

TRABAJOS CIENTIFICOS SOBRE EL TEST DE DERIFIELD

Rothbart BA. Relationship of Functional Leg-Length Discrepancy to Abnormal Pronation. J Am Podiatr Med Assoc. 2006 Nov-Dec;96(6):499-504; discussion 505-7.

An Anteriorly Rotated Innominate is Statistically Linked to a Functional Leg Length Discrepancy

The objective of this study was to determine whether a correlation exists between abnormal pronation and functional leg-length discrepancies. Visual assessment and a pelvic thrust maneuver were used to identify the functionally short leg in 56 indigenous Mexicans (20 males and 36 females; mean age, 33 years; mean weight, 59 kg; and mean height, 1.60 m). The Foot Posture Index was used with a modified stance position to identify the more pronated foot. The posterosuperior iliac spines were used to identify the "relative" position of the innominate bones. The raw data obtained from this study were evaluated using the McNemar test for paired proportions. A significant positive correlation was found between abnormal pronation and hip position and between hip position and functional leg-length discrepancy. These results are consistent with a theoretical ascending dysfunctional pelvic model: Abnormal pronation pulls the innominate bones anteriorly (forward); anterior rotation of the innominate bones shifts the acetabula posteriorly and cephalad (backward and upward); and this shift in the acetabula hyperextends the knees and shortens the legs, with the shortest leg corresponding to the most pronated foot.

Cooperstein R, Lucente M. Comparison of Supine and Prone Methods of Leg Length Inequality Assessment. J Chiropr Med. 2017 Jun; 16(2): 103–110. doi: 10.1016/j.jcm.2017.01.001

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5440679/>

OBJECTIVE

The primary objective of the current study was to determine the reliability between methods of supine and prone leg length inequality (LLI) assessment. The secondary objective was to determine if the degree of

examiner confidence affected the degree of intermethod agreement.

METHODS

Two experienced doctors of chiropractic assessed 43 participants for LLI, one using a prone and the other a supine method. They stated whether they were confident or not confident in their findings.

RESULTS

Kappa values for intermethod agreement were 0.16 for the full data set; 0.00 for the n = 20 subgroup with both examiners confident; 0.24 for the n = 18 subgroup with 1 examiner confident; and 0.55 for the n = 5 subgroup with neither examiner confident. Supine and prone measures exhibited slight agreement for the full data set, but no agreement when both examiners were confident. The moderate agreement with both examiners not confident may be an artifact of small sample size.

CONCLUSIONS

This study found that supine and prone assessments for leg length inequality were not in agreement. Positioning the patient in the prone position may increase, decrease, reverse, or offset the observed LLI that is seen in the supine position.

Schneider M, Homonai R, Moreland B, Delitto A .Interexaminer reliability of the prone leg length analysis procedure. J Manipulative Physiol Ther. 2007 Sep;30(7):514-521

OBJECTIVE:

The purpose of this study was to perform an interexaminer reliability evaluation of the prone leg length analysis procedure.

METHODS:

Two chiropractors each examined a series of 45 patients with a history of low back pain. Patients were in the prone position, with the knees in both extended and flexed positions, and with the head rotated right and left. The clinicians were asked to determine the side of the short leg with knees extended and if a change in leg length occurred with head rotation or when the knees were flexed. They were also asked to visually judge the amount of leg length differential by categorizing the difference as either less than 0.25, 0.25 to 0.5, 0.5 to 0.75, or more than 0.75 in. The head rotation portion of the test was performed only with patients (n = 22) in

whom the leg length differential was determined to be less than 0.25 in.

RESULTS:

kappa statistics and frequency distributions were calculated for each of the respective observations. Reliability of determining the side of the short leg with knees extended was good at 82% agreement (kappa = 0.65) but fair for determining the amount of leg length difference at 67% agreement (kappa = 0.28). Reliability of the head rotation testing procedure was extremely poor, with only 50% and 45% agreement about the observed change in leg length with the head rotated left and right, respectively (kappa = 0.04, kappa = -0.195). There was no significant correlation found between the side of reported pain by the patient and the side of the short leg as noted by either clinician (chi2 = 0.55, P = .91, and chi2 = 1.55, P = .67). All of the patients (100%) were judged to have a leg length difference by both clinicians. When the knees were flexed, there was 93% agreement that the short leg became longer (43/45 cases), with no reported cases of the short leg getting shorter. Calculation of kappa statistics was confounded for these last 2 observations because of extremely high prevalence bias.

