Academy of PHYSICAL MEDICINE

Research Paper Review

This review is published with the permission of Research Review Service (www.researchreviewservice.com)

Effect of slump stretching versus lumbar mobilization with exercise in subjects with non-radicular low back pain: a randomized clinical trial

Journal of Manual and Manipulative Therapy 2012; 20: 35-42

Nagrale AV, Patil SP, Gandhi RA, Learman K

ABSTRACT

Previous case reports, case series, and pilot studies have suggested that slump stretching may enhance the effects of spinal mobilization and stabilization exercises in patients with non-radicular low back pain (NRLBP). The purpose of this trial was to determine if slump stretching results in improvements in pain, disability, and fear and avoidance beliefs in patients with NRLBP with neural mechanosensitivity. Sixty patients, 18-60 years of age presenting with NRLBP with symptom duration >3 months, were randomized into one of two, 3-week physical therapy programs. Group one received lumbar spinal mobilization with stabilization exercises while group two received slump stretching in addition to lumbar spinal mobilization with exercise. Outcomes including the modified Oswestry disability index (ODI), numeric pain rating scale (NPRS), and the fear-avoidance belief questionnaire (FABQ) were collected at baseline, and at weeks 1, 2, 3, and 6. A doubly multivariate analysis of variance revealed a significant group-time interaction for ODI, NPRS, and FABQ. There were large within-group changes for all outcomes with $P<0.01$ and large between-group differences at weeks 3 and 6 for the ODI and weeks 1, 2, 3, and 6 for the NPRS and FABQ at $P<0.01$. A linear mixed-effect model comparing the composite slopes of the improvement lines revealed significant differences favoring the slump stretching group at $P<0.01$. The findings of the present study further support the use of slump stretching with spinal mobilization and stabilization exercises when treating NRLBP.

ANALYSIS

Reviewed by Dr. Joseph Brence DC (Research Review Service)

Author's Affiliations

Department of Physiotherapy, Apollo College of Physiotherapy, India; Department of Physical Therapy, Youngstown State University, Youngstown, OH, USA.

Background Information

Low back pain (LBP) has been a heavily investigated topic in the literature over the past decade. This is likely due to its prevalence, as well as its direct and indirect economic and societal impacts (1, 2). Generally speaking, most clinicians separate LBP into two groups: non-radicular (lacking nerve root involvement) and radicular (likely nerve root involvement) (3). The diagnosis of non-radicular LBP is normally made by ruling out neurological involvement, via tests such as the straight leg raise and slump tests (4). While neither test is highly specific, both have demonstrated decent sensitivity to determine if a neurological structure is compromised (4, 5). When a test is positive, some clinicians have advocated utilizing portions of the test as treatment interventions (6) but there is still a degree of uncertainty regarding when this should happen. The study under review here examined slump stretching, coupled with lumbar mobilizations and stabilization exercises, compared to lumbar mobilizations and stabilization exercises alone, in those with non-radicular LBP (see methods section for their definition of non-radicular LBP – it is an important factor to consider when interpreting the results of this study).

PERTINENT RESULTS

- 60 subjects were randomized into the control (mobilization + stabilization exercise) or experimental (mobilization + stabilization + slump stretching) group (30 in each group).
- Overall, both groups improved over time but at significantly different rates. The analysis showed a difference between the groups' slopes for each outcome of interest, with the experimental treatment group improving at a faster rate compared to the control group for all three dependent variables.
- A doubly multivariate analysis of variance was utilized to assess group–time interaction for the ODI, NPRS, and FABQ. It revealed a significant group-time interaction for all three variables.
- The between-group analysis indicated that there was significantly greater improvement in pain, disability and fear-avoidance, favoring the experimental group at many time points. There were between-group differences of disability at 3 and 6 weeks ($P < 0.01$) and between-group differences of pain and fear-avoidance at 1, 2, 3, and 6 weeks ($P < 0.01$).
- The main effect for time demonstrated that there were significant differences at all time points for pain, disability and fear-avoidance ($P< 0.01$) except for fear-avoidance at 3 and 6 weeks, which was non-significant ($P = 0.313$).

CLINICAL APPLICATION & CONCLUSIONS

The authors of this study were able demonstrate that the addition of slump stretching to a program that included lumbar mobilization and stabilization exercises, improved outcomes in patients with non-radicular LBP (again, remember the definition used in this study - pain that was referred distal to the buttocks with reproduction of the chief complaint during slump testing). This treatment not only reduced pain, but also improved disability and fear avoidance behaviors.

