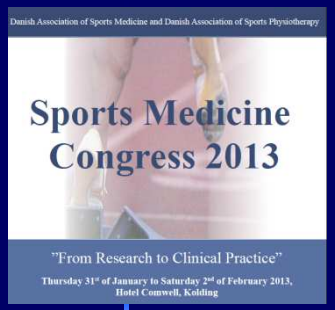

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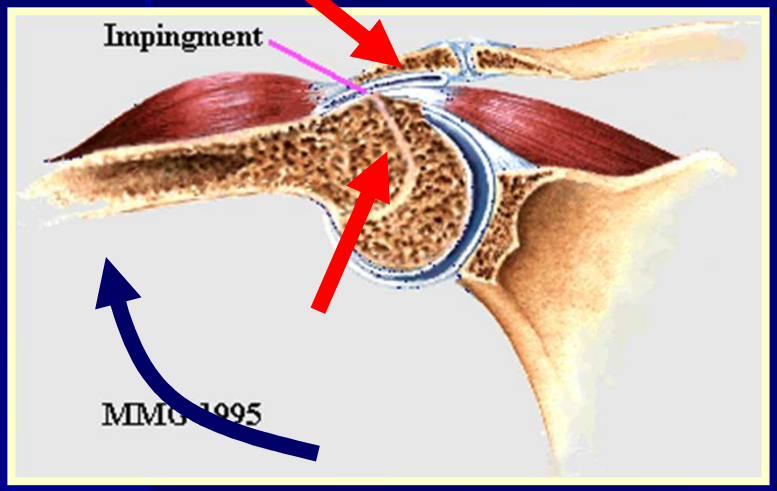
Shoulder impingement syndrome: Treatment modalities from a physiotherapist's perspective

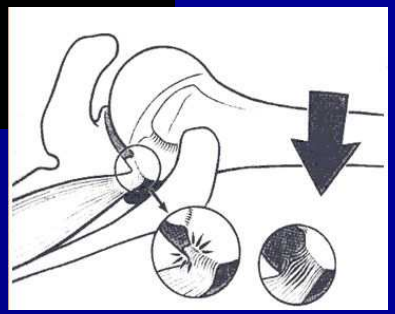
Shoulder impingement syndrome: Treatment modalities from a physiotherapists perspective

Prof dr Ann Cools, PT, PhD
Dept Rehab. Sciences & Physiotherapy
Ghent University, Belgium

Shoulder pathology?

- Impingement (SA & int)

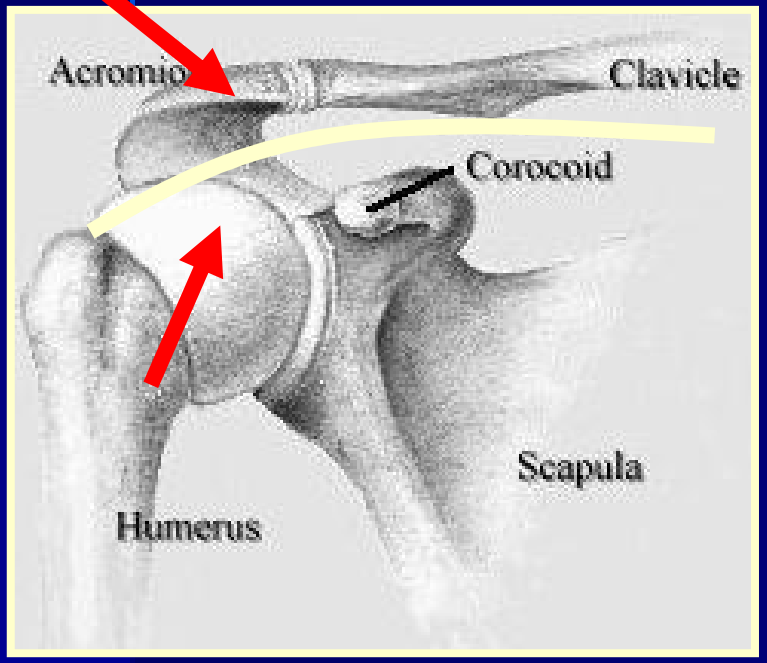




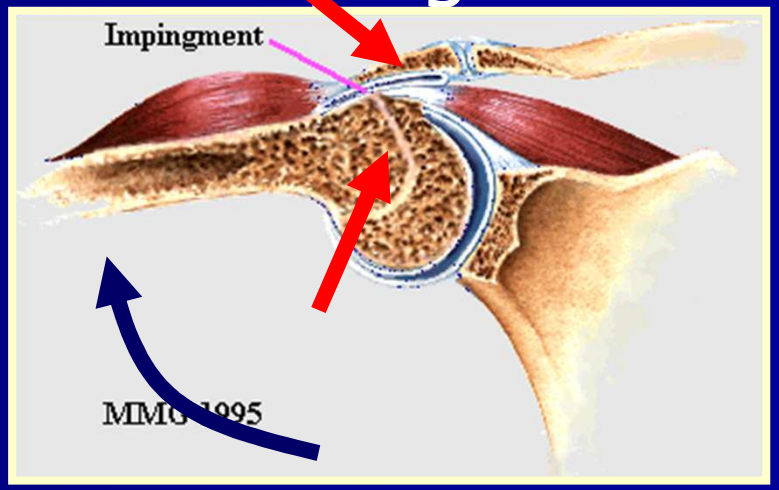
(Anderson Radiol Clin North Am 2010, Lintner Clin Sports Med 2008, Seroyer Sports Health 2009 , Reeser BJSM 2006, Briner Sports Med 1997)

