Subclassification of shoulder impingement or 'one size fits all'?

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Research Unit for Musculoskeletal Function and Physiotherapy,

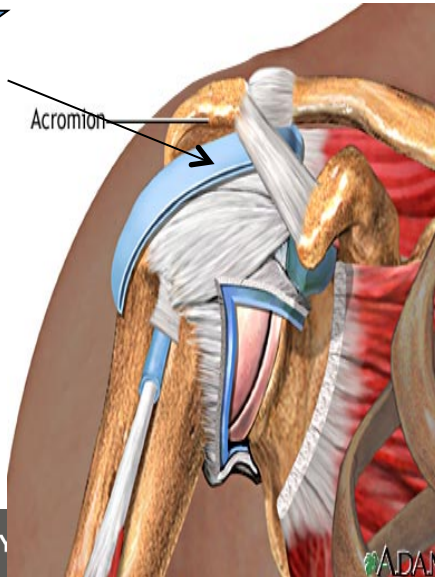
Institute of Sports Science and Clinical Biomechanics, Odense M, DK

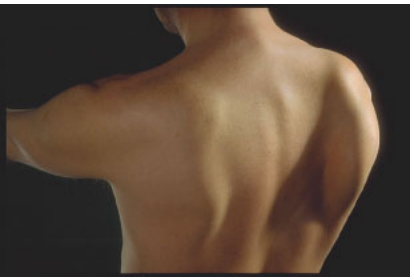
SIS ➔SAPS

- Clinically, painful condition, often at the frontside of shoulder, is aggravated by shoulder elevation

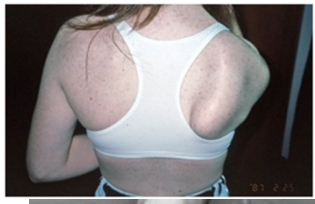
- Several potential etiological factors
  - External factors (structural/functional changes ➔impingement of tendons+pain)
  - Internal factors (changed tendon morphology/vascularity/mechanical conditions like Rupture, changed bursa condition, or both ➔pain)

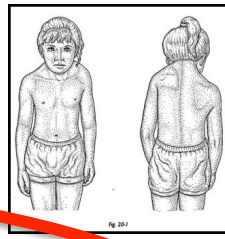
(e.g.Lewis,09;15)



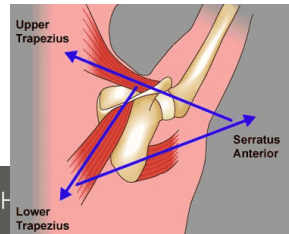


Result of *external factors*
Scapular dyskinesis





- Clinical term for visual
  - scapula changes from normal kinematics (Kibler,98; Mottram,97; Comerford,01; Kibler,03)
  - thoracic posture abnormalities (Ludewig,09; Page,11)
  - imbalance in muscle activation +/ strength of RC + thoraco-scapular muscles (tigtness,fatigue,pain) (Ludewig,09)
- asymptomatic ('silent condition') (Belling Sørensen,00)



PHYSIOTHERAPY THEORY and PRACTICE
http://informahealthcare.com/ptp
ISSN: 0959-3985 (print), 1532-5040 (electronic)
Physiother Theory Pract, Early Online: 1–30
© 2014 Informa Healthcare USA, Inc. DOI: 10.3109/09593985.2014.899414
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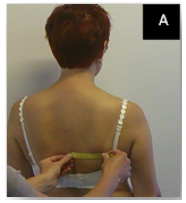
SYSTEMATIC REVIEW

Measurement properties of existing clinical assessment methods evaluating scapular positioning and function. A systematic review

Camilla Marie Larsen, PhD[1], Birgit Juul-Kristensen, PhD[1,2], Hans Lund, PhD[3,4] and Karen Søgaard, PhD[1]



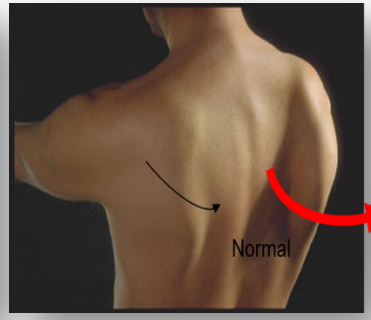
54 method names (50 articles) for clinical scapular assessment

- A. static positioning assessment (n=19)
- B. semi-dynamic functional assesment (n=13)
- C. dynamic functional assesment (n=22)

With clinical tests:
Clinimetric properties of clinical scapular tests are poor
-especially validity + responsiveness

Scapular Dyskinesi (SD)

Scapular position and movement (dyskinesis)

