Comparison of Longitudinal Sciatic Nerve Movement With Different Mobilization Exercises: An In Vivo Study Utilizing Ultrasound Imaging

**STUDY DESIGN:** Controlled laboratory study using a single-group, within-subjects comparison.

**OBJECTIVES:** To determine whether different types of neural mobilization exercises are associated with differing amounts of longitudinal sciatic nerve excursion measured in vivo at the posterior midthigh region.

**BACKGROUND:** Recent research focusing on the upper limb of healthy subjects has shown that nerve excursion differs significantly between different types of neural mobilization exercises. This has not been examined in the lower limb. It is important to initially examine the influence of neural mobilization on peripheral nerve excursion in healthy people to identify peripheral nerve excursion impairments under conditions in which nerve excursion may be compromised.

**METHODS:** High-resolution ultrasound imaging was used to assess sciatic nerve excursion at the posterior midthigh region. Four different neural mobilization exercises were performed in 31 healthy participants. These neural mobilization exercises used combinations of knee extension and cervical spine flexion and extension. Frame-by-frame cross-correlation analysis of the ultrasound images was used to calculate nerve excursion. A repeated-measures analysis of variance and isolated means comparisons were used for data analysis.

**RESULTS:** Different neural mobilization exercises induced significantly different amounts of sciatic nerve excursion at the posterior midthigh region (P<.001). The slider exercise, consisting of the participant performing simultaneous cervical spine and knee extension, resulted in the largest amount of sciatic nerve excursion (mean ± SD, 3.2 ± 2.0 mm). The amount of excursion during the slider exercise was slightly greater (mean ± SD, 2.6 ± 1.5 mm; P = .002) than it was during the tensioner exercise (simultaneous cervical spine flexion and knee extension). The single-joint neck flexion exercise resulted in the least amount of sciatic nerve excursion at the posterior midthigh (mean ± SD, –0.1 ± 0.1 mm), which was significantly smaller than the other 3 exercises (P<.001).

**CONCLUSION:** These findings are consistent with the results of previous research that has examined median nerve excursion associated with different neural mobilization exercises. Such nerve excursion supports theories of nerve motion associated with cervical spine and extremity movement, as generalizable to the lower limb.

**KEY WORDS:** diagnostic ultrasound, nerve biomechanics, nerve sliding, neurodynamics

A recent systematic literature review highlighted the heterogeneity of neural mobilization exercises that have been assessed via randomized controlled trials. Until recently, the proposed effects of neural mobilization were based on theory rather than research evidence. Accordingly, it is possible that many authors of randomized controlled trials chose neural mobilization exercises on a theoretical and ad hoc basis, rather than specifically designing exercises to match clinical conditions. In fact, several authors have stated that the exercises utilized were chosen solely on those used in previous studies. The use and description of neural mo-
mobilization to influence the mechanical properties of peripheral nerves gained popularity from the late 1970s through the mid-1980s. However, the underlying mechanisms associated with clinical improvements following neural mobilization remain unclear. There are many theories that have been postulated, including physiological effects (removal of intraneural edema), central effects (reduction of dorsal horn and supraspinial sensitization), and mechanical effects (enhanced nerve excursion).

Future research needs to focus on uncovering the underlying mechanisms of neural mobilization. Such research would, in part, increase understanding of the mechanical effects of neural mobilization exercises on peripheral nerves. Certainly, in the initial stages of such research, more attention must be given to understanding the influence of neural mobilization exercises on normal nerve excursion.

Previous studies have examined the influence of neural mobilization exercises on nerve mechanics in cadavers and subsequently in vivo. Coppiters et al examined the difference in median nerve excursion between different types of nerve-gliding exercises (including sliders and tensioners). Sliders utilize combinations of joint movements to encourage peripheral nerve excursion by increasing elongation at one end of the nerve bed, thereby creating tension in the nerve from that end, while simultaneously releasing tension from the other end of the nerve. In doing so, excursion is promoted without increased nerve tension. In contrast, tensioners utilize combinations of joint movements that elongate the nerve bed from both ends, in an attempt to stretch the neural connective tissues.

The conclusion has been that, of the nerve-gliding exercises assessed, sliders produce greater amounts of median nerve excursion compared to tensioners. It has also been shown that significantly less nerve excursion occurred during nerve-gliding exercises initiated from one end of the nerve bed, using a single-joint movement, compared to sliders.