Shoulder impingement

Impingement of soft tissue (tendon) between bony components



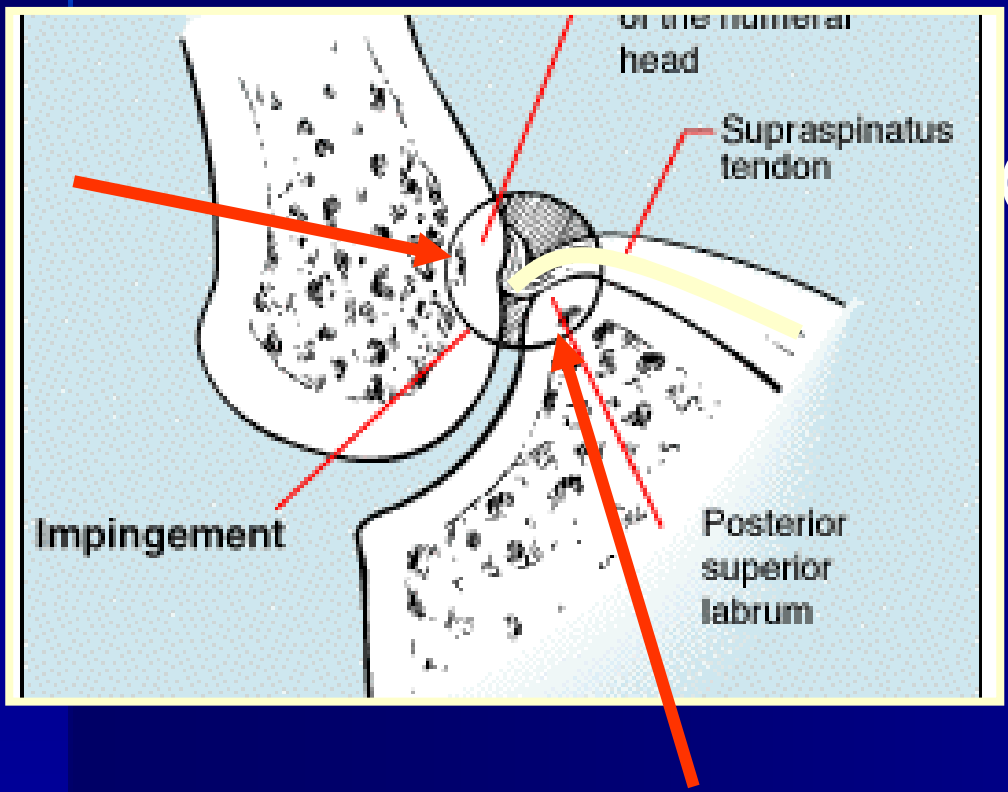
External (Subacromial) Impingement



(Neer 1972)

Shoulder impingement

Impingement of soft tissue (tendon) between bony components

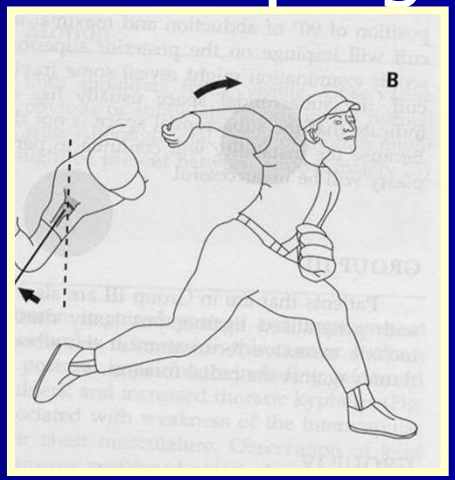


(Walch 1990, Drakos JBJS 2009)

Internal

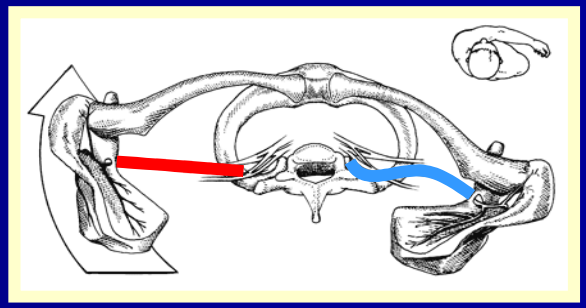
(postero superior glenoid)

