

Research report

# Factors affecting the intra-examiner and inter-examiner reliability of palpation for supine medial malleoli asymmetry

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## Abstract

**Background:** Many authors in the field of osteopathy claim that identification of asymmetrical bony landmarks may be useful for identifying sacroiliac joint dysfunction, but previous studies have failed to establish acceptable inter-examiner reliability for the detection of these landmarks.

**Objective:** To examine factors that may improve the inter-examiner reliability of palpation for medial malleoli asymmetry.

**Methods:** Five final-year osteopathic students examined two groups of five asymptomatic female subjects for supine medial malleoli symmetry in separate trials, conducted a week apart. Subjects in the first trial were not screened for any asymmetry. In Trial 2, the author screened and selected five subjects from 15 healthy volunteers who were estimated to have a medial malleoli asymmetry of greater than 4 mm, but less than 10 mm. Three rounds of assessment of medial malleoli symmetry were performed on every supine subject, by all examiners. In order to blind the examiners, subjects were covered from head to knees with a sheet, and changed tables between rounds. Examiner agreement was analysed using Cohen's weighted Kappa ( $\kappa$ ) statistic.

**Results:** Inter-examiner agreement for Trial 1 was fair ( $\kappa = 0.22$ ), but was almost perfect ( $\kappa = 0.94$ ) in Trial 2. Similarly, mean intra-examiner agreement in Trial 1 was fair ( $\kappa = 0.31$ ), whereas it was almost perfect ( $\kappa = 0.94$ ) in Trial 2.

**Conclusion:** Intra-examiner and inter-examiner reliability was almost perfect following subject selection for malleoli asymmetry, which suggests that clinicians can reliably detect medial malleoli asymmetries of greater than approximately 4 mm difference. The clinical usefulness of detecting medial malleoli levels and leg length inequality requires investigation.

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## 1. Introduction

Many authors in the field of osteopathy have claimed that sacroiliac and pelvic dysfunction, proposed to be a functional disturbance of the articulations of the pelvis, can be diagnosed using a variety of clinical tests. These authors have recommended using a combination

of motion testing and palpation for pelvic landmark asymmetry for the detection and identification of sacroiliac dysfunction (SIJD).<sup>1–6</sup> The use of these methods has been popularised by the muscle energy approach for treatment of pelvic somatic dysfunction, developed by Mitchell et al.<sup>5,6</sup> and now advocated by many authors in the field of osteopathy.<sup>1–6</sup> In this approach, the standing and seated flexion tests, as well as other sacroiliac motion tests, are used to determine the side of the dysfunction (right or left sacroiliac joint) and palpation for landmark asymmetry is used to identify the type of dysfunction.<sup>1–6</sup>

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Although there has been little research to establish what diagnostic tests osteopaths in private practice commonly use to detect SIJD, palpation for static asymmetry is a commonly used assessment procedure. Peace and Fryer<sup>7</sup> surveyed the Australian profession for tests used to determine SIJD, and, although the response rate in this study was relatively low, respondents reported the common use of static palpation for pelvic asymmetry. The most frequently examined landmarks that were routinely employed by respondents were the posterior superior iliac spine (PSIS, 94% of all respondents), anterior superior iliac spine (ASIS, 89%), the sacral inferior lateral angle (SILA, 69%) and medial malleoli (65%).<sup>7</sup> These osteopaths also reported common use of the standing flexion test (71%) and seated flexion test (44%). The use of these assessment procedures by osteopaths in other countries is speculative, however, it could be expected that American osteopathic physicians who use manipulative treatment would commonly use these diagnostic tests, because it has mostly been American authors who have advocated the use of these procedures.<sup>1–6</sup> It is likely that in the United Kingdom, however, where the teaching and application of muscle energy technique have been more muscle-based and less tied to the Fryette and Mitchell biomechanical models,<sup>8,9</sup> palpation for static asymmetry and use of the flexion tests may not have been as widely embraced as appear to be the case in Australia.