CONCLUSIONS:

The results indicate that 2 clinicians show good reliability in determining the side of the short leg in the prone position with knees extended but show poor reliability when determining the precise amount of that leg length difference. The head rotation test for assessing changes in leg length was unreliable in this sample of patients. There does not appear to be any correlation between the side of pain noted by the patient and the side of the short leg as observed by the clinicians; all 45 patients in this sample were found to have a short leg by both clinicians.

PMID: 17870420 DOI: 10.1016/j.jmpt.2007.07.001.

Knutson GA, Owens EF. Leg Length Alignment Asymmetry In A Non-clinical Population And Its Correlation To A Decrease In General Health As Measured By The SF-12: A Pilot Stud. Journal of Vertebral Subluxation Research, 2004 Nov: 1-5.

PURPOSE:

To determine if there is an association between a test commonly used by chiropractors as a sign of subluxation/joint dysfunction – supine leg length

alignment (LLA) asymmetry and health-related quality of life as measured by the SF-12 questionnaire, in a non-clinical population.

DESIGN:

Volunteers answered the SF-12 and background questionnaires and were then examined for supine LLA by a chiropractor blinded to their answers. Setting: Gatherings of people in the general population.

PARTICIPANTS:

Fifty-five unscreened volunteers. Examiner: Chiropractor with approximately 20 years of clinical experience.

MAIN OUTCOME MEASURES:

The association of supine LLA asymmetry with general health based on the two summary scores - physical (PCS) and mental (MCS) - of the SF-12.

RESULTS:

There were 27 volunteers with LLA asymmetry, they had a mean PCS of 49.6 and a mean MCS of 47.9. In the noLLA asymmetry group (n=23) the mean PCS was 50.8, and mean MCS of 54.0. A multiple regression analysis found that of the variables gender, age, back pain (current/former) and LLA asymmetry, the only factor to approach significance with the SF-12 MCS/PCS was the presence of LLA asymmetry. A t-test found there was a significant difference ($p=0.017$) in the MCS between the supine LLA asymmetry and no-LLA asymmetry groups.

CONCLUSION:

This pilot study suggests that in this group of volunteers (n=50) from the non-clinical general population, those who demonstrated a commonly used sign of subluxation/joint dysfunction - supine leg length alignment asymmetry - had a significantly ($P=0.017$) lower measure of general health as determined by the SF-12 survey than those volunteers without such asymmetry. Further investigation to clarify this relationship and to establish whether there is a connection between the putative entity of chiropractic subluxation and unloaded leg length alignment asymmetry is recommended.

Walker BF, Buchbinder R. Most commonly used methods of detecting spinal subluxation and the preferred term for its description: a survey of

chiropractors in Victoria, Australia. J Manipulative Physiol Ther. 1997 Nov-Dec;20(9):583-9.

PURPOSE:

To determine the most commonly used diagnostic methods for detecting the spinal entity that chiropractors adjust/manipulate and the preferred term for describing this entity.

DESIGN:

Postal survey (self-completed questionnaire).

SETTING:

Victoria, Australia.

PARTICIPANTS:

All 554 chiropractors registered May 30, 1994, with the Chiropractors and Osteopaths Registration Board of Victoria.

MAIN OUTCOME MEASURES:

Frequency of use and opinion with respect to reliability of 16 specific methods, measured on a 7-point, Likert-type scale [never used (1) to always used (7) and very unreliable (1) to very reliable (7), respectively]; the respondent's preferred term for describing the spinal entity that chiropractors adjust/manipulate.

RESULTS:

The response rate was 85%. The most commonly used method was static palpation (mean score 6.6 +/- 1.1). Seven other methods, including pain description of the patient, orthopedic tests, motion palpation, visual posture analysis, leg length discrepancy, neurological tests and plain static X-rays had mean scores greater than 4.0. All of these methods, as well as functional X-ray views and kinesiological muscle testing, were considered reliable, with mean reliability scores greater than 4.0. Motion palpation was regarded as the most reliable method (mean reliability score 5.9 +/- 1.2). Seventy-five different terms for describing the spinal entity were named by 440 respondents. "Subluxation" was included in the preferred term of 294 respondents (67%), 46 included "dysfunction" (11%), 35 included "fixation" (8%) and 20 included "manipulable" (4.5%).

