

**LITERATURE REVIEWS****Summary and Perspective of Recent Literature***Brian McClenahan, PT, Dip. MDT, FAAOMPT***Apeldoorn, A et al. 2016. The influence of centralization and directional preference on spinal control in patients with nonspecific low back pain. JOSPT.**

This study had two aims:

1. To 'evaluate if clinical signs of impaired spinal control improve in patients with nonspecific LBP after a MDT assessment, and if this differs between the three MDT pain pattern subgroups (DP/CEN, DP/non-CEN, and no-DP).'
2. To 'evaluate if pain severity and ROM improve after a MDT assessment and if these improvements are related to the three MDT-pain pattern subgroups.'

The authors acknowledge that "fundamental questions (regarding spinal control) remain unresolved for clinical presentation and measurement." Clearly, this presents some major pitfalls when attempting to study and discuss it. Tests and measures for 'motor control' lack validity and many lack reliability. Given that clinical practice guidelines continue to recognize the entity and the widely used treatment based classification system (TBC) has a stabilization category, this study chose the most appropriate clinical tests available that are believed to identify spinal control deficits.

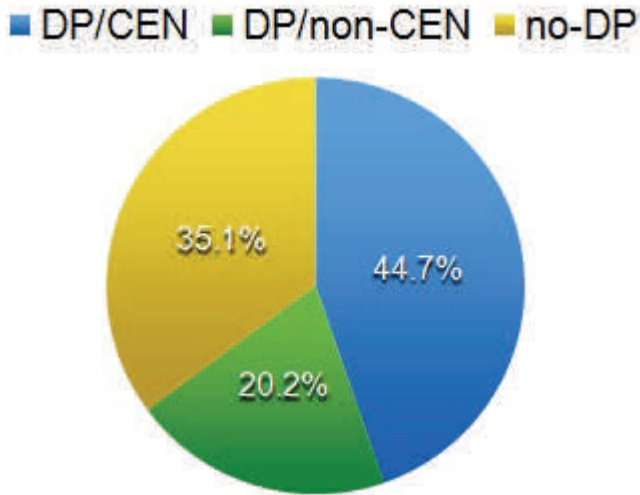
At a minimum, this study gives some further perspective to the 'stabilization category' in the TBC system and to the use and interpretation of spinal control testing and the practice of stabilization intervention. The exploration of a thorough MDT assessment / intervention prior to and following this testing will further help to evaluate the value of implementing these tests during daily clinical practice and considering 'stabilization' intervention depending on the results.

Centralization has been repeatedly demonstrated to be a highly important clinical finding. Werneke et al<sup>1</sup> demonstrated that Centralization may be a greater predictor of outcomes than Directional Preference alone. Therefore, this study differentiated Centralization from Directional Preference and no Directional Preference to determine if one had a greater impact on spinal control / pain severity / ROM than the other.

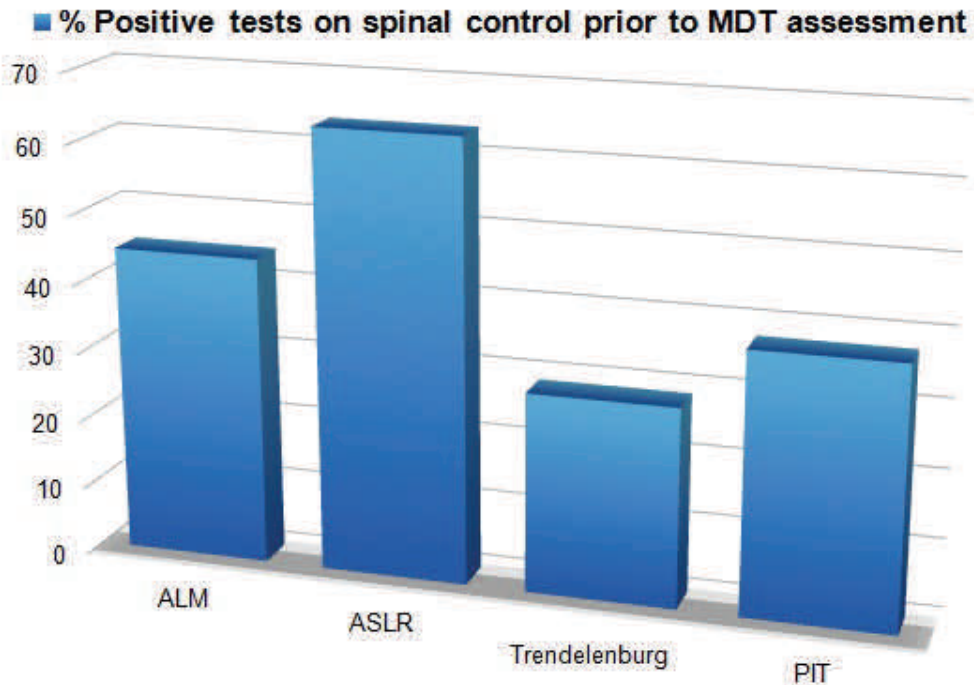
The study had a test-retest design. LBP patients with or without leg pain were recruited from three private clinics in the Netherlands and one in Belgium. They received a standardized assessment for spinal control with the use of four clinical tests performed by an independent examiner. The patients were then taken through a comprehensive MDT assessment by a Diplomaed MDT clinician before the spinal control tests were re-performed by the independent examiner. The spinal control tests used were aberrant lumbar movements (ALM), active straight leg raise (ASLR), the prone instability test (PIT) and the Trendelenburg test.