Authors in the field of osteopathy have attributed leg length discrepancy (LLD) to either anatomical (a discrepancy in the length of a bone) or functional causes. SIJD has been proposed to produce functional LLD, particularly when it consists of either a rotational dysfunction of the innominate (a ‘posteriorly’ rotated innominate is proposed to produce shortening of the leg, whereas an ‘anteriorly’ rotated innominate may cause lengthening), an innominate shear dysfunction (superior or inferior), or a sacral dysfunction that produces adaptive lumbar scoliosis.<sup>4–6</sup> Assessment of medial malleoli levels in the supine position is claimed to provide an indication of ‘functional’ leg length, and may be used to assist in the determination of the precise sacroiliac dysfunction.<sup>1–6</sup>

Accurate diagnosis requires that clinical tests be both reliable and valid. Reliability refers to the consistency, stability and reproducibility of a test.<sup>10</sup> A clinical test that is valid should examine the structure that it is intended to examine. Assessment methods such as the flexion tests and palpation for bony asymmetry have been criticised for having dubious validity,<sup>11,12</sup> and there have been calls to the profession to reassess the usefulness of these tests.<sup>7,13,14</sup> In view of the lack of objective ‘gold standard’ methods to determine SIJD, the validity of clinical tests purported to detect SIJD is difficult to establish, but if acceptable reliability cannot be established, validity is a moot point.

Intra-examiner reliability refers to the agreement of a single examiner on repeated assessments of the same individuals. Inter-examiner reliability is the agreement between different examiners for their examination findings. Inter-examiner reliability should be weighed more heavily than intra-examiner agreement when assessing the reliability and validity of a diagnostic test.<sup>10</sup> Agreement can be analysed using the Kappa statistic ( $\kappa$ ), which takes account of agreement by chance alone. Kappa values range from 0 (no agreement beyond chance) to 1 (perfect agreement).<sup>15</sup> Although there are no strict guidelines as to what constitutes adequate reliability for a clinical test, it is reasonable that a useful test should demonstrate at least substantial reliability ( $\kappa > 0.61$ ).

The inter-examiner reliability of palpation for static asymmetry has been reported to be poor in the examination of both the spine and pelvis, although many of these studies have used only asymptomatic subjects.<sup>16–18</sup> O’Haire and Gibbons<sup>17</sup> examined the reliability of palpation for asymmetry of pelvic landmarks in asymptomatic subjects and found that agreement between the 10 examiners for the PSIS, SILA and sacral sulcus was only slight ( $\kappa = 0.04–0.08$ ). Intra-examiner reliability was slightly better and ranged from substantial to less than chance ( $\kappa = 0.69$  to  $-0.05$ ).

Fryer et al.<sup>19</sup> examined the effect of training on the reliability of palpation of pelvic landmark asymmetry and the seated flexion test. Ten final-year osteopathic students, with comparable 3–4 years experience in these assessment procedures, examined 10 female subjects for a total of three times. Five examiners underwent two, 1-h training sessions in order to standardise their assessment techniques, whereas another five examiners did not. Fryer et al. found that the ‘trained’ group of examiners achieved marginally better intra-examiner and inter-examiner reliability than the ‘untrained’ group. Even with the training, inter-examiner reliability was only fair for the medial malleoli ( $\kappa = 0.31$ ) and ASIS ( $\kappa = 0.24$ ), and slight for the seated flexion test ( $\kappa = 0.14$ ), PSIS ( $\kappa = 0.08$ ) and SILA ( $\kappa = 0.04$ ). The small improvement in reliability of the ‘trained’ group could not unequivocally be attributed to the training sessions, because there may have been pre-existing differences in the skill levels of the individual examiners in each group. Even with standardising training, the inter-examiner reliability of palpation for these landmarks was unacceptably low for a clinical test.<sup>19</sup>

In the experience of the author, student repeatability for assessing some landmarks, such as the medial malleoli, often appears to be high. In the study of Fryer et al.<sup>19</sup> examiners palpated two landmarks on subjects lying supine, three landmarks when subjects were prone, in addition to performing the seated flexion test, all on 10 subjects for three consecutive rounds. Similarly, O’Haire and Gibbons<sup>17</sup> had examiners palpate three

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