

# Cognitief Functionele Therapie (CFT) van O'Sullivan

## Casus 2

(by W. Dankaerts en P. O'Sullivan e.a.)

### Een patiënt met de classificatie **Multi Directional Pattern**



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Case report

The use of a mechanism-based classification system to evaluate and direct management of a patient with non-specific chronic low back pain and motor control impairment—A case report

W. Dankaerts<sup>a,b,\*</sup>, P.B. O'Sullivan<sup>a</sup>, A.F. Burnett<sup>a</sup>, L.M. Straker<sup>a</sup>

<sup>a</sup>*School of Physiotherapy, Curtin University, Bentley 6102, WA, Australia*

<sup>b</sup>*Department of Rehabilitation Sciences and Physiotherapy, Ghent University, Ghent, Belgium*

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- \* In het nu volgende zullen we deze auteurs voor het gemak ook met POS afkorten, dat kan goed omdat zij in feite volgers van POS en de classificaties van POS zijn



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# The use of a mechanism-based classification system to evaluate and direct management of a patient with non-specific chronic low back pain and motor control impairment—A case report

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## 1. Introduction

Low back pain (LBP) is one of the most common and costly musculoskeletal pain syndromes, affecting up to 80% of people at some point during their lifetime (Katz, 2002; van Tulder et al., 2002; Ehrlich, 2003; Woolf and Pfleger, 2003). It is reported that in spite of the large number of pathological conditions that can give rise to LBP, 85% of these are without a detected patho-

Bouter et al., 1998; Leboeuf-Yde and Manniche, 2001). Any specific treatment applied to a falsely assumed homogenous sample may result in improvement, failure to respond or aggravation of the disorder (Binkley et al., 1993; Fritz et al., 2000; Leboeuf-Yde and Manniche, 2001; Fritz et al., 2003).

The shift from thinking about LBP as a patho-anatomical disorder, to viewing LBP as a multi-factorial bio-psycho-social disorder is now well accepted (Borkan

Zie volgende twee dia's



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## Advances in the Field of Low Back Pain in Primary Care

A Report from the Fourth International Forum

Jeffrey Borkan, MD, PhD,\* Maurits Van Tulder, PhD,† Shmuel Reis, MD,‡§  
Mark L. Schoene, BSc, Peter Croft, MD,|| and Doron Hermoni, MD, BSc¶

**Uit Borkan:** De huidige theorieën over lage rugpijn bewegen zich van het denken over rugpijn als een biomedische 'blessure' naar het beschouwen van rugpijn als een multifactorieel bio/psycho/sociaal pijnsyndroom dat in de loop van uw leven periodiek optreedt.

### Opmerking STEP

Het is maar zeer de vraag of deze multifactoriële bio/psychosociale theorie juist blijkt te zijn. Ze wordt meestal geponeerd door epidemiologen die weinig tot geen affiniteit met biomechanica hebben.

## W Non-specific low back pain

Federico Balagué, Anne F Mannion, Ferran Pellisé, Christine Cedraschi

- The predictors of outcome are similar for acute and chronic low back pain and are mostly psychosocial or belief-related in nature; however, most of the variance in outcome remains unexplained.
- Traditional mechanical factors probably don't have a major pathogenic role.

Neglect of occupational, mechanical loading as a causal factor in low back pain is not based on evidence and might seriously hamper effective prevention and management.

We declare that we have no conflicts of interest.

*\*J H van Dieën, P P F M Kuijer,  
A Burdorf, W S Marras, M A Adams  
j.van.dieen@vu.nl*

Het is zeer de vraag of deze multifactoriële bio / psycho / sociale theorie correct is.

In 2012 werd dit ook opgemerkt door vooraanstaande wetenschappers in de biomechanica.



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O’Sullivan reported that in general all disorders involving pain in the lumbar region are associated with movement or control impairment.

POS sluit zich graag aan bij de huidige bio/psycho/sociale mode met een overigens zeer eigenaardige motor controle theorie die op basis van palpatie allerlei afwijkingen in musculaire besturingssystemen en segmentale mobiliteit weet vast te stellen.

### Opmerking STEP

Het op basis van palpatie vaststellen van lichamelijke afwijkingen is wel iets dat past bij manueeltherapeuten, weinig wetenschappelijk en door de medische wereld vaak als kwakzalverij gezien.



## POS definities van Motor Control dysfuncties

Table 1

Definition of each pattern of motor control impairment (MCI) based on O'Sullivan (2000, 2004)

Pattern of MCI	Definition
Flexion	Pain disorder resulting from a loss of motor control of the lumbar segment into flexion (associated loss of segmental lordosis)
Lateral shift (flexion or extension)	Pain disorder resulting from a loss of motor control of the lumbar segment in the frontal plane (lateral shift pattern). This pattern is also associated with a loss of control into either flexion or extension
Active extension	Pain disorder resulting from the lumbar segment being 'actively' held into extension (increased segmental lordosis)
Passive extension	Pain disorder resulting from a loss of motor control of the lumbar segment into extension. This is associated with a tendency to passively over extend (hinging) at the symptomatic segment of the lumbar spine
Multi-directional	Pain disorder resulting from a multi-directional loss of control of a lumbar spinal segment (combinations of above)

**Hij bespreekt hierna een casus waar de motorische controle volgens hem in meer richtingen gestoord is**

Table 2  
Subjective examination findings

37-year-old female; married; 2- and 4-year-old child  
Work: part-time (2/7) nurse; involved minimal lifting  
Home: household activities; picking up and carrying children  
History: gradual onset of LBP symptoms; starting during the pregnancy of the first child (-4 years); post first pregnancy pain free for 2 years; early in the second pregnancy (-2 years); progressively deteriorating LBP  
Pain: LBP only (occasionally left buttock region)  
Aggravating postures: sitting (> *in couch*), lying on a hard mattress; sustained forward bending (e.g. *doing dishes*); sustained backwards bending (e.g. *hanging cloths on the wash-line*); standing (*carrying children*)  
Aggravating activities: walking (> *walking up hill*), bending; lifting; previous treatment: fit-ball (*stabilizing*) exercises, specific mobilising exercises (*lying flat moving leg*)  
Easing postures/activities: no symptom relief during weight bearing  
Pain-intensity (VAS): 4/10 (day intake examination); 4/10 (average pain week)  
Disability-score [Revised-Oswestry (Hudson-Cook et al., 1989)]: 34%  
Fear avoidance [Tampa Scale of Kinesiophobia(Kori et al., 1990)]: 34/68  
Medical imaging (X-ray and CT): no abnormalities detected  
Psycho-social risk factors ('yellow' flags): absent  
Serious pathology ('red' flags): absent

#### Key features

- Localised LBP
- No signs of neural tissue involvement
- No reported impairment of movement
- Multi-directional pain pattern mechanical in nature
- Absence of radiological abnormality
- Absence of dominant non-organic features
- Absence of any signs suggesting serious underlying pathology

## 2. Subjective and physical examination

A comprehensive subjective and physical examination was first performed on the patient in order to classify her disorder. This information is summarized in [Tables 2 and 3](#), respectively.