Neural mobilization exercises, derived from neurodynamic tests, such as the slump test or straight leg raise test, have been advocated in clinical texts and as a result of published clinical trials. However, to the authors' knowledge, no previous research has been published that has examined in vivo measurement of sciatic nerve excursion in normal, healthy participants during different types of neural mobilization exercises. Such work would complement previous work performed on the upper limbs. The generalizability of neurodynamics and neural mobilization exercise theories would be enhanced if it could be shown that similar trends exist in the lower limb, where anatomical structures and motion are different.

The aim of this study was to examine longitudinal sciatic nerve excursion at the posterior midtigh region, using high-resolution ultrasound imaging, during slump-sitting neural mobilization exercises. This research was conducted with healthy participants to assess normal nerve excursion. Consistent with previous studies, it was hypothesized that sliders would induce greater longitudinal sciatic nerve excursion compared to both tensioners and nerve-gliding exercises, which utilize single-joint movements.

**METHODS**

**Participants**

Thirty-one healthy participants (22 women, 9 men; range, 21-61 years; mean ± SD age, 29 ± 9 years; height, 170.5 ± 7.5 cm; weight, 68.6 ± 13 kg; body mass index, 23.4 ± 3 kg/m²) were included in this study. Participants met the inclusion criteria if they were healthy, over the age of 18 years, and did not have symptoms suggestive of sciatic nerve dysfunction.

Participants were excluded if they had a history of major trauma or surgery to the lumbar, hip, buttock (gluteal), or hamstring (posterior thigh) regions; symptoms consistent with sciatic nerve impairment (eg, paresthesias, weakness, etc); or a positive slump test (a test that determines mechanosensitivity of the sciatic nerve and its associated branches) as described by Butler. Participants were also excluded if they had a neurological condition or other systemic disorders (eg, diabetes) that might alter the function of the nervous system.

Based on the data of the first 15 participants in the study, a power analysis and sample-size calculation were performed using G*Power 3. The dependent variable used for this analysis was the difference in sciatic nerve excursion among the different neural mobilization exercises, and calculations were based on a 30% difference being observed. This value was arbitrarily chosen, but thought to be a notable change that would be relevant to clinicians. It could also be considered conservative, based on findings from previous research on the upper limb.

With power set at 0.8 and an alpha of .05, the number of subjects required was 21. Following the power analysis, a review of the procedures and methods was conducted, with the conclusion that no changes were necessary. Therefore, data from an additional 16 participants were added to those of the first 15.

Participants were provided with both written and verbal information concerning the testing procedures. Informed consent was given by all participants. The study was approved by the Auckland University of Technology Ethics Committee.

**Participant Setup** A Biodex System 3 Isokinetic Dynamometer (Biodex Medical Systems, Inc, Shirley, NY) was used to provide a consistent, fixed, and supported sitting position and to enable standardization of passive joint movement for the neural mobilization exercises. Participants were positioned on the Biodex seat and asked to adopt a slumped spinal posture, in which the thoracic and lumbar spine would relax into a flexed position. Once in the slump position, the
trunk of each participant was brought forward until the hips were at 90° of flexion, as measured by a universal goniometer. The slump position was maintained with contact of the sternum against a 45-cm-diameter inflated ball, which was placed on the participant’s lap. A belt was then utilized to maintain this position (FIGURE 1).

**FASTRAK Electrogoniometer**

Range of movement at the cervical spine and knee was measured with a 3SPACE FASTRAK (Polhemus, Inc, Colchester, VT) electromagnetic motion tracking system. The FASTRAK monitors the position of up to 4 separate sensors in real time and with 6 degrees of freedom, in respect to a source unit that emits a low-intensity electromagnetic field. It records the position and orientation of each of the sensors (angular and linear displacement) within the electromagnetic field at a set frequency (30 samples per second when using 4 sensors). The FASTRAK system has been shown to be accurate to within ±0.2° when recording spinal motion.10

For cervical spine motion, sensor 1 was placed at the middle of the forehead, in line with the bridge of the nose;2,23,35,46,47 using an adjustable elastic headband, and sensor 2 was placed over the spinous process of C7 and secured with double-sided tape and tape over the top of the sensor. For knee-motion measurements, both sensors were secured (using double-sided tape) on the lateral aspect of the lower extremity, with sensor 1 positioned 100 mm above the lateral joint line and sensor 2 located 100 mm below the joint line.12

To avoid potential interference from metallic objects within the electromagnetic field, the electromagnetic source unit was secured to a wooden pole and elevated from the ground, as recommended by previous studies utilizing the FASTRAK system.12,32 The supporting pole was placed far enough in front of the participant and other metal equipment to ensure that there was no interference. Preliminary calibration using all 4 sensors, in pairs, against a universal goniometer moved through a set angle, demonstrated no interference affecting the FASTRAK system.