CONCLUSION:

Chiropractors commonly use a variety of methods to identify the spinal entity that they manipulate. There is no consensus as to the preferred term for describing this entity.

Rhodes DW, Mansfield ER, Bishop PA, Smith JF. Comparison of leg length inequality measurement methods as estimators of the femur head height difference on standing X-ray. J Manipulative Physiol Ther. 1995 Sep;18(7):448-52.

OBJECTIVE: To assess the validity and reliability of prone and supine measurements of leg length inequality and to determine the potential use of measurements at the iliac crests and patient demographics as predictors to estimate standing leg length differential.

DESIGN: Repeated prone and supine measurements of leg length inequality were made by an experienced chiropractor and compared with iliac crest and femur head measurements made on X-rays of standing patients. Multiple regression analysis was performed.

PARTICIPANTS: The first 50 new patients with low back pain that were X-rayed were included in the study.

RESULTS:

Intraexaminer reliability was excellent for the prone measurements. The supine tests were less reliable. The prone measurements were highly correlated with the standing X-ray femur head measurement. The supine measurements were poorly correlated. Measurements of deficiency at the iliac crests on X-ray were most highly correlated with X-ray measurements of discrepancy. In multiple regression, the prone measurements and duration of problem were the only significant predictors of standing X-ray difference.

CONCLUSIONS:

In this study, crest measurements were made on X-ray; the degree of accuracy with which millimeter differences can be measured clinically on patients is unknown. In a few cases, the supine measurements were more accurate than the prone; however, the supine test validity was poor when compared with the standing X-ray measurements, and reliability was less than expected. Supine measurements should not be used to estimate

standing leg length discrepancy in new low back pain patients but perhaps can be used in other clinically meaningful ways. Intraexaminer reliability of the prone measurements was higher, but further investigations need to focus on interexaminer reliability. The prone measurement as a predictor holds promise, but new measurement tools must be developed.

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De Witt JK, Osterbauer PJ, Stelmach GE, Fuhr AW. Optoelectric measurement of changes in leg length inequality resulting from isolation tests. J Manipulative Physiol Ther. 1994 Oct;17(8):530-8.

OBJECTIVE: a) Establish a precise, standardized method to assess prone leg alignment changes (functional "leg length inequality"), which have, until now, been reported clinically to occur as a result putative chiropractic subluxation isolation tests [neck flexion (C5) and extension (C1)]; and b) describe differences in leg alignment changes in a group of healthy subjects and patients with chronic spinal complaints.

DESIGN:

Two group, two isolation tests, descriptive, repeated measure analysis of variance.

SETTING:

Exercise and Sport Research Institute, Arizona State University.

PARTICIPANTS:

Eight healthy controls, eight patients with a history of chronic spinal complaints and observable leg alignment reactivity.

INTERVENTIONS:

Active cervical flexion/extension maneuvers.

OUTCOME MEASURES:

Optoelectric markers affixed to heels and occiput, as subjects lay prone. Marker locations sampled at 100 Hz for 10 sec during: a) three no movement trials, b) three cervical extension and c) three flexion trials. Data transformed to local reference frame approximately each subject's longitudinal axis prior to analysis.

RESULTS:

Heel position movement occurred during trials and were highly individualistic. Patients exhibited more asymmetrical movements than the controls during the head-up trials. No differences existed between controls and patients for range of heel displacement or net displacement.

CONCLUSIONS:

The results of this study allow the following to be concluded: 1) small leg displacements (< 1 mm) were recorded by the optoelectric measurement system; 2) heel position changes during isolation tests were identifiable; 3) as a result of head-up maneuvers, patients exhibited more asymmetrical heel movement than controls ($t = 8.743$, $p < .01$); 4) The heel range of motion was not different between the groups; and 5) The net change in heel position was not different between the groups. Patients exhibited more asymmetrical heel motion during head-up isolation tests, suggesting that some phenomena may separate these two groups, warranting future study.

Cooperstein R, Morschhauser E, Lisi A, Nick TG. Validity of compressive leg checking in measuring artificial leg-length inequality. J Manipulative Physiol Ther. 2003 Nov-Dec;26(9):557-66.

OBJECTIVE: To determine the accuracy of instrumented prone compressive leg checking.

DESIGN: Repeated measures ($n = 26$) on single subjects ($n = 3$).

SETTING:

Chiropractic college research clinic.