	Scapular upward rotation test (degrees°)	Modified qualitative evaluation systeme (Y/N)	Scapular Dyskinesis Test (3 categories)
Reliability and Validity			
	Johnson et al. (2001) **Tucker and Ingram (2012)** **Watson et al. 2005**	**Uhl et al. (2009)**	**McClure et al. (2009);** **Tate et al. (2009)**
Study quality	**ICC: 0.89-98 (95% 0.82-0.98)**	**79% agreement, K: 0.41**	**K_w: 0.55-0.58 (95%CI 0.32,0.79)**
	3D: (r) 0.59-0.92 **Digital inclinometer:** **(r) 0.989-0.996**	**Sens. 74–78%** **Spec. 31–38%** **Accuracy 64–66%** **(3D measurements)**	**Dys.score; sign. changes in 3D movements. P < 0.05**

"Winging"

Is there a relationship between subacromial impingement syndrome and scapular orientation? A systematic review

Elizabeth Ratcliffe,[1] Sharon Pickering,[2] Sionnadh McLean,[3] Jeremy Lewis[4,5,6]

Ratcliffe E, *et al*. *Br J Sports Med* 2014;**48**:1251–1256. doi:10.1136/bjsports-2013-092389

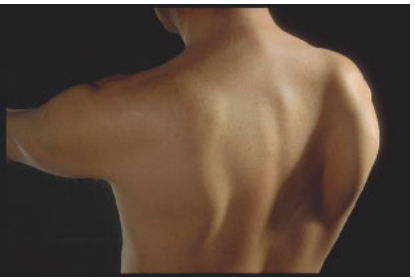
With objective measurements:
No clear pattern for scapular dyskinesis in SAPS
-but tendencies to
decreased Upward Rotation predictor of pain!

Explanations (Ratcliffe,14)

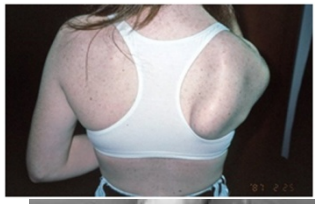
- Different definitions of SAPS (multifactorial nature of SAPS…no subclassification)
- Different methods for measuring scap pos, limited reliability/ validity
- Is there a normal/abnormal scap.pos? Normal variation?

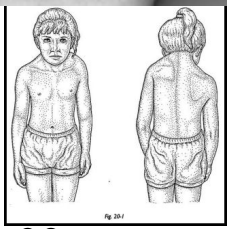
2 typical patterns!

- **Decreased upward rotation** (increased ant tilt+med rot) as a cause for SAPS? (Ludewig,00;Su,04;Endo,01;Lin,11;Lukasiewicz,99;Warner,92;Borstad,02;Hebert, 02; Struyf,14)
- **Increased upward rotation** as a compensation/prevention SAPS? due to increased volume (oedema/thickening/fibrosis) in the small subacr. space?) (Finley,05;McClure,06)



Scapular dyskinesis
(external factors)





- Clinical term for visual
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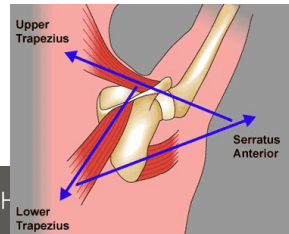


Journal of Electromyography and Kinesiology 24 (2014) 277–284

Contents lists available at ScienceDirect

Journal of Electromyography and Kinesiology

journal homepage: www.elsevier.com/locate/jelekin

Review

Scapulothoracic muscle activity and recruitment timing in patients with shoulder impingement symptoms and glenohumeral instability

Filip Struyf[a,b,*], Barbara Cagnie[c], Ann Cools[c], Isabel Baert[a,b], Jolien Van Brempt[a], Pieter Struyf[d], Mira Meeus[a,b,c]

Chester et al. BMC Musculoskeletal Disorders 2010, 11:45
http://www.biomedcentral.com/1471-2474/11/45

BMC Musculoskeletal Disorders

RESEARCH ARTICLE Open Access

The impact of subacromial impingement syndrome on muscle activity patterns of the shoulder complex: a systematic review of electromyographic studies

Rachel Chester[1,2*], Toby O Smith[1,3], Lee Hooper[4], John Dixon[5]

Muscle activity…

Muscle recruitment….