**RESULTS:** The chart below shows the breakdown of the participants in relation to their response to the MDT assessment. As is shown, the largest proportion demonstrated centralization, and combining the DP/CEN and the DP groups gives us the information that 65% were Derangements.

**Patients categorized by pain pattern subgroups**



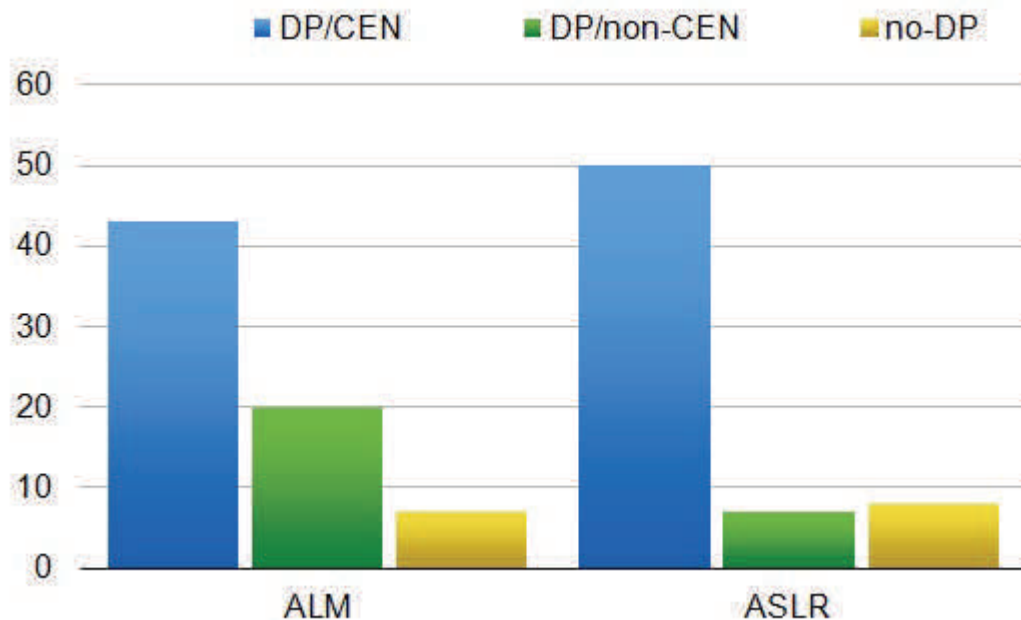
The chart below shows the baseline results prior to the MDT assessment. The ASLR is the only test that was positive for the majority of patients, which is interesting as pregnancy was an exclusion criteria and this test was originally proposed specifically as a test for that population. The two tests that showed significant change pre and post MDT assessment were the ALM and the ASLR. The differences in response depending on the subgroup were quite dramatic, as is illustrated in the graph below. As perhaps expected, we see the biggest difference between centralization and no DP, but it is interesting to



also note that the DP with no centralization did not have anywhere near such a dramatic effect. Clinically, both are classified as Derangements, so the expectations might be that the effect should be similar, but this was obviously not the case in relation to these stability tests.

## Participants that improved on varying spinal control tests following an MDT assessment: Proportion % that changed per 'stability' test

Of note, changes in Trendelenberg and Prone Instability Tests did not reach statistical significance. Additionally, changes indicating a decline in spinal control tests following an MDT assessment were not statistically significant.



Other results of interest in regards to the symptomatic and mechanical responses of the subgroups are:

- DP/CEN demonstrated the greatest increase in extension AROM compared to either DP/non-CEN or no-DP.
- DP/CEN showed a greater reduction in fingertip-to-floor distance compared to DP/non-CEN
- DP/CEN had a greater reduction in most distal pain compared to no-DP

The authors note that the results of this study may be confounded by these factors: duration of current LBP symptoms, none of the spinal control tests used has empirical evidence to support its validity, the reliability of the spinal control tests were not assessed, and the effects on spinal control were only assessed immediately after treatment.