METHODS:

A pair of surgical boots were modified to permit continuous measurement of leg-length inequality (LLI). Multiple prone leg-check observations of a blinded examiner on 3 subjects were tested against artificial LLI that was created by randomly inserting 0 to 6 1.6-mm shims in either boot. Accuracy was assessed both within observations (observed versus artificial LLI) and between observations (observed versus artificial changes in LLI). The intraclass correlation coefficient (ICC), Lin's concordance correlation coefficient (CCC), Bland-Altman limits of agreement, and linear regression

statistics were obtained to determine the reliability and validity of compressive leg checking compared to a reference standard.

RESULTS:

For each shim condition, test-retest reliability was excellent (ICC = .85 and CCC = 0.95). The 95% confidence interval for the limits of agreement for observed versus artificial change in LLI was -5.44 to 5.67. The observed and artificial LLI shared 87% of their variation within observations (n = 78) and 88% between observations (n = 75). The mean examiner error was 1.72 mm and 2.01 mm, respectively.

CONCLUSION:

Compressive leg checking seems highly accurate, detecting artificial changes in leg length ± 1.87 mm, and thus possesses concurrent validity assessed against artificial LLI. Pre-leg-check and post-leg-check differences should exceed 3.74 mm to be confident a real change has occurred. It is unknown whether compressive leg checking is clinically relevant.

PMID: 14673405 DOI: 10.1016/j.jmpt.2003.08.002

Hestbaek L, Leboeuf-Yde C. Are chiropractic tests for the lumbo-pelvic spine reliable and valid? A systematic critical literature review. J Manipulative Physiol Ther. 2000 May;23(4):258-75.

OBJECTIVE:

To systematically review the peer-reviewed literature about the reliability and validity of chiropractic tests used to determine the need for spinal manipulative therapy of the lumbo-pelvic spine, taking into account the quality of the studies.

DATA SOURCES:

The CHIROLARS database was searched for the years 1976 to 1995 with the following index terms: "chiropractic tests," "chiropractic adjusting technique," "motion palpation," "movement palpation," "leg length," "applied kinesiology," and "sacrooccipital technique." In addition, a manual search was performed at the libraries of the Nordic Institute of Chiropractic and Clinical Biomechanics, Odense, Denmark, and the Anglo-European College of Chiropractic, Bournemouth, United Kingdom.

STUDY SELECTION:

Studies pertaining to intraexaminer reliability, interexaminer reliability, and/or validity of chiropractic evaluation of the lumbo-pelvic spine were included.

DATA EXTRACTION:

Data quality were assessed independently by the two reviewers, with a quality score based on predefined methodologic criteria. Results of the studies were then evaluated in relation to quality.

DATA SYNTHESIS:

None of the tests studied had been sufficiently evaluated in relation to reliability and validity. Only tests for palpation for pain had consistently acceptable results. Motion palpation of the lumbar spine might be valid but showed poor reliability, whereas motion palpation of the sacroiliac joints seemed to be slightly reliable but was not shown to be valid. Measures of leg-length inequality seemed to correlate with radiographic measurements but consensus on method and interpretation is lacking. For the sacrooccipital technique, some evidence favors the validity of the arm-fossa test but the rest of the test regimen remains poorly documented. Documentation of applied kinesiology was not available. Palpation for muscle tension, palpation for misalignment, and visual inspection were either undocumented, unreliable, or not valid.

CONCLUSION:

The detection of the manipulative lesion in the lumbo-pelvic spine depends on valid and reliable tests. Because such tests have not been established, the presence of the manipulative lesion remains hypothetical. Great effort is needed to develop, establish, and enforce valid and reliable test procedures.

Shambaugh P, Sclafani L, Fanselow D. Reliability of the Derifield-Thompson test for leg length inequality, and use of the test to demonstrate cervical adjusting efficacy. J Manipulative Physiol Ther 1988 Oct;11(5):396-9

The Derifield-Thompson test for leg length inequality (LLI) is commonly used by chiropractors to assess a need for adjustment and to evaluate the results of adjustment. The two previous studies testing the reliability of

the technique reported conflicting results. This study had two objectives: to demonstrate inter- and intraobserver reliability in detecting a LLI as little as 3 mm; and to document what effect Pierce-Stillwagon cervical adjusting has on a functional LLI. Twenty-six subjects walked into five successive examining rooms where a Derifield leg check was performed, including an estimate of the millimeters of difference in leg lengths. The subjects then entered a treatment room where they were randomly given no treatment, cervical adjusting, or gluteal massage. This process continued for 5 cycles. This study demonstrated that clinicians could reliably measure a LLI to less than 3 mm (both inter- and intraobserver), and also detect a change in LLI when the head was rotated. Neither cervical adjustment nor gluteal massage produced a significant change in observed LLI.

