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# Physiotherapists' and students' capacity to assess and categorize lumbar movement control using tests of lumbagopelvic movement control

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**Abstract**

**Background:** Low back pain (LBP) affects a significant portion of the adult population, with non-specific low back pain (NSLBP) being the most common form. Lumbopelvic movement control tests are used to assess motor control patterns in patients with NSLBP, aiding in diagnosis and treatment. However, the ability of physiotherapists and physiotherapy students to accurately perform these tests with minimal training remains unclear. This study aimed to identify commonly used lumbopelvic control tests and evaluate the ability of physiotherapists and final-year students to classify movement patterns in patients with NSLBP.

**Methods:**This study was conducted on physiotherapists were surveyed about the tests they commonly use to evaluate lumbopelvic control. Data were analyzed for agreement with an expert panel, and statistical comparisons were made using Fisher's exact test and logistic regression.

**Results:** The study included 100 physiotherapists and 100 physiotherapy students. A majority (85%) of physiotherapists reported familiarity with lumbopelvic movement control tests, but clinical application was limited. Students showed higher agreement with the expert panel on several tests, such as the waiter's bow and rocking backward tests. Both physiotherapists and students demonstrated the ability to classify movement patterns accurately, with no significant difference in performance based on experience or qualifications.

**Conclusion:** Lumbopelvic movement control tests can be effectively utilized by both physiotherapists and physiotherapy students, even with minimal training, to classify movement patterns in NSLBP. The results suggest that these tests are a feasible diagnostic tool for clinicians of varying experience levels, potentially improving the efficiency and consistency of NSLBP management.

## Introduction

Low back pain (LBP) impacts between 60% and 85% of adults at some point in their lives (1). According to Louw et al. (2), it leads to a notable level of disability, significantly limiting individuals' daily activities and ability to work. Globally, LBP is a major public health challenge, and its prevalence continues to rise in various regions, including Africa (2). The condition has profound social and economic repercussions, with approximately 23% of cases progressing to chronic LBP and 11%–12% of the population being disabled by it (3). Notably, around 90% of LBP cases are classified as non-specific (NSLBP), meaning they lack identifiable patho-anatomical or radiological causes (4, 5).

Physiotherapists may employ lumbopelvic motor control tests to categorize NSLBP, particularly if motor control exercises are part of the treatment plan. These tests can help classify patients into distinct patterns, such as flexion, flexion with lateral shifting, active or passive extension, or multidirectional patterns (6). Common assessments for flexion and extension patterns include techniques such as the waiter's bow, rocking backward, pelvic tilt, and prone knee bend, among others (7).

Accurate diagnostic methods are essential for properly categorizing and rehabilitating patients with NSLBP. Consistency in these assessments is crucial, especially when multiple physiotherapists are involved in evaluating and treating the same patients (8). Although some studies have demonstrated strong inter- and intrarater reliability for lumbopelvic movement control tests, the participants in those studies were limited to a small group of physiotherapists who underwent intensive training. Familiarity with these tests has been shown to improve their reliability, but there is limited research on their application by physiotherapy students or minimally trained practitioners (4, 8). Evaluating whether these tests can be effectively utilized without extensive prior training is vital, especially in situations where such training is not feasible.

A lack of knowledge about the movement control tests currently employed in clinical practice (as explored in Part 1 of this study) can hinder physiotherapists from adopting reliable, evidence-based assessments. Understanding which tests are in use will enable educators to disseminate the latest evidence-based practices.

However, even highly reliable tests are unlikely to gain widespread adoption if their purpose and interpretation are poorly understood.

Developing a standardized set of lumbopelvic movement control tests can streamline the identification of specific motor control dysfunctions, reducing the need for unnecessary assessments. Tests selected for this study have shown high inter- and intrarater reliability under conditions of intensive training. If it can be demonstrated that these tests can also be accurately performed by individuals with minimal training or by students identifying movement dysfunctions, they could become a practical option for all physiotherapists, regardless of experience. The choice of which tests to use often depends on clinical reasoning and the specific insights the tests provide. Understanding the tests most commonly used in practice would benefit educators and raise awareness about potentially more reliable options already in use.