The FASTRAK was linked to a computer that recorded the signals being transmitted from the sensors. LabVIEW 2009 Version 9.0f2 (National Instruments Corporation, Austin, TX) computer software was utilized to allow real-time visualization and recording of motion. The joint-angle data for the cervical spine and knee were then synchronized offline to the recorded ultrasound sequences.

**Imaging**

Excursion of the sciatic nerve was assessed at the level of the posterior midthigh (halfway between the gluteal crease and popliteal crease). Initial transverse imaging at the posterior midthigh allowed localization of the sciatic nerve. Once identified, the ultrasound transducer was rotated into the longitudinal plane.12,32 A sonographer with 5 years of experience performed all ultrasound scans. The sonographer was blinded to the analysis of all ultrasound imaging.

B-mode real-time ultrasound scanning was performed using an iU22 (Royal Philips Electronics, Amsterdam, the Netherlands) ultrasound machine with a 12- to 5-MHz, 50-mm linear-array transducer. An ultrasound sequence of the nerve in a longitudinal plane was recorded for each exercise trial. The video sequence was captured over a 3-second period at a capture rate of 30 frames per second.

**Ultrasound Image Analysis**

Each video sequence was converted to a digital format (bitmaps). The image size for each of the frames was 800 × 600 pixels. ImageJ Version 1.42 (National Institutes of Health, Bethesda, MD) digital image analysis software was used to calculate the image resolution and to convert the image scale from pixels to millimeters. Image resolution varied between 7.3 and 10.4 pixels per mm, depending on the depth of ultrasound penetration required to capture the sciatic nerve.

Each video sequence was then analyzed offline, using a method of frame-by-frame cross-correlation analysis that was developed in MATLAB (The MathWorks, Inc, Natick, MA) by Dilley et al.24 This method employs a cross-correlation algorithm to determine relative movement between successive frames in a sequence of ultrasound images.24 During the analysis, the program compares the grayscale values of speckle features from the regions of interest within the nerve between adjacent frames of the image sequence. In the compared frame, the coordinates of the regions of interest are offset along the horizontal and vertical image planes 1 pixel at a time within a predetermined range. A correlation coefficient is calculated for each individual pixel shift. The peak of a quadratic equation fitted to the maximum 3 correlation coefficients is equivalent to the pixel shift/movement between adjacent frames.24

Pixel-shift measurements for the nerve were offset against (subtracted from) pixel-shift measurements from stationary structures (ie, subcutaneous layers, bone, etc) within the same ultrasound field. This method allows for any slight movement of the ultrasound transducer to be eliminated from the analysis. This method has proven to be highly reliable.
for the assessment of nerve motion.22,24,27

**Video Selection Criteria**

Each ultrasound video sequence was reviewed several times. To be selected for analysis, the video sequence must have had clear pixelation and clear identification of the sciatic nerve throughout the 3-second duration. The sciatic nerve must have stayed within the longitudinal plane of the ultrasound transducer. Of the video sequences that met these criteria, 2 were randomly chosen for each of the 4 neural mobilization exercises per participant.

During the ultrasound sequence selection and cross-correlation analysis, the researcher was blinded to the participant (including relevant demographic data), the recording session, and the neural mobilization exercise performed (FIGURE 2).

**Neural Mobilization Exercises**

**Slider Mobilization**
The Biodex System 3 Isokinetic Dynamometer performed passive knee extension (from 80° of flexion to 20° of flexion, loading the sciatic nerve caudally via the tibial nerve) while the participant simultaneously performed active cervical spine extension (from full comfortable cervical flexion to full comfortable cervical extension, unloading the nervous system cranially).

**Single-Joint Mobilization (Knee)**
The Biodex System 3 Isokinetic Dynamometer performed passive knee extension (from 80° of flexion to 20° of flexion, loading the sciatic nerve caudally via the tibial nerve) while the participant looked straight ahead to maintain the cervical spine in a neutral position during the movement of passive knee extension.

**Single-Joint Mobilization (Cervical Spine)**
The participant performed active cervical flexion (from full comfortable cervical extension to full comfortable cervical flexion, loading the nervous system cranially). The knee was held stationary by the Biodex System 3 Isokinetic Dynamometer at 80° of knee flexion.