**COMMENTARY:** Participants that demonstrated a Directional Preference and elicited Centralization during the MDT assessment significantly improved the scores for the clinical tests for 'instability'. MDT practitioners are likely not surprised. Aberrant lumbar movements (ALM) are observed and noted by the MDT clinician on a daily basis. The five measurements for aberrant movement included painful arc in flexion (PDM for MDT), painful arc on return (PDM for MDT), Gowers' sign (use of hands to assist movement), instability catch (Deviation for MDT), and reversal of lumbopelvic rhythm (bends knees to assist movement). Any of the above signs / symptoms demonstrated would alert the skilled MDT clinician that a Derangement is a likely classification. As a result, we would not be surprised to elicit Directional Preference during testing that would confirm the classification of Derangement. The distinguishing factor is that MDT clinicians would consider these findings to simply be baselines or characteristics of Derangements that require re-examination following a thorough repeated movement exam rather than informing the need for stabilization exercises.

Aberrant lumbar movements depend upon clinician observation and it is important to note that reliability studies have conflicting findings. As a result, it is possible that the variation alone is the result of the lack of reliability of the test rather than the MDT exam.

Active straight leg raise test (ASLR) was originally used to assess for posterior pelvic pain after pregnancy and is scored based on patient report of difficulty performing a leg raise with and without external support. It is used during daily clinical practice, but inter-rater reliability varies from kappa .53 - .87. As with ALM, the findings could be a result of variation in the lack of reliability of the test.

Interestingly, Trendelenberg and Prone Instability Tests are not significantly influenced statistically following an MDT assessment. The Trendelenberg Test lacks reliability, validity and is not recommended by clinical practice guidelines. Therefore, influence, or lack thereof, is not of clinical importance. The Prone Instability Test (PIT) has acceptable inter-rater reliability as a pain provocation test but lacks validity for measuring spinal control. It is used during clinical practice as one finding to support stabilization intervention for patients per the TBC. Lack of Centralization and/or Directional Preference coupled with a (+) PIT may indicate a subgroup of patients that may benefit from an alternate intervention, but further studies are needed.

This study did not attempt to report on the TBC Stabilization Category prevalence, but rather looked at a variety of physical tests used to 'measure' spinal control. However, it is interesting the number of positive tests that became negative following a single MDT repeated movement exam. These findings of reduction in positive findings are consistent with those of Werneke et al<sup>2</sup>. Werneke et al<sup>2</sup> demonstrated that only 7% of 628 consecutive patients seeking care fit the Stabilization CPR before an MDT assessment and of those 80% elicited DP/CEN during the MDT examination. This resulted in an overall reduction of the stabilization prevalence to less than 1%.

As a whole, this study provides further evidence of the importance of applying a thorough MDT assessment prior to considering alternate treatment options. It reminds us that all findings prior to repeated movements are baselines or perhaps just the side effects of the presence of a Derangement. If we always consider the evidence of the patient and complete a proper mechanical exam, we will ensure that we provide the best opportunity for the patient to achieve a successful outcome.

#### References:

1. Werneke MW, Hart DL, Cutrone G, et al. 2011. Association between directional preference and centralization in patient with low back pain. *J Orthop Sports Phys Ther*; 41:22-31.
2. Werneke MW, Hart DL, et al. 2010. Prevalence of classification methods for patients with lumbar impairments using the McKenzie syndromes, pain pattern, manipulation and stabilization clinical prediction rules. *J Man Manip Ther*; 18:197-210.

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#### Summary and Perspective of Recent Literature

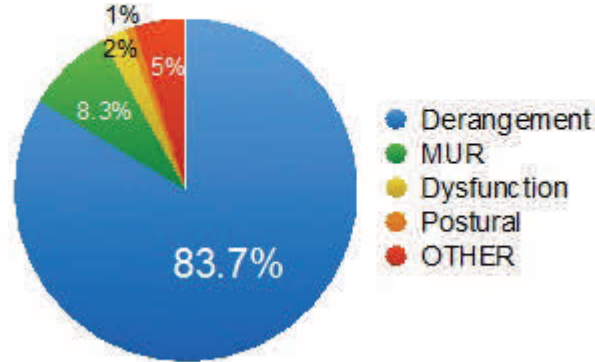
Anja Franz, PT, Dip. MDT and Richard Rosedale, PT, Dip. MDT

**Otéro, J, Bonnet, F. 2014. Lomalgie: prévalence des syndromes McKenzie et des préférence directionnelles. (Low back pain: Prevalence of McKenzie's syndromes and directional preferences) *Kinesithérapie*; 14(145), 36–44.**

This prospective multi-center study assessed the prevalence of Derangement, Dysfunction, Postural Syndrome, OTHER subgroups, Centralization and Directional Preference (DP) as well as their consistency over five visits (Otéro & Bonnet, 2014). 349 patients with nonspecific low back pain of any duration were classified by 36 certified MDT therapists working in a variety of clinical settings in France.

