vector is always downward (caudal glide) and centering (Poppen & Walker 1978): less impingement provoked
(Poppen & Walker 1978)
Impingement symptoms

External Subacromial impingement
- Jobe +
- Neer + ant
- Hawkins +
- Apprehension + (pain) ant

Internal (posterior) impingement
- Jobe –
- Neer + post
- Hawkins –
- Apprehension + (pain) post

Primary Impingement
- Relocation -
- Full Can +
- Rotator cuff pathology

Secondary Impingement
- Relocation +
- Release + (pain)

Secundary Impingement
- Relocation +
- Release + (pain)

Relocation +
- Release + (pain)

Scapular dyskinesis

Instability

Biceps SLAP

G.I.R.D.

(Cools et al. BJSM 2008)
Scapular involvement?

- Scapular dyskinesia in association with impingement (Ludewig 2000)
- Evaluation of scapular involvement in shoulder pathology
- Evaluation of specific muscle dysfunction
Scapular involvement?

(Rabin et al. JOSPT 2006)

- Scapular Assistance Test: movement quality
Scapular involvement?

(Kibler et al. AJSM 2006, Tate et al. AJSM 2008)

- Scapular Retraction Test: scapular stability
Scapular dyskinesia: serratus ant or lower trap?

(M. Kelley personal communication aug 2003)
Impingement symptoms

External Subacromial impingement
- Jobe +
- Neer + ant
- Hawkins +
- Apprehension + (pain) ant

Primary Impingement
- Full Can +
- Rotator cuff pathology
- Relocation -

Secondary Impingement
- Relocation +
- Release + (pain)
- SAT +
- SRT +
- Scapular dyskinesia

Internal (posterior) impingement
- Jobe –
- Neer + post
- Hawkins –
- Apprehension + (pain) post

- Relocation +
- Release + (pain)
- instability
- Biceps SLAP
- G.I.R.D.

(Cools et al. BJSM 2008)
Testing shoulder instability

(Levy et al. 1999, Tennent AJSM 2003, Hegedus et al. BJSM 2008)

A. Provocation tests
- Apprehension
- Relocation
- Release

B. Laxity tests
- Load & Shift (anterior drawer)
- Sulcus sign
- Posterior subluxation test – Jerk
Glenohumeral instability?

- **Anterior laxity**: Load & Shift test
LOAD & SHIFT

- Grade I (movement up to glenoid rim)
- Grade II (movement over glenoid rim + spontaneous reduction)
- Grade III (movement over glenoid rim + no spontaneous reduction)
Glenohumeral instability?

- **Inferior laxity:**
  Sulcus sign
Glenohumeral instability?

- **Posterior laxity**: Posterior Subluxation Test
Impingement symptoms

External Subacromial impingement
- Jobe +
- Neer + ant
- Hawkins +
- Apprehension +(pain) ant

Primary Impingement
- Full Can +
- Rotator cuff pathology

Secondary Impingement
- SAT +
- SRT +
- Scapular dyskinesia

Internal (posterior) impingement
- Jobe –
- Neer + post
- Hawkins –
- Apprehension +(pain) post

Relocation + (pain)

Relocation –

Relocation +

Release + (pain)

Laxity tests +
- Appr + (appr)
- Relocation + (appr)

Biceps SLAP

G.I.R.D.

(Cools et al. BJSM 2008)
Involvement of Biceps and superior labrum pathology

- A large amount of SLAP-lesion tests
- “hyper-diagnosed” and “hyper-operated-on”?
- Oh et al. AJSM 2008: choose 2 sensitive and 1 specific test
Biceps pathology or SLAP?

(Hegedus et al. BJSM 2008, Oh et al. AJSM 2008)

- O’ Brien Test
Biceps pathology or SLAP?
(Hegedus et al. BJSM 2008, Oh et al. AJSM 2008)

- Speed’s Test
Biceps pathology or SLAP?
(Hegedus et al. BJSM 2008, Oh et al. AJSM 2008)

- Biceps Load II test

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Impingement symptoms

External Subacromial impingement
  - Relocation -
  - Relocation +
  - Release +

Primary Impingement
  - Full Can +
  - Rotator cuff pathology

Secondary Impingement
  - SAT +
  - SRT +

Scapular dyskinesia

Internal (posterior) impingement
  - Relocation +
  - Release +

Secondary Impingement
  - Laxity tests +
  - Appr + (appr)
  - Relocation + (appr)

Instability

Biceps SLAP

G.I.R.D.

Jobe +
Neer + ant
Hawkins +
Apprehension + (pain) ant

Jobe -
Neer + post
Hawkins -
Apprehension + (pain) post

(Cools et al. BJSM 2008)
GIRD?

- Internal Rotation ROM in 90° abduction

(Trakis et al. AJSM 2008)
Impingement symptoms

External Subacromial impingement
- Jobe +
- Neer + ant
- Hawkins +
- Apprehension +(pain) ant
  - Relocation -
  - Full Can +
  - Rotator cuff pathology

Primary Impingement
- SAT +
- SRT +
- Scapular dyskinesis

Secondary Impingement
- Laxity tests +
- Appr + (appr)
- Relocation + (appr)
- IR ROM↓
- O'Brien+
- Speeds+
- Biceps load II+
- Biceps SLAP
- G.I.R.D.

Internal (posterior) impingement
- Jobe –
- Neer + post
- Hawkins –
- Apprehension +(pain) post
  - Relocation+
  - Release +(pain)

Relocation+
Release +(pain)

(Cools et al. BJSM 2008)
In general:

- Hegedus, BJSM 2008
  - Large amount of studies on diagnostic accuracy shoulder tests, with conflicting results
  - Some tests far worse when used by other than the originator of the test

In general: “we urge caution if a diagnostic test is only been studied once, and if the originator of the test is the author of the paper” (Hegedus et al. BJSM 2008)
More information?

Screening the athlete’s shoulder for impingement symptoms: a clinical reasoning algorithm for early detection of shoulder pathology

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Klinisch onderzoek van de schouder
Examen clinique de l’épaule
Clinical examination of the shoulder

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Thank you!!

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