**Tensioner Mobilization**
The Biodex System 3 Isokinetic Dynamometer performed passive knee extension (from 80° of flexion to 20° of flexion, loading the sciatic nerve caudally via the tibial nerve) while the participant simultaneously performed active cervical flexion (from full comfortable cervical extension to full comfortable cervical flexion, loading the nervous system cranially).

To specifically limit movement to the knee and cervical spine, a rigid thermoplastic ankle-foot orthosis, set at neutral (0° of ankle dorsiflexion), was worn by each participant to eliminate the potential influence of ankle movement.

Knee joint motion occurred at an angular velocity of 20°/s. The participant was instructed to perform the cervical spine movement over 3 seconds. The exercises were completed in randomly assigned order to avoid any possible order effects. Each participant completed all 4 exercises after performing 2 repetitions of each movement to become familiar with the trials. Then, a further 3 repetitions of each movement were performed for data collection. There was 1 minute of rest between each mobilization exercise.

**Statistical Analysis**

A 1-way repeated-measures analysis of variance was utilized to assess differences in longitudinal sciatic nerve excursion across the 4 mobilization exercises performed. Alpha was set at .05. Post hoc pairwise comparisons of means were then performed with Bonferroni adjustment, with the alpha level at .008 (.05/6 potential pairwise comparisons).39

The intrarater reliability of measuring longitudinal sciatic nerve excursion...
from ultrasound footage using cross-correlation software was also examined. A 2-way, mixed intraclass correlation coefficient (ICC₂,₁), with 95% confidence intervals and standard error of measurement, was calculated to determine the reliability of measurement.

Descriptive statistics were used to report the amount of cervical spine and knee range of motion for each of the neural mobilizations. Descriptive statistics were also calculated to document the cervical spine start and end positions for each of the neural mobilizations. Dependent t tests (α<.05) were used to determine whether there were differences in total cervical spine and knee range of motion between specific pairs of neural mobilization exercises.

**RESULTS**

Of the 31 participants enrolled in the study, data from 1 participant were excluded, because the sciatic nerve could not be maintained within the longitudinal scanning plane during data recording.

The descriptive data for cervical range of motion for each of the 4 neural mobilization exercises are presented in the Table. There was no statistically significant difference (P>.05) in the overall range of cervical spine motion among the slider, tensioner, and movement of the cervical spine from full flexion to full extension exercises.

For the 2 exercises that started with the cervical spine in extension and ended with the cervical spine in flexion, there was no statistically significant difference in cervical extension at the start of the movement (mean ± SD, 31.4° ± 25.1° versus 29.5° ± 21.3°; P = .54). However, the amount of flexion at the end of the movement was significantly different between exercises (87.5° ± 22.7° versus 96.8° ± 21.7°; P = .002). Cervical spine extension was greater for the slider exercise than for the other 2 exercises (cervical spine extension only and tensioner exercises) that used cervical spine motion (P<.01). It should be noted that for the slider exercise, cervical spine extension is the end position, as opposed to the start position for the other 2 exercises. The cervical spine start position in flexion with the slider exercise was significantly less than the cervical flexion end position for the tensioner exercise (P>.001).

For exercises involving knee extension, the mean ± SD range of motion was 58° ± 1.3° (from 78.5° ± 1.8° to 20.5° ± 0.1° of flexion). No statistically significant differences were observed between the start and end positions for knee range of motion across all 3 neural mobilization exercises that included knee movement (P>.3).

The repeated-measures analysis of variance indicated that there was a statistically significant difference in motion of the sciatic nerve at the posterior midthigh region across the neural mobilization exercises (P<.001). Following Bonferroni adjustment, there were statistically significant differences (P<.008) in sciatic nerve excursion between the slider and tensioner mobilization exercises (mean ± SD, 3.2 ± 2.0 versus 2.6 ± 1.5 mm; P = .002) and between the slider and both single-joint mobilization exercises (3.2 ± 2.0 versus 2.6 ± 1.4 mm for knee extension exercises, P = .002; 3.2 ± 2.0 versus 0.1 ± 0.1 mm for neck flexion exercises, P<.001). There was no significant difference between the tensioner and knee extension exercises (P = .62), but both were significantly different from the neck flexion exercise (P<.001) (Figure 3).

The reliability of measuring sciatic nerve excursion across all trials for all 4 neural mobilizations combined was excellent, with an ICC of 0.95 (95% confidence interval: 0.92, 0.96; standard error of measurement, 0.2 mm).