Table 3  
Physical examination findings

Posture and movement analysis

- Standing: hyper-lordotic thoraco-lumbar posture; reduction in tone in the transverse abdominal wall and gluteal muscles
- Forward bending: splinting pattern (holding lumbar spine into extension); sudden drop into lumbar flexion (curve reversal) at end range; full ROM (fingers to floor) with associated pain
- Return from forward bending: initiated from the thoraco-lumbar spine by hyper-extending and associated with a lateral shifting pattern and a painful arc ('catch of pain'); uses hands to return to neutral
- Backwards bending: provoked pain with a lateral shifting pattern present; full ROM
- Side bending (R/L): provoked pain with a lateral shifting pattern present; full ROM
- Single leg standing: prominent lateral shifting pattern (bilateral)
- Sitting posture: flexed at the lower lumbar spine; extended at the thoraco-lumbar spine
- Sit to stand: difficulties of shifting load; tendency to hyper-extend and laterally shift the low back

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A comprehensive subjective and physical examination was first performed on the patient in order to classify her disorder. This information is summarized in Tables 2 and 3, respectively.

## Opmerkingen STEP

Bij rood onderstreept dubieuze subjectieve info.

Niets wordt gemeten, allemaal subjectief op het oog vastgestelde zaken  
(lordose, tonus, full ROM)



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Physical examination findings

Posture and movement analysis

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## Opmerkingen STEP

Bij rood onderstreept dubieuze subjectieve info.

Veel op het oog en met de hand waargenomen zaken, die niet objectief gemeten zijn.

Table 3  
Physical examination findings

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Specific movement tests (O'Sullivan, 2004)

- Inability to maintain neutral lordosis during trunk flexion and load transfer in sitting and inability to achieve a neutral lordosis in standing
- Repositioning sense in sitting (O'Sullivan et al., 2003): inability to reposition the lumbar spine within a neutral lordosis; 'over-shoot' into either flexion (kyphosis) or extension (lordosis)

Specific muscle testing (O'Sullivan, 2004)

- Inability to activate the lower transverse abdominal wall (transverse fibres of internal oblique and lower transversus abdominis) in side lying without breath holding

**2. Subjective and physical examination**

A comprehensive subjective and physical examination was first performed on the patient in order to classify her disorder. This information is summarized in [Tables 2 and 3](#), respectively.

## Opmerkingen STEP

1. Dat een patiënt zogenaamde specifieke bewegingstesten niet kan uitvoeren is nietszeggende subjectieve informatie
2. Het al dan niet kunnen uitvoeren van activeren van de buikspieren is eveneens nietszeggende subjectieve informatie

Table 3  
Physical examination findings

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Screening neurological examination (Hall and Elvey, 1999)

- Absence of neurological findings (provocation testing, reflexes, sensation and manual muscle testing)

Passive physiological motion segment testing (Maitland, 1986)

- Absence of segmental movement restriction; increased segmental motion into both flexion and extension at the two lower lumbar segments
- 

Passive accessory testing (Maitland, 1986)

- Posterior/Anterior pressure (PA) at L4/5 and L5/S1 levels highly symptomatic; reproductive of the patient's symptoms
- 

## Opmerkingen STEP

1. Passieve bewegingstesten op segmentaal niveau zijn typische manueeltherapeutische nietszeggende subjectieve en zeer dubieuze testen
2. Lokale pijnlijke druk is ook nietszeggende subjectieve info

### 3. Classification based on history and physical examination

It is acknowledged that rather than relying on one test, classification of a disorder should be based on information of the history taking examination and a 'cluster of tests' in combination with a reasoning process (Elvey and O'Sullivan, 2004). In this way, several key features of the physical examination findings (not one single test) consistent with the history, helped to formulate the hypothesis of a classification of multi-directional pattern of MCI disorder (O'Sullivan, 2004). The critical factors of the classification were that this patient had mechanically induced, localized pain that was multi-directional in nature. She had no impairment in range of spinal motion but presented rather with MCI resulting in repeated end range spinal strain and pain. Normalization of her altered motor control (control of the spinal neutral zone) reduced her pain.

### Opmerking STEP

POS stelt dat men niet op één test moet vertrouwen, maar dat classificatie van een aandoening gebaseerd moet zijn op informatie uit de anamnese, lichamelijk onderzoek en een serie specifieke testen te onderwerpen aan een redeneerproces.

Het feit dat er pijn is in meerdere richtingen betekent niet dat de motorische controle niet goed zou zijn.

Het hele concept van motorische controle met multifidus, buikspieren en bekkenbodemp is subjectief en dubieus.

Provocerende belastingen voorkomen is een goed aangrijpingspunt maar dan niet met deze multifactoriële manueeltherapeutische cognitieve (oefen)therapie van POS.

Onnodig ingewikkelde, deftig en duur doende borstklopperij met weinig oog voor recidiefpreventie.

#### 4. Laboratory testing

An objective laboratory-based assessment (surface EMG and spinal kinematics) was performed on the patient and a matched control subject. The method of this laboratory testing has been described in detail elsewhere (Dankaerts et al., 2006b,c). This case study reports on the lumbo-sacral kinematics and the sEMG activity of superficial Lumbar Multifidus (sLM) and transverse fibres of Internal Oblique (trIO) during forward bending. This test was selected since it is frequently used in the LBP research to investigate the reduction in back muscle activity at full body flexion (McGill and Kippers, 1994; Shirado et al., 1995; Kaigle et al., 1998; Gupta, 2001).

STEP opmerking:

EMG en spinal kinematics, dit klinkt reuze ingewikkeld en objectief en wordt schijnbaar gebruikt om de lezer te imponeren en te overtuigen van de hoogwaardige kwaliteit van de training van lokale segmentale controle met bekkenbodem, ademhaling, transversus abdominis en multifidus, aangevuld met allerlei onnodig ingewikkelde sensitiviteit en cognitieve theorieën.