Nguyen HT, Resnick DN, Caldwell SG, Elston EW Jr, Bishop BB, Steinhouser JB, Gimmillaro TJ, Keating JC Jr. Interexaminer reliability of activator methods' relative leg-length evaluation in the prone extended position. J Manipulative Physiol Ther. 1999 Nov-Dec;22(9):565-9.

OBJECTIVE:

To investigate the interexaminer reliability of the prone extended relative leg-length check as described by Activator Methods, Inc.

SUBJECTS:

Thirty-four subjects were selected from a pool of 52 consecutive patients visiting a private chiropractic office.

METHODS:

Exclusion criteria included congenital or acquired conditions known to affect lower extremity length and inability to lie prone for a 10-minute period. Two experienced chiropractors who specialize in Activator Methods and are "advanced-proficiency rated" by Activator Methods, Inc. assessed each patient in random order for leg length inequality. Findings were recorded as left short leg, equal leg length, or right short leg.

RESULTS:

The data for 34 subjects were organized in a 3 x 3 contingency table. Total agreement was 85%. A simple, unweighted kappa value yielded kappa = 0.66. A disproportionately greater number of right short leg findings than

left short leg findings were observed by both examiners. In only 2 instances were equal leg lengths observed, and both were detected by the same examiner. Because examiners found only 2 of 34 subjects with equal leg lengths, several secondary analyses involving data reductions were conducted. The resulting kappa values were similar to the 3 x 3 analysis.

CONCLUSION:

There was good reproducibility between 2 examiners by using the Activator Method to detect leg length inequality in the prone extended position. This study does not address the validity or clinical significance of the measurement method. Future studies should include larger numbers, a wider variety of subjects, and a diversity of examiners.

Mannello DM. Leg length inequality. J Manipulative Physiol Ther 1992 Nov-Dec;15(9):576-90

OBJECTIVE:

The (Pacific) Consortium for Chiropractic Research has taken the initiative to research, investigate and provide information directed toward health care accountability, including evaluation of health care measures and practices. This article is a review of the literature pertaining to leg length inequality (LLI). Leg length measures are utilized by various health care providers as an indicator of biomechanical imbalance and necessity for care. Following the overview of the incidence, classifications and clinical significance, emphasis was placed on methods of evaluation, especially the visual "quick" leg length measurement procedure. Finally, a brief section on conservative care has been provided.

DATA SOURCES:

The information and studies reviewed were obtained from Medline, the Index to Chiropractic Literature, Chiropractic Research Archives Collection, Physiotherapy Index, Chiropractic Literature Analysis and Retrieval System, various technique manuals, personal communication with technique research advisors, proceedings and dissertations. REFERENCE

SELECTION:

In spite of the widespread use of leg length measures, there is still much controversy associated with LLI, its biomechanical significance and the reliability of the various measurement systems employed. Therefore, the

182 references utilized were selected on the basis of applicable information, especially studies that provided a detailed methodological design with statistical analysis regarding evaluation procedures.

CONCLUSION:

There appears to be a lack of agreement concerning incidence, classification and point of clinical significance. However, the manifestations or consequences of LLI demonstrate greater accordance. Of the three most commonly utilized evaluation methods, radiographic measures such as the scanograms are recognized as the most reliable procedure for the evaluation of anatomical LLI. Much controversy exists with some of the clinical orthopedic methods and the visual "quick" leg check. Because there is such a vast range in estimates of reliability, few if any definitive conclusions can be made regarding these methods. Given this, it is evident that more research is needed before the use of certain orthopedic and visual checks are considered reliable and valid.

Falltrick DR, Pierson SD. Precise measurement of functional leg length inequality and changes due to cervical spine rotation in pain-free students. J Manipulative Physiol Ther 1989 Oct;12(5):364-8

A series of blinded studies to determine the feasibility of documenting functional leg length inequalities and changes in functional leg length in normal and non-normal patients were performed.

Results indicated an absence of any significant effect of head rotation, type of table, galvanic stimulation, or any difference between persons classified as cervically lesioned or not cervically lesioned.

