

The influence of centralization on stability tests in patients with low back pain.

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How do we Match the right treatment to the right patient?



Stability training

A very common intervention



Peter O'Sullivan



Paul Hodges



**Prof Peter O'Sullivan and
Core Stability - April 2012**

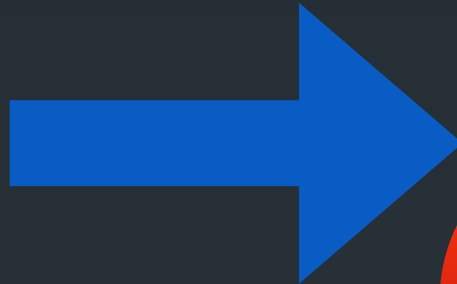
Paul Hodges on core stability

Cardinal Features of MDT



Symptomatic
responses

Mechanical
responses



Subgroups

Baseline
symptoms and
movements



Repeated
movements/
loading
strategies



Change in
baselines



Which
Subgroup?



Derangement

Centralization/Directional preference

Dysfunction

Posture

Derangement



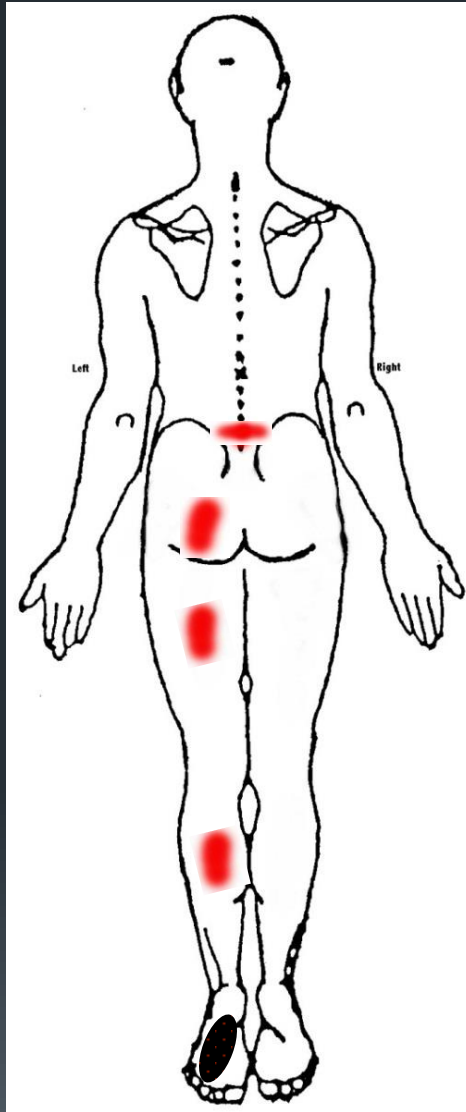
Disturbance of the normal resting position of the joint surfaces

Study

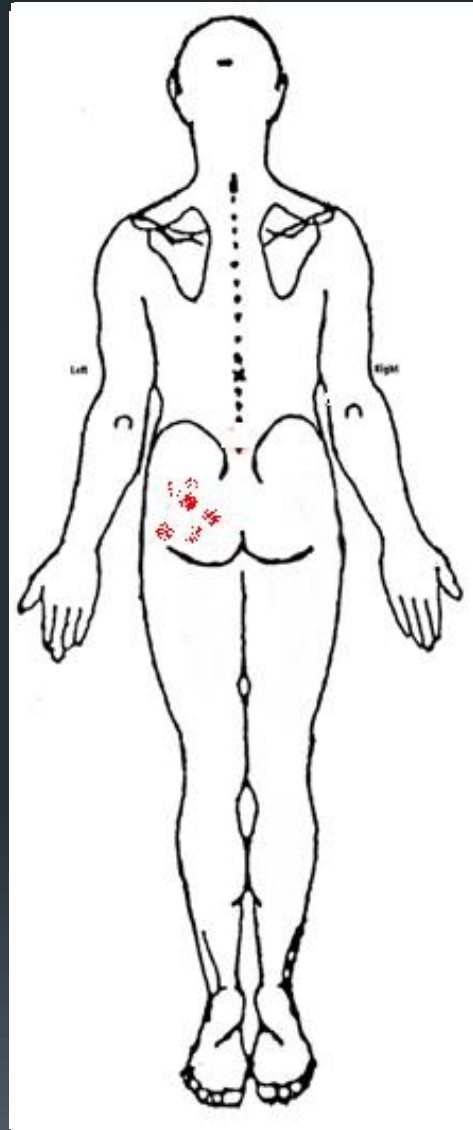
- Clinical experience: Centralization has a positive effect on motor control
- Research question
What is the effect of centralization on motor control?
- Hypothesis
In patients with a centralization phenomenon, the reduction in positive motor control tests will be larger compared to patients with directional preference.