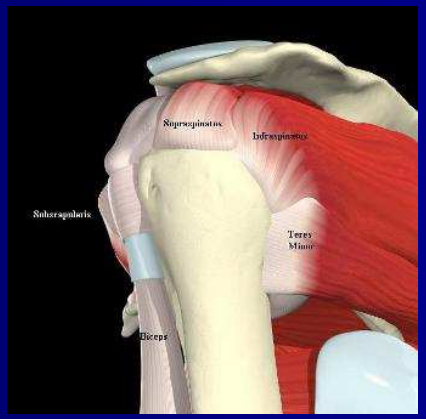
Impingement



Shoulder pathology?

- Impingement
- Rotator cuff dysfunction, including suprascapular nerve entrapment

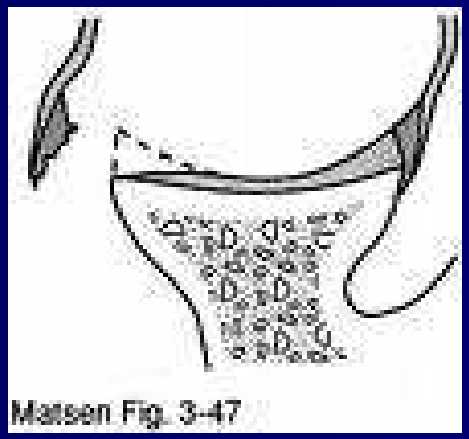


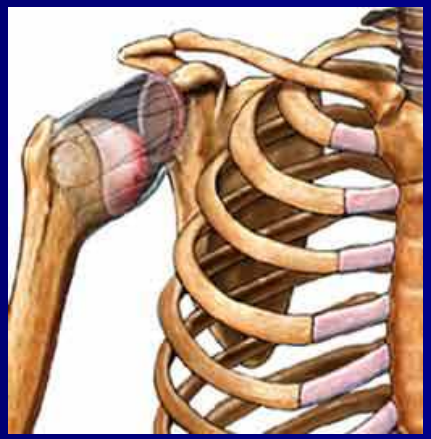


(Anderson Radiol Clin North Am 2010, Lintner Clin Sports Med 2008, Seroyer Sports Health 2009 , Reeser BJSM 2006, Briner Sports Med 1997)

Shoulder pathology?

- Impingement
- Rotator cuff pathology
- Instability (traumatic & acquired)

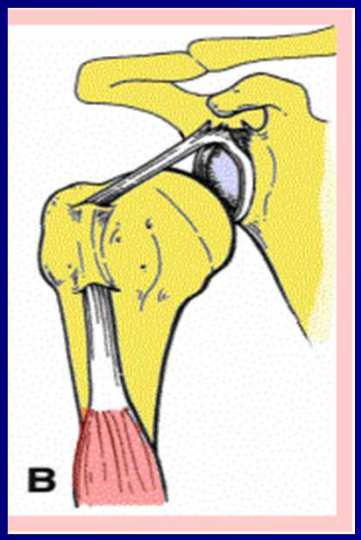




(Anderson Radiol Clin North Am 2010, Lintner Clin Sports Med 2008, Seroyer Sports Health 2009 , Reeser BJSM 2006, Briner Sports Med 1997)

Shoulder pathology?

- Impingement
- Rotator cuff pathology
- Instability
- SLAP lesions



(Anderson Radiol Clin North Am 2010, Lintner Am J Sports Med 2008, Seroyer Sports Health 2009 , Reeser BJSM 2006, Briner Sports Med 1997)

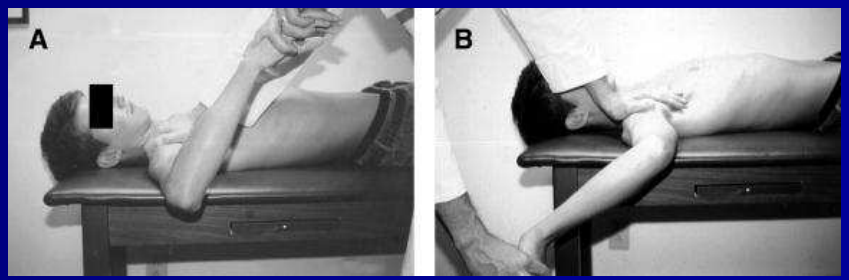
Shoulder pathology?

- Impingement
- Rotator cuff pathology
- Instability
- SLAP lesions
- Scapular dyskinesis

(Anderson Radiol Clin North Am 2010, Lintner Clin Sports Med 2008, Seroyer Sports Health 2009 , Reeser BJSM 2006, Briner Sports Med 1997)

Shoulder pathology?