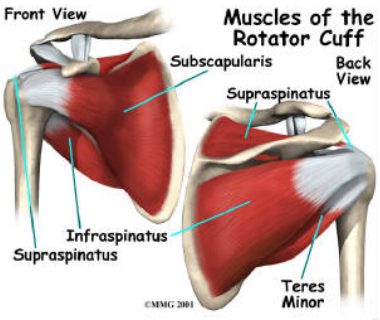
No clear pattern for scapular dyskinesis in SAPS
-but tendencies to
increased UT, decreased LT+SA

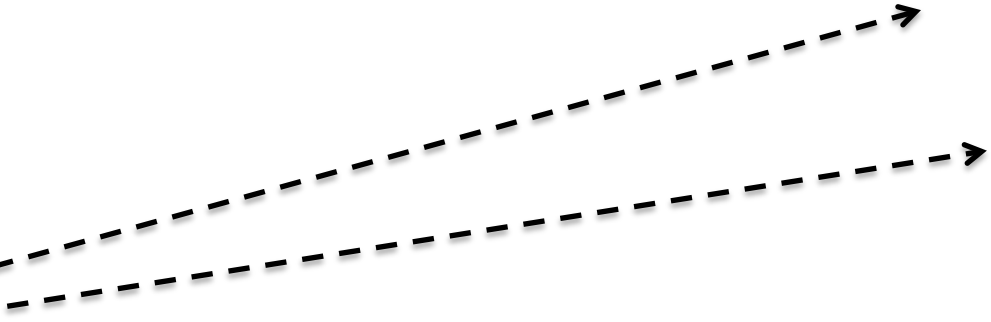
Explanations (Struyf,14; Chester,10; Larsen,14)

- Small samples
- Varying diagnostic criteria, few with subclassification of SAPS into scapular dyskinesis
- Varying testing procedures, EMG-variables reported
- Recommendation: **Subclassification of SAPS**

NO subclassification

SAPS





Mixed popu-lation

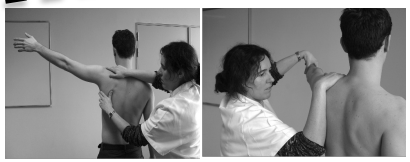
General clinical examination

Mixed training in shoulder??

Effect? due to what?

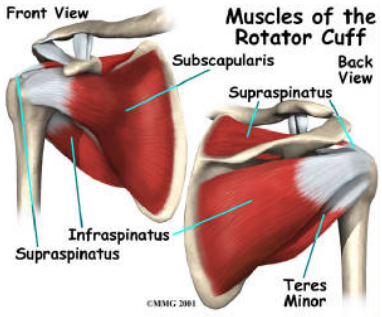
WITH subclassification

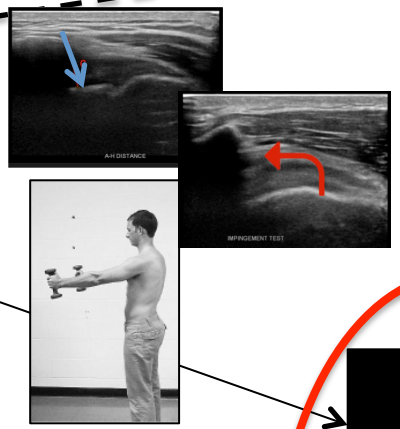
SAPS
Scapular dyskinesis



SAT SRT

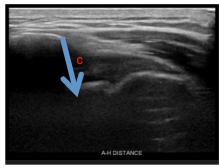
Verification of assisting movements

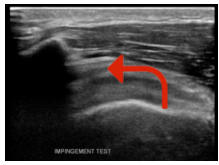




Clin exa-mination
Scap.posit./ muscle activity Clinimetrics on validity/resp?

Motor control training
which sh. program??





Scap.posit., muscle activ, strength

Effect

Rehabilitation of Scapular Muscle Balance : Which Exercises to Prescribe?

Ann M. Cools, Vincent Dewitte, Frederick Lanszweert, Dries Notebaert, Arne Roets, Barbara Soetens, Barbara Cagnie and Erik E. Witvrouw

Am J Sports Med 2007 35: 1744 originally published online July 2, 2007
DOI: 10.1177/0363546507303560

KRISTOF DE MEY, PT[1] • LIEVEN
LIES HUYGHE

Effect
Activation Measured
face Electromyography

THOPAEDIC & SPORTS PHYSICAL THERAPY | VOLUME 43 | NUMBER 1 | JANUARY 2013

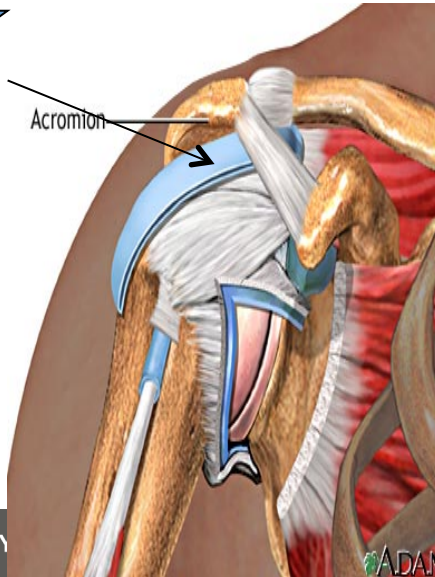
Some evidence for motor control training
(probably due to scapular dyskinesis, unknown)
-seems to be targeted mostly
-scap. dyskinesis is not measured before/reduced!

