

**Feature Commentary****MDT EDUCATION UPDATES**

*THE MCKENZIE INSTITUTE INTERNATIONAL EDUCATION COMMITTEE*

Since its development, the McKenzie Classification System has been subjected to scrutiny by researchers, academics and clinicians alike. It has been modified over time in response to clinical needs and research findings (e.g. removal of the numbering of derangement because it contributed to poor reliability). Minor revisions will be required from time to time to ensure the MDT classification system remains contemporary, continues to meet the accepted criteria for reliability, and contributes to better outcomes for patients when MDT is utilized.

The McKenzie Institute International Education Committee (IEC) has prepared this MDT Education Update to define and explain recent MDT terminology changes, particularly to ensure that those clinicians already Credentialed and Diplomates are aware.

These changes address:

1. OTHER Subgroup
2. Irreducible Derangement
3. Definitions of Derangement / Centralisation / Peripheralisation / Directional Preference

A key change agreed upon by the IEC is that capital letters should be used for the term OTHER to ensure that it is differentiated from when the word has alternative meanings.

It will take some time for this transition to occur in all the Institute's documentation, however the IEC asks that all faculty and providers of MDT make these changes effective immediately where appropriate.

The complete MDT Education Update is available on the pages following this introduction.

**Inside This Issue:**

- Feature Commentary
- A Clinician's Perspective
- Literature Review: Guest Commentary
- Literature Reviews
- Business & Marketing Corner



# MDT Education Updates

## Background

Since its development the McKenzie Classification system has been subjected to scrutiny by researchers, academics and clinicians alike. The MDT classification system has been modified over time in response to clinical needs and research findings (e.g. removal of the numbering of derangement because it contributed to poor reliability). Minor revisions will be required from time to time to ensure the MDT classification system remains contemporary, continues to meet the accepted criteria for reliability, and contributes to better outcomes for patients when MDT is utilized.

## 1. OTHER Subgroup

A common criticism is that the MDT Classification system is not comprehensive and does not allow for classification of all patients within the biopsychosocial model. This arises in part from the lack of understanding from those external to the Institute, that the MDT classification system does have a 4<sup>th</sup> category – OTHER. However the criteria for the identification of the subgroups of Spinal or Extremity OTHER and the management of those patients is not currently well described in the MDT educational programme.

The use of MDT in the extremities has expanded the importance of OTHER to ensure that all patients with musculoskeletal symptoms can be classified, and the fact that MDT is a comprehensive system of classifying musculoskeletal conditions has been emphasized.

In response to these factors the focus on OTHER within the MDT classification system has been expanded. For both the Spine and the Extremities the subgroups of OTHER have been defined and criteria established (see Tables 1 and 2 on the following pages). The management of each subgroup will be determined by what is currently supported in the literature. It should be emphasised that classification into one of the OTHER subcategories only occurs when Derangement, Dysfunction and Postural syndromes have been excluded.

The teaching of the subgroups of OTHER will become an integral part of the McKenzie Institute International Education Programme and discussion on the management of the subgroups will be included in the Part C and D course. A summary article describing Extremity OTHER has been published and a similar article for the spine is being prepared to help ensure that non-MDT trained clinicians become aware of this development.



Table 1: McKenzie Classification: Spinal OTHER

Serious Pathology (List is not exhaustive)		
Category	Clinical Findings (Red Flags)	Clinical Examples
<b>Cancer</b>	Age >55, <b>history of cancer</b> , unexplained weight loss, progressive, not relieved by rest.	
<b>Cauda equine syndrome / cord compression</b>	Bladder retention, bowel incontinence, saddle anaesthesia, global or motor weakness in legs. Clumsiness in legs.	
<b>Spinal fracture</b>	History of severe trauma, older age, prolonged steroid use <u>OR</u> young, active with sport related back pain.	Compression fracture, stress fracture of the pars
<b>Spinal related infection</b>	Fever, malaise, constant pain, all movements worsen.	Epidural abscess, discitis
<b>Vascular</b>	Vascular disease, smoking history, family history, age over 65, male>female.	Abdominal aortic

Subgroup	Definition	Criteria (common)	Clinical Examples
<b>Chronic pain syndrome</b>	Pain-generating mechanism influenced by psychosocial factors or neurophysiological changes	Persistent widespread pain, aggravation with all activity, disproportionate pain response to mechanical stimuli, inappropriate beliefs and attitudes about pain.	
<b>Inflammatory</b>	Inflammatory arthropathy	Constant pain, morning stiffness, excessive movements exacerbate symptoms.	RA, sero-negative arthritis
<b>Mechanically inconclusive</b>	Unknown musculoskeletal pathology	All other classifications excluded. Symptoms affected by positions or movements <b>BUT</b> no recognisable pattern identified <b>Or</b> inconsistent symptomatic and mechanical responses on loading.	
<b>Mechanically unresponsive radiculopathy</b>	Radicular presentation consistent with a currently unresponsive nerve root compromise	Symptoms presenting in a radicular pattern in the upper or lower extremity. Accompanied by varying degrees of neurological signs and symptoms. There is no centralisation and symptoms do not remain better as a result of any repeated movements, positions or loading strategies.	
<b>Post-surgery</b>	Presentation relates to recent surgery	Recent surgery and still in post-operative protocol period.	
<b>SIJ / Pregnancy related pelvic girdle pain (PGP)</b>	Pain-generating mechanism emanating from the SIJ or symphysis pubis	Three or more positive SIJ pain provocation tests having excluded the lumbar spine and hip.	If related to pregnancy: PGP
<b>Spinal stenosis</b>	Symptomatic degenerative restriction of spinal canal or foramina	<b>Lumbar Spine:</b> older population, history of leg symptoms relieved with flexion activities and exacerbated with extension, longstanding loss of extension. <b>Cervical Spine:</b> arm symptoms consistently produced with closing foramen, abolished or decreased with opening.	Lumbar stenosis, cervical lateral foraminal stenosis
<b>Trauma / recovering trauma</b>	Recent trauma associated with onset of symptoms	Recent trauma associated with onset of constant symptoms / recent trauma associated with onset of symptoms, now improving and pain intermittent.	Post whiplash



Table 2:McKenzie Classification: Extremity OTHER

Serious Pathology (List is not exhaustive)		
Category	Clinical Findings (Red Flags)	Clinical Examples
<b>Cancer</b>	Age >55, <b>history of cancer</b> , unexplained weight loss, progressive, not relieved by rest.	
<b>Fracture</b>	History of significant trauma (If osteoporosis present minor trauma.) Loss of function. All movements make worse.	

Subgroup	Definition	Criteria	Clinical Examples
<b>Articular structurally compromised</b>	Soft tissue and/or bony changes compromising joint integrity	Mechanical symptoms (ROM restricted, clunking, locking, catching). May have sensation of instability. Long history of symptoms or history of trauma. Irreversible with conservative care.	Late stage OA, dislocation, labral tear, cruciate ligament rupture, irreducible meniscal tear
<b>Chronic pain syndrome</b>	Pain-generating mechanism influenced by psychosocial factors or neurophysiological changes	Persistent widespread pain, aggravation with all activity, disproportionate pain response to mechanical stimuli, inappropriate beliefs and attitudes about pain.	Regional pain syndromes
<b>Inflammatory</b>	Inflammatory arthropathy	Constant pain, morning stiffness, excessive movements exacerbate symptoms.	RA, sero-negative arthritis, some stages of OA
<b>Mechanically inconclusive</b>	Unknown musculoskeletal pathology	All other classifications excluded. Symptoms affected by positions or movements <b>BUT</b> no recognisable pattern identified <b>Or</b> inconsistent symptomatic and mechanical responses on loading.	
<b>Peripheral nerve entrapment</b>	Peripheral nerve entrapment	No spinal symptoms. Local paraesthesia / anaesthesia. May have local muscle weakness.	Carpal tunnel syndrome, myalgia paraesthetica
<b>Post-surgery</b>	Presentation relates to recent surgery	Recent surgery and still in post-operative protocol period.	
<b>Soft tissue disease process</b>	A fibroblastic or degenerative disease process affecting inert soft tissue with unknown or disputed aetiology	Each disease process has a unique clinical presentation, natural history and response to a variety of interventions.	Frozen shoulder, Dupuytren's, plantar fascia syndrome
<b>Trauma / recovering trauma</b>	Recent trauma associated with onset of symptoms	Recent trauma associated with onset of constant symptoms / recent trauma associated with onset of symptoms, now improving and pain intermittent.	
<b>Vascular</b>	Symptoms induced by poor blood supply due to pressure increase in a closed anatomical space	Below knee symptoms, predominantly in younger athletes. Consistently induced by exercise or activity. May have pain and /or paraesthesia in field of local cutaneous nerve and local swelling. Muscle may feel tight or full.	Compartment syndrome



