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Comparison of Supine and Prone Methods of Leg Length Inequality Assessment

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ABSTRACT

INTRODUCTION: *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.*

DISCUSSION: *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.*

CONCLUSION: *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.*

ANALYSIS

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Background Information

Many clinicians assess for leg length inequality (LLI) by looking at the relative, baseline position of the feet in either a supine or prone position and often use this information to inform them on the optimal site for spinal manipulation. However, current literature shows varying levels of reliability and validity for supine and prone LLI assessment procedures (2, 3) and there are few studies looking at the influence of the information supplied by LLI assessment on clinical outcomes. It may also be important for clinical use to differentiate between anatomic LLI (LLIa), where the legs are measurably of different lengths (4), and functional LLI (LLIf), where the legs are equal in length and one has been drawn cephalad in some manner (5), as this discrimination may have an impact on treatment selection and/or clinical outcomes (6).

The purpose of this study was to determine the inter-method reliability of supine and prone LLI assessments and to see if the degree of assessor confidence impacted the degree of inter-method agreement.

Pertinent Results:

43 student volunteers were recruited. All were asymptomatic or minimally symptomatic, with 5 participants reporting leg pain ranging from 1-6 on an 11-point scale, and 3 participants reporting histories of lower extremity injuries and surgeries. The prone and supine leg checks agreed that the left leg was short 13 of 43 times (30.2%) and that the right leg was short 12 of 43 times (27.9%). In 18 of 43 cases (41.9%) the leg check methods disagreed on the side of the short leg! The examiner performing the supine check was confident 30 of 43 times and the examiner performing the prone check was confident 28 of 43 times (69.8% and 65.1%, respectively). EDITOR'S NOTE: the lack of confidence is perhaps telling, but could also result from the examiners HAVING to pick a short side.

Using the full data set, inter-method agreement was minimal. However, when both examiners were confident their agreement was perfectly nil, when either one was confident this increased to fair, and when neither was confident this increased to moderate. This moderate agreement may have been a result of the small sample size increasing the odds that the two examiners may agree by chance (remember, only left or right were the options here – like flipping a coin!).

The lack of agreement between the supine and prone methods of checking for LLI may indicate that the tests are actually checking for different clinical phenomena and that the supine and prone positions have different effects of LLI. It has been suggested that pressure on the PSISs when lying supine can mitigate pelvic torsion, while lying prone would not mitigate this effect. Thus, the lack of agreement between the prone and supine checks may be attributable to variance between the methods or to different impacts of the patient's body position on LLI.

CLINICAL APPLICATION & CONCLUSIONS

This study showed that the results from supine and prone leg length assessments are not interchangeable and suggest they may measure different phenomena (the importance of which remains unknown!). More specifically, placing the patient in a prone position may increase, decrease, reverse, or exactly offset any LLI that is seen in a supine position. The authors suggest that assessment in the prone position may be more useful for detecting pelvic torsion while supine assessment may be more useful to detect upper cervical segmental misalignment (this remains theoretical!). However, there is no direct evidence in this study to indicate what is being measured by either assessment! More research is needed in this area.

STUDY METHODS

Study participants were recruited with a single inclusion criterion of 'willingness to participate in the study' and a single exclusion criterion of 'prior adverse response to any form of chiropractic leg checking procedure'. Two examiners performed the checks, one with 30 years' experience in the supine assessment procedure utilized by upper cervical chiropractors, and one with 39 years' experience in the prone assessment procedures utilized by most other chiropractors. Assessments were performed on identical, flat, padded, bench-type chiropractic tables. Patients receiving the prone check were instructed to approach the foot of the table, kneel on the foot of the table, and then lay prone, using their arms to pull the body cephalad until their ankles were at the foot of the table. Patients receiving the supine check were instructed to approach and sit down at the foot of the table, then use their arms to pull their bodies toward the head of the table until their ankles cleared the foot of the table. This was done in an attempt to remove any table positioning artifacts. In both groups, participants removed all items from their pockets before getting on the table and a towel was draped over their pelvis, thighs, and knees to conceal any anatomical information that may have affected the examiners' observations of LLI. Both checks were performed by dorsiflexing the feet and visually comparing the medial malleoli for any LLI. Examiners were required to judge either the left or right leg short and were not allowed to find the legs even.

All participants were checked in both the supine and prone positions with about 10 minutes between checks. The examiner would whisper the participant's ID number, which leg they

judged to be short, and whether they were confident in that finding into a data recorder. There was no conversation between the examiners and the participants or between the examiners.

STUDY STRENGTHS/WEAKNESSES

Strengths:

- Previous studies have shown substantial reliability for both prone and supine leg checking procedures (1). This was one of the first studies to compare the two methods.

Weaknesses:

- Requiring the examiners to declare one leg as short is not demonstrative of a real clinical examination. In clinical practice, it would be expected that some individuals would be deemed to have no LLI.
- This study had no validity arm, so it is impossible to know how accurate the leg checkers were.
- Using largely asymptomatic subjects may not provide similar findings to individuals who are generally seen in clinical settings

Additional References:

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