In dia 49 t/m 58 wordt duidelijk dat dit helemaal niets voorstelt en geen enkele rechtvaardiging van de POS aanpak is.

## 5. Intervention

The patient's management consisted of a motor learning intervention based on a cognitive behavioural model. It was progressed over a 14-week period (total of 8 visits, the first 3 were spaced 1 week apart, with subsequent sessions once every 2–3 weeks) to address the impairments in motor control of this patient in a functionally specific manner. The choice of this treatment approach was based on the diagnosis and classification assigned to this patient. Each session included re-evaluation and review of home exercises.

The specific exercises and progression was linked with the examination findings and are described in detail by O'Sullivan (2004). Briefly, this motor learning intervention was divided into stages, based on the model proposed by Fitts and Posner (1995). This approach to exercise training focuses on the quality of control of segmental spinal posture and movement.

This approach operates within a cognitive behavioural framework where the mechanism of the ongoing pain sensitization is explained to the patient. The patient was educated on the mechanics of the spine, the nature of ongoing tissue sensitization with habitual adoption of end range postures and the importance of the muscle system of the lumbo-sacral region to control spinal motion segments and minimize strain.

During this *cognitive stage* the patient was made aware that the postures and patterns of movements that she had adopted had in fact resulted in maintaining her pain. She was made aware she had no control, or sense of her neutral spine positions, nor an ability to isolate the activation of specific muscles (transverse abdominal wall, superficial fibres of lumbar multifidus/sLM, pelvic floor and gluteal muscles)

## Opmerkingen STEP

1. De aanpak is te vergelijken met de aanpak in de eerste casus, een paar uitlichtingen
2. Heel duidelijk ook hier weer de indoctrinering van de leek met dubieuze POS opvattingen:
  - \* er is bij u sprake van pijn sensitisatie
  - \* U heeft geen segmentale motorische controle
  - \* U heeft geen controle over buikspieren, multifidus, bekkenbodemp en gluteus

She was first instructed to control her lumbo-pelvic region through the mid-range independent from the thorax (in supine crook lying). At the same session she was instructed to co-activate the pelvic floor, transverse abdominal wall and sLM (Krause et al., 2000) in side lying. She was also instructed to change her sitting posture to maintain a neutral lordosis and relax the thoracolumbar region with co-contraction of the transverse abdominal (TrA/trIO) wall. This was then progressed to standing.

Once she had the ability to assume a neutral lordosis in weight bearing (sitting and standing) with co-contraction of the transverse abdominal wall this was incorporated into static holding tasks and dynamic tasks such as single leg stand, sit-stand, squat and lifting (*associative stage*).



## Opmerkingen STEP

De aanpak is te vergelijken met de aanpak in de eerste casus, nog een paar uitlichtingen

1. Bekken kantel oefeningen in ruglig
2. In zijlig co-activatie oefeningen van bekkenbodem, transversus en oppervlakkige lumbale multifidus
3. Co-contractie van transversus abdominis en transversale vezels van de interne schuine buikspieren in zit, uitgebreid naar stand
4. Bij beheersing in zit en stand uitbreiden naar statische en dynamische taken zoals op 1 been staan, gaan staan vanuit zit, squat en tillen

**Kortom veel gekker kan het niet**

As she was generally de-conditioned, she was encouraged to perform gentle aerobic activities (walking, exercise bike) with low level of co-contraction of her transverse abdominal wall while maintaining optimal postural alignment. At the 10-week point she was trained with loaded exercise (hand weights with squats and sit to stand) to increase her global strength and endurance whilst controlling her spinal mid-position.

The final (*autonomous*) stage was reached when the patient reported that she could carry out functional movement tasks with a low degree of attention (Fitts and Posner, 1995). It should be noted that the patient had to achieve each stage of the program before it was progressed.

## Opmerkingen STEP

De aanpak is te vergelijken met de aanpak in de eerste casus, nog een paar uitlichtingen.

1. Conditie oefeningen met lichte co-activatie transversus abdominis
2. Zwaarder belastende oefeningen ter spierversterking en uithoudingsvermogen met segmentale controle
3. De laatste autonome fase is bereikt als de patiënt functioneel kan bewegen met co-activatie en weinig bewuste aandacht

**Kortom veel gekker kan het niet**



## 6. Clinical outcome

The patient progressed well during the intervention with a gradual decrease in pain and an increase in functional ability. At 14 weeks (end of intervention) she reported to be pain-free with an ability to perform work and household-related tasks. This was associated with a normalization of her movement patterns and absence of pain, improved spinal proprioception, adoption of neutral zone postures and reduced tissue sensitivity. The Revised-Oswestry Disability Questionnaire (Hudson-Cook et al., 1989) was used to document functional progress and disability. The patient's Revised-Oswestry score (0–100%) decreased across the study period from 34% (pre-intervention) to 14% post-intervention. In the three months following discharge, the patient experienced no exacerbation of LBP-related symptoms and continued to improve functionally (2% at 6-month follow-up). This status was maintained at 1-year follow-up (0%). The pain intensity score (average over a week; 0–10) decreased from 4/10 pre-intervention, to 2/10 post-intervention, to 0/10 at 6-month follow-up. This pain free status was maintained at 12-month follow-up. The score for fear avoidance (measured by the Tampa Scale of Kinesophobia) decreased from 34/68 to 17 (the minimum score that can be recorded) at 6-month follow-up and was maintained at 12-month follow-up. These scores reflect an absence of pain, transition in function from moderate disability (<40) to no disability and an absence of fear avoidance following the intervention.

### STEP opmerking:

Dit klinkt allemaal reuze interessant, maar zijn natuurlijk standaard zaken als een patiënt minder klachten krijgt en dat zo'n Tampa schaal minder wordt is natuurlijk ook logisch als de rugklachten afnemen bij een patiënt die overigens zeer terechte bewegingsangst had.

Dit rechtvaardigt de aanpak van POS echter in het geheel niet. Het blijft absurd om mensen lastig te vallen met de training van lokale segmentale motorische controle met bekkenbodempomp, ademhaling, transversus abdominis en multifidus en daarnaast nog met allerlei onnodig ingewikkelde sensitiviteit en cognitieve theorieën.