## 2. Irreducible Derangement

The term Irreducible Derangement has gradually become an integral part of the MDT classification system. Although Robin McKenzie did use the term to describe derangements with advanced discal pathology which did not respond mechanically it wasn't until the revision of text books that Irreducible Derangement became an "independent classification".

This caused "issues" in two ways:

1. Research data on the prevalence of derangements. Some studies have included "irreducible data" under the classification of derangement, whilst other studies have had a separate classification of "irreducible derangement". The result being difficulty in comparing prevalence studies.
2. Teaching – the criteria for the use of the classification of "irreducible derangement" or the use of the classification "mechanically inconclusive" under "Other" was never established. During patient demonstrations on courses non-responsive "derangements" could either be called irreducible derangements or mechanically inconclusive depending on the opinion of the particular faculty. This had potential to result in confusion for course participants.

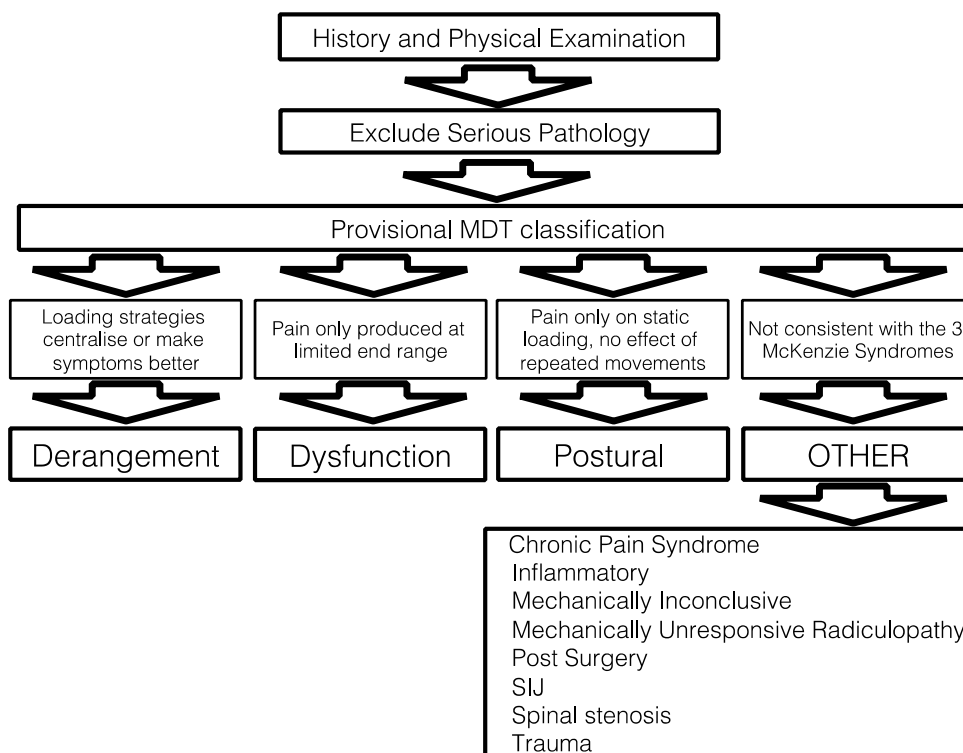
Following discussion with Robin McKenzie in March 2013, he agreed that the term Irreducible Derangement should cease being used and that the group of patients that appeared to be "derangements", but did not respond over a period of 3-5 sessions, should be classified under "Other" either as Mechanically Inconclusive or Mechanically Unresponsive Radiculopathy (MUR). The reason for the distinction between the two is that those with the radiculopathy may need other intervention such as surgery.

Definitions of these two terms follows:

Mechanically inconclusive	Unknown musculoskeletal pathology	All MDT Syndromes and OTHER subgroups are excluded.  Symptoms affected by positions or movements <b>BUT</b> no recognizable pattern identified <b>Or</b> inconsistent symptomatic and mechanical responses on loading.
Mechanically unresponsive radiculopathy	Radicular presentation consistent with a currently unresponsive nerve root compromise	Symptoms presenting in a radicular pattern in the upper or lower extremity.  Accompanied by varying degrees of neurological signs and symptoms.  There is no centralisation and symptoms do not remain better as a result of any repeated movements, positions or loading strategies over a few days/sessions



The Classification Algorithm as it will now be taught is shown below:



### 3. Definitions of Derangement / Centralisation / Peripheralisation / Directional Preference

The definitions of Derangement, Centralisation, Peripheralisation and Directional Preference have been modified slightly to ensure they are inclusive of what is seen in clinical practice. Again the changes were driven by the need for consistent terminology when teaching students.

#### ❖ Derangement

Derangement Syndrome is a clinical presentation associated with a mechanical obstruction of an affected joint. Directional Preference is an essential feature and Centralisation is an important phenomenon observed in the spine.

#### ❖ Centralisation / Centralising / Centralised

- **Centralisation** describes the phenomenon by which distal pain originating from the spine is progressively abolished in a distal to proximal direction. This is in response to a specific repeated movement and / or sustained position and this change in location is maintained over time until all pain is abolished. As the pain centralises there is often a significant increase in the central pain. If spinal

pain only is present, this moves from a widespread to a more central location and then is abolished.

- **Centralising** means that during the application of loading strategies distal pain is being abolished. The pain is in the *process* of becoming centralised, but this will only be confirmed once the distal pain remains abolished.
- **Centralised** means that as a result of the application of the appropriate loading strategies the patient reports that all distal pain has abolished and now the patient only has back pain. The central back pain will then continue to decrease and abolish.

#### ❖ Definition of Peripheralisation / Peripheralising / Peripheralised

- **Peripheralisation** describes the phenomenon by which proximal symptoms originating from the spine are progressively produced in a proximal to distal direction. This is in response to a specific repeated movement and/or sustained position and this change in location of symptoms is maintained over time. This may also be associated with a worsening of neurological status.
- **Peripheralising** means that during the application of loading strategies distal symptoms are being produced. Symptoms are in the *process* of becoming peripheralised but this will only be confirmed once the distal symptoms remain.
- **Peripheralised** means that as a result of the application of the inappropriate loading strategies the patient reports that the distal symptoms that have been produced remain.

#### ❖ Directional Preference

Directional Preference describes the clinical phenomenon where a specific direction of repeated movement and/or sustained position results in a clinically relevant improvement in either symptoms and/or mechanics though not always the Centralisation of the symptoms. It is an essential feature of the Derangement Syndrome.

#### ❖ Differences between Centralisation and Directional Preference

Directional Preference encompasses a broader range of responses than Centralisation. **Centralisation** refers to the lasting change in the location of symptoms as a result of loading strategies, whereas **Directional Preference** results in a lasting improvement in symptoms and / or mechanics though not always a change in location of pain. Thus all centralisers have a directional preference **But** not all those who have a Directional Preference are centralisers.