**Methods**

This study participating patients, physiotherapists, and students. Qualified physiotherapists were recruited through professional gatherings and advanced courses. Participants were included if they actively treated patients with non-specific low back pain (NSLBP). Fourth-year physiotherapy students from three universities within the same region were also invited to join.

The study consisted physiotherapists completed a questionnaire detailing the tests they routinely used to evaluate lumbopelvic control , the ability of both physiotherapists and students to assess and classify lumbopelvic control was tested using specific procedures.The questionnaires were designed by the primary investigator (Huysamen) in collaboration with a panel of experts, who validated their content.

patients performing nine tests from a lateral perspective. These included six specific lumbopelvic movement control tests (such as the waiter's bow, pelvic tilt, sitting knee extension, rocking backward, rocking forward, and prone knee bend) as described by Luomajoki et al., and three general tests (forward flexion, sitting, and slump) as per Dankaerts et al. (5,9).

Patients, both male and female, were aged between 20 and 61 years and demonstrated either an extension or flexion movement pattern. Exclusion criteria included previous spinal surgeries, neurological conditions, and multidirectional or lateral shifting patterns

The study hypothesized accuracy rates of 82% for physiotherapists and 62% for students in evaluating the tests (8). Using a two-sample comparison ($\alpha = 0.05$) and based on these anticipated accuracy rates, a sample size of 88 physiotherapists and 88 students was calculated. No adjustments for multiple comparisons were made.

Data were first entered into an Excel spreadsheet and then analyzed using STATA, Version 12 (StataCorp LLC). Categorical data were presented as frequencies and percentages. Agreement between physiotherapists and students on individual lumbopelvic movement control tests was quantified as percentages with 95% confidence intervals (CIs). Group comparisons for correct or incorrect assessments were conducted using two-way tables and Fisher's exact test.

The known movement patterns (flexion or extension) identified by the expert panel were used as a reference for comparison. Logistic regression was performed to analyze the assessments, expressed as odds ratios. Physiotherapists with more than five years of experience were considered the reference group. Statistical significance was set at $\alpha \leq 0.05$, and missing data were excluded from analysis.

**Results**

The study involved 100 licensed physiotherapists and 100 fourth-year physiotherapy students. The physiotherapists ranged in age from 21 to 61 years, with a median age of 25 years (interquartile range: 6.75; quartile 1 = 23; quartile 3 = 29.75). Among these, 31% had clinical experience exceeding five years. Educationally, 71% held a bachelor's degree in physiotherapy, 11% had completed postgraduate courses, 12% possessed a certification in orthopedic manipulative therapy, and 6% had earned a master's degree. The physiotherapy students' ages ranged from 20 to 27 years, with an average age of 22.20 years (SD 1.48).

A total of 85% of the physiotherapists reported familiarity with lumbopelvic movement control tests; however, their clinical use was limited. A small portion of data was incomplete due to participants skipping specific questions. The most commonly used tests included posture, flexion, and straight leg raise, which align with the Maitland framework for low back pain assessments. Other frequently employed tests included gait, extension, lateral flexion, and rotation.

Tests grouped under the category "Other" encompassed methods such as McKenzie mobilization, squats, stork tests, sport-specific assessments (e.g., bike setups, golf swings), Gillet tests, Faber's tests, quadrant tests, the Sahrmann abdominal stabilization scale, passive accessory intervertebral mobilizations, sit-to-stand analyses, side-lying abduction motor control, active straight leg raises, combined movement assessments, and transversus abdominis control.

**Agreement with Expert Panel**

For instance, 83.5% of physiotherapists and 95.8% of students concurred with the expert panel.

In general, both groups showed consistent agreement with the expert panel's identification of components present during the three general tests. Students significantly outperformed physiotherapists in classifying as flexion (p = 0.015). However, no statistically significant differences were observed in participants' ability to classify these tests based on years of professional experience, educational background, or completion of advanced training programs.