## 7. Laboratory testing outcome

### 7.1. Forward bending: range of motion

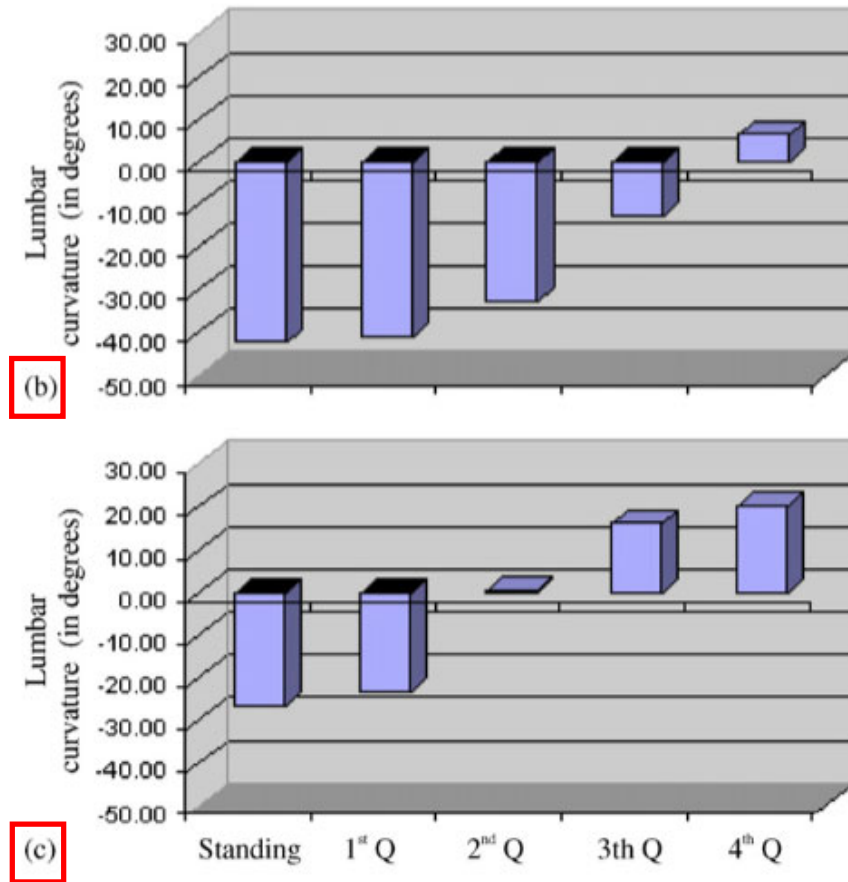
The patient's lumbar spine ROM into forward bending was 48° at the intake examination and 47° at 6-month follow-up. This confirms the clinically observed absence of any movement impairment into forward bending being related to her LBP. This is consistent with the CS.

POS zegt dat de ROM bij intake en bij de 6 maanden F-up gelijk is. Verder dat hij bij intake goed gezien heeft dat er geen bewegingsbeperking is.

Echter bij intake begint de patiënt in bijna  $\pm 45^{\circ}$  lordose (b) en eindigt in  $\pm 2^{\circ}$  flexie (b)

En bij de F-Up begint de patiënt in bijna  $\pm 30^{\circ}$  lordose (c) en eindigt in  $\pm 17^{\circ}$  flexie (c)

Er was dus bij intake geen full ROM in flexie, Een flinke flexie beperking van  $15^{\circ}$  werd door POS gemist.

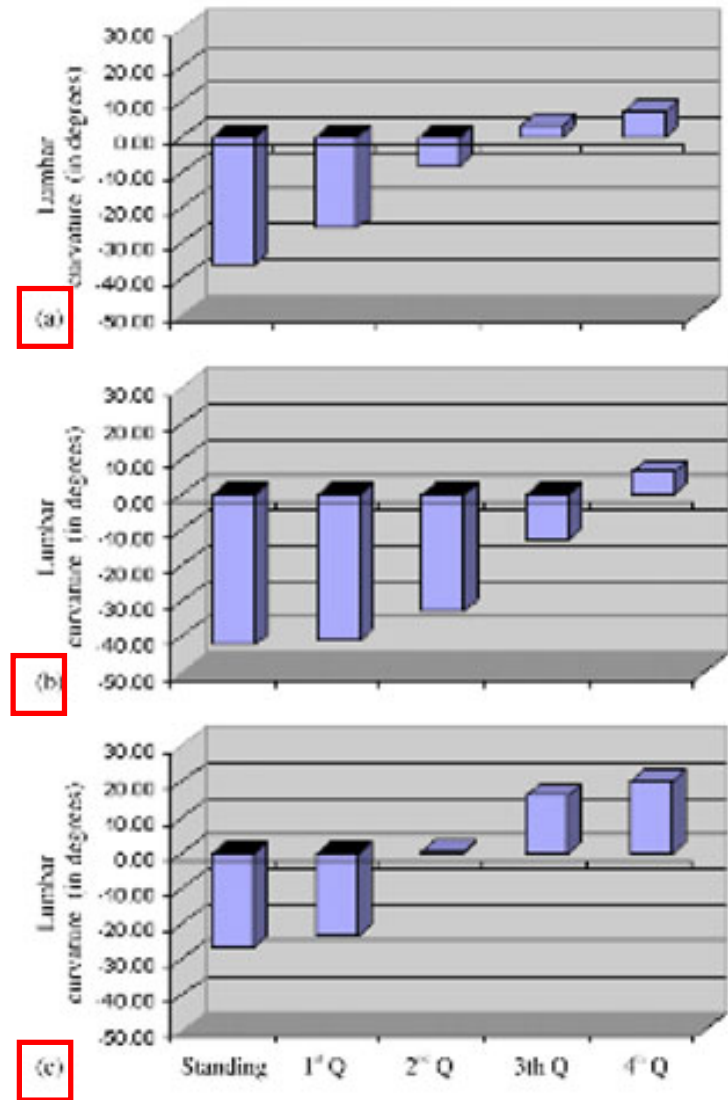


## 7.2. Forward bending: kinematic pattern

Fig. 1 shows the lumbar curvature ( $L \times C$ ) in degrees as measured by the Fastrak™ in standing and per quartile as the subject bends forward. Negative values represent a lordotic posture. Fig. 1a represents a matched (age and parity) healthy control subject. A pattern of gradual change of  $L \times C$  (from being extended to being flexed) is observed.

Fig. 1b represents the case study patient pre-intervention. Lumbar spine hyperextension was maintained as she progressed into the forward bending range with a curve reversal at the end (3rd to 4th quartile). At the 6-month follow-up (Fig. 1c) curve reversal was observed more central in range (2nd to 3rd quartile) and this was similar to the control case data (Fig. 1a).

