Glenohumerale instabiliteit

Kracht of controle?

Lustrum Congres 2018
SN Oostelijk Zuid Limburg

Karin Hekman MSc MT
IBC Amstelland, Amstelveen

IBC AMSTELLAND
Interdisciplinair Behandelcentrum
schouder, rug en revalidatie

Glenohumerale instabiliteit

What's the problem?

Olds 2015; review Recurrence rate; TASD 39%

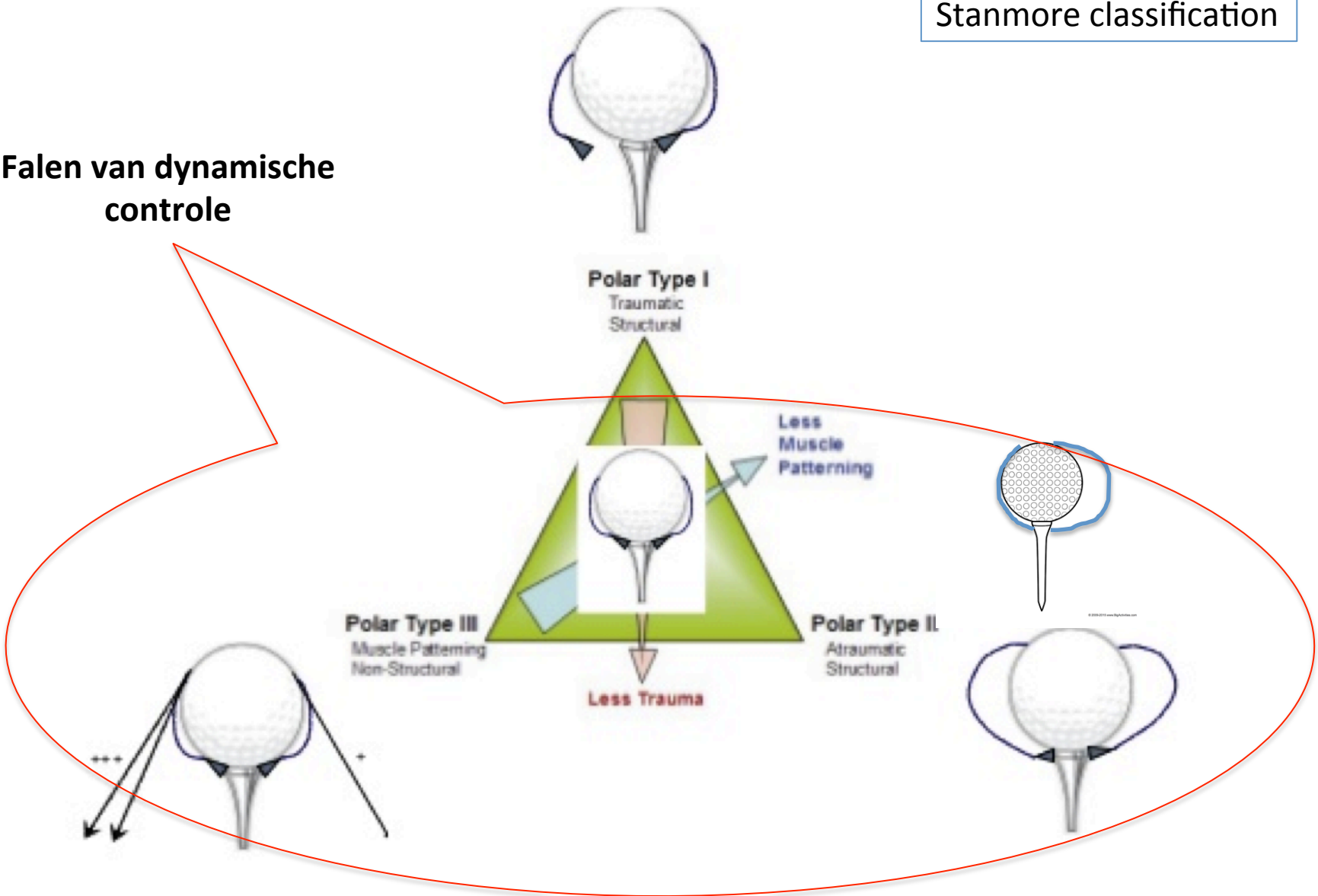
Recurrence rates na arthroscopische Bankart repair