Periferalization

Directional preference with centralization

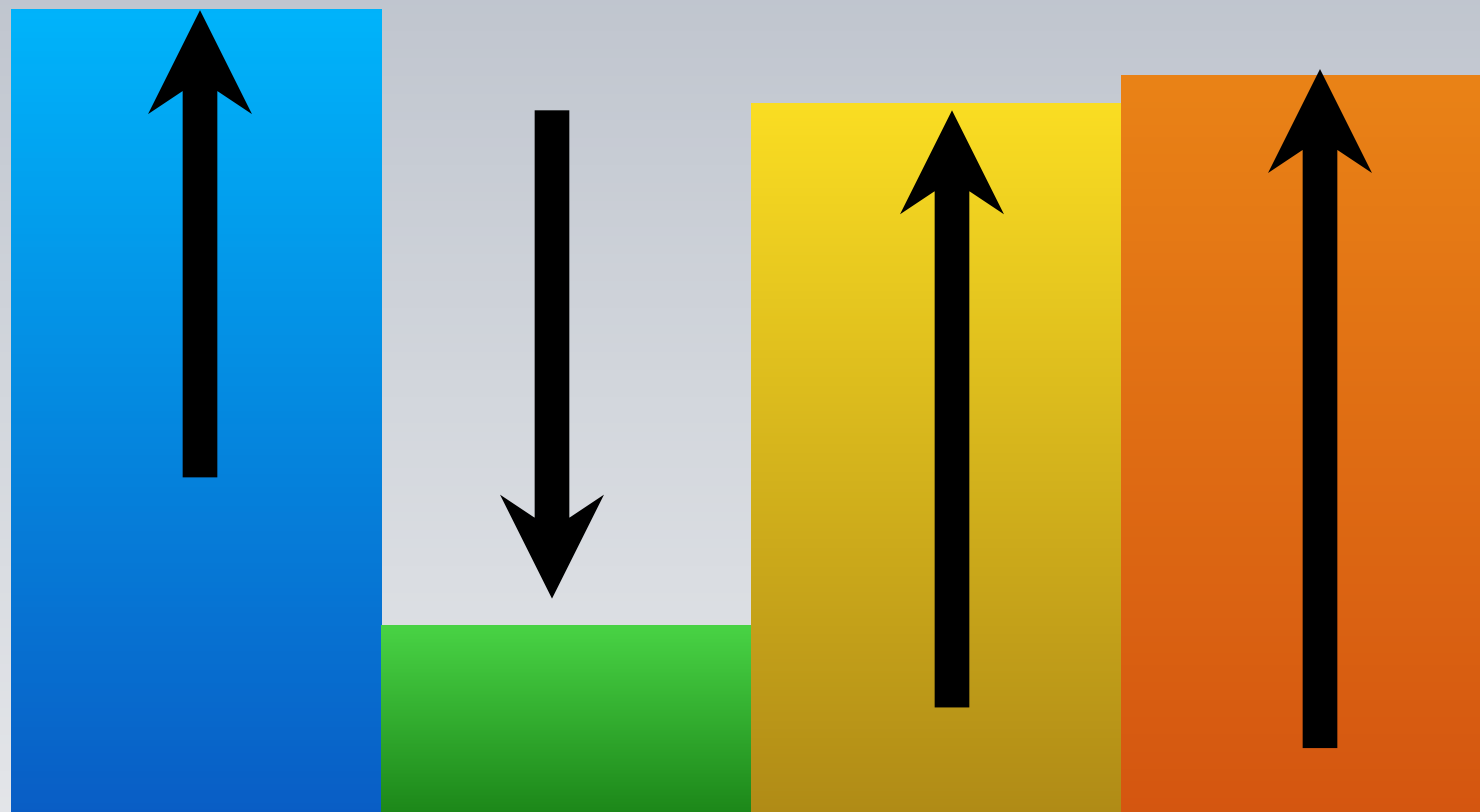


Directional preference for extension without centralization



For many patients Centralisation means

■ Outcomes ■ Pain ■ Back to work ■ Function



Protocol

Tester 1

- **Pre-assessment 4 motor control tests**

- Aberrant movements
- Prone instability test
- Trendelenburg
- Active straight

- **MDT diplomat**

- MDT assessment

Tester 1 (blinded)