- Impingement
- Rotator cuff pathology
- Instability
- SLAP lesions
- Scapular dyskinesis
- GIRD



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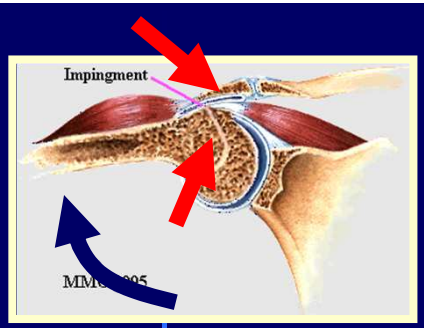
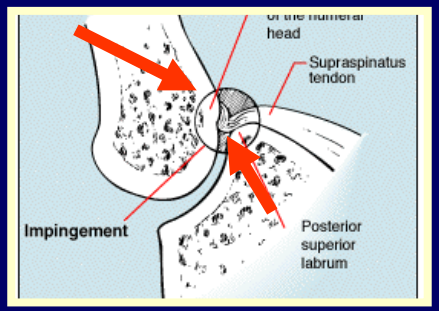


Impingement symptoms



External Subacromial impingement

Internal (posterior) impingement

Primary Impingement

Secondary Impingement

Rotator cuff pathology

Scapular dyskinesis

instability

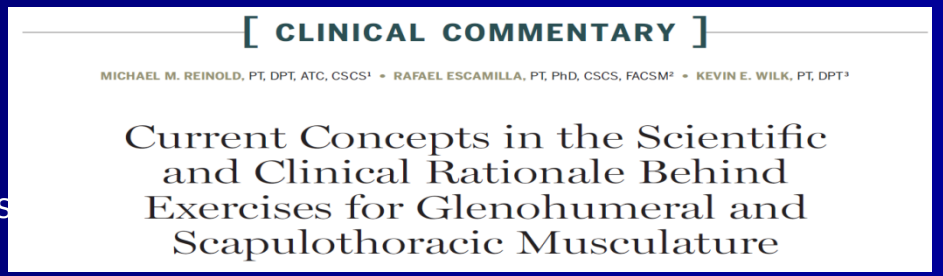
Biceps SLAP

G.I.R.D.

Which exercises activate rotator cuff muscles?

(Jobe 1987, Donatelli 2004, Ellenbecker 2006, Townsend 1991, Reinold 2009)

- Internal rotation
- External rotation
- Full can
- Horizontal abduction with external rotation

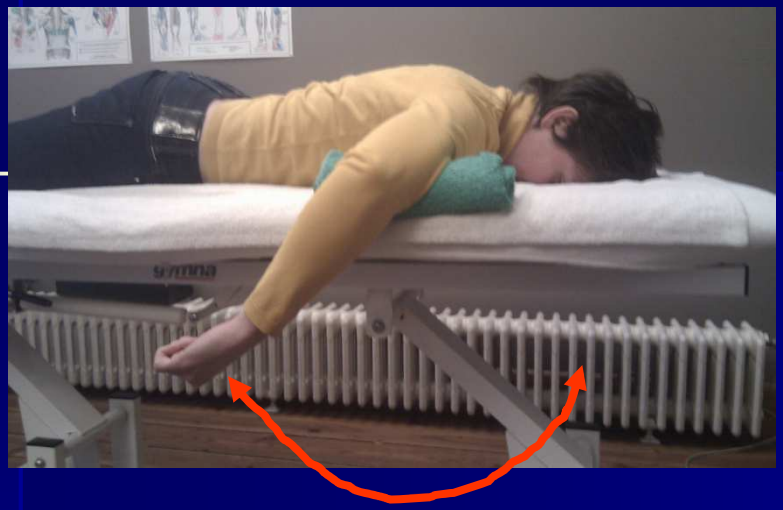


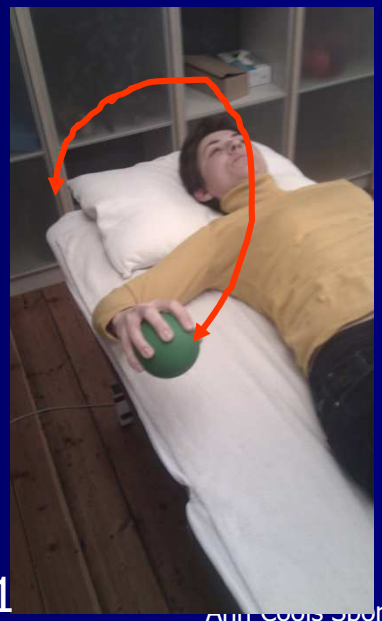
[CLINICAL COMMENTARY]

MICHAEL M. REINOLD, PT, DPT, ATC, CSCS[1] • RAFAEL ESCAMILLA, PT, PhD, CSCS, FACSM[2] • KEVIN E. WILK, PT, DPT[3]

Current Concepts in the Scientific and Clinical Rationale Behind Exercises for Glenohumeral and Scapulothoracic Musculature

Exercises to promote RC control





(Anju Jaggi London 2011
Karen Ginn, Goth 2012)

Eccentric exercises

Evidence?