Author	Recurrence
Castangna 2010	23%
Van der Linde 2011	35%
Mohtadi 2014	23%
Weber 2014	28%
Aboalata 2016	18%
Zimmerman 2016	28%

Diagnostiek

Stanmore classification

Falen van dynamische controle



1. Rotator cuff

60 -70% dynamische stabiliteit GH

- Gesloten systeem; negatieve druk
- Pre-stabilisatiefunctie
- Richting specifieke actie
- Positie informatie
- Duurbelasting

Statisch + door het hele bw traject

- Exo/endo ratio?

Edouard, 2011, Reed 2016, Rathi 2016

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Edouard, 2011, Reed 2016, Rathi 2016

1. Rotator cuff

J Sci Med Sport. 2011 Sep;14(5):376-82. doi: 10.1016/j.jsams.2011.01.001. Epub 2011 Feb 17.

The rotator cuff muscles have a direction specific recruitment pattern during shoulder flexion and extension exercises.

Wattanaprakornkul D[1], Cathers I, Halaki M, Ginn KA.

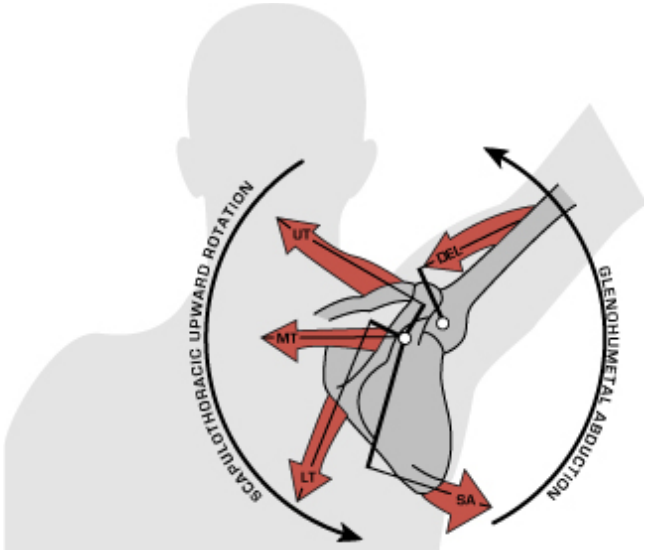
⊕ Author information

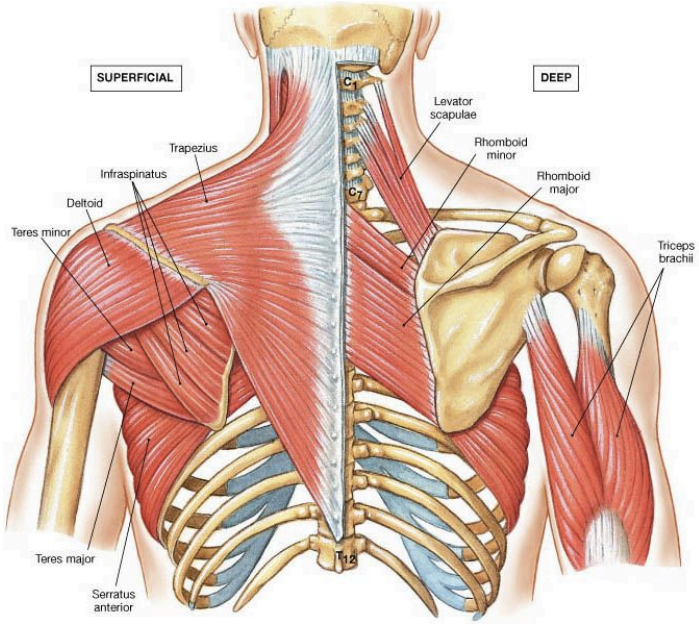
Abstract

A recent study has shown that posterior rotator cuff (RC) muscles are recruited at significantly higher levels than the anterior RC during shoulder flexion. It was proposed that the mechanism whereby the posterior RC muscles were providing shoulder stability during flexion was to counterbalance potential anterior humeral head translation caused by flexion torque producing muscles. This hypothesis implies that anterior RC activity should be higher than posterior RC activity during extension to prevent posterior humeral head translation. As the normal recruitment pattern of the RC during extension has not been established, the purpose of this study was to examine this hypothesis by comparing shoulder muscle activation levels and recruitment patterns during flexion and extension exercises. Electromyographic (EMG) activity was recorded from 9 shoulder muscles in 15 volunteers. Flexion and extension exercises were performed