- **Post-assessment 4 motor control tests**

Easy to perform

Some evidence on
reliability

Aberrant movements (Hicks et al. 2003)

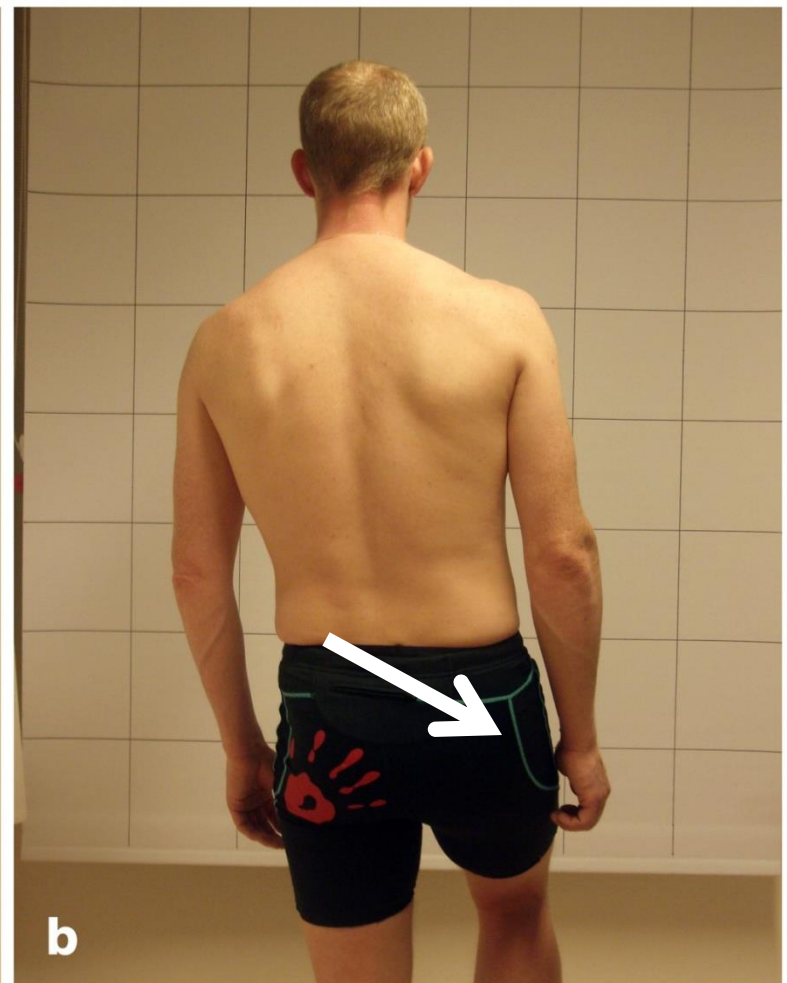
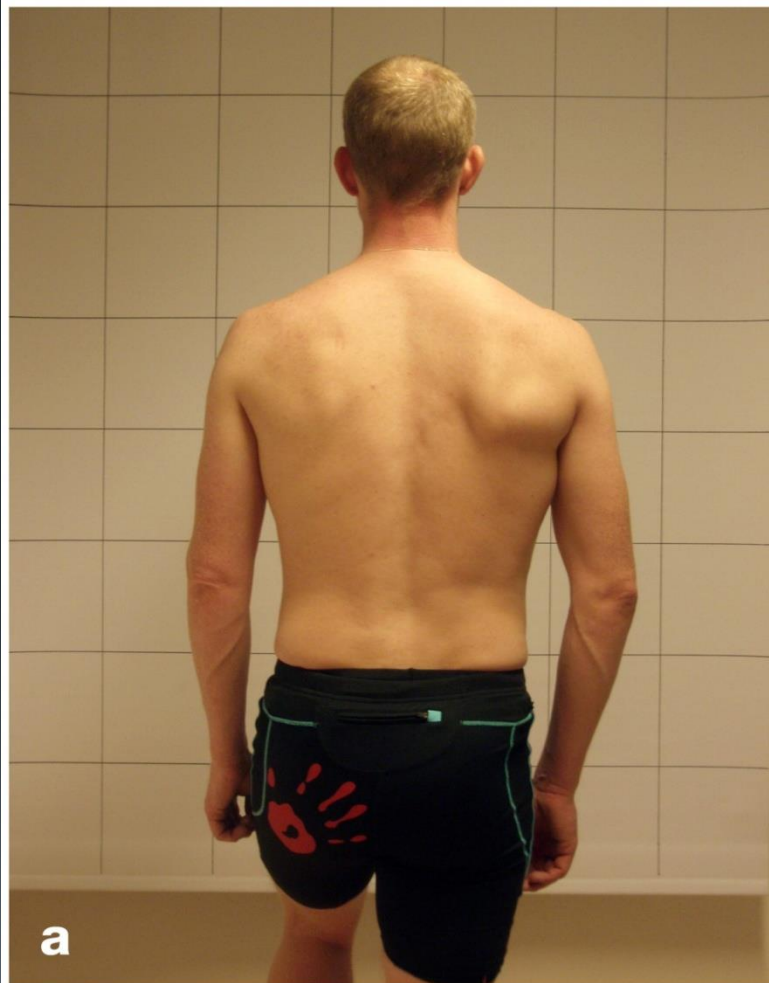
- a) Painful arc in flexion
- b) Painful arc on return
- c) Gower sign ('thigh climbing', using the hands for assistance)
- d) Instability or painful catch
- e) Reversal of lumbopelvic rhythm (the patient bends the knees and shifts the pelvis anteriorly before returning to erect position).