SIS ➔SAPS

- Clinically, painful condition, often at the frontside of shoulder, is aggravated by shoulder elevation

- Several potential etiological factors
  - External factors (structural/functional changes ➔impingement of tendons+pain)
  - Internal factors (changed tendon morphology/vascularity/mechanical conditions like rupture, changed bursa condition, or both ➔pain)

(e.g.Lewis,09;15)



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Physiotherapy

Physiotherapy 98 (2012) 101–109

Systematic review

Exercise for rotator cuff tendinopathy: a systematic review

Chris Littlewood[a,*], Jon Ashton[b], Ken Chance-Larsen[c], Stephen May[c], Ben Sturrock[c]

Participants

Studies of adult patients presenting with signs and symptoms suggestive of rotator cuff tendinopathy, defined as:

1. Symptom duration greater than three months.
2. Minimal resting pain.
3. Largely preserved range of shoulder motion.
4. Pain exacerbated consistently through resisted testing, usually abduction and/or lateral rotation.
5. No cervical spine involvement [4].

For inclusion, criteria 3 and 5 had to be met along with at least one from criteria 1, 2 and 4. Studies which included participants with painful/stiff shoulder associated with oth diagnoses, e.g. frozen shoulder, were excluded

Are these really the most specific diagnostic criteria for RC-tendinopathy???

SDU

University of Southern Denmark, Odense, DK

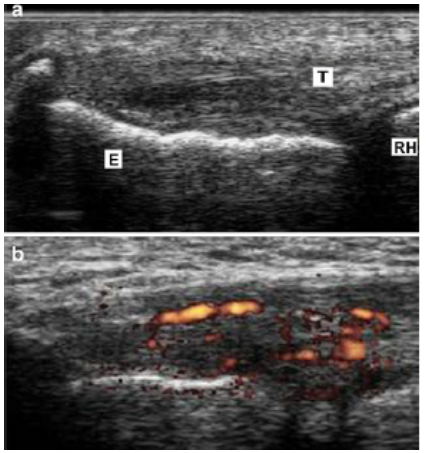
KEEP MOVING! RESEARCH EXCELLENCE IN MUSCULOSKELETAL HEALTH AND EXERCISE FOF

Open Access Research

BMJ Open

Ultrasound assessment for grading structural tendon changes in supraspinatus tendinopathy: an inter-rater reliability study

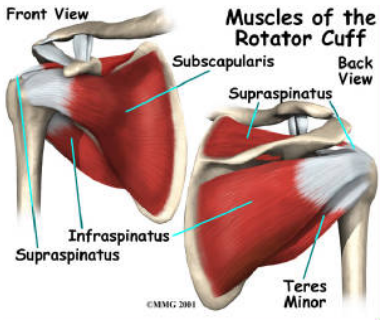
Kim Gordon Ingwersen,[1,2] John Hjarbaek,[3] Henrik Eshoej,[1] Camilla Marie Larsen,[1,4] Jette Vobbe,[5] Birgit Juul-Kristensen[1,6]



Vascularisation, calcification, fibrillar disruption, AH/tendon thickness

NO subclassification

SAPS



Mixed popu-lation

General clinical examination

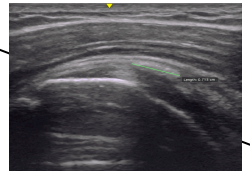
Mixed training in shoulder??

Effect due to what?

WITH subclassification

SAPS
RC-tendinopathy

RC-tend.

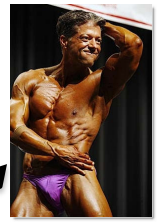


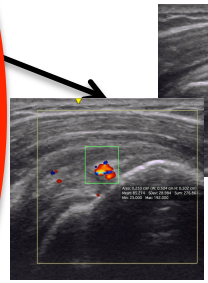
clin.tests
+anamnesis

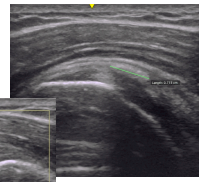
Suppl.

US-exam.
(Clinimetrics?)