in prone at 20%, 50%, and 70% of each participant's maximal load. A repeated measures ANOVA was used to determine differences between exercises, muscles and loads, while Pearson's correlation analysis was used to relate mean EMG patterns. During extension subscapularis and latissimus dorsi were activated at higher levels than during flexion; during flexion, supraspinatus, infraspinatus, deltoid, trapezius, and serratus anterior were more highly activated than during extension. In addition, the pattern of activity in each muscle did not vary with load. These results support the hypothesis that during flexion and extension the RC muscles are recruited in a direction specific manner to prevent potential antero-posterior humeral head translation caused by torque producing muscles.

2. Scapula

- Stabiele basis voor contractie van de rotator cuff
- Overdracht van krachten naar distaal en de romp; keten functie
- Creëren van goede kop-kom verhouding





1. Scapula

J Sci Med Sport. 2016 Sep;19(9):755-60. doi: 10.1016/j.jsams.2015.10.007. Epub 2015 Nov 5.

Does load influence shoulder muscle recruitment patterns during scapular plane abduction?

Reed D[1], Cathers I[2], Halaki M[3], Ginn KA[2].

⊕ Author information

Abstract

OBJECTIVES: Load is used to increasingly challenge muscle function and has been shown to increase muscle activity levels with no change in activation patterns during shoulder flexion, extension, adduction and rotation. However, the effect of load during shoulder abduction, a movement commonly used in assessment of shoulder dysfunction and to improve shoulder function, has not been comprehensively examined. Therefore, the purpose of this study was to determine if load influences shoulder muscle activation patterns and levels during scapular plane abduction in normal subjects.

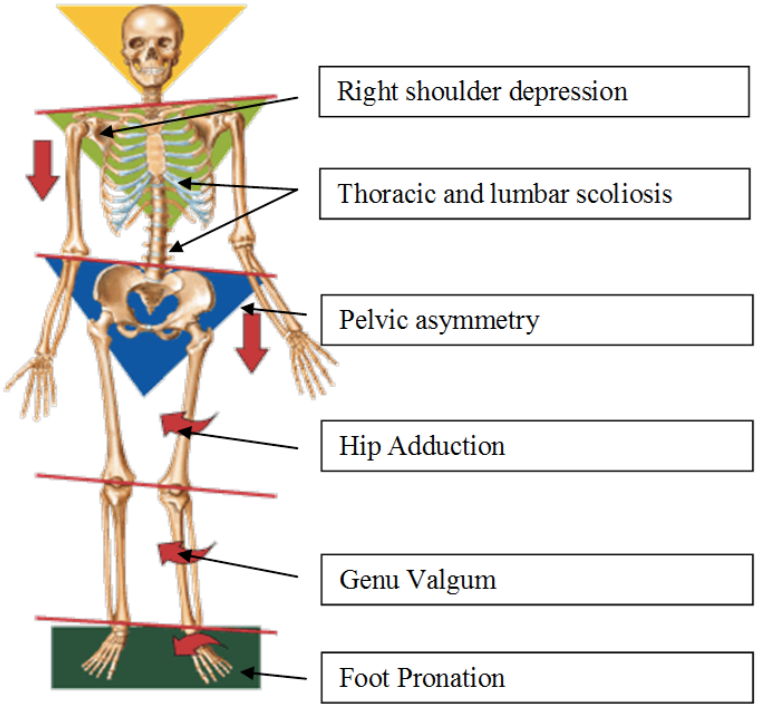
DESIGN: Experimental study.