**CASE REVIEW: A CLINICIAN'S PERSPECTIVE****Is the Patient Shifted or Not?***Kimberly Greene, PT, Dip. MDT*

Many MDT practitioners have difficulty with determining whether or not a patient displays a relevant lumbar lateral shift deformity. The literature supports poor to good reliability when examining a lateral shift<sup>123</sup> supporting the struggle that therapists have with this aspect of the examination. MDT's definition of a relevant lateral shift deformity consists of the following criteria<sup>4</sup>:

- a. Upper body is visually shifted to one side
- b. Onset of shift occurred with back pain
- c. Patient is unable to correct shift voluntarily
- d. If patient is able to correct shift, they can't maintain the correction
- e. Correction affects the intensity of symptoms
- f. Correction causes centralization or worsening of peripheral symptoms

Two questions that often arise are whether all criteria have to be present, and, if not, how many must be present to determine whether the patient has a relevant deformity.

I recently treated a patient that challenged the criteria. The patient had longstanding history of asymmetrical right back, hip and leg symptoms. She describes that in the last two months she began shifting. Rather than describing the episodic history typical with a lateral shift, she reported symptoms lasting more than a year with the deformity occurring fairly recently. Since shifting two months ago, she reported an increase in pain intensity and decreased function; therefore, supporting a worsening scenario. She met three of the six criteria (a, d, and e). She reported shifting associated with functional activities including prolonged sitting, prolonged walking and dancing.

The physical exam revealed the following:

- She had a visually obvious contralateral left lateral shift deformity
- Movement loss: mod loss Ext, mod loss R SGIS, min loss Flex, no loss L SGIS
- No change in symptoms with posture correction
- Negative neurological exam and negative cross-leg pain
- Any attempt at extension worsened leg symptoms
- Self-correction improved her shift and symptoms immediately

After self-correction without an extension component, she continued to display a slight shift to the left, but was much improved. In addition, her symptoms and motion improved with less pain associated with weight bearing. She did not centralize; however, her most distal symptom decreased in intensity suggestive of directional preference. Since she was still slightly shifted, I attempted manual shift correction. The technique produced and worsened her right leg. She was able to improve with self-correction without the extension component and was sent home with self-correction without extension as her reductive exercise.

She continued with self-correction for two visits with functional and symptomatic improvements each visit, but mechanically remained the same with a slight shift to the left. Any attempt at manual shift correction worsened leg symptoms. Any attempt at extension worsened leg symptoms.

On the third visit, she reported "sometimes the exercise would help and sometimes the exercise would make my leg worse". She continued to report a shift with prolonged periods of sitting, standing and dancing, but was now able to perform the activities for longer periods before the shift occurred. She continued to display a slight left shift and extension techniques continued to worsen leg symptoms. Since she had plateaued with self-correction and worsened with manual correction, an alternative lateral loading strategy was trialed, sustained left rotation in flexion. The patient responded with a temporary improvement in standing posture; however, within several minutes the shift returned. End range SGIS consistently produced leg pain with baseline assessment. She was sent home with sustained left rotation in flexion.



After three visits of sustained left rotation in flexion with force progressions including mobilization, she was finally able to perform extension techniques without worsening leg symptoms. However, mechanically she continued to display a slight left lateral shift within minutes of performing her reductive exercises. Her right lateral movement remained slightly limited and symptomatic, but she continued to make functional gains.

On the sixth visit, she reported that she continued to shift with prolonged activities; however, to my surprise, she shifted occasionally without symptoms. This was the first time that I recalled a patient reporting shifting without symptoms. The patient's clinical picture illustrates the challenges of being able to identify a relevant lateral shift deformity:

- a. Upper body being "visually obvious"; degree of shift can vary each treatment session making it difficult to determine relevance.
- b. Shift may occur **after** onset of back pain or leg symptoms.
- c. After shift correction, trunk may continue to remain visually shifted after the lateral component is reduced. Or, the shift may be visually obvious and unable to fully reduce lateral component.
- d. The centralization phenomenon may not be observed in the chronic population<sup>5</sup> therefore, defining centralization or worsening of symptoms is more difficult in the chronic presentation.

This patient demonstrates the point that identification and treatment of a lateral shift deformity is very challenging. Provided below are some tips to help therapist improve their abilities to identify and treat lateral shift deformities:

*Tips for being able to **identify** a lateral shift deformity:*

1. Assess the patient from the front and back. Often, the shift is more obvious from the front than from the back. Assess the linea alba. Remove their shirt and assess distance between arm and trunk.
2. Assess the patient's posture immediately after they have been sitting. The shift may be more obvious if they have been sitting in the waiting room or after spending time in the car.
3. If you are unsure if the shift is relevant, assess extension techniques with caution. This is especially critical in the chronic population. Worsening of standing posture, peripheralization, and decreased lateral movement are often produced with extension techniques if the shift is relevant.
4. Assess the patient's walking tolerance. Relevant lateral shifts will often worsen with prolonged walking or are unable to walk more than a few minutes without producing a shift.
5. Ask the patient if they get "crooked". Most patients know if they have a deformity and will be able to describe the side that they shift. On rare occasions, patients will describe an alternating shift.

*Tips for **treating** an acute lateral shift deformity:*

1. Remember that the acute lateral shift deformity takes time and patience. Even after getting a patient perfectly straight with time using manual shift correction, they can return to shifted position within minutes of standing or sitting.
2. Constantly monitor the most distal symptom when performing manual shift correction or self-correction. Focusing only on mechanics without monitoring the most distal symptom can result in a poor outcome.
3. Consider mid-range SGIS. Some patients need dozens if not hundreds of small mid-range SGIS before attaining full over correction.
4. If the patient with an acute shift can refrain from sitting, they may respond quicker than returning to an office chair. Taking a few days off work is not an unreasonable request for an acute lateral shift deformity.
5. Many patients need to perform 30-40 or more repetitions/per hour of self-correction for several days to maintain an erect posture.
6. Once a shift is corrected, emphasize importance of equal weight bearing in standing. Many patients return to placing more weight onto the unaffected leg even though their symptoms and posture has improved.
7. With shift correction, not all patients can tolerate restoring lordosis on Day 1; sometimes patients can't tolerate REIS due to peripheral symptoms. Try to be especially cautious with radiculopathy.

*Tips for application of manual shift correction:*

1. **Patient Position:**

Prior to starting, make sure that patient attempts to place weight equally through both legs with feet shoulder width apart (mirror can be helpful). The knee in which the patient has shifted away from should remain straight to allow for more weight bearing through the lumbar spine. Patient's elbow bent 90 degrees toward side of shift.

2. **Therapist Position:**

Therapist superoanterior shoulder on distal 1/3 humerus of side in which the patient is shifted. Therapist should make sure that the elbow clears the ilium prior to correction. Wide base of support with hands interlocking opposite ilium and head behind the patient.

3. **Force application:**

Slow and gradual pressure with equal amounts of force pushing trunk away with shoulder and pulling pelvis towards therapist. Unlike mobilizations, manual shift correction should only partially release while working slowly toward end-range every three to five seconds. In a slightly over corrected position, guide patient into extension to restore lordosis. Assure line of drive allows for hips to translate forward.



*Nomenclature reminders when discussing lateral shifts:*

- Relevant lateral shift=deformity=derangement always. The term "lateral shift" is not always suggestive of derangement unless modified with "relevant" or "deformity". Many patients display an anatomical lateral shift without symptoms.
- All relevant lateral shifts have a lateral component (unless mechanically unresponsive radiculopathy which is a higher percentage in this population). Many patients with a lateral component do not display a relevant lateral shift.
- The lateral shift is always described in relation to the direction of the shoulders. In contrast, REIL with hips off center is always described in direction of the hips.