Failure to obtain subjects with frank pain as well as absence of an applied cephalad pressure (as is performed clinically) during leg length evaluation were considered as possible explanations for the failure to detect an effect of head rotation in the leg lengths. Discussion addresses the need for sensitive leg length inequality assessment techniques which eliminate subjectivity and contribute to decreased error variances.

Youngquist MW, Fuhr AW, Osterbauer PJ. Interexaminer reliability of an isolation test for the identification of cervical sublaxation. J Manipulative Physiol Ther 1989 Apr;12(2):93-7

A reliability study was conducted to determine whether prone leg length analysis in association with an isolation test maneuver was reproducible. Seventy-two subjects were evaluated by two examiners on separate occasions for the presence of C1 subluxation. Concordance was assessed by the Kappa statistic, and interexaminer percentage of agreement was compared. Agreement beyond chance for the two groups was $K = 0.52$, p less than 0.01 and 0.55, p less than 0.001, respectively. The results indicate good reliability using this method of analysis for putative upper cervical subluxation in this patient population. Further investigation is necessary to correlate this method of analysis with the empirical evidence of manipulable lesions or subluxations.

DeBoer KF, Harmon RO Jr, Savoie S, Tuttle CD. Inter- and intra-examiner reliability of leg-length differential measurement: a preliminary study. J Manipulative Physiol Ther 1983 Jun;6(2):61-6

The phenomenon of "short leg" has long been used and debated clinically. A uniquely chiropractic measurement technique was not studied in any of the few studies of reliability of measurement which have been reported. An inter- and intra-examiner reliability study was therefore performed to validate a prone leg length-differential test. Naive students ($n = 40$) were called, in random order, into three adjacent examining rooms where three experienced chiropractic clinicians measured differential leg lengths. Using standard placement a tape measure was read to the nearest mm to detect inequalities at the shoe-sole interface. The leg length differences were recorded, for both the straight and flexed legs prone positions, twice by each of the three clinicians. Intraclass correlations were significant for the two independent readings for all three examiners, indicating high reliability of the test. Good agreement among examiners was indicated as well by significant intraclass correlation in two of the three possible examiner combinations. These results argue strongly for the reality of the leg length inequality phenomenon and also that it can be reliably measured.

Aspegren DD, Cox JM, Trier KK. Short leg correction: a clinical trial of radiographic vs. non-radiographic procedures. J Manipulative Physiol Ther. 1987 Oct;10(5):232-8.

Visual leg length insufficiency detection and correction is compared with

established radiographic procedures on 41 consecutive patients presenting to a chiropractic clinic with low back pain. It is commonly accepted that the most accurate procedure of short leg demonstration is the standing X ray. Visual correction, as described by Rene Cailliet, uses three anatomical points of reference: a) iliac crest levelness, b) vertical appraisal of the spine from the sacral base (the spine should be perpendicular to the sacral base) and c) levelness of the posterosuperior iliac spine (PSIS) dimples. Lifts of varying thickness were placed under the foot of the short leg in both leg length corrective procedures. This study found that the visual method of measurement did not differ significantly from the X-ray method of measurement for leg length insufficiency. Further, it was found that when comparing those in which the visual measure was less than the X-ray measure and those in which the visual measure was greater, there was a significant relationship between visual and X-ray measures. Eta (eta 2) demonstrates that there is a very strong relationship between visual and X-ray methods of measurement. A review of the literature is presented regarding the correlation of leg length insufficiency and musculoskeletal disorders, as well as the discrepancy required to alter biomechanical properties of the trunk and lower extremity.

Burk JM, Rhudy TR. Inter-examiner reliability of functional leg-length assessment. American Journal of Chiropractic Medicine 1990;3(2):63-66.

Hestbaek L, Leboeuf-Yde C. Are chiropractic tests for the lumbo-pelvic spine reliable and valid? A systematic critical literature review. J Manipulative Physiol Ther. 2000 May;23(4):258-75.