METHODS: Fourteen volunteers performed shoulder abduction in the scapular plane at 25%, 50% and 75% of maximum load. Eight shoulder muscles were investigated using a combination of indwelling and surface electromyographic recordings: middle deltoid, infraspinatus, subscapularis, supraspinatus, serratus anterior, upper and lower trapezius and rhomboid major.

RESULTS: All muscles tested showed increasing average muscle activation levels with increasing load and strong correlations in the activation patterns between loads.

CONCLUSIONS: Increasing shoulder abduction load not only increases activity in middle deltoid but also in the rotator cuff (infraspinatus, subscapularis, supraspinatus) and axioscapular (serratus anterior, upper and lower trapezius, rhomboid major) muscles. The functional stabilising role of both the rotator cuff and axioscapular muscles is considered an important contribution to the increased activation levels in these muscle groups as they function to counterbalance potential translation forces produced by other muscles during shoulder abduction. The activation patterns of all shoulder muscle groups during abduction can be trained at low load and progressively challenged with increasing load.

3. Kinetische keten

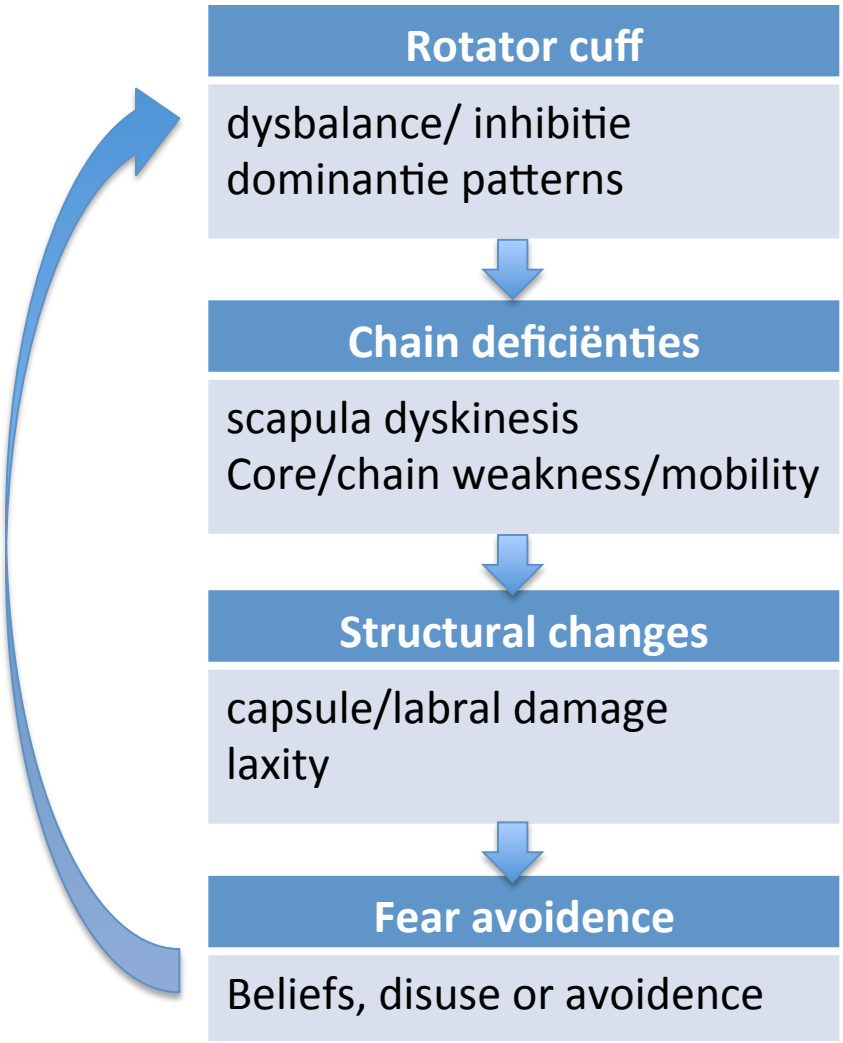


50-30-20 regel

>60% slechte core stab
+/- 50% heeft zwakke heup musc

Kibler, 2011, Sciascia 2012, Gibson, 2012

Schouderinstabiliteit



Detailed Search Results

Anterior shoulder instability in athletes: comparison of isokinetic resistance exercises and an electromyographic biofeedback re-education program -- a pilot program

Reid DC, Saboe LA, Chepeha JC

Physiotherapy Canada 1996 Fall;48(4):251-256

clinical trial

4/10 [Eligibility criteria: Yes; Random allocation: Yes; Concealed allocation: No; Baseline comparability: Yes; Blind subjects: No; Blind therapists: No; Blind assessors: No; Adequate follow-up: Yes; Intention-to-treat analysis: No; Between-group comparisons: No; Point estimates and variability: Yes. Note: Eligibility criteria item does not contribute to total score] *This score has been confirmed*

