

# INTRAEXAMINER AND INTEREXAMINER RELIABILITY OF MANUAL PALPATION AND PRESSURE ALGOMETRY OF THE LOWER LIMB NERVES IN ASYMPTOMATIC SUBJECTS

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## ABSTRACT

**Objective:** Nerve palpation is a method of clinically identifying mechanosensitivity of neural tissue by means of pressure algometry and manual palpation. There are few investigations of the reliability of lower limb nerve palpation, and femoral nerve palpation has never been previously reported. The aim of this study was to investigate the reliability of nerve palpation of the femoral, sciatic, tibial, and common peroneal nerves and to report normative values for the femoral nerve.

**Methods:** The 4 lower limb nerves were palpated in 39 healthy volunteers using pressure algometry and manual digital palpation. Measurements were taken twice by 1 rater (intrarater reliability) and once by a second rater (interrater reliability).

**Results:** Intraclass correlation coefficients for pressure pain thresholds (PPTs) via pressure algometry of the femoral, common peroneal, tibial, and sciatic nerves were 0.69, 0.84, 0.64, and 0.9 for intrarater reliability, respectively, and 0.82, 0.7, 0.56, and 0.75 for interrater reliability.  $\kappa$  Values for manual palpation were 0.59, 0.55, 0.42, and 0.60 for intrarater reliability and 0.30, 0.49, 0.37, and 0.60 for interrater reliability. Males demonstrated significantly higher PPTs than females for the femoral, sciatic, and tibial nerves, and differences in PPTs were present between right and left sides.

**Conclusion:** Nerve palpation of the femoral, common peroneal, and sciatic nerves using pressure algometry demonstrated good to excellent reliability, whereas the tibial nerve PPTs showed moderate to good reliability. Manual palpation measurements demonstrated fair to moderate reliability. (*J Manipulative Physiol Ther* 2014;37:97-104)

**Key Indexing Terms:** *Peripheral Nerves; Musculoskeletal Pain; Reliability and Validity*

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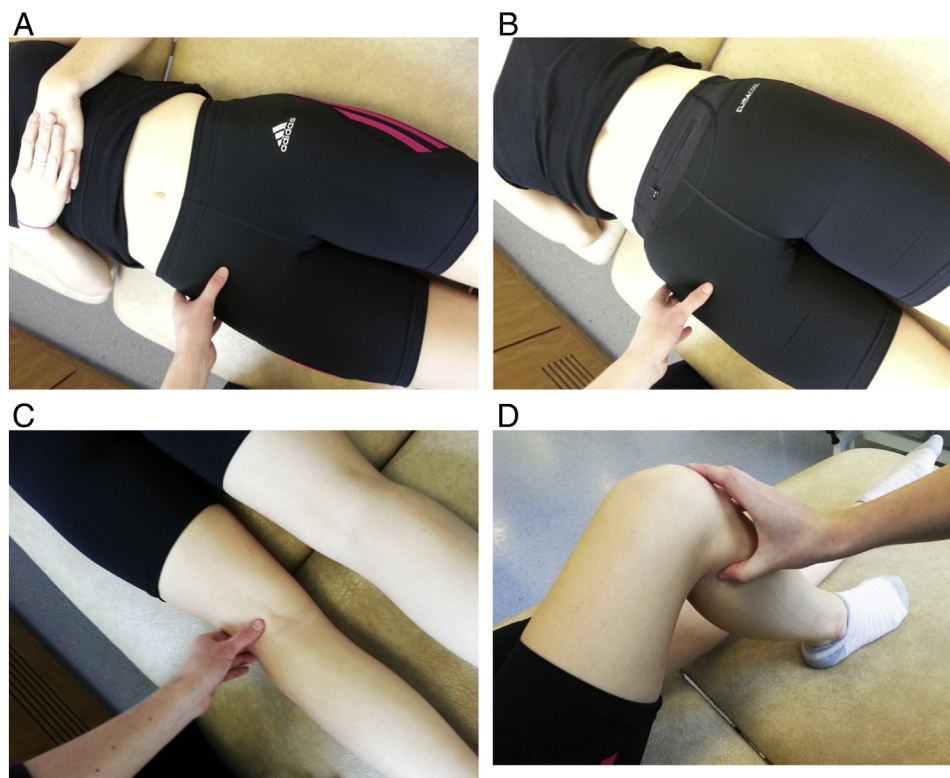
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Neural tissue mechanosensitivity may be assessed by neural tissue provocation tests such as nerve palpation. Mechanical palpation using pressure algometry and manual palpation with the thumb have a high degree of clinical utility as they may be performed as part of a standard bedside examination.<sup>1,2</sup>