Table 1, No significant differences were found in the accuracy of test classifications concerning years of clinical experience or educational level. the odds ratios for incorrect classification across various qualification levels, including students, physiotherapists with over five years of experience, those with postgraduate training, those holding an Advanced Professional Development Level (APDL) 2 qualification, and master's degree holders.

**Table 1. Comparison of Physiotherapists and Physiotherapy Students Overall Correct Classification of Movement Dysfunction**

| **Pattern as determined by the expert panel** | **(%)who chose the same classification as the expert panel** | | ***p*-value** |
|---|---|---|---|
| | **Physiotherapists;%** | **Students; %** | |
| Extension | (91.4) | (92.7) | 0.79 |
| Flexion | (87.1) | (96.9) | 0.015 |
| Extension | (90.3) | (88.5) | 0.81 |
| Flexion | (77.4) | (87.5) | 0.09 |

**Discussion**

This study aimed to identify the lumbopelvic movement control tests currently used by physiotherapists to assess patients and to evaluate both physiotherapists' and physiotherapy students' ability to classify lumbar movement dysfunction using six specific lumbopelvic tests and three general assessments. Our findings show that physiotherapists frequently utilize the Maitland approach (which includes tests such as posture, flexion, extension, lateral flexion, and straight leg raise) for evaluating patients. Both physiotherapists and students were able to correctly classify patients exhibiting extension or flexion patterns, with their classifications aligning closely with the expert panel's judgments.

Despite 86% of physiotherapists being familiar with lumbopelvic movement control tests, these assessments were rarely applied in clinical practice. Among the participants, the tests that were most commonly used to assess patients with non-specific low back pain (NSLBP) were those that are part of the Maitland approach. Although this approach dates back to 1954, lumbopelvic movement control, first introduced in 1987, has not been widely adopted in practice, which may explain the limited use in our sample. The lack of widespread application may also be influenced by the structure of physiotherapy undergraduate curricula, which may favor the Maitland approach and leave lumbopelvic movement control underrepresented. This might also explain the higher usage of general tests, particularly among physiotherapists with over five years of experience. However, it is important to note that an assessment of university curricula was outside the scope of our study, and this remains speculative.

The study's convenience sampling led to a disproportionate representation of physiotherapists with less than five years of clinical experience and only an undergraduate degree, which may account for the minimal differences observed between the physiotherapists' and students' assessments. Another possible explanation for the similar classifications made by both groups is that less experienced physiotherapists are able to quickly assimilate new information, similar to the learning patterns of students. Studies suggest that learning frequency can improve one's ability to grasp new concepts more easily as exposure increases (13).

Comparing physiotherapists with more experience and additional qualifications to their less experienced counterparts, we observed no significant differences in classification accuracy. Aasa and colleagues (14) found that physiotherapists with over 20 years of experience performed better in classification tasks compared to those with less than one year of experience. However, their study focused on different tests, specifically active movement tests for the cervical spine, shoulder, and scapulothoracic joints, which likely explains the discrepancy in findings.

Dankaerts and colleagues (10) reported nearly perfect inter-examiner reliability when expert clinicians (with over 12 years of experience) classified patients with NSLBP, achieving a κ value of 0.96 (97% agreement). Similar studies by Luomajoki and colleagues also highlighted that inexperienced or newly qualified physiotherapists may require additional training to analyze movements accurately (4, 10, 13). However, our findings diverge from those reports. In our study, physiotherapists and students received only a brief, 15-minute presentation and four pages of notes on how to evaluate and classify lumbopelvic movement control, yet were still able to effectively use the tests. This suggests that minimal training can be sufficient for both groups to use these tests accurately.

Overall, physiotherapists' and students' classifications of movement patterns as either flexion or extension were highly consistent with the expert panel's judgments. Given that flexion is the most common movement pattern (15), one might have expected physiotherapists to perform better, which makes this result noteworthy.
There were several limitations in our study. While the sample size was adequate to minimize the risk of Type I error, we did not adjust for multiple comparisons. Additionally, the sample was drawn from a single region, which may limit the generalizability of our findings to other areas or countries. Lastly, our study focused only on flexion and extension patterns—future research should explore additional movement patterns, such as lateral shifting and multidirectional movements.