The purpose of this pilot project was to examine function, flexibility and isokinetic strength parameters in 20 male athletes with symptomatic subluxing shoulders, and then to randomly assign them to one of two treatment programs. One program, comprised of isokinetic resistance exercises (IRE), was designed to improve muscle strength and endurance and the other program of electromyographic biofeedback re-education (EMGBF) was designed to improve motor control. These two treatment groups were then compared in function and strength at 8, 26 and 52 weeks after entering the study. All 20 athletes had a positive apprehension test. The dominant arm was involved in 8 (40%) cases and 13 (65%) demonstrated generalized hypermobility. At entry into the study, all athletes reported pain with activity and greatest functional limitation in sport. The symptomatic shoulder generated significantly less abduction peak torque than the asymptomatic shoulder. While there was no significant difference between the treatment groups in function, pain or isokinetic parameters at any test time, the athletes treated with EMGBF showed significant improvements in work and sport function, and decreased pain over time. These changes were not significant in the IRE group. These findings support the tenet that subluxers do not have a "normal" shoulder support the use of a EMGBF treatment approach to the unstable shoulder and suggest it might be the treatment of choice if improved function and decreased pain are the treatment objectives.

> 2000 meer aandacht voor motor control

Comerford 2001;	muscle imbalance
Comerford, Mottram 2001;	compensatoire movements
Sahrmann 2002;	movement impairment
Richardson 2004;	substitution strategies
O'Sullivan 2005;	control and movement impairments
Cook 2005;	stability and motor control dysfunction
Alexander 2007;	altered control trapezius
Jaggi 2010;	muscle patterning

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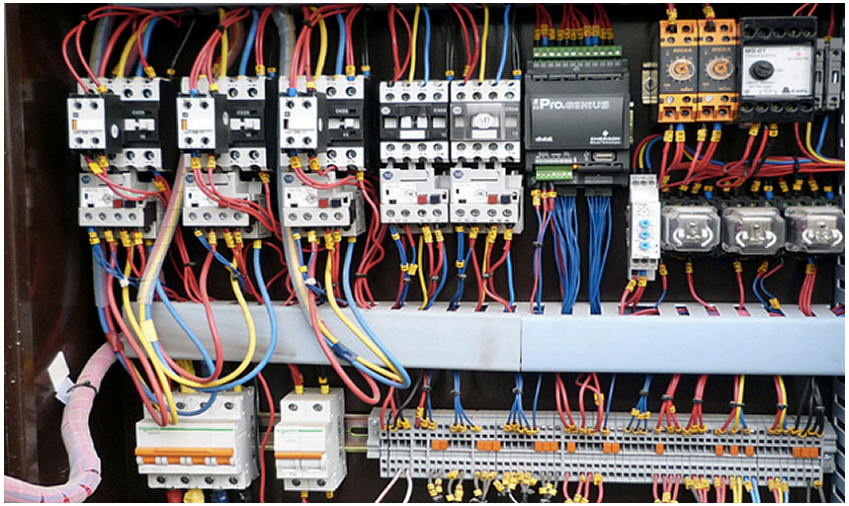