Jonsson et al 2005	Bernhardsson et al 2010	Camargo et al 2012
9 subjects, 12 weeks	10 subjects, 12 weeks	20 subjects, 6 weeks
Ecc. empty can with pulley	Ecc. training SS + IS +scapular stabilisation + stretching UT	Isokinetic device Ecc. Abd 20°-80°
↑Function ↓ Pain	↑Function ↓ Pain	↑ Force (Small change) ↑ Function ↓ Pain
Not randomised No control group	Not randomised No control group	Not randomised No control group

Evidence? Only a few RCT's

Knee Surg Sports Traumatol Arthrosc
DOI 10.1007/s00167-012-2012-8

SHOULDER

Does adding heavy load eccentric training to rehabilitation of patients with unilateral subacromial impingement result in better outcome? A randomized, clinical trial

Annelies G. Maenhout · Nele N. Mahieu · Martine De Muynck · Lieven F. De Wilde · Ann M. Cools

BMJ 2012;344:e787 doi: 10.1136/bmj.e787 (Published 20 February 2012)

RESEARCH

Effect of specific exercise strategy on need for surgery in patients with subacromial impingement syndrome: randomised controlled study

OPEN ACCESS

Theresa Holmgren *PhD student*[1], Hanna Björnsson Hallgren *PhD student*[2], Birgitta Öberg *professor*[1], Lars Adolfsson *professor*[2], Kajsa Johansson *senior lecturer*[1]

[1]Department of Medical and Health Sciences, Division of Physiotherapy, Linköping University, SE- 581 83, Linköping, Sweden; [2]Department of Orthopaedics, University Hospital, SE-581 85, Linköping

Knee Surg Sports Traumatol Arthrosc
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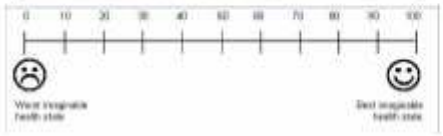
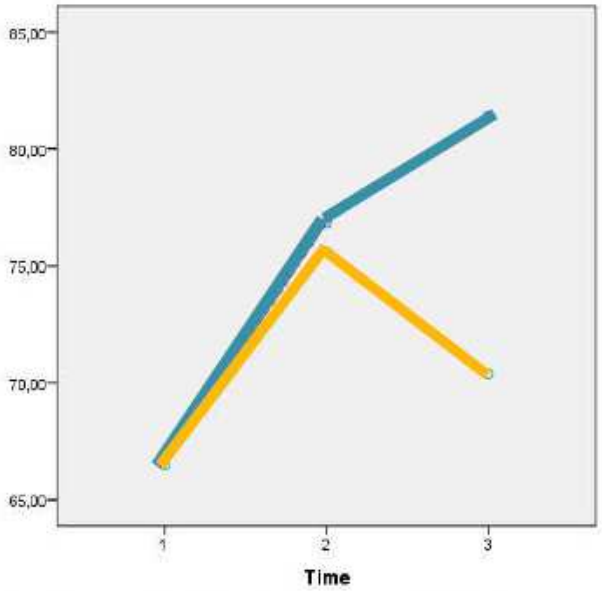
Dosing~ pain monitoring model



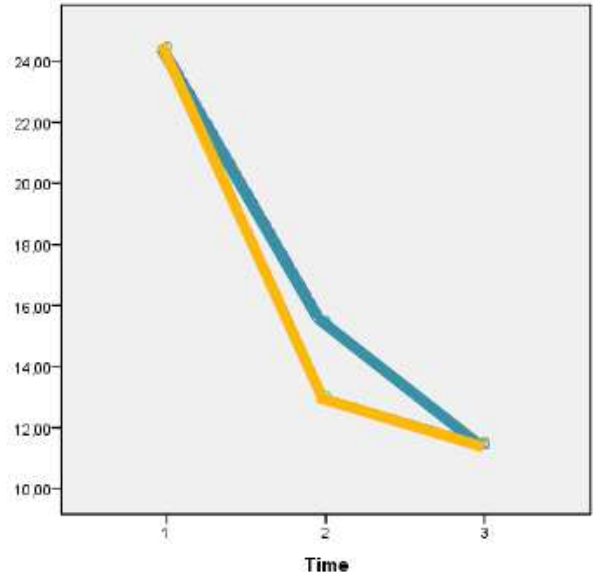
Higher force Supraspinatus test



Eccentric
Traditional

Covariates appearing in the model are evaluated at the following values: Pre_Abd90 = 66,4786

No difference for pain and function



Covariates appearing in the model are evaluated at the following values: Pre_SPADIpain =

BMJ 2012;344:e787 doi: 10.1136/bmj.e787 (Published 20 February 2012)

