

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

Fingertip-to-Floor Test and Straight Leg Raising Test: Validity, responsiveness, and predictive value in patients with acute/subacute low back pain

Archives of Physical Medicine & Rehabilitation 2012; 93: 2210-5

Ekedahl H, Jönsson B and Frobell R

Reviewed by Dr. Michael Haneline DC (Research Review Service)

ABSTRACT

Objectives: *To investigate the validity over time of the fingertip-to-floor test (FTF) and the straight leg raising test (SLR) using the Roland Morris Disability Questionnaire (RMDQ) and correlation coefficient (r), and to assess the predictive value of factors related to the change in RMDQ over 12 months using multivariate regression analysis.*

Design: *Longitudinal study.*

Setting: *Outpatient physical therapy clinic.*

Participants: *Subjects (N=65) with acute/subacute low back pain (≤ 13 wk of symptoms). Thirty-eight (58%) had radicular pain as determined by the slump test.*

Interventions: *Not applicable.*

Main Outcome Measures: *Self-reported disability was used as a reference variable and was measured using the RMDQ at baseline and after 1 and 12 months. The FTF and SLR were measured at baseline and after 1 month. Responsiveness and imprecision were assessed by using effect size (ES) and minimal detectable change (MDC). The sample was stratified by the presence or absence of radicular pain (categorized by the slump test).*

Results: *The change in FTF results was significantly correlated to the 1-month change in RMDQ, both in the entire sample ($r=.63$) and in the group with radicular pain ($r=.66$). Similar analysis for the SLR showed a weak relationship to RMDQ. FTF showed adequate responsiveness (ES range, 0.8-0.9) in contrast to SLR*

(ES range, 0.2-0.5). The MDC for FTF and SLR were 4.5 cm and 5.7°, respectively. The change in FTF results over 1 month was independently more strongly associated with the 12-month ($R(2)=-.27-.31$) change in RMDQ than any of the other variables and multivariate combinations.

Conclusions: Our results suggest that the FTF has good validity in patients with acute/subacute low back pain and even better validity in those with radicular pain. The change in FTF results over the first month was a valid predictor of the change in self-reported disability over 1 year. In contrast, the validity of SLR can be questioned in the present group of patients.

ANALYSIS

Author's Affiliations:

The Department of Orthopaedics, Clinical Sciences Lund, Lund University, Lund, Sweden.

Background Information

Criterion validity over time (i.e. whether the results of a test correlate well with other accepted measures, like self-reported disability);

- measurement properties (e.g. responsiveness and minimal detectable change [MDC]), which help in establishing the usefulness of a test; and
- predictive value for different subgroups (e.g. those with and without radicular pain, and acute/subacute versus chronic LBP patients).

Therefore, the aims of this study were to:

1. Distinguish subjects with radicular pain from those with nonspecific acute/subacute LBP using the slump test;
2. explore the differences in patient characteristics, disability, pain, FTF, and SLR between these 2 subgroups;
3. compare the FTF and SLR with the Roland Morris Disability Questionnaire (RMDQ) to investigate their psychometric properties and criterion validity over time (1 month); and
4. estimate the predictive value of factors that are shown to be related to the change in RMDQ scores over 1 month and over 12 months in both subgroups.

The authors hypothesized that:

- The association between functional impairment and the RMDQ would be stronger in radicular pain patients; and
- the association between changes in FTF and SLR compared with the RMDQ scores over time would be stronger in radicular pain patients than in the entire sample.

PERTINENT RESULTS

Fifty-eight percent of the subjects (38 out of 65) had radicular pain.

As compared to the entire sample at BL, radicular pain subjects had significantly more neurologic signs, more leg pain, decreased FTF distance, and decreased SLR angle in left leg. However, the only difference between these groups that remained at 1-month follow-up was an increased number of neurologic signs in the radicular pain subjects.

At 12 months, there was no difference in RMDQ between the radicular pain subjects and the entire sample. Also, there was no significant difference in the number of treatments or type of treatment received between the 2 groups.

With regard to longitudinal validity of the tests over 4 weeks:

- The RMDQ and FTF effect sizes (ES) were large in both the radicular pain subjects and in the entire sample (ES=0.8 to 1.1), but only medium for SLR of the affected side (ES=0.5) .
- The change in RMDQ correlated well to the change in FTF in the radicular pain subjects as well as in the entire sample ($r=0.63$ and 0.66 , respectively), but poorly to the change in SLR ($r=0.13$ to 0.28).