POS zegt dat lumbaal bij intake meer in extensie blijft in de beginfase en dat het omslaan naar flexie meer aan het eind plaatsvindt (b). Verder dat er bij F-Up minder extensie is in de beginfase en het omslaan naar flexie weer meer in het midden plaatsvindt (c), zoals dat ook bij een controle persoon zonder rugklachten het geval is (a). Op zich is deze constatering juist, maar het is niet juist om dit toe te schrijven aan de motoriek diagnosticus en monteur POS. Die verklaring is veel eenvoudiger, zie de volgende 3 dia's.





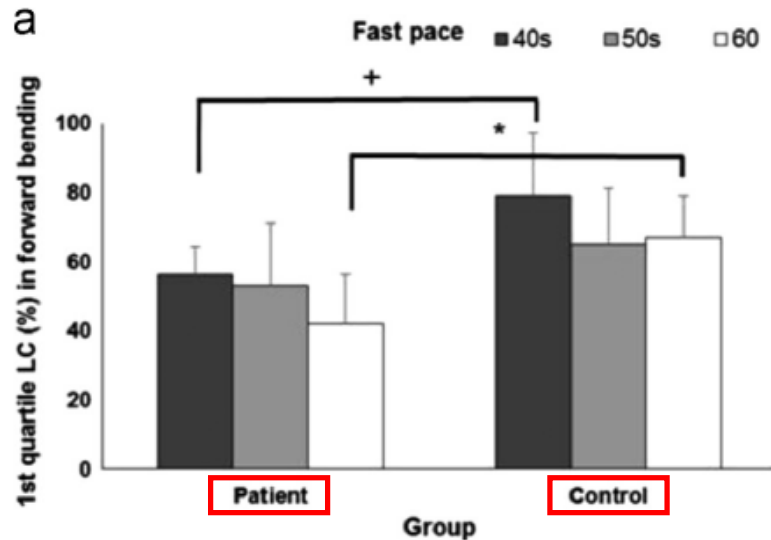
Timing and magnitude of lumbar spine contribution to trunk forward bending and backward return in patients with acute low back pain

Iman Shojaei<sup>a</sup>, Milad Vazirian<sup>a</sup>, Elizabeth G. Salt<sup>b</sup>, Linda R. Van Dillen<sup>c</sup>, Babak Bazrgari<sup>a,\*</sup>

<sup>a</sup> F. Joseph Halcomb III, M.D. Department of Biomedical Engineering, University of Kentucky, Lexington, KY 40506, USA

<sup>b</sup> College of Nursing, University of Kentucky, Lexington, KY 40506, USA

<sup>c</sup> Program in Physical Therapy, Department of Orthopedic Surgery, Washington University School of Medicine, St. Louis, MO 63108, USA



Beweging in het **eerste** kwart van de bukbeweging is bij mensen met rugklachten veel minder

## STEP verklaring met wetenschappelijke onderbouwing over begin flexie beweging

Mensen met rugklachten vertonen minder flexie in het begin van de flexie beweging

Mensen met flexie rugklachten beperken gewoon heel verstandig en natuurlijk de provocerende flexie, daar is niets mis mee

## Reliability and Validity of a New Objective Tool for Low Back Pain Functional Assessment

Daniel Sánchez-Zuriaga, MD, PhD,\* Juan López-Pascual, BSc,† David Garrido-Jaén, BSc,†  
María Francisca Peydro de Moya, PhD, MD,† and Jaime Prat-Pastor, MD, PhD,†



### STEP verklaring met wetenschappelijke onderbouwing over maximale flexie aan het eind

Uit het onderzoek van Sánchez-Zuriaga blijkt dat bij mensen met rugklachten de lumbale beweeglijkheid aanzienlijk verminderd.

Bij opstaan van zit tot stand, bij bukken zonder tillen, bij tillen van 5 en 10 kg treedt gemiddeld een flexiebeperking van  $\pm 30\%$  op in vergelijking met proefpersonen zonder rugklachten.

Bij actuele rugklachten is er dus een beperking aan het **begin** en het **einde** van de flexie beweging, die zich weer heel natuurlijk normaliseert als de klachten verminderen, zie de volgende dia.

Dit is niet de verdienste van POS maar van het natuurlijk herstel.

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### **STEP verklaring met wetenschappelijk onderbouwing over de normalisering van de flexie beweging**

Ook toont dit onderzoek aan dat deze natuurlijke beperking vermindert als de rugklachten minder worden. Als de belastbaarheid toeneemt, herstelt de motoriek zich vanzelf.

De belastbaarheid laat je toenemen door het orthopedische basisprincipe toe te passen: voorkom overbelasting tijdens het natuurlijk herstel.

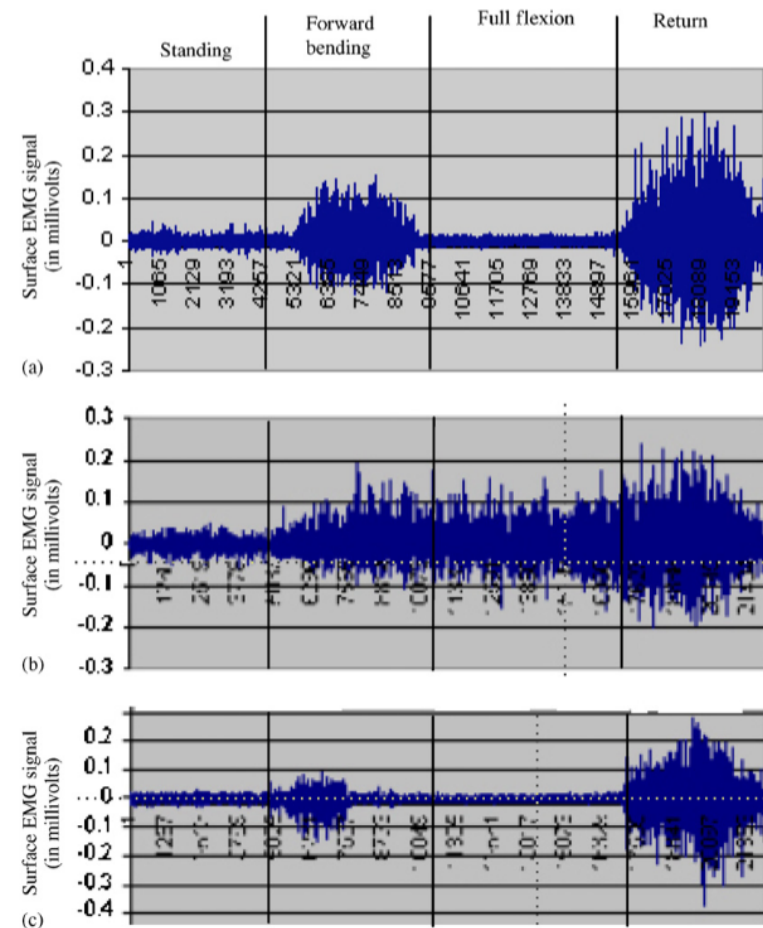
Daar is POS als motoriek diagnosticus en monteur niet bij nodig en alleen maar irritant en duur doend aanwezig.