RESEARCH

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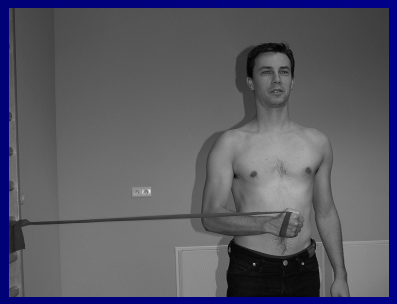
[1]Department of Medical and Health Sciences, Division of Physiotherapy, Linköping University, SE- 581 83, Linköping, Sweden; [2]Department of Orthopaedics, University Hospital, SE-581 85, Linköping

Conclusion A specific exercise strategy, focusing on strengthening eccentric exercises for the rotator cuff and concentric/eccentric exercises for the scapula stabilisers, is effective in reducing pain and improving shoulder function in patients with persistent subacromial impingement syndrome. By extension, this exercise strategy reduces the need for arthroscopic subacromial decompression within the three month timeframe used in the study.

Normal strength RC?

- No side differences (10% more strength on dominant side)
- ER/IR ratio 66% (isokinetic testing) or 75% (isometric testing)
- Special attention to ER



(Ellenbecker & Cools 2010, Byram et al. AJSM 2010, Niederdracht et al. 2008)

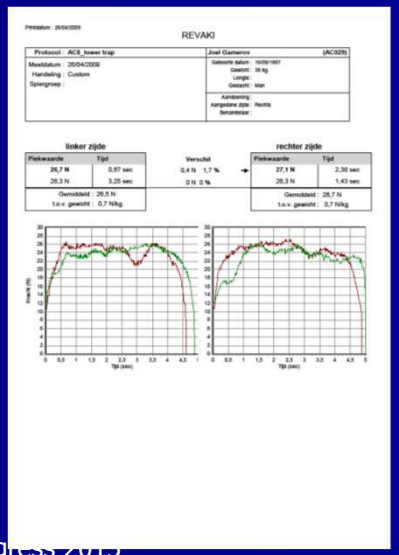
Measurement of RC strength

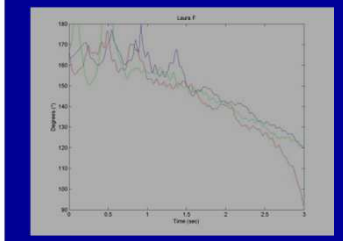


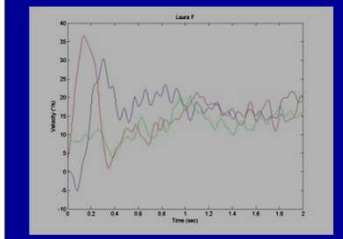
ER/IR ratio <66% increases the risk for shoulder injury in overhead athletes
(Byram et al. AJSM 2010)

Functional tests?

- Eccentric strength RC:
  - new protocol for ecc strength measurement using compuFET HHD: 90° - 3 seconds - ER







Functional tests?

Within- and between tester reliability and validity of a new protocol for measuring eccentric RC strength (Johansson & Cools, paper in progress 2013)

Within tester reliability	tester 1	Tester 2
Trial 1	127,2N	119,1N
Trial 2	122,0N	112,2N
Trial 3	110,9N	111,5N
ICC between trials	**0.88**	**0.86**

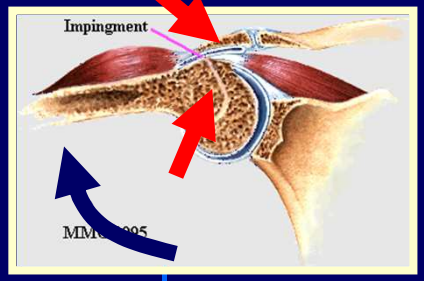
(Cools et al. BJSM 2010
Johansson &Cools, paper in progress 2013)

Functional tests?

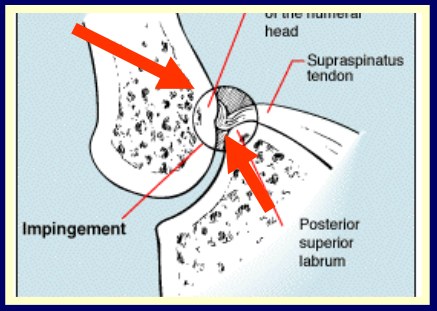
Within- and between tester reliability and validity of a new protocol for measuring eccentric RC strength (Johansson & Cools, paper in progress 2013)

Between tester reliability	
Tester 1	120,1N
Tester 2	114,2N
ICC between testers	**0,71**

Validity with Biodex	
CompuFET	114,2N
Biodex	110,9N
Pearson Correlation coefficient	**0,78**



Impingement symptoms



External Subacromial impingement

Internal (posterior) impingement

Primary Impingement

Secundary Impingement

Rotator cuff pathology

Scapular dyskinesis

instability

Biceps SLAP

G.I.R.D.