*Other presentations that can mimic a relevant lateral shift deformity:*

- Any musculoskeletal lower extremity pathology, especially painful hip.
- Mechanically Unresponsive Radiculopathy
- Sacroiliac Joint
- Red Flags: fracture, discitis, cancer

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2. Clare H, Adams R, Maher C. (2005). Reliability of Detection of Lumbar Lateral Shift. *Journal of Manipulative Physiotherapy*; 26:476-480.
3. Werneke MW, Deutscher D, Hart DL, Stratford P, Ladin J, Weinberg J, Herbowy S, Resnik L. (2014 Feb 1). McKenzie lumbar classifications: inter-rater agreement by physical therapists with different levels of formal McKenzie post-graduate training. *Spine*; 39(3):E182-90.
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**LITERATURE REVIEW: GUEST COMMENTARY****When the Foundation is Shaken***Georg Supp, PT, MT, Dip. MDT***Quo Vadis Reliability?**

In the preface of Robin McKenzie's book *The Lumbar Spine: Mechanical Diagnosis and Therapy* (2003), Nik Bogduk wrote about MDT: "...studies have sought the evidence for its reliability, validity and efficacy. Its reliability is now beyond doubt...".

The evidence concerning the topic of reliability in regards to MDT has been overwhelmingly positive. In an area where other systems bob up and down in the Stone Age, McKenzie has an impressive track record with convincing evidence. The superiority in terms of reliability is easy to explain. Within MDT, palpation doesn't play any role and inspection just a marginal role. A standardized history taking and repeated movements performed by the patients themselves lead onto classification and management.

Evidence supporting the reliability of MDT has been established for many years (Razmjou et al. 2000, Kilpikoski et al. 2002, Clare et al. 2003, Clare et al. 2005, May and Ross 2009, Abady et al. 2014, May et al. 2006). Since Spring 2014, everything seems to be different. The 'MDT tribe' is slowly waking up from a study published by Mark Werneke and colleagues that seemingly unsettles the foundation pillars of the system, and I hope this article will encourage discussion.

**The Study*****McKenzie Lumbar Classification: Inter-rater Agreement by Physical Therapists with Different Levels of Formal McKenzie Postgraduate Training***

Werneke MW, Deutscher D, Hart DL, Stratford P, Ladin Joel, Weinberg J, Herbowy S, Resnik L. (2014 Feb 1). *Spine* (Phila Pa 1976);39(3):E182-90. doi: 10.1097/BRS.0000000000000117

**Study Design:** Inter-rater chance-corrected agreement study.

**Objective:** Mark Werneke (USA), Daniel Deutscher (Israel) and their team examined whether there is a relationship between the level of formal McKenzie postgraduate training – without the Credentialing Exam (CE) – and reliability of educated clinicians in evaluating back pain patients. The researchers examined reliability concerning the following classification variables:

- main McKenzie syndromes
- presence of lateral shift
- derangement reducibility
- directional preference
- centralization

**Summary of Background Data:** Minimal level of McKenzie postgraduate training needed to achieve acceptable agreement of McKenzie classification system is unknown.

**Methods:** 47 Israeli physical therapists with an average professional experience of 14 years completed multiple sets of two independent successive examinations. Therapists conducted history taking and clinical examination in a one-to-one situation. A ten minute break had been scheduled between the two examinations.

The authors gathered data according to training level in three groups: Part A+B, Part C, and Part D. Agreement was assessed with Kappa coefficients and associated 95% confidence intervals. A minimum Kappa threshold of 0.60 was used as a predetermined criterion for level of agreement acceptable for clinical use.

**Results:** Raters examined 1662 patients in 25 clinics (mean age = 51 ± 15, range 18–91, 57% females, 57 % chronic). Eventually, the researchers were able to analyze data of 1587 patients. Data distributions were not even and were highly skewed for all classification variables. No training level studied had acceptable agreement for any McKenzie classification variable. Agreements for all levels of McKenzie postgraduate training were higher than expected by chance for most of the classification variables except

Parts A + B training level for judging lateral shift and centralization and Part D training level for judging reducibility. Agreement between training levels Parts A+B, Part C, and Part D were similar with overlapping 95% confidence intervals.

An overview of the Kappa values:

Three syndromes and OTHERS: 0.40 (Part A/B), 0.44 (Part C) and 0.37 (Part D)

Lateral Shift: 0.11 (A/B), 0.37 (C) and 0.43 (D)

Reducibility of Derangement: 0.26 (A/B), 0.26 (C) and 0.11 (D)

Directional Preference: 0.39 (A/B), 0.27 (C) and 0.33 (D)

Centralization: 0.11 (A/B), 0.35 (C) and 0.39 (D)

**Conclusion:** Results indicate that the level of inter-rater chance-corrected agreement of the McKenzie classification system was not acceptable for therapists at any level of formal McKenzie postgraduate training. This finding raises concerns about the clinical utility of the McKenzie classification system at these training levels. Additional studies are needed to assess agreement levels for therapists who receive additional training or experience at the McKenzie credentialed or diploma levels.

### **Comment**

Running a reliability study with more than 1600 patients is an impressive task. Mark Werneke, Daniel Deutscher and their team deserve the greatest respect for this accomplishment. I'm not aware of any reliability study that has used such high numbers. The design of former studies did not follow recommended blinded assessment and number of raters and patient guidelines for reporting reliability. But what are the consequences of these results on the McKenzie system and its users? There may be a short answer favoring a killer argument, and there are multiple, slightly longer, but helpful answers.

### ***The Short Answer:***

#### **Qualification of therapists**

At the end of a driving school, after having taken all the required lessons, a driving test has to be attended. Only those who pass the test fulfill a minimal standard and receive a driver license. During the driving lessons, it may be obvious that some student drivers are fast learners, are able to operate confidently, and rapidly become trustworthy. Other student drivers need more time and more instruction. A successful driving test certifies who is allowed to drive a car on his own. No matter how the individual driving lessons went, the exam ensures the quality. This can be compared quite logically with MDT training. CE participants have to prove their competency. For the training from Part A to CE, it's not the principle of 'addition', but the principle of 'multiplication' that applies. If one factor is zero, the result is, consequently, also zero – at least in terms of the completeness of the training. Of course, there are some participants who are willingly adjusting their clinical reasoning according to MDT as they work through the courses. However, crucially, there are more clinicians who are considering MDT just as a "tool in their PT toolbox"; they are mixing their new knowledge with their old, combining approaches and systems. When someone passes the CE, the probability will increase that s/he will value MDT not as just a tool, but as the toolbox itself.

For that reason, former studies on prevalence (Hefford 2008, May and Aina 2012), reliability (Razmjou et al. 2000, Kilpikoski et al. 2002, Clare et al. 2003, Clare et al. 2005, May and Ross 2009, Abady et al. 2014) and effectiveness (Long et al. 2004, Rosedale et al. 2014, Machado et al. 2010) did well by using the CE or the Diploma in MDT as a minimal standard for the inclusion of clinicians. Researchers who utilized therapists without this minimal level got as comparably poor results as Werneke and Deutscher (Riddle and Rothstein 1993, Kilby et al. 1990). The authors of the current study wisely considered this aspect when coming to their conclusion. Their doubts about the utility of the McKenzie classification are referring to the examined training levels and not to the system in general.

Whether or not a driving school generates good drivers should be judged by examining the successful examinees and not by the student drivers during their first driving lessons.

### ***The Longer Answers:***

#### **The study represents daily clinical practice**

The results are hardly surprising. They mirror very well daily clinical practice.

## **Classification**

One strength of the McKenzie system is the immediate and consequent involvement of the patient – not only in terms of management, but also concerning diagnosis. The provisional classification on day one is only a snapshot. Very often, it is only after a trial of initial treatments over the first few sessions that the clinician is able to be sure about the classification and management. Classification by multiple sessions has shown superiority regarding final diagnosis and prognosis as compared to a single session based classification (Werneke and Hart 2003). This accounts to a special degree for chronic patients, which account for the majority in Werneke's study. The fact that clinicians categorize differently in the first session would only be clinically relevant and disappointing if they would not be able to adjust their classification due to the clinical presentation at certain points in time. Audrey Long has shown that a change of the treatment strategy, according to the responses on trial treatments, will lead to a significant improvement of long term results (Long et al. 2008).