### 7.3. Forward bending: surface EMG findings

#### 7.3.1. Superficial lumbar multifidus (sLM)

Fig. 2a shows the raw sEMG activation of the sLM during forward bending and return from forward bending of the matched control subject. A burst of EMG activity, as the subject starts the movement, is observed followed by a pattern of muscle relaxation at the end of the forward bending phase and the return is then associated with a burst in the sLM. This pattern of onset–offset during forward bending is commonly referred to as the flexion relaxation phenomena (FRP). Watson et al. (1997) indicated that this type of dynamic sEMG activity of the paraspinal muscles can be reliably measured and is useful in differentiating CLBP patients from normal controls.

Prior to the intervention, the patient displayed increased muscle activity with no FRP during forward bending (Fig. 2b). At the 6-month follow-up, a more normal sEMG pattern, with an FRP was observed (Fig. 2c).



**STEP opmerking:** Deze EMG normalisering rechtvaardigt de aanpak van POS ook in het geheel niet, dit is volstrekt natuurlijk, zie volgende dia.

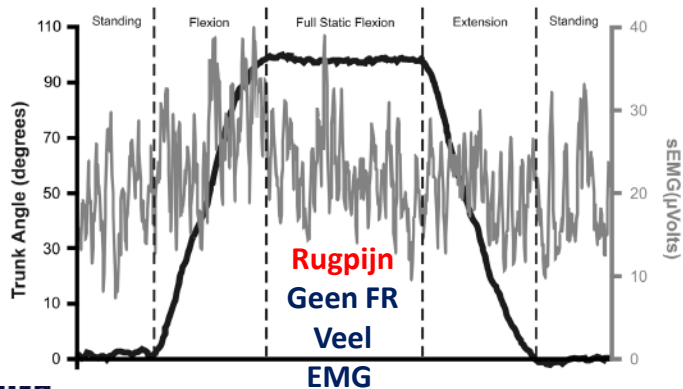
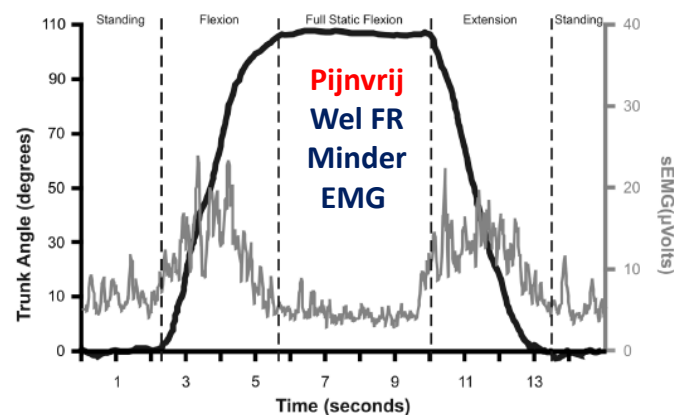
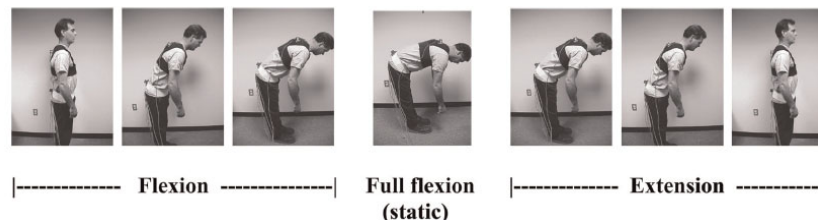
# Flexion Relaxation and Its Relation to Pain and Function over the Duration of a Back Pain Episode

Raymond W. McGorry\*, Jia-Hua Lin

Liberty Mutual Research Institute for Safety, Hopkinton, Massachusetts, United States of America

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## Gegevens uit het onderzoek van McGorry

Pijnvrije mensen bewegen met Flexie Relaxatie (FR), zie afbeelding links boven.

Patiënten met (sub)acute lage rugklachten (< 6 mnd) bewegen **zonder** FR en met meer EMG activiteit van de beschermende rugspieren, zie afbeelding links onder.

Als de pijn na 5 tot 8 weken minder wordt, normaliseert de FR ook.

Dit is niet de verdienste van POS maar van het natuurlijk herstel.