**DISCUSSION**

In support of the study hypotheses, differences in the amount of longitudinal sciatic nerve excursion at the posterior midthigh region exist between different types of neural mobilization exercises. Statistically, the slider mobilization generated significantly more sciatic nerve excursion compared to the tensioner mobilization; however, the difference between the 2 exercises was only 0.6 mm, which may or may not be clinically meaningful. The slider mobilization also generated statistically greater sciatic nerve excursion compared to the
single joint mobilizations of knee extension and cervical spine flexion. These findings are generally in agreement with other research that has examined similar techniques in the upper limb and thus provide evidence that the theoretical construct of nerve excursion during joint motion is also occurring in the lower limb.

More specifically, it has been suggested that a slider mobilization is designed to maximize nerve excursion by simultaneously elongating the nerve bed from one end of the nerve while releasing tension from the other end. This combined action should result in the greatest amount of nerve excursion. A single-joint mobilization deliberately utilizes movement from one end of the nerve bed predominantly and, therefore, may have less potential to induce nerve excursion, due to possible increases in nerve tension and less capacity to exploit any potential cumulative effect.

Sciatic nerve excursion was significantly greater during the sliding technique (technique A, 3.2 mm) compared to either the single-joint mobilization generated at the knee (technique B, 2.6 mm) or the tensioner mobilization (technique D, 2.6 mm). It is expected, from cadaver studies, that full extension of the cervical spine would allow a release of neural tension via the spinal cord and spinal nerve roots, which potentially allows more excursion of the sciatic nerve.

It is notable that no difference in excursion was seen between the single/joint mobilization (technique B, 2.6 mm) and the tensioner mobilization (technique D, 2.6 mm). The tensioner mobilization involved simultaneous elongation of the nerve bed from both ends. However, the inclusion of cervical flexion did not decrease the amount of sciatic nerve excursion as hypothesized, having elongated the proximal aspect of the nerve bed. In a similar manner, the single-joint mobilization generated at the cervical spine (technique C) produced minimal sciatic nerve excursion (~0.1 ± 0.1 mm), which was in fact smaller than the measurement error.

It is generally accepted that, although greatest closer to the axis of joint rotation, nerve excursion becomes less at more distant regions along the same nerve tract. Cervical flexion has been suggested to increase tension within the lumbar nerve roots, resulting in an unfolding of resting slack within the nerve root. Cervical flexion has been widely advocated as an additional maneuver to the slump test to further tension the neural system, leading to neural sensitization and symptom reproduction. However, it is unclear whether the increased neural sensitization stems from an increase in neural tension, neural excursion, or both. Hall et al reported that the addition of cervical flexion during a straight leg raise test did not show any significant change in hip flexion, to first onset of manually perceived resistance, in either healthy individuals or a group with lumbar radiculopathy. These authors concluded that cervical flexion did not have a significant effect on neural tissue compliance during the straight leg raise. Our findings are consistent with this theory, in that minimal sciatic nerve excursion was evident during isolated cervical flexion.

Previous studies that have assessed nerve excursion during neural mobilization exercises in cadavers and in vivo have observed greater amounts of median nerve excursion, both in absolute terms and between the different mobilizations, compared to the present study of sciatic nerve excursion. It is difficult to make direct comparisons here due to the different kinematics between movement of the upper and lower limbs (eg, in relation to joint ranges of motion). In respect to certain techniques, similarities can be seen between upper-limb and lower-limb data. For example, sciatic nerve excursion during the tensioner technique (2.6 mm) is close to that seen for the median nerve during a tensioner mobilization (1.8 mm).

In the current study, the maximum mean excursion of the sciatic nerve was 3.2 mm. Direct comparisons of the present study to the available evidence are difficult, due to methodological variations. It is not possible to directly compare cadaveric measures of nerve excursion to those taken in vivo, as methods of tissue dissection and preservation have the potential to alter nerve mechanics. Unfortunately, there is a paucity of research that has examined the excursion of the sciatic nerve in vivo. However, a study utilizing cadavers by Beith et al examined the increase in length of the nerve bed of the sciatic-tibial-medial plantar nerve tract and found an increase (mean ± SD, 42.2 ± 2.4 mm) in nerve bed length when moving the knee from 90° of flexion to terminal extension. The same nerve bed increased by 6.8 ± 0.69 mm from 20° of ankle plantar flexion to a neutral (0°) ankle position.