## **Lateral Shift**

Reliable visual detection of a lateral shift had been revealed as wishful thinking by many previous studies (Donahue et al. 1996, Clare et al. 2003, Seymour et al. 2002, Kilpikoski et al. 2002). To accept this as a fact should be even easier after this paper.

## **Directional Preference (DP)**

The same thoughts as for classification apply here. Of course, it is desirable to find the particular DP on day one, but in everyday clinical practice it commonly needs one or multiple trial treatments to achieve this.

## **Reducibility**

Fortunately, future generations of MDT clinicians will not have to struggle with the oxymoron "Irreducible Derangement". Since Summer 2014, there exists only "Reducible Derangements" or just "Derangements". The McKenzie Institute International has adjusted and updated the classification due to the current "state of the clinical art". The category 'OTHER' now contains subcategories for the discontinued model "Irreducible Derangement".

Raters in the Israeli study did classify 83.5% of all back pain patients as Derangements, with 93% of them as "reducible". This aspect should raise concerns as the available evidence doesn't support such a high prevalence of Derangements (May and Aina 2012). A certain overemphasis of Derangement and Directional Preference in MDT training may play an important role here.

## **Reliability: statistical versus clinical?**

Reliability is usually appreciated as the foundation pillar of a system for diagnosis and management. But, reliability is a dull sword if the classification system is not valid. The subgroup of stabilization within the Treatment Based Classification (Delitto et al. 1995) is a nice example for this disproportionateness. Tests for identification of this subgroup may be reliable (Rabin et al. 2013), but the validity of the Clinical Prediction Rule for stabilization is questionable (Rabin et al. 2014), the subgroup shows substantial overlap with other subgroups (Werneke et al. 2010, Apeldoorn 2014) and its ultimate impact on outcomes is in dispute (Henry et al. 2014).

In clinical research, the term reliability is commonly used in the context of classification and refers to particular variables which are determined in the initial evaluation – let's call this "statistical reliability". BUT, in daily clinical practice, what's happening over time during the course of treatment is more important. How reliably do clinicians handle their patients? Do they draw the same conclusions from symptomatic, mechanical and functional responses? It seems that there also exists "clinical reliability".

## **Beyond reliability: Why does McKenzie work?**

Reliable classification within the initial evaluation is ONE thing; a successful course of treatment is another. The recent publication of Daniel Deutscher is showing this quite impressively (Deutscher et al. 2014). After reliability, Deutscher investigated the efficiency of McKenzie trained physical therapists in terms of functional status and number of required treatment sessions. He analyzed data of more than 20,000 back pain patients. Results showed McKenzie trained therapists work more cost effectively and achieved better functional outcomes than therapists without MDT training. But, only marginal differences between training levels became apparent. Therapists who had attended a Part C course needed significantly less treatment sessions than clinicians that attended only Parts A and B.

### **So, why does McKenzie work?**

Directional Preference and Centralization are effective guidelines for the treatment of LBP patients (Surkitt et al. 2012, Long et al. 2004, 2008), but mechanical classification and directional oriented treatment represents only a cutout of MDT management. MDT emphasizes self-responsibility of patients. MDT trained clinicians provide their patients with understandable and empowering movement and posture strategies instead of intimidating them with patho-anatomic explanations. A clearly structured, active management approach functions in the framework of a biopsychosocial thought model (Takasaki et al. 2014). The mechanical examination using repeated movements should be also appreciated as an effective entry point to a fear releasing, movement oriented management. It's not only a standard procedure for the definition of a diagnostic category. Therapeutic alliance, instead of sole instructions for exercise programs, has a better chance of success (Ferreira et al. 2013).

### **Should all this have an impact on the MDT education?**

Besides all thoughts on the strength of MDT management and the reflection on "clinical reliability" of therapists, achieving better "statistical reliability" should be on the topic list for future MDT training programs. The current MDT educational program is outstanding, involving the participants and promoting an interactive learning experience.

There may be some potential in using more role plays instead of patient vignettes and forcing the participants to go actively through the evaluation process instead of analyzing a provided case study. Patient demonstrations on MDT courses are an integral part of the training, but watching an experienced clinician examining a patient can't replace the learning process of conducting a history taking and clinical examination on your own.

My heartfelt thanks to Mark and Daniel and the great Dennis Hart who passed before the study had been published. They rouse the McKenzie people with their brilliant studies. It is movement in the right direction – very much in line with Robin McKenzie.

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LITERATURE REVIEWS

**Summary and Perspective of Recent Literature**

*Stephen May, PhD, MA, FCSP, Dip. MDT, MSc (UK), Celia Monk, Dip Phys (Otago), Dip. MDT, MNZSP, MINZ and Chris Littlewood, BHSc (Hons), MSc, PhD, Dip. MDT, FHEA*

**Deutscher D, Werneke M, Gottlieb D, Fritz J, and Resnik L. (2014). Physical Therapists' level of McKenzie education, functional outcomes, and utilisation in patients with low back pain. *Journal of Orthopaedic and Sports Physical Therapy*; 44(12):925 – 936**

**Objective:**

To examine the relationship between the level of McKenzie education of physical therapists, patient functional outcomes and number of treatments given.

**Design:**

A longitudinal, prospective observational cohort

**Setting:**

The Physical Therapy Service, Maccabi Healthcare Services, Tel Aviv, Israel. This study involved staff and patients from 72 out-patient clinics throughout Israel.

**Patients:**

Inclusion criteria for the patients:

- Treated by the same Physical Therapist throughout the episode of care
- 18 years of age and older
- Lumbar spine was primary musculoskeletal impairment on admission to treatment
- Independently completed the lumbar-specific computerised adaptive test (LCAT)
- Had two or more treatments during their episode of care
- Was discharged from treatment

Inclusion criteria for the Physical Therapists:

- No formal MDT training prior to the study commencement
- Had worked for the Maccabi Healthcare services for at least one year
- Had at least one year's experience of working with patients with low back pain
- Participated in at least a Part A course during the study period
- Had an overall completion rate for patients of 40% or more
- Had at least 30 patients in the data set with completed episodes of care

**Intervention:**

The Maccabi Healthcare Service routinely collects data for all patients attending its 72 clinics throughout Israel. This study analysed data from patients who fit the inclusion criteria from April 2006 to December 2012.

As the objective of the study was to determine if having MDT training affected treatment outcomes, the MDT educational status for each treating therapist was also collected for that time of treatment. Normal treatment protocols were followed, and treatment given was determined by the therapist in accordance to the clinical reasoning process. On discharge, the patients completed the LCAT again to demonstrate any change in their functional status.