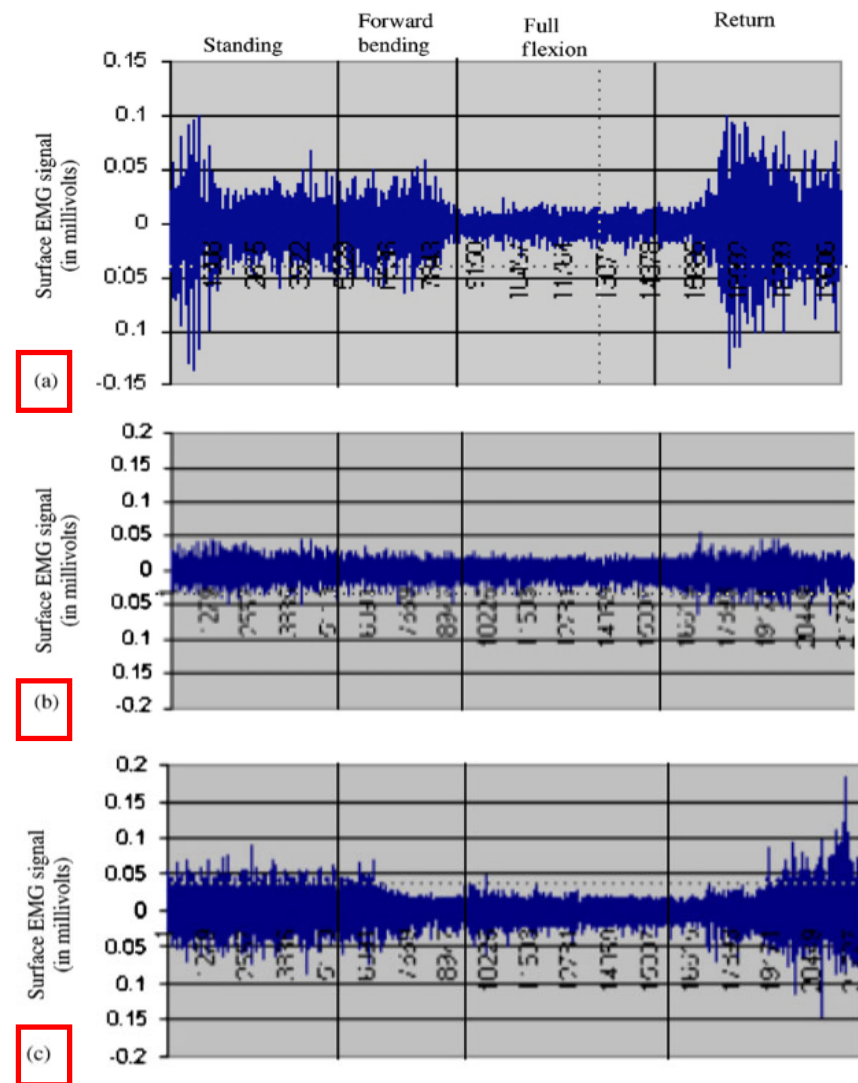


### 7.3.2. Lower transverse fibres of the internal oblique (trIO)

Surface EMG profile of the control subject (Fig. 3a) during forward bending and return from forward bending shows a clear pattern of onset–offset–onset for trIO similar to that observed in the sLM at the end of ROM. In contrast the patient pre-intervention (Fig. 3b) showed no clear onset–offset–onset pattern with a deficit in motor activity. At the six month follow-up an onset–offset–onset pattern (similar to the control subject) was observed (Fig. 3c).

**STEP opmerking:** Hier geldt hetzelfde als bij de rugspieren, mensen met rugklachten vertonen meer EMG activiteit en Flexie Relaxatie treedt op zo gauw de rugklachten zich herstellen.

Dit rechtvaardigt de aanpak van POS echter in het geheel niet. Het blijft absurd om mensen lastig te vallen met de training van lokale segmentale motorische controle met bekkenbodembodem, ademhaling, transversus abdominis en multifidus en daarnaast nog met allerhande onnodig ingewikkelde sensitivatie en cognitieve theorieën.



## 8. Discussion

A novel aspect of this case report is the addition of laboratory-based support to the clinical examination findings of MCI associated with sagittal spinal movement. Despite having full ROM into forward bending, the case subject presented clinically with symptoms through ROM, suggesting a lack of motor control during this movement. The kinematic quantitative assessment was capable of identifying patterns of MCI. Fig. 1b shows that as the patient progressed into forward bending a substantial lordosis (hyper-extension) was maintained, with the curve reversal at the end range (3rd to 4th quartile). This is consistent with O'Sullivan (O'Sullivan, 2000, 2004) who postulated that patients with a multi-directional pattern of MCI have a lack of ability to control a neutral spine posture during functional movements and have a less gradual transition from one end range position to the other. At the 6-month follow-up, laboratory testing showed the curve reversal appearing earlier in the range (2nd to 3rd quartile) (Fig. 1c). This is similar to the control case data shown in Fig. 1a. This is an important finding in the search for quantifiable outcome measurements for this

sub-group of CLBP patients. This demonstrates that the kinematic analyses were sensitive in detecting changes in motor control following a specific intervention. Further research is warranted to evaluate these parameters in a larger population.



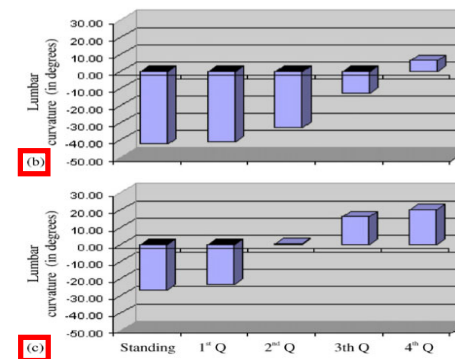
## STEP opmerking:

Van de discussie laten we alléén een paar typische POS rechtvaardigingspassages zien.

In de bespreking van de casus zijn de opvattingen en aanpak van POS ruim voldoende weersproken.

Hiernaast is hij kinderlijk en uitgebreid trots op de FasTrak metingen die de juistheid van zijn motor control aanpak zouden moeten illustreren.

Zie dia 49 t/m 53 voor de onjuistheid van zijn verklaring.



## 8. Discussion

For this case report EMG data were also recorded during the laboratory-based testing. Raw EMG is frequently used for pattern recognition and onset–offset EMG detection (Shirado, et al., 1995; Hodges and Richardson, 1997).

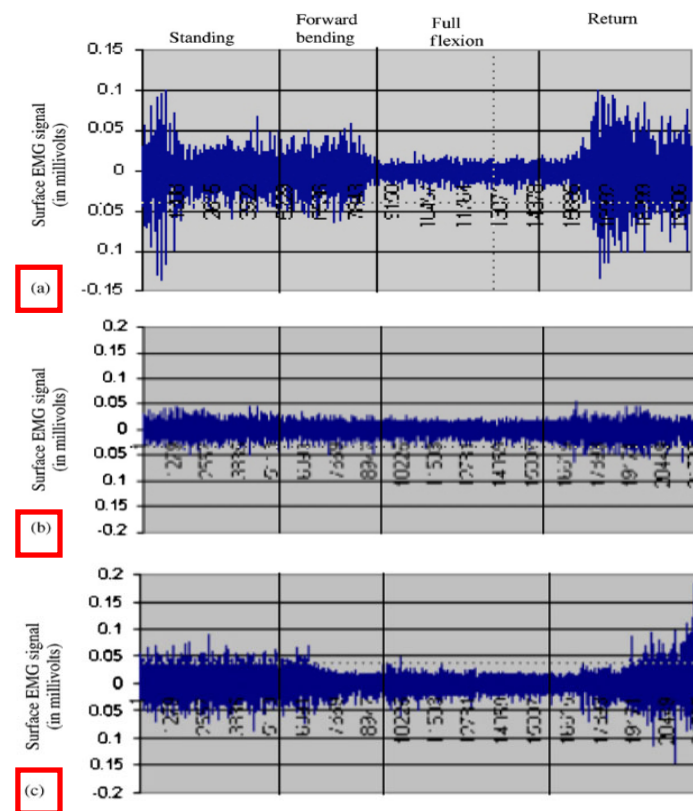
forward bending with a clear FRP present in the sLM (Fig. 2c), which was also associated with a similar pattern in trIO (Fig. 3c).