As noted in the results section, both groups demonstrated improvements, but the addition of slump stretching improved outcomes more rapidly and substantially and it could therefore be considered for the treatment of individuals with this clinical presentation. As always, patient improvement should be carefully monitored to evaluate treatment efficacy, with alterations in treatment prescription occurring as needed.

STUDY METHODS

Subjects in this study were obtained via referral from other healthcare practitioners, or through recruiting ads in a local magazine advertisement. 60 subjects were included between the ages of 18 and 60 years old with non-radicular LBP lasting more than 3 months. Non-radicular LBP was defined as: pain that was referred distal to the buttocks with reproduction of the chief complaint during slump testing.

Exclusion criteria: symptoms consistent with spinal infection, neoplasm, osteoporosis, spinal fracture, demonstrated positive neurologic signs or symptoms consistent with nerve root involvement (decreased reflexes, sensation or strength) or signs of upper motor neuron involvement. Patients were also excluded if they were pregnant, had history of spinal surgery, or a positive SLR test < 45 degrees.

Prior to randomization, pain was measured on a numeric pain rating scale, disability was measured on the Oswestry Disability Index (ODI), and fear of pain and avoidance beliefs was measured on the Fear Avoidance Beliefs Questionnaire (FABQ). Following the gathering of baseline data, the subjects were examined to ensure they met inclusion/exclusion criteria, by a blinded, independent clinician. After this examination, the initial clinician left the room and a second clinician entered and opened a sealed, opaque envelope indicating randomization into the experimental or control group.

Interventions

- The control group began each session with a 5-minute active bicycle warm-up. They then received 10 minutes of posterior-anterior mobilizations (either grade 3 or 4) targeting hypomobile segments of the lumbar spine. Following this, the subjects performed 10 repetitions of wall squats, bridges, pelvic tilts and quadruped arm/leg lifts. This program was advanced per clinician's discretion
- The experimental group completed the same interventions as the control group with the addition of slump stretching. This was described this as follows: the subject was positioned in long sitting, feet against a wall to maintain neutral dorsiflexion angle (90 degrees at the ankle), trunk flexed to enhance dural elongation, while the therapist applied cervical overpressure to ensure a consistent pressure just at the onset of symptom provocation. Five repetitions of 30-second holds were performed.

- Both groups of subjects were treated twice a week for three weeks.

Outcome Measures

Subjects completed the modified Oswestry disability index (ODI), numeric pain rating scale and fear-avoidance belief questionnaire (FABQ) at baseline, and weeks 1, 2, 3 and 6.

STUDY STRENGTHS / WEAKNESSES

Study Strengths

- The study assessed the addition of a commonly used intervention in combination with other commonly used interventions (which were progressed per clinicians discretion) which enhances it external validity and applicability in everyday practice.
- This study built on the findings of previous studies and was also able to demonstrate slump stretching to be an effective part of a comprehensive treatment program for those with non-radicular LBP (again, the study patients had their primary symptoms recreated with the Slump Test position).

Study Weaknesses

- There was a lack of a true "control group" (a no intervention group).
- The subcategory of LBP examined in this study represents only a small portion of those we treat clinically.
- There were several variables introduced to each subject, making it difficult to determine if the added intervention was truly responsible for the results demonstrated.

Additional References

1. Walker BF, Muller R, Grant WD. Low back pain in Australian adults: prevalence and associated disability. J Manipulative Physiol Ther 2004; 27: 238–244.
2. Stewart WF, Ricci JA, Chee E et al. Lost productive time and cost due to common pain conditions in the US workforce. JAMA 2003; 290: 2443–2454.
3. Koes BW, van Tulder MW, Thomas S. Diagnosis and treatment of low back pain. BMJ 2006; 332: 1430–1434.
4. Stankovic R, Johnell O, Maly P, Willner S. Use of lumbar extension, slump test, physical and neurological examination in the evaluation of patients with suspected herniated nucleus pulposus. A prospective clinical study. Man Ther 1999; 4: 25–32.
5. Vroomen PC, de Krom MC, Wilmink JT et al. Diagnostic value of history and physical examination in patients suspected of lumbosacral nerve root compression. J Neurol Neurosurg Psychiatry 2002; 72: 630–4.
6. Coppieters MW, Butler DS. Do 'sliders' slide and 'tensioners' tension? An analysis of neurodynamic techniques and considerations regarding their application. Manual Therapy 2008; 13: 213-221.