STUDY PROTOCOL Open Access

A neuromuscular exercise programme versus standard care for patients with traumatic anterior shoulder instability: study protocol for a randomised controlled trial (the SINEX study)

Henrik Eshoj[1,10,11*], Sten Rasmussen[2,3], Lars Henrik Frich[4], Inge Hvass[5], Robin Christensen[6], Steen Lund Jensen[7], Jens Søndergaard[8], Karen Søgaard[1] and Birgit Juul-Kristensen[1,9]

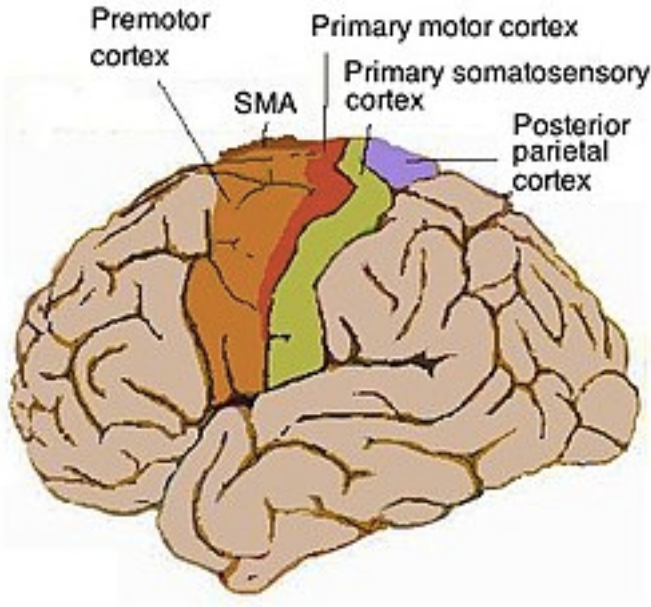
2017 Feb 28;18(1):90.

Motor control

Motor control is the process by which humans and animals use their brain/ cognition to activate and coordinate the muscles and limbs involved in the performance of a motor skill.

1. Recruitment probleem
2. Veranderde taakverdeling
3. Afstemming in lengte/kracht verandert

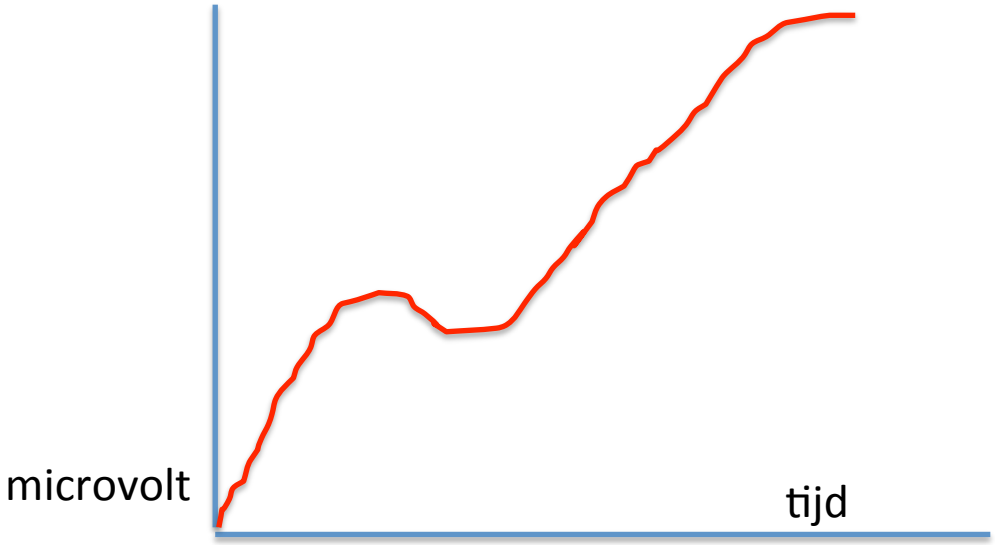
4. Motorische cortex representatie verandert