The sEMG findings from trIO during forward bending and return highlight a lack of co-contraction between trIO and sLM prior to the intervention (Fig. 3b). The CLBP literature contains numerous reports on co-activity and synergistic behaviour of muscle groups during trunk flexion-extension and it is well accepted that the trIO muscle increase intra-abdominal pressure (Cresswell et al., 1992; Cholewicki et al., 1999), and act in co-contraction with trA, pelvic floor muscles and back extensors to stabilize the lumbar spine (Panjabi, 1992a,b). Loss of co-contraction between trunk muscles has been previously reported in LBP populations (Hodges and Richardson, 1996; O'Sullivan et al., 1997; Hodges and Richardson, 1999). The absence of co-contraction in combination with the kinematic data, in this case, lends support to the classification of MCI.

From a review of the literature it seems that the exact *mechanism* affecting trunk muscle recruitment in the presence of LBP is not completely understood with several mechanisms hypothesized in the literature (see Hodges and Moseley, 2003 for review). Farfan (1973), Panjabi (1992a,b) and Richardson et al. (1999) amongst others, have presented models that suggest that deficits

## STEP opmerking:

POS strooit zichzelf en anderen zand in de ogen door met quasi interessante Fastrak en EMG metingen te suggereren dat zijn MCI systeem en Cognitief Functionele therapie deugt. In de dia's 49 t/m 56 hebben we de onjuistheid hiervan aangegeven.



## 8. Discussion

It is also acknowledged that cognitive factors such as enhanced patient awareness, improved coping strategies and increased functional capacity (which are all powerful cognitive factors associated with the intervention), are likely to reduce the central drive of pain. The capacity of this form of intervention to impact on the physical and cognitive aspects of the pain disorder is highlighted by the documented reductions in fear avoidance behaviour at 6- and 12-month follow-up. Due to the limitations associated with a case report, the results do not imply a definite answer to the cause-effect question, nor can the patient's outcomes be generalized across a larger sample. However, the classification of MCI is strengthened by the laboratory-observed changes indicating more normal spinal kinematics and muscle co-activation patterns at 6-month follow-up.

### STEP opmerking:

POS haalt er van alles bij van centrale sensitivatie, coping strategie, bewegingsangst en conditie

Al deze manueel therapeutische onzin achterwege laten en mensen eenvoudig met STEP rugscholing het orthopedische basisprincipe leren toepassen is ruim voldoende. Pijn, angst en beliefs verdwijnen dan vanzelf.

POS geeft ook aan dat deze resultaten geen bewijs zijn voor de juistheid van de CFT. Dat klopt wat ons betreft volkomen.

POS vindt wel dat zijn classificatie ondersteund wordt door Fastrak en EMG metingen in het laboratorium.

Daar is wat ons betreft geen enkele sprake van.

## 8. Discussion

For this case subject it is not known whether pain caused the changes in motor control or whether motor control changes lead to pain, or both. However, we hypothesize that the improvement in pain intensity and disability was primarily due to the improvement in her spine motor control, which in turn reduced the peripheral nociceptive drive of pain.

### STEP opmerking:

POS zegt hier dat zijn hele aanpak een hypothese is en dat hij denkt dat de verbeteringen te danken zijn aan de absurde training van lokale segmentale motorische controle met bekkenbodemp, ademhaling, transversus abdominis en multifidus.

Al die manueel therapeutische onzin achterwege laten en mensen eenvoudig met STEP rugscholing het orthopedische basisprincipe leren toepassen is ruim voldoende, dit werkt veel sneller en is veel beter met het oog op recidiefpreventie.

## 9. Conclusion

This case study illustrates the use of O'Sullivan's CS to guide physiotherapy intervention for a patient with a classification of multi-directional MCI. The kinematic and EMG data support the classification and demonstrated pre-intervention an impairment in the control of the spine during functional movement tasks. Following a motor learning intervention the altered motor control was normalized and was associated with reductions in pain disability and movement-based fear. Ultimately, further research in the form of RCTs is required, comparing intervention based on the CS to other approaches. This is an essential final step to validate this CS-based approach before its widespread use can be advocated (Dankaerts et al., 2006a).

## STEP opmerking:

POS zegt hier natuurlijk dat zijn classificatie multidirectioneel MCI en zijn CFT aanpak ondersteund wordt door Fastrak en EMG metingen en dat om de juistheid echt te bewijzen er verder onderzoek met een RCT nodig is.

Wat ons betreft kan, of beter eigenlijk, moet deze aanpak de prullenbak in en volgen we het rationaliteitsprincipe van de geneeskunde en passen we het orthopedische basisprincipe toe : **realiseer en leer mensen overbelasting tijdens het natuurlijk herstel te voorkomen met rugscholing die ook op recidiefpreventie is gericht.**

Once she had the ability to assume a **neutral lordosis** in weight bearing (sitting and standing) with co-contraction of the transverse abdominal wall this was incorporated into static holding tasks and dynamic tasks such as single leg stand, sit-stand, squat and lifting

### **Opmerking STEP:**

Het enige dat POS goed heeft gedaan is dat hij trachtte patiënten in een neutrale lordose te laten bewegen en hen waarschuwde een tijdlang maximale flexie te voorkomen.

In feite heeft hij bewerkstelligd dat er minder flexieprovocatie plaatsvond en de belastbaarheid en de motoriek veranderingen zich zo natuurlijk herstelden.

Maar om hier nu zo'n raar verhaal aan vast te plakken met sensitiviteit, motore controle afwijkingen, multifactoriële oorzaken en mensen met transversus abdominis en multifidus geneuzel lastig te vallen, is volkomen absurd.

### **Dat kan en moet veel eenvoudiger.**

De belastbaarheid laat je toenemen door het rationaliteitsprincipe van de geneeskunde, het orthopedische basisprincipe, toe te passen: **realiseer en leer mensen overbelasting tijdens het natuurlijk herstel te voorkomen met rugscholing van veilig ruggebruik, die vooral ook op recidiefpreventie is gericht.**