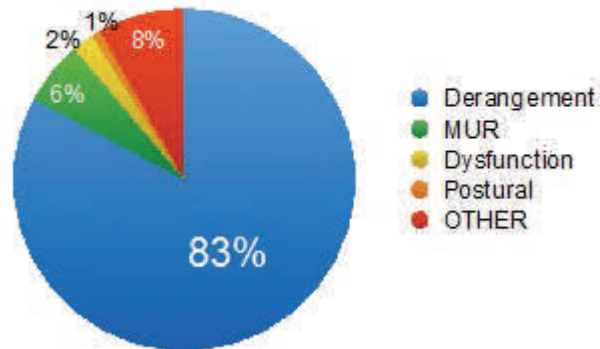
At the initial visit, the proportion classified is shown below. As can be seen, the proportion of patients classified as Derangement is encouragingly high, despite the fact that more than 40% of the patients had a history of greater than three months. (Note: With the recent change in terminology, 'irreducible derangements' are now termed Mechanically Unresponsive Radiculopathies (MUR).)

### Classification on initial visit



Concerning the consistency of classification over five visits, only 5.57% of Derangements were reclassified in another subcategory, mostly MUR (26.5%) and OTHER (20.6%). On the other hand, 50% of MURs were reclassified, most of them as Derangements (29.4%). The proportions by the fifth visit are shown below:

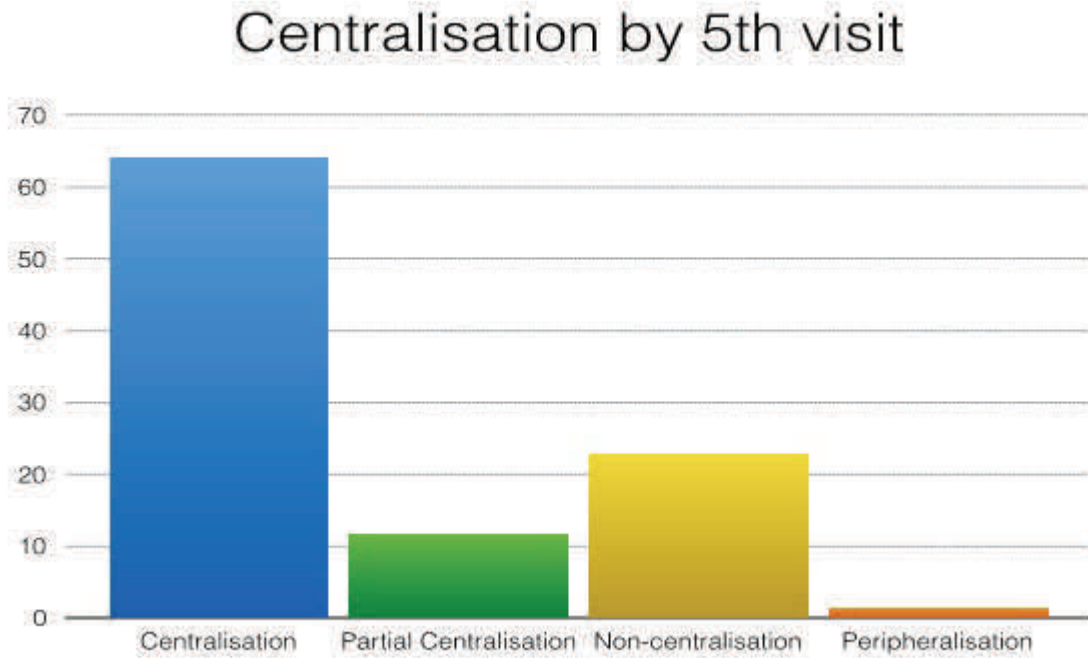
### Classification by 5th visit



For Derangements, extension was the most frequent DP (79.5%), followed by lateral (15.1%). A DP for flexion was observed in only 5.4%. During the initial visit, centralization was observed in 50.1% and partial centralization in 20.3%.

For the consistency of observation of DP, the overall prevalence rates varied only marginally over the five visits. However, the DP changed from one spinal movement to another in a total of 26.5%. The authors describe a total of 24 such changes; the most common change was from a DP for pure sagittal extension to a DP for extension with hips off center (18.7%). In 9.9% no DP changed to a DP for extension, and conversely, in another 9.9% a DP for extension changed to no DP.

Concerning the prevalence of centralization, by the fifth visit, the breakdown is shown below:



So, what are the Implications for the MDT clinician? While this study confirms the prevalence rates observed in other studies, the prevalence rates of the various reclassifications and their detailed descriptions adds interesting new information to the current literature and informs clinical practice. It substantiates the importance of continuous re-assessments in order to confirm a provisional diagnosis and to guide management. Indeed, clinicians should not hesitate to test and confirm appropriate management over a few visits in order to thoroughly assess challenging clinical presentations.

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