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First author, year of	Quality	Results	Comments
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publication, position of subjects tested	score (%)		
Intraexaminer reliability			
DeBoer (1983) (prone, legs straight and flexed)	88	Statistically significant "degree of sameness": correlation coefficients: 0,52, 0, 70, and 0,77 for the three pairs	Examiner bias when testing in the flexed position immediately after extended position
Shambaugh (1988) (prone, head right and left)	69	No statistically significant difference between ratings in 9 of 10	Data sparse
Rhodes (1995) (prone and supine)	75	High degree of repeatability for prone but not supine"	None
Interexaminer reliability			
Venn (1983) (prone, legs straight and flexed)	38	62,25% to 65,33%; agreement "very significant.	20 test procedures without repositioning the study subject in between
DeBoer (1983) (prone, legs straight and flexed)	88	Statistically significant agreement in 2 of 3examiner pairs; intraclass correlation coefficients: 0,23, 0, 32, and 0.37	Examiner bias when testing in the Hexed position immediately after the extended position
Shambaugh (1988) (prone, head right and left)	69	Reliable measures of differences to <3 mm and detection of change with head rotation	Data presentation sparse and data analysis unsatisfactory
Fuhr (1989) (prone)	88	Kappa= 0,31 to 0,75; "fair" to "good"	None
Rhudy (1993) (prone, legs straight and flexed, head right and left)	100	2 normal examiners: "poor" agreement; 2 "experts": "none" to "moderate" agreement; "fair" agreement between experts maximum 25% of the time	None
Validity			
Venn (1983) (supine and prone, legs straight and flexed); validated against radiography	60	Correlation coefficient for examiner against radiography: .162 to .525 ("poor"); examiner against tape measure: - 0,193 to 0,384 ("poor")	20 test procedures without repositioning the study subject in between
Aspegren (1987) (visual evaluation of the height of iliac crests and dimples and of lumbar verticality): validated against radiography	70	Minimal difference between radiographs and visual findings; z = 0,128 (not significant for P = 0,05); Eta= 0,885	None
Shambaugh (1988) (prone, head right and left)	65	No significant difference in leg-length inequality change after treatment or sham adjustment	Asymptomatic subjects; data presented sparse and analysis unsatisfactory
Haas (1993) (prone)	80	Unclear; author concludes that "reactivity does not address the issue of a relationship between the diagnostic test and the lesion it was designed to detect"	None
Rhodes (1995) (prone); validated against radiography	70	52% agreement within 3 mm; 76% agreement within 6 mm; 88% agreement within 12 mm	Full examination between observation and control (radiography) may alter leg-length inequality
Rhodes (1995) (prone and supine); validated against radiography	80	52% agreement within 3 mm prone; 34% agreement within 3 mm supine; prone measures differed (left/right) from radiography 18% of the time	None

Leg-length inequality. It is difficult to conclude on the basis of the retrieved articles if leg-length inequality is a useful test method because of the different evaluation methods used in the reviewed studies.

However, a correlation between measures conducted on subjects in the prone position and radiographic measures seem to have been supported.

There was also some evidence in favor of reliability, with results for

intraexaminer reliability slightly better than for interexaminer reliability.

There were three intraexaminer reliability studies with quality scores from 69% to 88%, with only one scoring more than 80%.

This study demonstrated statistically significant reliability for measurements made with the study subject in the prone position.

There were five interexaminer reliability studies (quality scores 38% to 100%), with three scoring more than 80%.

The study with a 100% score demonstrated no to moderate agreement, whereas the other two acceptable studies showed statistically significant agreement in most but not all cases.

All these studies used prone measurements for the subject evaluation.

Of six validity studies (quality scores 60% to 80%), four validated the method against radiographic measures, and the other two compared results before and after treatment.

Only one of each reached the 80% limit: one compared leg-length inequality before and after treatment and showed no relation between the test and the lesion it should detect, and the other compared results with radiographic measurements and demonstrated good results for prone measures but poor for supine measures.

Potter NA, Rothstein JM. Intertester reliability for selected clinical tests of the sacroiliac joint. Phys Ther. 1985 Nov;65(11):1671-5.

The purpose of this study was to examine the intertester reliability of 13 tests for sacroiliac joint (SIJ) dysfunction. Eight therapists examined 17 patients in two clinical settings. In each case, two therapists independently examined the patients and obtained results on all 13 of the SIJ tests. Patients with lumbosacral pain and unilateral lower extremity symptoms of a duration less than one year were examined. All the therapists had specialized in orthopedic physical therapy and had been trained in SIJ examination. Reliability was poor; 11 of the 13 tests resulted

in less than 70% agreement. The two tests that relied solely on subjective patient response and imparted no information on SIJ position or mobility were within a range of 70% to 90% agreement. Our findings suggest the necessity of reviewing examination methods for the SIJ and improving reliability of clinical testing of this joint.