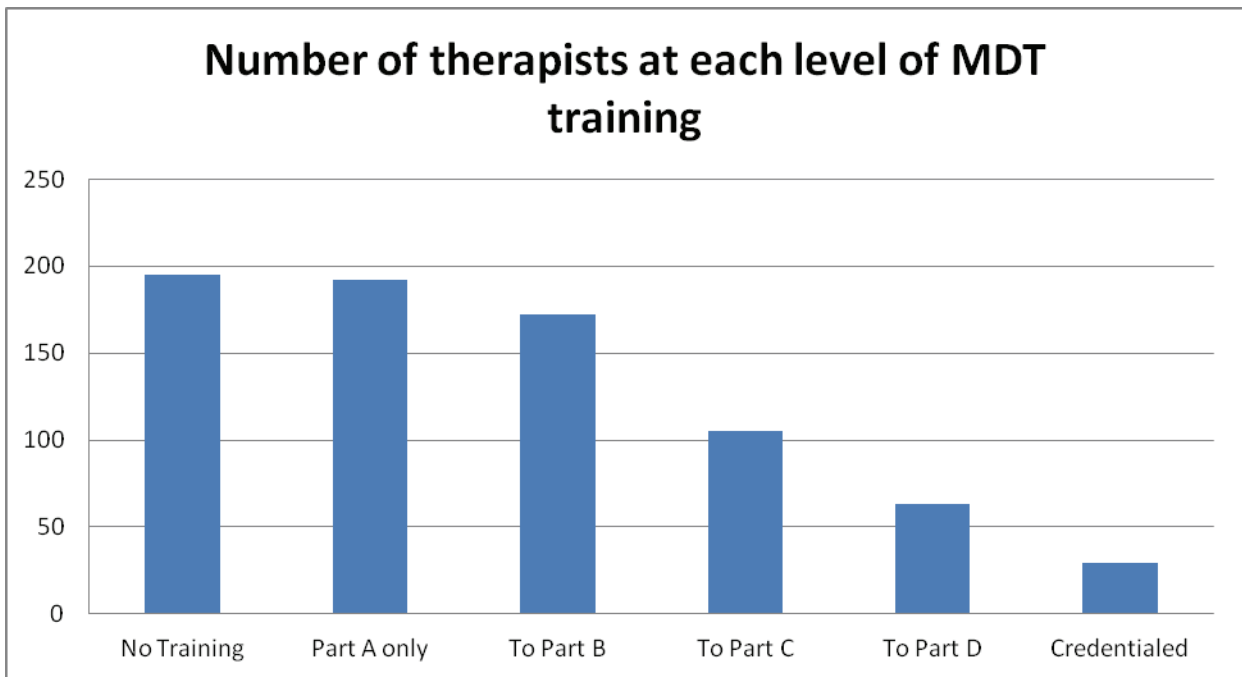
**Main Outcome Measures:**

1. The level of MDT training of the treating therapist at the time of the episode of care. This was one of six levels – no training, Part A only, to Part B, to Part C, to Part D, or Credentialed.
2. The Functional Status outcome for the patient at the end of the episode of care
3. The number of treatments required to achieve that Functional Status outcome.

**Main Results:**

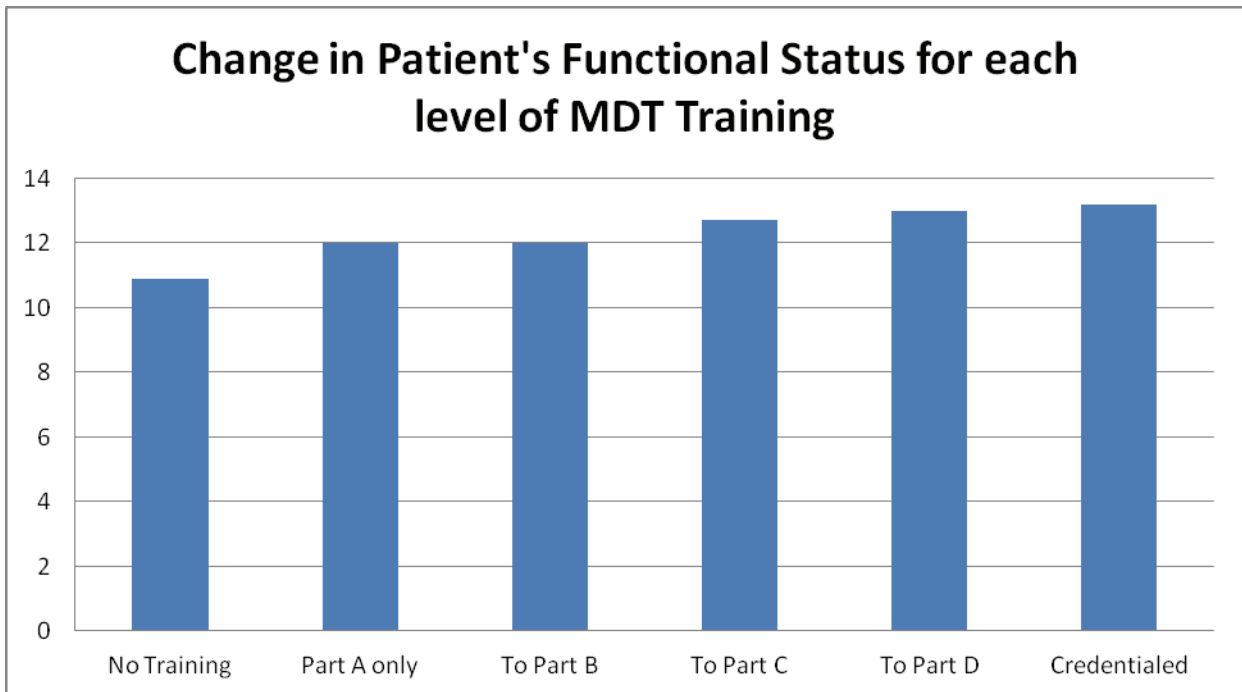
There were 195 physical therapists from 72 out-patient clinics throughout Israel who met the inclusion criteria over the six year study period. They all commenced the study with no training, and 29 completed the MDT educational programme through to Credentialed level.



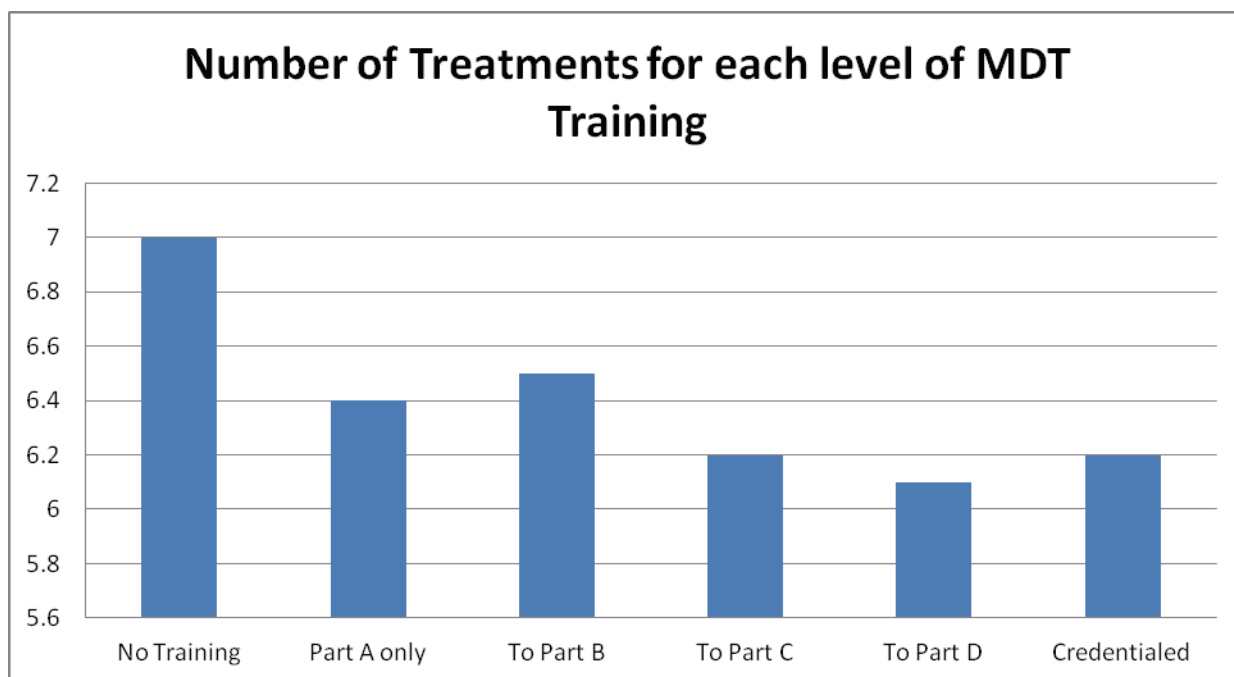


There were 20,882 patients involved in the study over the six year period.