**Conclusion**

Although most physiotherapists are familiar with lumbopelvic movement control tests, their clinical use remains limited. The tests examined in this study can be effectively used by both physiotherapists and students, even with minimal training, to classify patients with NSLBP into flexion or extension patterns. The participants' ability to perform these classifications was not significantly influenced by experience or additional qualifications.

**References**

1. Middleton K, Fish DE. Lumbar spondylosis: clinical presentation and treatment approaches. Curr Rev Musculoskelet Med. 2009;2(2):94–104. 10.1007/s12178-009-9051-x. Medline:19468872
2. Louw QA, Morris LD, Grimmer-Somers K. The prevalence of low back pain in Africa: a systematic review. BMC Musculoskelet Disord. 2007;8(1):105. 10.1186/1471-2474-8-105. Medline:17976240
3. Balague F, Mannion AF, Pellise F, et al. Non-specific low back pain. Lancet. 2012;379(9814):482–91. 10.1016/s0140-6736(11)60610-7.
4. Luomajoki H, Kool J, DeBruin E, et al. Reliability of movement control tests in the lumbar spine. BMC Musculoskelet Disord Biomed Central. 2007;8:90. 10.1186/1471-2474-8-90. Medline:17850669
5. Dankaerts W, O'Sullivan P, Burnett A, et al. Differences in sitting postures are associated with nonspecific chronic low back pain disorders when patients are subclassified. Spine. 2006;31(6):698–704. 10.1097/01.brs.0000202532.76925.d2. Medline:16540876
6. Saragiotto BT, Maher CG, Yamato TP, et al. Motor control exercise for chronic non-specific low-back pain. Cochrane Database Syst Rev. 2016;1:CD012004. 10.1002/14651858.cd012004. Medline:26742533
7. Luomajoki H, Kool J, DeBruin E, et al. Reliability of movement control tests in the lumbar spine. BMC Musculoskelet Disord. 2007;8:90. 10.1186/1471-2474-8-90. Medline:17850669
8. Luomajoki H, Kool J, DeBruin E, et al. Movement control tests of the low back; evaluation of the difference between patients with low back pain and healthy controls. BMC Musculoskelet Disord. 2008;9:170. 10.1186/1471-2474-9-170. Medline:19108735
9. Luomajoki H.Movement control impairment as a sub-group of non-specific low back pain: evaluation of movement control test battery as a practical tool in the diagnosis of movement control impairment and treatment of this dysfunction. Kuopio: University of Eastern Finland, Faculty of Health Sciences; 2010.
10. Dankaerts W, O'Sullivana PB, Strakera LM, et al. The inter-examiner reliability of a classification method for non-specific chronic low back pain patients with motor control impairment. Man Ther. 2006;11(1):28–39. 10.1016/j.math.2005.02.001. Medline:15936976
11. Maitland G, Hengeveld E, Banks K, et al. Maitland's vertebral manipulation. 7th ed. Edinburgh: Elsevier; 2005.
12. Comerford M, Mottram S. Kinetic control: the management of uncontrolled movement. Chatswood, NSW: Churchill Livingstone; 2012.
13. Waring R, Takaki M. At what rate do learners learn and retain new vocabulary from reading a graded reader? Reading Foreign Lang. 2003;15(2).
14. Aasa B, Lundeström L, Papacosta D, et al. Do we see the same movement impairments? The inter-rater reliability of movement tests for experienced and novice physiotherapists. Eur J Physiother. 2014;16(3):173–82. 10.3109/21679169.2014.917435.
15. O'Sullivan P.Masterclass: Lumbar segmental "instability": clinical presentation and specific stabilizing exercise management. Man Ther. 2000;5(1):2–12. 10.1054/math.1999.0213.