Motor control training = Brain training

Motor control en RC

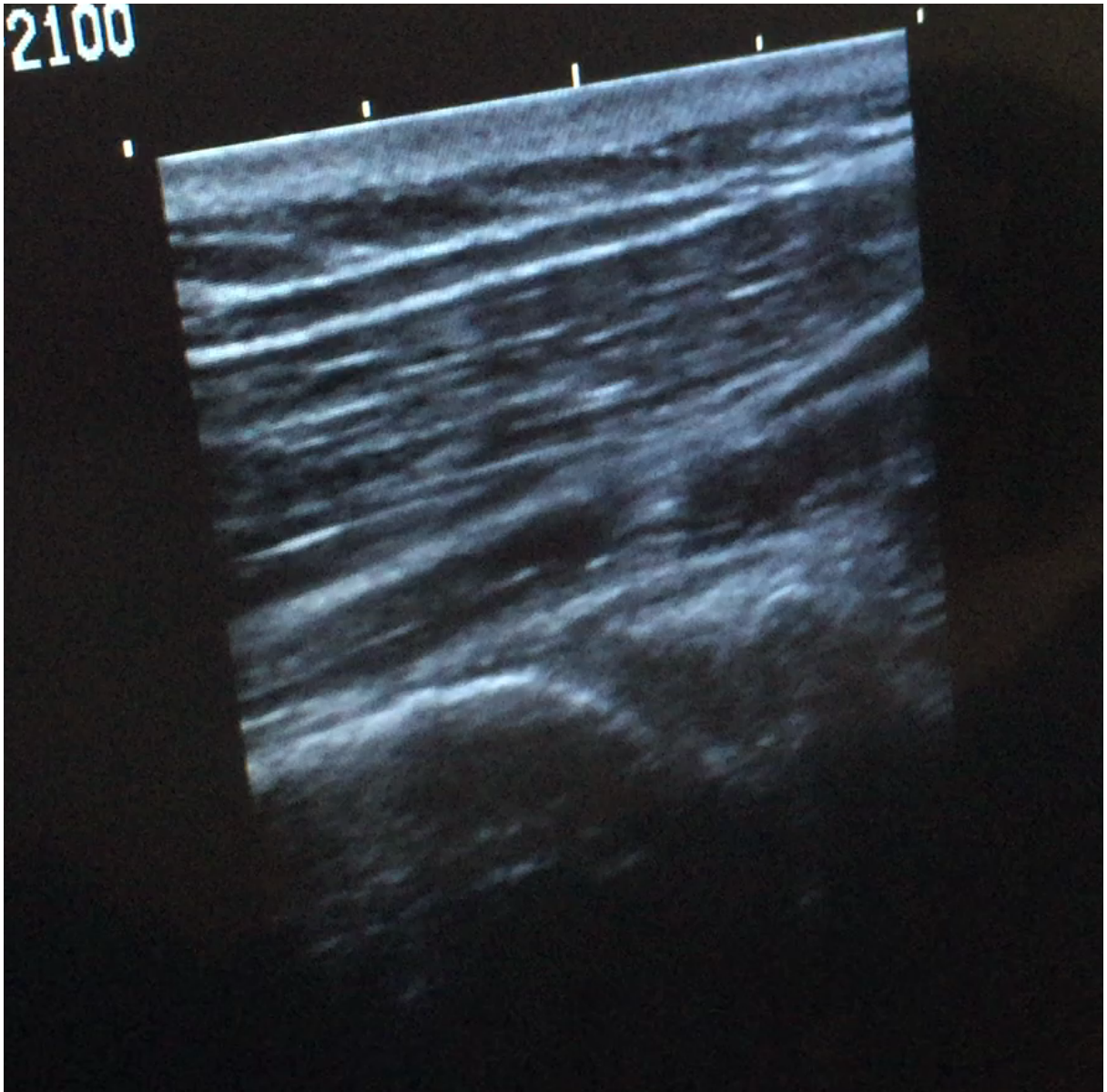
- Time to peak te langzaam
- slechte Active Control of Centralisation
- Kan geen kracht verwerken; inhibitie
- Kan het niet volhouden