- Negative (no motor control dysfunction) = 0
- Positive (motor control dysfunction) = 1 – 5

Prone Instability



Trendelenburg



Active straight leg raise (Mens et al. 2012)

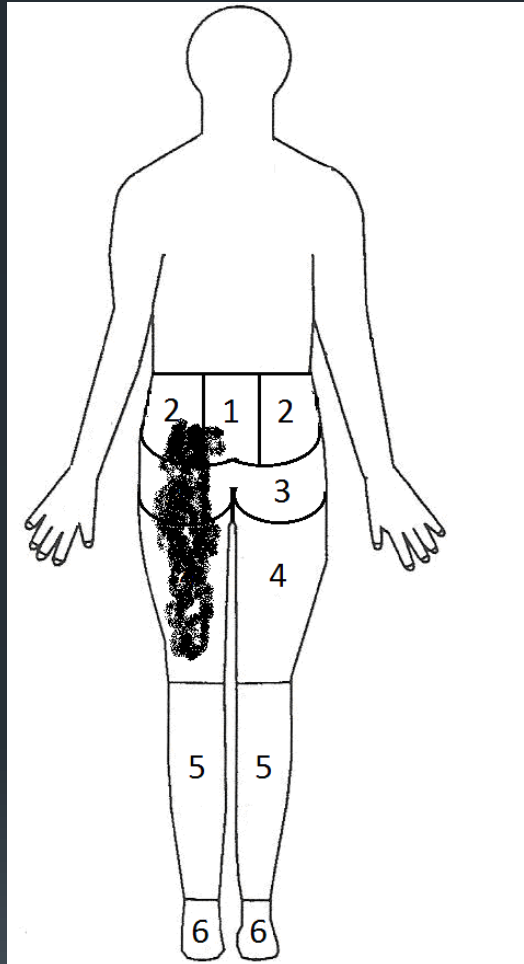
Subjective weakness; left leg (0-5) and right leg (0-5)

- 0) not difficult at all
- 1) minimally difficult
- 2) somewhat difficult
- 3) fairly difficult
- 4) very difficult
- 5) unable to do