After controlling for a number of comorbidities and treatment-related confounders, all MDT educational levels were significantly ( $p < 0.001$ ) associated with better functional outcomes compared to no training. There was an additional 0.7 to 1.3 Functional Status score improvement at discharge compared to no MDT education, with no significant differences between educational levels.



The number of treatments per episode of care was lower for patients treated by Physical Therapists with any MDT education compared to those with no training, by 0.6 to 0.9 fewer visits. Between 11% and 13% fewer visits for those treated by Physical Therapists with a MDT education level of Part C and above.



The small improvements in better functional outcomes for less treatments represented a 1.5% to 3% improved efficiency of the overall Maccabi Physical Therapy Health Service.

#### **Conclusions:**

Functional outcomes for patients receiving treatment for low back pain were higher for patients treated by Physical Therapists who had received any level of MDT training compared to those who had received no training. Additionally, patients who received treatment from therapists with MDT training had 0.6 – 0.9 fewer treatments, with the fewest treatments being given by therapists who had completed Parts C, D or were Credentialed therapists.

#### **Comments:**

This large study, involving 195 physical therapists and 20,882 patients in 72 clinics over a six year period, demonstrated the greatest difference in functional outcome and number of treatments given between no level of MDT training and completing only the Part A course. While the functional outcome only improved by one point, the number of treatment sessions fell by 1.5. These findings suggested some effectiveness of the Part A course content and delivery as the therapists were able to effectively apply their new knowledge and gain clinical improvements in their own settings immediately. Due to the large scale of this study, it has the statistical power for these findings to be reliable, so McKenzie Institute branches could potentially utilise these findings in their marketing strategies.

As with any study, there are limitations. We need to be careful that we use the information correctly, as the findings demonstrate that the more MDT training a therapist received the better their outcomes, but we do not know whether this was because of specific MDT treatment given or a increased level of confidence or clinical reasoning skills in the therapists, or merely chance.

This study also demonstrates the value in having electronic data collection for all patients, to enable these large scale studies to be performed without disrupting the normal treatment provided by a clinic. With the development and implementation of electronic patient management systems throughout the world, there is the potential for similar data to be collected by the many MDT credentialed therapists internationally. That is a very exciting thought and a potential for some very powerful research in the near future.

<http://www.jospt.org/doi/abs/10.2519/jospt.2014.5272#.VQbecONEi70>



**Rohlmann A, Conmuller T, Dreischarf M, et al. (2014). Measurement of the number of lumbar spinal movements in the sagittal plane in a 24-hour period. *European Spine Journal*; 23:2375-2384. DOI 10.1007/s00586-014-3588-0**

**Objective:**

The objective of this study was to measure the spinal movements in a 24-hour period of typical daily activities in asymptomatic individuals.

**Design:**

This study was a prospective design using data collected from an earlier study in 2012. In this earlier study, the reliability of the measurement tool was validated, and data collected.

**Setting:**

Julius Wolff Institute - Berlin, Germany

**Patients:**

429 subjects were involved in the initial study. The inclusion criteria were that the subjects had not had low back pain for the past six months and had not had spinal surgery. 208 of these subjects were then asked to wear the measurement tool for a 24 hour period to gather data for this study.

**Intervention:**

The Epionics SPINE measurement system was applied to each subject. This measurement tool consisted of two strips of 12 sensors which were taped to the skin to the left and right of the spine, at a mid-line distance of 15 cm. The base of each strip was at the level of the posterior superior iliac spine, with the top reaching approximately to the mid-thoracic region, depending on the height of the subject.

To calibrate each measurement tool and to gather the baseline measurements, the subjects were instructed to perform movements that achieved full spinal flexion and extension, left and right lateral bending, and left and right rotation. The subjects then returned to their normal daily activities, except for bathing to ensure the sensor strips remained in full contact with the skin. After a 24 hour period, the subjects returned and the data was downloaded and stored on a computer before being analysed.

**Main Outcome Measures:**

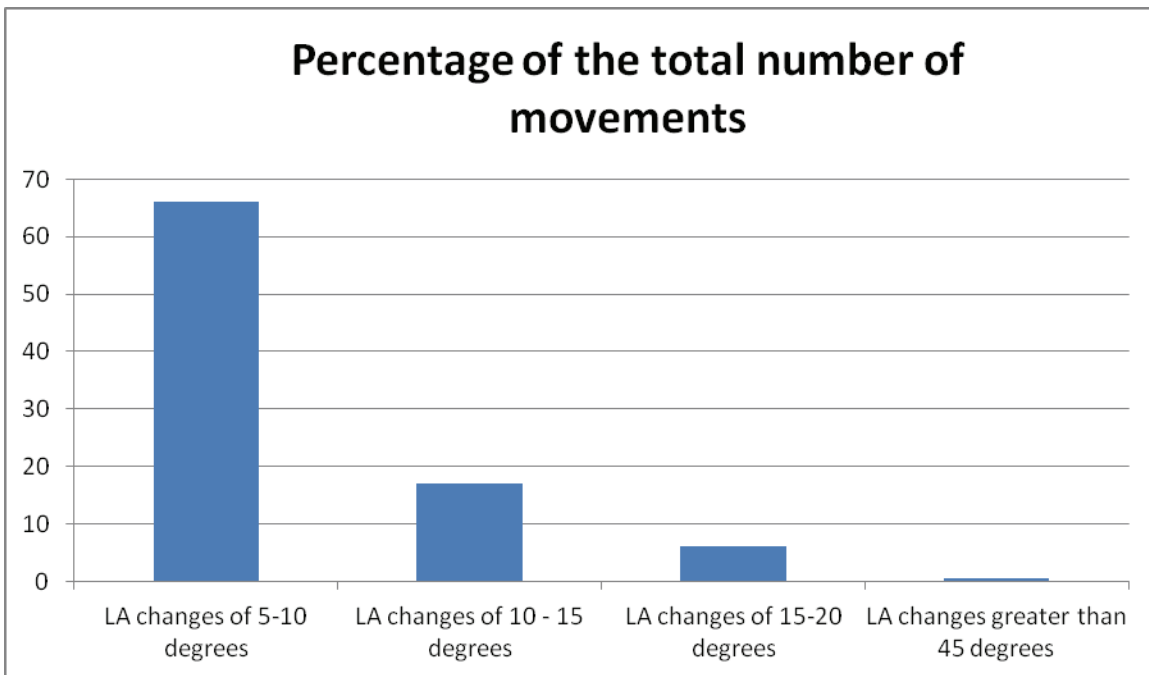
1. Number of movements within the flexion range of the lumbar spine
2. Number of movements within the extension range of the lumbar spine
3. The amount of time the subjects spent within certain ranges of the total ROM

**Main Results:**

Demographics:

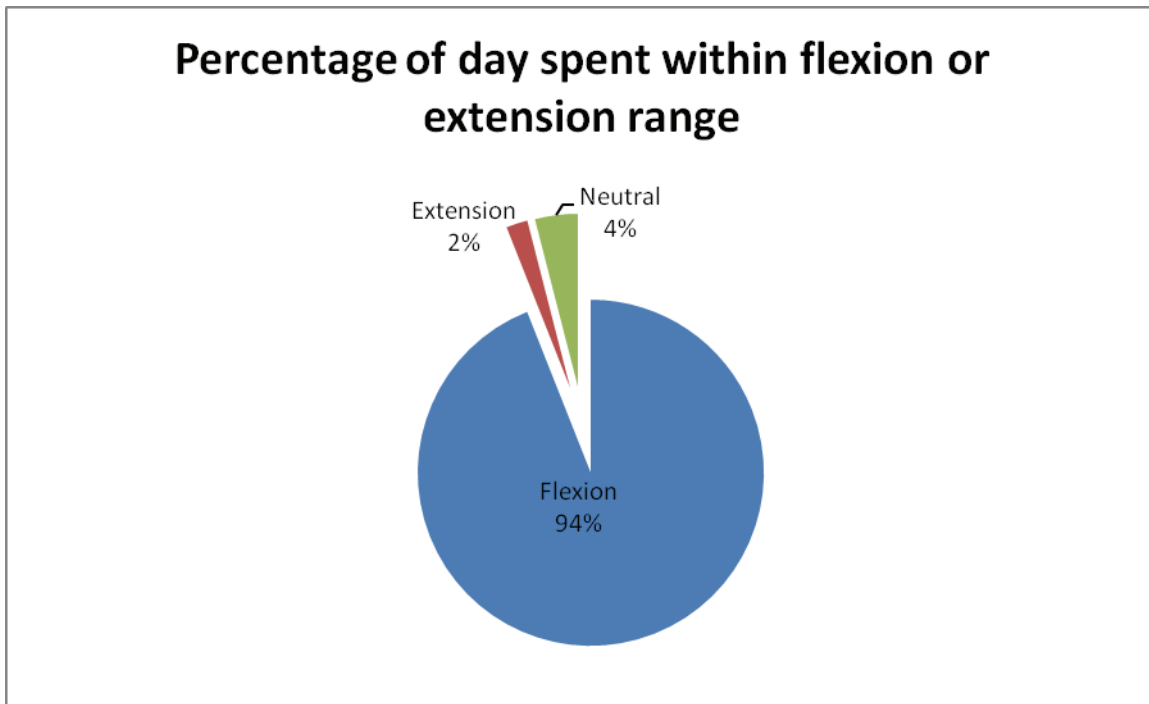
Total number of subjects	208
Number of females	115
Number of males	93
Aged 20-34 years old	92
Aged 36 – 50 years old	74
Aged 51-75 years old	42
Median BMI	22.6 kg/m <sup>2</sup>

The median total number of movements with a change in the lordosis angle (LA) greater than 5 degrees was approximately 4,400 within the 24 hour period. Most of these occurred within a small range of movement.



It is important to note that a change of LA does not indicate flexion or extension, as the change in angle was relative to the previous position, not relative to standing erect.

On average, full flexion was achieved 50 times within the 24 hour period, whereas full extension was achieved 0 times. 94% of the day was spent in the 0-50 degree range of flexion and 2% of the day (24 minutes) was spent in any extension relative to the standing position.



The BMI ranged from 17 to 26 kg/m<sup>2</sup> and had no significant effect on the number of LA changes. Females performed significantly more (29%) movements than males (4,978 for females, 3,846 for males). Age had a minor effect on the number of movements for males, with fewer movements in the older group. Age had no effect on the number of movements that females performed.

**Conclusions:**

The data illustrated the predominantly small range of movement of the spine during normal daily activities, the small amount of time spent in extension, and the majority of time spent in flexion.

**Comments:**

This study provided information about the type of movements of the lumbar spine performed by individuals without symptoms over a 24-hour period, and the proportion of time spent in flexion and extension. For MDT clinicians, it is not a surprise that only 2% of the day is spent in extension, and none of that time spent in full extension, compared to 50 times that the spine is fully flexed forwards, and 94% of the time spent in flexion.

An interesting observation was that 66% of the movements occurred within a very small range – only 5 to 10 degrees of movement. It appears that those movements are occurring within the flexion range, but of course may not be at full end-range. It is good to finally have some evidence about the number of movements and the type of movements that an individual without symptoms performs in a normal 24 hour period. What this research does not tell us, and nor did it attempt to do so, is if individuals with symptoms have a different movement pattern.

<http://link.springer.com/article/10.1007/s00586-014-3588-0>

## BUSINESS & MARKETING CORNER

### Incorporating Outcomes Makes Total Sense!

David Gallegos, ATC, Cert. MDT and Denise Campbell, PT, OCS, ATC, Dip. MDT

We hear it in every MDT course and discuss it with our patients daily, but I challenge you to reflect on patient empowerment and active patient involvement as 'operational principles' in both patient care and practice management. We have come to realize in 20 years of practicing MDT an excitingly unique principle in MDT vs. Non-MDT clinicians and even in great MDT vs. good MDT clinicians. The ability to serve as the agent for patient-involved decision making, clinician and patient education, injury prevention, and what we feel most important, is the sense of enjoyment achieved when helping in ways that transform the relationship from provider/patient to coach/teammate.

On a practice management level, this sense of duty is supported by the use of outcome tools. Many articles and discussions center on the use of outcomes to drive contract negotiations, greater reimbursement, justification of cash-based service models and competitive marketing strategies. These are great and much needed, but the true benefit of incorporating outcomes into MDT practice is the ability to improve patient care and extend the patient empowerment principle.

The shift in healthcare towards a value-driven pay for performance paradigm has highlighted the need to demonstrate and validate positive physical therapy outcomes. The McKenzie Method (MDT) has readily demonstrated positive patient outcomes and placed focus on validation through a commitment to research, study and publication. The new model will value these facets, but will require clear patient outcomes' reporting and an independent third party confirmation process.

Focus on Therapeutic Outcomes Inc. (FOTO) is a physical therapy outcome management system primed to support the MDT impact. FOTO is a patient-centered outcomes tool that provides a functional intake score and tracking through repeat assessments. The system is unique in that the outcomes report provides insight into psychosocial factors, predictive data on expected outcome scores, patient satisfaction and total expected visits / cost. The six million plus patient data sets allow for accurate prediction through risk adjusted scores. Age, chronicity, comorbidities, gender, fear, and severity are included in risk adjusting the data to create accurate predictions. The most valuable benefit of FOTO is the MDT specific data. Mark Werneke, PT, DPT, Dip. MDT, SCS, OCS, CSCS has helped develop a MDT category that allows tracking of MDT trained clinician outcomes against national PT averages. At a cost of \$25 per month for unlimited use, the potential benefit of a focused MDT-FOTO relationship is critical in establishing the unique MDT value.

Business development, staffing recruiting and marketing will be much easier with third party verified excellence. Practice differentiation is a fundamental piece to opening new doors and creating conversations with previously inaccessible parties. United Insurance Group is currently keeping outcome and utilization data on all involved practices and staff. Knowing your data provides you the understanding needed to make contract negotiation decisions, accepting new contracts or even predict your success in a cash-based model. Either we keep our data and make decisions or it will be kept for us with resulting top down mandates. FOTO has made it easy with website widgets and smart phone apps that allow practices to clearly demonstrate their unique MDT value.



FOTO Smartphone App

Best Practices we have identified that fit within our practice mission are:

- All applicable patients complete an outcome assessment prior to seeing the clinician. Many of these are emailed to the patient and completed before they report for their evaluation.
- The clinician has a printed copy of the reports with any medical referrals to be utilized as part of the baseline assessment process and in Day One patient education. In addition to an EMR copy, the print-out helps to drive home the importance to the patient.

- A second survey is scheduled for the midpoint of the established Plan of Care (POC) for review and discussion with the patient. POC updates are made based on MDT findings and patient reports.
- A third assessment is scheduled for the final visit with time allotted for reflection on MDT and outcomes success.
- An established goal of a 70% minimum of patients having completed all three surveys so the clinician-patient team has multiple opportunities to make needed corrections and celebrate success.
- The requirement of 70% of patients to have multiple surveys establishes credibility of the outcome ranking. Clinicians are also expected to have a minimal national ranking of 70%.
- Senior MDT staff focus to help achieve the 70%/70% goals.
- Quarterly reviews of outcomes with staff kudos!
- Finally, address and take advantage of traditional business applications.

Metrics are the fundamental indicators in practice management and used to make vital business decisions. It seems self-quantification is not far behind with every tech savvy patient aware of their blood pressure, sleep patterns, BMI, heart rate variability, etc. We are sure they would love to know their MDT outcome score, they just don't know it yet.

The window of opportunity is open allowing MDT practitioners a common language the healthcare system can understand and value. Insurance companies, doctors and patients will make decisions that best address their needs. We encourage you to demonstrate MDT value through outcome measures!