(Cools et al. BJSM 2008)

Stretching posterior shoulder: clinical experience

POSTERIOR SHOULDER STRETCHING

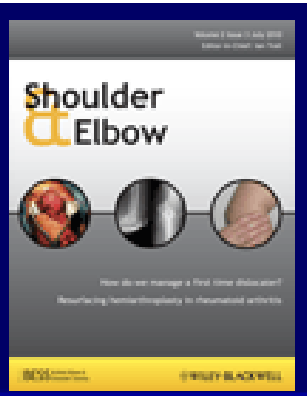
- Sleeper's stretch & cross body stretch improve ROM (Mc Clure 2005)
- Improvement ROM is related to reduction of symptoms (Tyler 2010)
- Additional manual mobilisations improve ROM (Manske 2010)

Mechanism and results?

R ORIGINAL ARTICLE

Stretching the posterior shoulder structures in subjects with internal rotation deficit: comparison of two stretching techniques

Ann M. Cools*, Fredrik R. Johansson†, Barbara Cagnie*, Dirk C. Cambier* & Erik E. Witvrouw*
*Department of Rehabilitation Sciences and Physiotherapy, University Hospital, Ghent, Belgium
†Sportmedicin/ESTESS Official Clinic, Segeltorp, Sweden

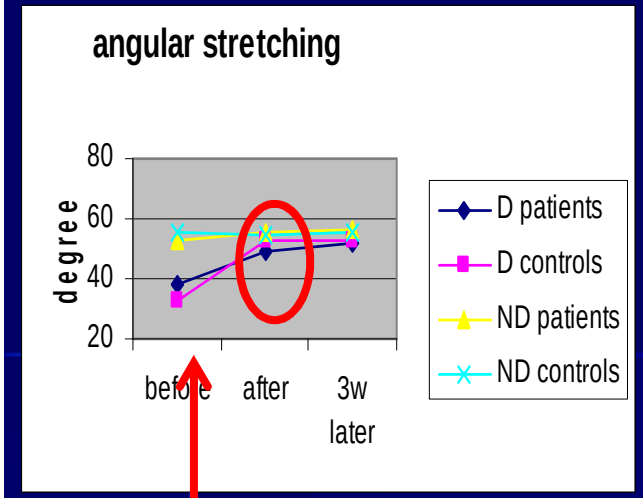


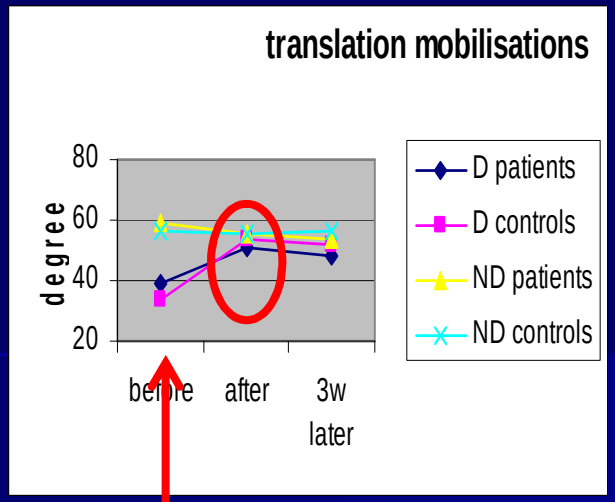
Angular stretching

Translation mobilisation

(Cools et al. Shoulder & Elbow 2011)

(patients with GIRD: n=30, healthy shoulders with GIRD: n=30)





VAS	Before-after	After-3w later
Pain/movement	**p= 0,001**	p= 0,042
Hawkins' test	**p= 0,001**	p= 0,116
Neer's test	**p= 0,002**	p= 0,223
Apprehension	p= 0,022	p= 0,755
Modified Rowe	**p= 0,001**	p= 0,125

RESULTS:

- Significant increase in ROM after 3w
- Equal results both techniques
- Significant pain reduction in patient group

(Cools et al. Shoulder & Elbow 2011)