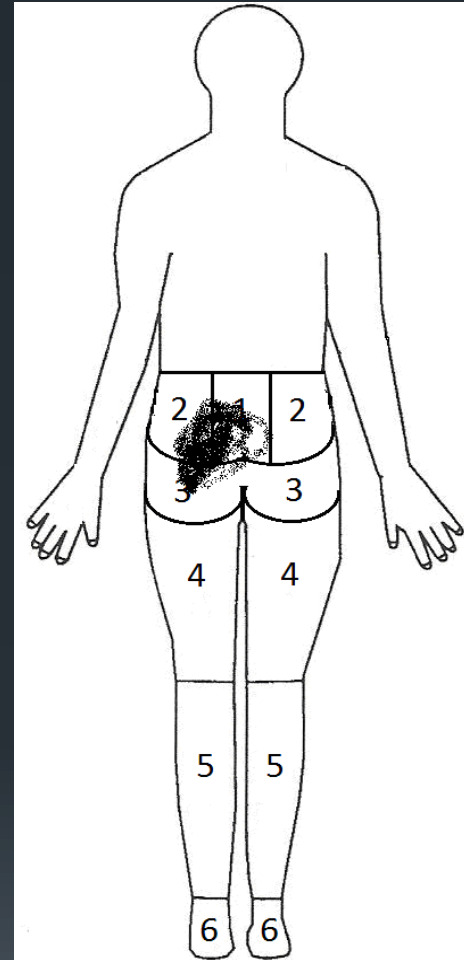


- Scores of both sides were summed (0-10)
- No motor control dysfunction = 0
- Moderate motor control dysfunction = 1-4
- Severe motor control dysfunction = 5-10

Pre-assessment



Post-assessment




Localization of pain was pointed out by the patient on a drawing

Baseline characteristics (n = 114)

- Age in years 43.9 (SD 11.2)
- Acute (0-6 weeks) 28.4%
- Sub-acute (7-12 weeks) 8.3%
- Chronic (>12 weeks) 63.3%
- LBP past week(0-10) 5.2 (SD 2.5)
- Pain radiated in the leg 43%
- Oswestry disability index 25.2 (SD 15.5)

Prevalence motor control tests pre-assessment



■ Aberrant Movement	44%
■ Trendelenburg test	29%
■ Prone instability test	38%
■ ASLR	
■ no dysfunction (0)	36%
■ moderate dysfunction (1-4)	50%
■ severe dysfunction (5-10)	14%

MDT assessment (n = 114)



- **Derangement**

- **n = 74 (65%)**

- **CEN: n = 51 (45%)**

- **DP but no CEN: n = 23 (20%)**

- **No derangement:**

- **n = 40 (35%)**

Differences between the three groups (pre-test positive)



Mogelijke oorzaken:

Pijnprovocatie test

Laterale beweging trendelenburg

	CEN (n = 51)								
	Pre-test + (n)	Post-test + (n)							
AM	30	17							
Trendelenburg	13	7	46%	8	4	50%	12	8	33%
PIT	19	7	63%	7	1	86%	16	10	38%
ASLR	31	15	52%	14	13	7%	24	22	8%

Differences between the three groups (pre-test negative)



	CEN (n = 51)			DP (but no CEN) n = 23			Non-DP (n = 40)		
	Pre-test neg. (n)	Post- test neg. (n)	Change	Pre-test neg. (n)	Post- test neg. (n)	Change	Pre-test neg. (n)	Post- test neg. (n)	Change
AM	21	20	5%	16	15	6%	25	25	0%
Trende- lenburg	38	36	5%	15	15	0%	28	28	0%
PIT	31	28	10%	15	13	13%	23	22	4%
ASLR	20	18	10%	9	7	22%	15	14	7%

Severity of pain

	Pre-assessment (SD)	Post-assessment (SD)	Difference (SD)	p-value
CEN	4.0 (2.2)	1.2 (1.8)	2.8 (2.1)	<0.001
DP minus CEN	4.2 (2.7)	2.3 (1.9)	1.9 (1.9)	<0.001
Non-DP	3.7 (2.6)	4.0 (2.8)	- 0.2 (1.0)	0.152

NB: Mobility in ext en flexion changed in CEN, DP,
no significant diff. between CEN, DP

Conclusions

- **Our hypothesis was confirmed**

In patients with a centralization phenomenon, the reduction in positive motor control tests is larger (43%-63%) compared to patients without a derangement (7-38%).

Our results suggest that

- It is clinically interesting to start with a MDT assessment before motor control training
- Centralization is a clinically more important sign than directional preference in the absence of centralization

Baseline
symptoms and
movements

Including
instability test
baselines

Repeated
movements/
loading
strategies

Which
Subgroup?

Incl subgroup
Relevant
instability

Change in
baselines





Take Home Message

- Why train your muscles, if you better repair your bicycle tire !