Fabis et al. BMC MSD, 2016

Motor control RC

Active
Control of
Centralisation



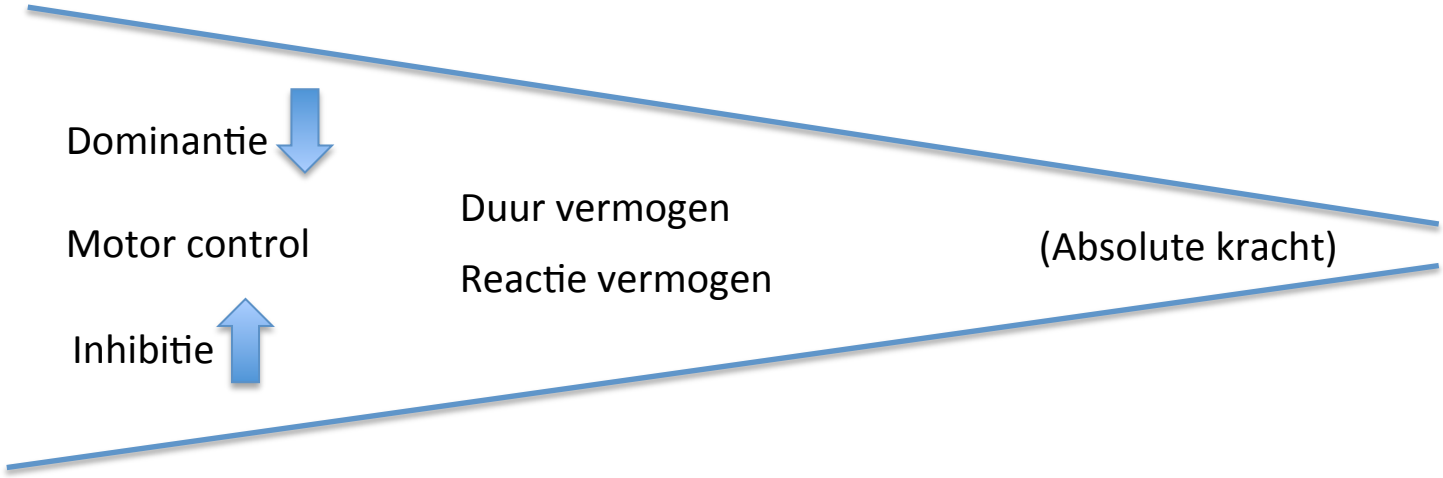
1. Recruitement scapula musculatuur

2. Veranderde taakverdeling

Labriola, 2005, Konrad 2006, Jaggi 2010

2. Veranderde taakverdeling

Volgorde van training



Feedback
Auto-palpatie
EMG
Echo
Spiegels

Activatie
Keten
Herkenbare patronen
Functie specifiek
Core activatie
Greep activatie
Lastarm
Posterieure cuff activatie
Compressie

Samenvattend

- Stanmore classificatie voor diagnostiek
- Functionele aspecten verklarend voor instabiliteit?
- RC de belangrijke factor voor GH stabiliteit
- “Controle maakt kracht”

Dank voor uw aandacht

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