Pruebas	Números de pacientes	Acuerdo (%)	X ² Valor para la bondad de ajuste con 90% del acuerdo esperado	X ² Valor para la bondad de ajuste con 70% del acuerdo esperado
Prueba de Gillet de pie	15	46.67	203.82	24.82
Prueba de flexión de pie	16	43.75	232.56	31.57
Prueba de flexión sentada	16	50.00	173.36	18.11
Separación iliaca supina	17	94.12	1.46 ^b	26.57
Test de comprensión	17	76.47	18.86	1.19 ^b
Prueba decúbito-sentado	15	40.00	272.25	41.44
Prueba de flexión de rodilla en prono (Derefield)	17	23.53	48.36	100.63

Arab AM, Abdollahi I, Joghataei MT, Golafshani Z, Kazemnejad A. Inter- and intra-examiner reliability of single and composites of selected motion palpation and pain provocation tests for sacroiliac joint. Man Ther. 2009 Apr;14(2):213-21. doi: 10.1016/j.math.2008.02.004. Epub 2008 Mar 25.

The sacroiliac joint (SIJ) has been implicated as a potential source of low back and buttock pain. Several types of motion palpation and provocation tests are used to examine the SIJ. It has been suggested that use of a cluster of motion palpation or provocation tests is a more acceptable method than single test to assess SIJ. This study examined the inter- and intra-examiner reliability of single and composites of the motion palpation and provocation tests together. Twenty-five patients between the ages of 20 and 65 years participated. Four motion palpation and three provocation tests were examined three times on both sides (left, right) by two examiners. Kappa coefficient and prevalence-adjusted and bias-adjusted kappa (PABAK) were calculated to evaluate the reliability. PABAK for intra- and inter-examiner reliability of individual tests ranged from 0.36 to 0.84 (95% CI: -0.22 to 1.12) and 0.52 to 0.84 (95% CI: -0.18 to 1.08) which is considered fair to substantial. PABAK for intra- and inter-examiner reliability for clusters of motion palpation or provocation tests ranged from 0.44 to 0.92 (95% CI: -0.36 to 1.2) which is considered moderate to excellent reliability. PABAK for intra- and inter-examiner

reliability of composites of motion palpation and provocation tests ranged from 0.44 to 1.00 (95% CI: -0.22 to 1.12) and 0.52 to 0.92 (95% CI: -0.02 to 1.32) which is considered substantial to excellent. It seems that composites of motion palpation and provocation tests together have reliability sufficiently high for use in clinical assessment of the SIJ.

Autores	Grupo de tests	Acuerdo %	Kappa	Comentario del autor
Riddle y Freburger,2002	TFD, Derefield, decúbito a sentado, palpación EIPS sentado.	60% a 69%	0,11 a 0,23	No fiable
Tong et al (2006)	Posición del sacro Posición del ilíaco Lado de la disfunción SI.		0,47 0,08 0,32	Poco fiable
Kokmeyer et al,2002	TFD, Palpación EIPS sentado, decúbito a sentado, Derefield)	Sensibilidad 0,82,especificidad 0,88, valor predictivo positivo 0,86 , valor predictivo negativo 0,84		Fiable
Arab et al, 2009	TFD, TFD, Gillet, Derefield.		0,44 a 0,92	Fiabilidad moderada a excelente
Robinson et al,2007	Juego articular procúbito, prueba de la caída de la pelvis	88 % a 97 %	0,47 a 0,84	Fiable si utilizado con pruebas de provocación

Tests	Side	Tester 1					Tester 2					Intertester				
		k	95% CI	kmax	PI (BI)	PABAK	k	95% CI	kmax	PI (BI)	PABAK	k	95% CI	kmax	PI (BI)	PABAK
Prone knee flexion	R	0.41 (0.18)	0.07-0.78	0.75	0.24 (0.12)	0.44	0.34 (0.21)	-0.06 to 0.7	0.72	0.4 (0.12)	0.44	0.58 (0.16)	0.25-0.91	0.75	0.24 (0.12)	0.6
	L	0.27 (0.25)	-0.22 to 0.78	0.52	0.6 (0.16)	0.52	0.48 (0.2)	0.07-0.88	0.89	0.48 (0.04)	0.6	0.33 (0.26)	-0.18 to 0.85	0.61	0.64 (0.12)	0.6