

“To slump, or not to slump – that is the question”

CRITICALLY APPRAISED PAPER (CAP)

Adapted & commented from **Michaela Neubauer** PT, OMT, M. Physio, IMTA teacher, lecturer at the University of Applied Sciences St. Pölten. 29.06.2016



Title of article

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Research question

1. How accurate is the slump test in patients with neuropathic pain in low to moderate chronic low back pain (LBP)?
2. Does it improve the accuracy of the test if anatomical and qualitative pain descriptors are added?

Introduction/ background

According to the “International Association for the study of pain” (IASP), the cause of a neuropathic pain is a lesion or a disease of the somatosensory system (Jensen et al 2011). Because management and prognosis in chronic LBP is different in patients with and without neuropathic pain, it is crucial to have sensitive and specific diagnostic tests to identify possible involvements of the neural system. The SLUMP test is such an assessment tool, a neurodynamic test, that is frequently used in clinical practice.

The main aim of this study is to determine the accuracy of the slump test compared to a standardized neurosensory examination in a population with and without neuropathic pain.

Methods

21 subjects with LBP underwent a neurosensory testing by means of a standardized assessment form for detecting neuropathic pain (Bennett et al 2001, Bouhassira et al 2004, Cruccu et al 2009).

Neurosensory testing was performed by an experienced manual physical therapist. It consisted of examining the location, behaviour and quality of pain, as well as motor, sensory and autonomic functions and the Straight leg raise (SLR).

Based on the test results an *established algorithm* was used to classify the symptoms as unlikely, possible (subjective but no objective positive parameters found), probable (subjective and objective parameters positive) or definite (as probable plus radiographic and magnetic resonance imaging positive) from a neuropathic origin (Treede et al 2008). Afterwards the participants were investigated by a different manual physical therapist. The **slump test** was performed (Butler 2000). Reproduction of Symptoms and their location were recorded. The test was counted

as positive if:

- Symptoms changed with neck extension
- Right to left difference in symptoms distribution of knee extension OR a difference in right to left knee extension.

Subjects

21 participants with mild to moderate LBP (with and without radiating leg pain) were recruited from a sample of English speaking adults suffering from musculoskeletal LBP (eg. sciatica, radiculitis, radiculopathy). Prior to the study, they received conservative treatment only. All of them were able to complete a neurosensory examination as well as a slump test. Subjects with a history of back surgery, systemic or central disorders (eg. cancer, diabetes, multiple sclerosis, stroke) were excluded.

Dates Analysis

Sensitivity, specificity, predictive values, and likelihood ratios were determined. The neurosensory examination was used as the reference standard.

Results

The slump test showed high sensitivity (0.91, positive predictive value 0.77) and moderate specificity (0.70, negative predictive value 0.88) in diagnosing neuropathic pain compared with the neurosensory testing.

If the subject had pain distal to the knee it decreased the sensitivity (0.55) but increased the specificity (1.00) of the manoeuvre.

Discussion / Conclusion (study author)

The findings of the study have to be taken into account with care due to the small sample size and the fact, that there exists no objective test that can be used as a gold standard.

Comments of CAP- summarizer

This study looked at participants with mild to moderate LBP. The researchers show that the slump test is sensitive in detecting neuropathic contributions. The combination of a thorough neurological examination with the SLR and the slump test, provides a good tool to diagnose neuropathic pain in LBP.

Nevertheless, **four facts** have to be considered.

First, in this study **radiographic or magnetic imaging** have to show symptoms of nerve root lesions to be counted as “definitely” from neuropathic origin. However, there are patients with neuropathic pain that do not have any disc pathologies or root compression signs seen in the MRI/CT and vice versa (Janardhana et al 2010, Godlewski et al 2016). Furthermore, in patients with compressions of lumbar nerve roots the SLR may test negative (Jonsson et al 1997). Jonsson et al 1997 found no correlation between symptoms, signs and radiographically detected constriction in a population with patients suffering from lumbar spinal stenosis. One explanation why there are no MRI findings in symptomatic radiculopathies is that biochemical changes due to leaking inflammatory mediators from disc injuries may sensitize neural tissue (Mulleman et al 2006). Sen et al 2005 found in a population with lumbar disc diseases higher rates of inflammatory markers when their SLR tested positive. Another important fact when looking at SLR and slump tests is that both tests elongate the meninges, nerve roots and the dorsal nerves of the legs (Boyd et al

2005, Lew et al 1994, Ko et al 2006). Therefore, pain responses may also occur because of an increased mechanosensitivity to elongation rather than exclusively from nerve compression (Dilley et al 2005, Hall et al 2005). To identify participants suffering from neuropathic pain MRI and CT shall not be used as a gold standard.

Secondly, there might be **neurogenic symptoms without any neurological deficits** in mild to moderate LBP. Nerves may be sensitive without any disturbances in axonal conductivity (Eliav et al 1999, Eliav et al 2001). Therefore, a neurological examination cannot be a reference standard to detect neuropathic pain in mild to moderate low back pain.

Thirdly, according to the study outcome, the patient suffers more likely from **neuropathic pain**, if it runs distal to the knee. The clinic shows that there are many patients with neural symptoms located in the buttock or thigh in LBP patients. Therefore, care should be taken not to base the diagnosis of neuropathic pain only on the location of pain.

Fourthly, from the author's experience in patients suffering from **mild LBP** the SLR can be negative but the slump test shows a reproduction of symptoms. This can be reasoned because the slump manoeuvre brings more load on the nervous system than the SLR does. Majlesi et al (2008) came to a similar result in a population with lumbar disc herniation. They demonstrated that the slump test was found to be more sensitive (0.84) than the SLR (0.52). On the other side a study of Walsh et al (2009) shows substantial agreement of the SLR and slump test in a population with *moderate* low back and leg pain. The intensity and irritability of the neuropathic pain status might cause the difference in the study outcome. Looking at the single tests, the diagnostic accuracy of the SLR is because of its weak specificity (26%) limited (Deville et al 2000). Combining it with a neurological examination increases its sensitivity and specificity (Reihani-Kermani 2004). Philip et al (1989) show a high inter-therapist reliability in a sample of LBP patients if the symptoms could be reproduced.

Future research should not investigate ONE single test. Better performance may be obtained when tests are combined, as it is done in the clinic. Additionally, to the subjective examination an extensive physical examination should be performed. The first signs of a neural involvement can be observed when the patient is standing. A slightly bent knee or an external rotation of the hip might be protective deformities to release the tension of the nervous system. In an acute or subacute state, correction of the position will reproduce or increase symptoms. If the pain comes with forward bending, the therapist adds neck flexion. As before, if the patient's pain gets more it is a sign of a neural involvement in this presentation and the therapist has to perform the slump test or the SLR to confirm this hypothesis. Palpation shows tightness and stiffness of the associated lumbar area and increased sensitivity of the affected nerve trunk. Research demonstrates that a positive neurodynamic test together with local tenderness over the associated peripheral nerves are main signs of neural tissue mechanosensitivity (Dilley et al 2005, Hall et al 2005). In cases of referred symptoms, a neurological examination is important to investigate if the neural conduction is disturbed. Therefore, instead of solely looking at one single test a clinical relevant study should investigate the following: **“Are physical therapists able to diagnose patient with neuropathic pain?”**.

Coming back to the question “To slump, or not to slump”. From a clinical and scientific perspective the answer is: **Go on and slump!**

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