With regard to the tests' predictive values:

- Univariate regression analysis showed that most of the variables were not significantly related to changes in RMDQ. Nonetheless, symptom duration and Pain VAS contributed significantly in explaining the longitudinal change in self-reported disability.
- Multivariate analysis demonstrated that the strongest association was between change in FTF over 1 month and the change in RMDQ at 1-month and 12-months. Moreover, change in FTF over 1 month explained 27% to 43% of the variance in the RMDQ variable.
- Receiver operating characteristics (ROC) analysis showed that the discriminative value of FTF in predicting change in RMDQ over 1 month and over 12 months was higher in the radicular pain subjects than in the entire sample, with a cutoff point of 4.5cm.

CLINICAL APPLICATION & CONCLUSIONS

The main findings of this study are that:

- Change in FTF is strongly related to change in self-reported disability (RMDQ).
- Conversely, change in SLR is poorly related to change in RMDQ.
- Early change in FTF is a good predictor of long-term changes in disability levels in both radicular pain and nonspecific LBP patients.

Accordingly, the authors recommended that clinicians rely more on the FTF than the SLR when assessing patients with acute/subacute LBP and radicular pain.

Clinicians should note the authors' description of the slump test, as well as its clinical importance in distinguishing nonspecific LBP patients from those with radicular pain (3). The slump test consists of a combination of seated patient positions that should be performed in the following sequence:

- thoracolumbar flexion,
- cervical flexion,
- ankle dorsiflexion, and
- knee extension.

Increased LBP/leg symptoms indicate a positive slump test and when the increased symptoms are relieved when cervical flexion is released, it is a reliable indicator of sciatica.

This study was the first to assess the criterion validity over time of FTF and SLR in acute/subacute LBP patients who were evaluated all together and as a subgroup of radicular pain patients. Its findings are important to clinicians in making decisions about which tests are truly useful in making a diagnosis and monitoring treatment progress in these types of patients.

STUDY METHODS

Acute (symptoms < 6wks) and subacute (symptoms 6-13 weeks) LBP patients were consecutively recruited in a primary care outpatient physiotherapy clinic.

Patients were evaluated at baseline (BL), after 1 month and after 12 months (only self-reported disability at this point, which was obtained over the telephone).

Patients were treated a median of 6 times (range was 2-16 visits) by a single physiotherapist who used the McKenzie method, manual therapy, and stabilizing exercises.

The same physiotherapist assessed all of the patients at BL and after 1 month using a structured procedure comprised of (in order) the FTF, slump and SLR tests. This was followed by a neurologic assessment that evaluated deep tendon reflexes, strength of large toe dorsiflexion, and dermatomes. The patients also completed the RMDQ and responded to questions about their demographic history and measures of pain.

Three self-rated measures of pain were utilized, as follows:

- LBP (lumbar and gluteal region) at present,
- leg pain (thigh or more distal) at present, and
- the worst lumbar/leg pain during the last 3 days.

A subgroup of subjects with radicular pain, as determined by the slump test at BL, was segregated from the entire group for the statistical analysis. Comparisons between the radicular pain group and the entire sample were carried out at BL, 1-month, and 12-month follow-ups.

Longitudinal validity was determined by calculating effect size (ES), standard error of measurement, and minimal detectable change (MDC) over 4 weeks. The interpretation for ES values is as follows:

- small ES = 0.20;
- medium ES = 0.50; and
- large ES ≥ 0.80.

The degree of criterion validity was determined by comparing changes in RMDQ scores at 1-month to changes in FTF and SLR using the Pearson correlation coefficient.

The predictive value of significant explanatory variables was determined by means of multivariate linear regression. The discriminative ability of the predictive variables was assessed using ROC analysis.

STUDY STRENGTHS / WEAKNESSES

The following are some of the study's limitations:

- Patients were recruited from a primary care practice, therefore the study's results are best generalized to such patients.
- Subgroup analysis was limited because of the small sample size.
- Psychological factors, which have previously been shown to be associated with LBP, were not evaluated in this study.
- A single physiotherapist conducted all of the evaluations and treatment which may have permitted various biases to enter in.

Additional References

1. Ekedahl KH, Jönsson B, Frobell RB. Validity of the fingertip-to-floor test and straight leg raising test in patients with acute and subacute low back pain: a comparison by sex and radicular pain. Arch Phys Med Rehabil 2010; 91: 1243-7.
2. Jönsson B, Strömqvist B. The straight leg raising test and the severity of symptoms in lumbar disc herniation. A preoperative evaluation. Spine 1995; 20: 27-30.
3. Philip K, Lew P, Matyas TA. The intertherapist reliability of the slump test. Aust J Physiother 1989; 35: 89-94.

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