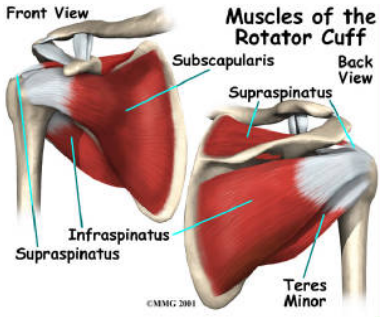
Targeted training
In shoulder??







Effect



Therapeutic exercise for rotator cuff tendinopathy: a systematic review of contextual factors and prescription parameters

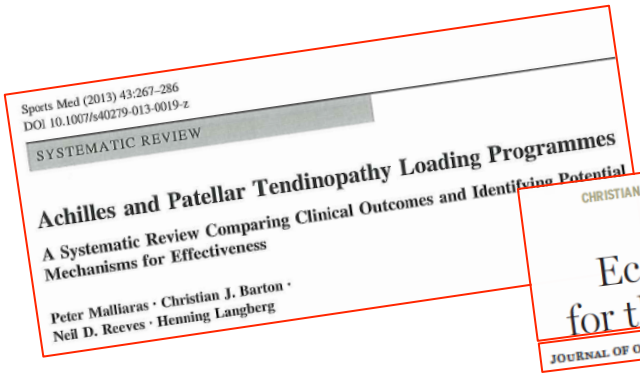
Chris Littlewood[a], Peter Malliaras[b] and Ken Chance-Larsen[c]

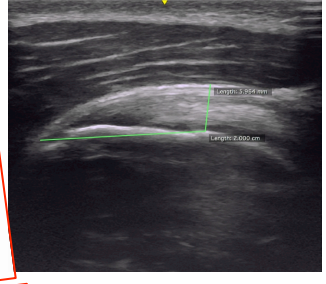
International Journal of Rehabilitation Research 2015, Vol 38 No 2

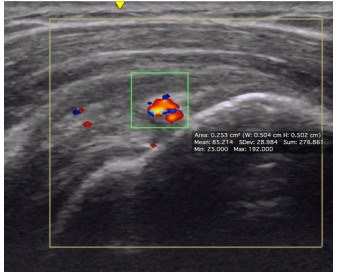
-RC-tendinopathy +
-SIS

-Resistance level unclear
-No of reps/set unclear
-3 sets better than 2 or 1 set,
-Duration at least 12 weeks
-Optimum freq/day/wk unclear

No specific recommendation!!







Which type of training to tendinopathy?

Table 3 Characteristics of Alfredson, Stanish and Curwin, Silbernagel and HSR programmes

Programmes	Type of exercise	Sets, reps	Frequency	Progression	Pain
Alfredson	Eccentric	3, 15	Twice daily	Load	Enough load to achieve up to moderate pain
Stanish and Curwin	Eccentric-concentric, power	3, 10–20	Daily	Speed then load	Enough load to be painful in third set
Silbernagel	Eccentric-concentric, eccentric, faster eccentric-concentric, balance exercise [30, 41], plyometric [23]	Various	Daily	Volume, type of exercise	Acceptable if within defined limits[a]
HSR	Eccentric-concentric	4, 15–6	3×/week	15–6 RM	Acceptable if was not worse after

reps repetitions, *RM* repetition maximum

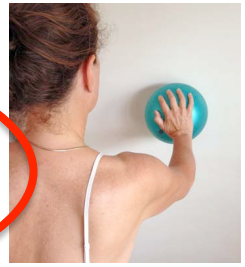
[a] Moderate (less than 5 of 10 on a visual analogue scale, 10 = worst pain imaginable); subsided by the following day

(Malliaras,13;Couppe,15)

Some relevant literature ('SAPS')

Effect of motor control training

- **Some evidence** (mostly used, due to scap.dyskinesis?)
  - Scap.control, balance of UT/SA-LT, UT-MT (deMey,12; Worsley,13)
  - Scap.control, rot.cuff (Holmgren12+Hallgren,14 (RCT); Baskurt,11 (RCT))
  - Scap.control, scap.mobil, stretching (Struyf,13 (RCT); Baskurt,11 (RCT))
  - Scap.control, co-contraction PM+LD (Beaudreil,11 (RCT))



Effect of strength training (+ limited gluco-corticoid)

- **Weak evidence**
  - Heavy load eccentr (Maenhout,12 (RCT); Jonnson,06; Camargo,12; Bernhardsson,11)
  - Heavy-moderate load conc-eccentr (Lombardi,08 (RCT); Holmgren,12 (RCT); Ingwersen,17 (RCT))

Thank you

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