Findings of localized and widespread hyperalgesia are suggestive of pain sensitization.<sup>3</sup> Increased sensitivity to nerve palpation has been observed in a number of chronic pain conditions, for example, nonspecific arm pain,<sup>4</sup> low back pain,<sup>5</sup> and work-related upper limb pain.<sup>6</sup> It has been suggested that nerve sensitivity may be explained by peripheral sensitization mechanisms,<sup>7</sup> in which neurogenic inflammation leads to the sensitization of neural mechanoreceptors (nervi-nervorum).<sup>8</sup> In addition, central sensitization mechanisms may play a role in nerve sensitization, whereby nonnoxious stimuli from the nervi-nervorum are processed abnormally in the central nervous system.<sup>9</sup>

There are reports of the reliability of nerve palpation in relation to nerves of the upper limb,<sup>1,6,10</sup> and very limited data exist in relation to the reliability of lower limb nerve



**Fig 1.** A, Femoral nerve manual palpation. B, Sciatic nerve manual palpation. C, Tibial nerve manual palpation. D, Common peroneal nerve manual palpation. (Color version of figure is available online.)

palpation,<sup>5,11</sup> despite its use in a number of studies on clinical decision making in relation to low back and leg pain disorders.<sup>2,12,13</sup>

Walsh et al<sup>11</sup> investigated the reliability of mechanically palpating the sciatic, tibial, and common peroneal nerves of the lower limb using a pressure algometer and provided normative pressure pain threshold (PPT) values for these nerves. Walsh and Hall<sup>5</sup> carried out digital (manual) palpation of lower limb nerves bilaterally and simultaneously in patients with low back and leg pain and rated pain or discomfort on the symptomatic side in relation to the symptomatic side. However, there are conflicting reports in relation to differences in PPT measurements between symptomatic and asymptomatic sides in subjects with chronic pain, with reports of no significant differences<sup>3</sup> as well as reports of significant differences between sides.<sup>14</sup> A possible explanation is the presence or absence of peripheral and central sensitization of the nervous system in chronic pain states, and it may, therefore, be important to carry out nerve palpation of right and left sides separately. In relation to the femoral nerve, no studies have investigated the reliability of femoral nerve palpation or reported normative PPT values. The femoral nerve crosses the hip joint, supplying muscles of the anterior thigh and innervating the knee joint,<sup>15</sup> which may make it vulnerable to sensitization in patients with longstanding pain disorders

of the lower limb. In addition, there have been no studies investigating the reliability of manual palpation of lower limb nerves, which have reported separate right- and left-sided palpation.

The purpose of this study was to investigate the reliability of femoral nerve palpation, using manual pressure and pressure algometry, in addition to further testing the reliability of manual palpation and pressure algometry of the sciatic, common peroneal, and tibial nerves by means of alternate unilateral palpation. The study also sought to provide normative PPT data for the femoral nerve.

## METHODS

### Subjects

The Quality Appraisal Tool for Studies of Diagnostic Reliability guidelines was used in the design of this study.<sup>16</sup> Based on previous reliability studies, a sample of 39 participants was selected for the study.<sup>1,5,6,11</sup> All subjects were students of University College Dublin (UCD) who were over 18 years, with no chronic pain or neurologic disorders and no previous history of lumbar spine or lower limb pathologies. Subjects were invited via email to take part in the study and provided written informed consent before participation. Ethical approval was obtained from the UCD Human Research Ethics Committee.

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