Inter-examiner reliability of supine leg checks for discriminating leg length inequality

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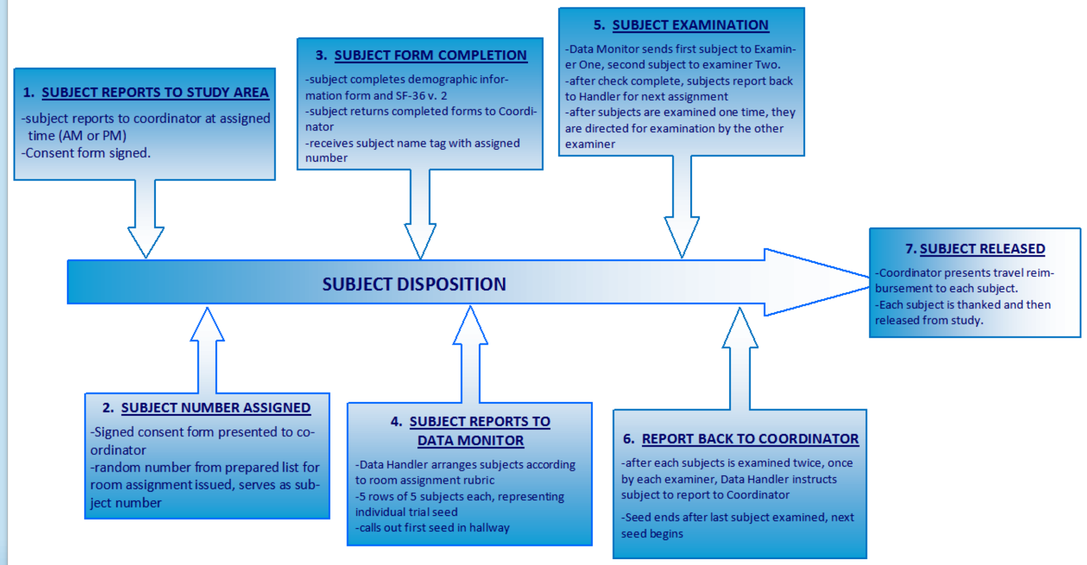
STUDY SEQUENCE



Examiner 1

Examiner 2	Left > ¼"	Left ⅛"- ¼"	Left < ⅛"	"even"	Right < ⅛"	Right ⅛"- ¼"	Right > ¼"	Total
Left > ¼"	2	1	0	0	0	0	0	3
Left ⅛"- ¼"	4	4	0	5	0	6	2	21
Left < ⅛"	0	1	0	1	0	0	1	3
"even"	0	0	0	0	0	0	0	0
Right < ⅛"	0	0	0	0	0	0	0	0
Right ⅛"- ¼"	0	0	0	2	0	6	3	11
Right > ¼"	0	2	0	3	0	3	4	12
Total	6	8	0	11	0	15	10	50

INTER-RATER AGREEMENT FOR LEG LENGTH INEQUALITY

by side and estimated magnitude of shorter leg, κ = 0.44 (95% CI: 0.21 to 0.67)

ABSTRACT

Objective:

The primary purpose of this study was to explore and quantify inter-examiner reliability of a standardized supine leg check procedure used to screen for leg length inequality.

Methods:

Two board certified National Upper Cervical Chiropractic Association practitioners used a standardized supine leg check procedure to examine fifty volunteers for leg length inequality. The order of examination was randomized. Subjects walked between examinations and were repositioned before being reexamined by a second examiner. The side and magnitude of leg length inequality was determined to the nearest 1/8 inch. Subjects and examiners were blinded. Inter-examiner reliability was assessed with a Bland-Altman plot, tolerance table of absolute differences, a quadratic weighted kappa statistic for quantitative scores, and a Gwet's AC1 coefficient for dichotomous ratings.

Results:

The quadratic weighted kappa statistic to quantify the reliability of the rating scale was 0.44 (95% CI: 0.21 to 0.67) indicating moderate reliability. The two examiners agreed exactly 32% of the time, within 1/8 inch 58% of the time, within 3/16 inch 72% of the time, and within 3/8 inch 92% of the time. The Bland-Altman plot revealed possible heterogeneity in reliability that requires additional study. The examiners agreed on the presence of a leg length inequality of at least 1/8 inch in 40 (80%) of 50 subjects (AC1 = 0.76), suggesting good agreement for this diagnostic category.

Conclusion:

The examiners demonstrated moderate reliability in assessing leg length inequality at 1/8 inch increments and good reliability in determining the presence of a leg length inequality. Further study is needed to determine whether results apply to different examiners and patient populations, and to determine the extent to which results correlate with neurophysiological responses and clinical signs and symptoms.

The trial was conducted in accordance with the Good Clinical Practice/ International Conference on Harmonization guidelines, and LCCW Institutional Review Board with mandatory informed consent signed by all subjects.

Examiner 1

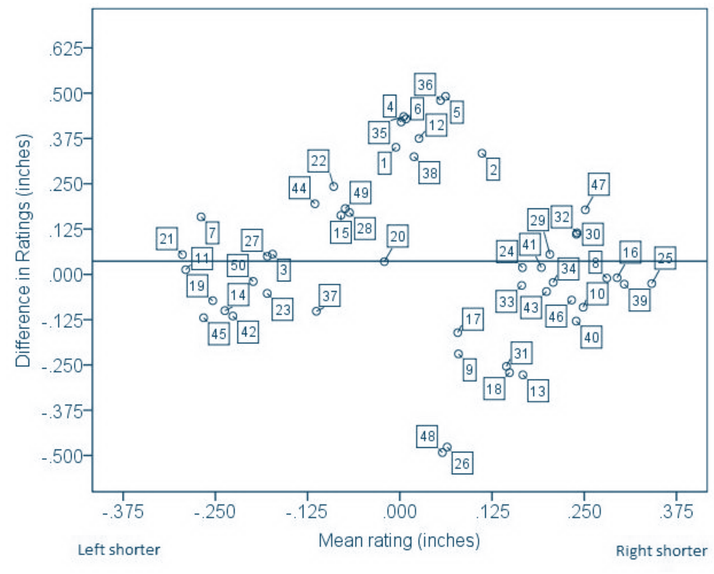
Examiner 2	Left	Right	
Left	**12**	**9**	21
Right	**2**	**16**	18
	14	25	39

INTER-RATER AGREEMENT

for side of the shorter leg in which both examiners offered a rating on the side of the short leg, kappa = 0.45 (95% CI: 0.19 to 0.71).

* Using a threshold of between 0 and less than 1/8 inch, Examiner #1 rated 11 subjects as "even" Examiner #2 rated those same 11 subjects as 6 with a short left leg and 5 with a short right leg.

BLAND-ALTMAN PLOT



The Bland-Altman plot displays differences in rating-pairs (*Y*-axis) against averages of rating-pairs (*X*-axis). This plot suggests excellent agreement in the left-most and right-most wings of the graph and poor agreement in the middle of the graph, near mean ratings of zero.

For example: study subject #11 on this plot shows an LLI rating of −0.3125 (left leg shorter by approximately 5/16 inch) by both examiners. Thus, the difference is 0 and the mean rating is −0.3125. In contrast, study subject #5 received an LLI rating of 0.3125 by examiner 1 (right leg shorter by approximately 5/16 inch) and a rating of −0.1875 by examiner 2 (left leg shorter by 3/16 inch). Thus, the difference is 0.3125 − (−0.1875) = 0.5000 and the mean is (0.3125 + (−0.1875) / 2 = 0.0625.