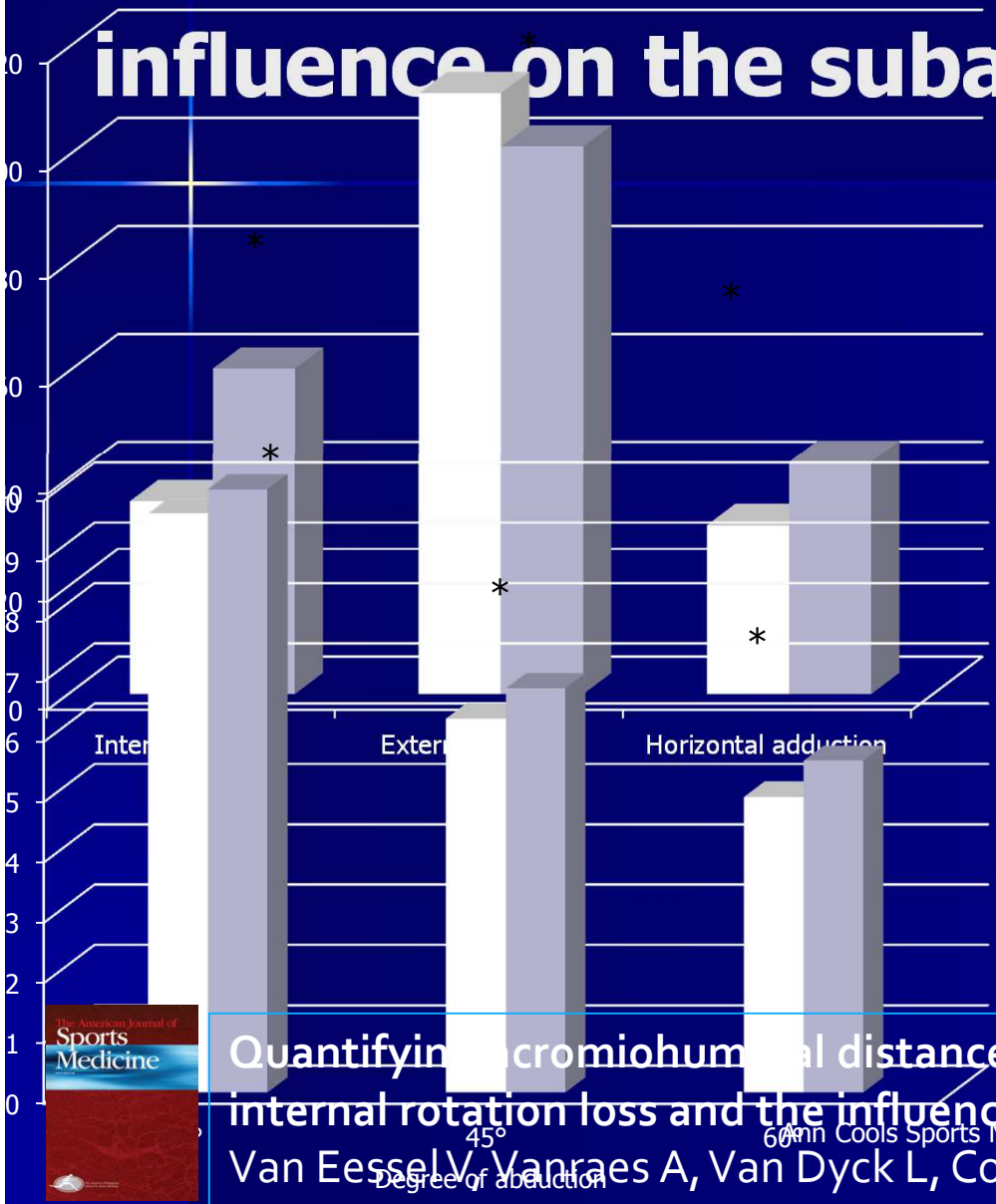
STRETCHING G.I.R.D.: influence on the subacromial space?

Measurements:

- Acromiohumeral distance (Echoblaster 128; Telemed, Vilnius, Lithuania)
- Glehonumeral ROM (Acumar inclinometer)

Quantifying acromiohumeral distance in overhead athletes with glenohumeral internal rotation loss and the influence of a stretching program. Maenhout A, Van Eessel V, Vanraes A, Van Dyck L, Cools A. (Accepted AJSM May 2012)

STRETCHING G.I.R.D.: influence on the subacromial space?



Quantifying acromiohumeral distance in overhead athletes with glenohumeral internal rotation loss and the influence of a stretching program. Maenhout A, Van Eessel V, Vanraes A, Van Dyck L, Cools A. (AJSM May 2012)

Six week stretching program (sleeper's stretch daily) increases the ROM into IR and increases the subacromial space

Quantifying Acromiohumeral Distance in Overhead Athletes With Glenohumeral Internal Rotation Loss and the Influence of a Stretching Program

Annelies Maenhout,*† PT, PhD, Valerie Van Eessel,† PT, Lieselot Van Dyck,† PT, Aagje Vanraes,† PT, and Ann Cools,† PT, PhD
Investigation performed at the Department of Rehabilitation Sciences and Physiotherapy, Ghent University, Ghent, Belgium

Take home message

- Impingement is a **symptom**, and the underlying causes should be treated
- In RC pathology, **eccentric training** has benefits for strength, both traditional and eccentric training programs reduce pain and increase function
- **Stretching** of the posterior capsule reduces symptoms, normalizes ROM and increases acromiohumeral distance

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Future congress:

THE SHOULDER IN THE OVERHEAD ATHLETE: CHALLENGES FOR SCAPULAR REHABILITATION AND RETURN TO PLAY AFTER INJURY

FRIDAY 29th MARCH 2013

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Thank you

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