Of note is the small magnitude of sciatic nerve excursion. The only other study that has examined sciatic nerve excursion using in vivo ultrasound assessment found similar levels of sciatic nerve excursion at the posterior mid-high region. However, direct comparison to this previous study is limited, as differing methods were utilized. An alternative means of comparison for in vivo nerve excursion during neural mobilization is from studies performed in the upper limb. From these studies, the mean and median nerve excursion ranges recorded were 3.4 to 10.2 mm and 0.8 to 3.0 mm, respectively, utilizing different methods and neural mobilization exercises.

At this time, the clinical implication of the small magnitude of nerve excursion during neural mobilization exercises is unclear. A key factor that limits further scrutiny of these values is the controversy over whether reduced nerve excursion may be a factor in peripheral nerve disorders and, if impaired nerve excursion is evident, whether neural mobilization...
may influence a potential loss of nerve excursion. Although the magnitude of excursion between the different techniques appears small, given the accuracy of measurement (as seen from the ICC and standard error of measurement values), these values reflect true differences. However, the clinical relevance of this small change is uncertain.

The neural mobilization techniques used in this study utilized a combination of passive knee movement and active cervical spine movement. It would have been ideal to use movements at the knee and cervical spine that were either both active or passive. In regard to using active knee movement, there are technical difficulties with using ultrasound with an actively moving limb, particularly at the posterior midhigh, as activation of the hamstrings makes it difficult to maintain posterior midhigh transducer contact.

Implementing passive cervical spine movement, with the participant in an upright, slump-sitting position, through a standardized range would have been logistically difficult. Therefore, active cervical movement was utilized. It is acknowledged that this is a methodological limitation, in that the active movement presents less rigorous control than standardized passive motion does. However, all cervical spine motion amounted to each participant’s normal and full active range. This could be interpreted as adding clinical relevance to the use of the participant’s normal and full cervical spine range of motion.

Furthermore, analysis of the cervical spine position at the start and end of each mobilization showed some variation between individual participants. It is likely that this variance is related to the variance of cervical spine postures within the participant sample and the effect of the slump position on cervical spine posture and range of motion. This variance was also highlighted in the differences in cervical spine range of motion from the various start and stop positions between each exercise. As previously discussed, it is acknowledged that this is a limitation of the study.

Two points are noteworthy. The first is that there was no significant difference in nerve excursion seen between exercises B and D. The difference in performance between the exercises was the addition of cervical spine flexion for the tensioner mobilization (D). Evidently, the cervical spine flexion used for D did not result in significantly more sciatic nerve excursion. Furthermore, the amount of sciatic nerve excursion seen when flexing the cervical spine in isolation, as seen with C, was not larger than measurement error. Second, the mean overall range of active cervical spine movement, used between the different neural mobilization exercises, was not statistically different. Although there was variance seen in cervical spine start and end positions for each of the mobilizations, the overall ranges of movement were not significantly different, indicating a sufficient level of consistency of cervical spine movement between participants across the different exercises. It may be worthwhile for future studies to utilize more standardized methods of passive cervical spine motion to add further rigor.

In light of the small difference in sciatic nerve excursion between the different neural mobilizations, other potential features, which were not examined in this study, may influence nerve excursion. For example, nerve strain has been shown to influence nerve excursion. Likewise, symptom reproduction may also limit joint range of motion and, subsequently, nerve excursion. Sciatic nerve excursion at the posterior midhigh region does not offer any direct reflection as to what may occur more proximally along the sciatic nerve tract. These features, along with further analysis of nerve mechanics, are worthy of consideration in regard to future research of neural mobilization. Future research investigating the therapeutic efficacy of neural mobilization should select specific exercises based on a better understanding of the neural mechanical effects that are likely to be exploited.

**CONCLUSION**

The findings of this study provide evidence that lower-limb nerve excursion agrees with the theory related to such movements. Different types of neural mobilization exercises induced different amounts of longitudinal sciatic nerve movement. A slider mobilization produced the most nerve excursion compared to single-joint mobilizations and a tensioner mobilization. It may be relevant to take this information regarding nerve mechanics in healthy participants, together with similar findings from related research in the upper limb, to enable more specific design and prescription of neural mobilization.

**KEY POINTS**

**FINDINGS:** Different types of neural mobilization exercises produce different amounts of longitudinal sciatic nerve excursion. The use of cervical extension during a slump slider resulted in the largest amount of sciatic nerve excursion.

**IMPLICATIONS:** Knowledge regarding the varied amounts of sciatic nerve excursion observed with different exercises may be important to aid in specific design of neural mobilization exercises.

**CAUTION:** Details regarding the amount of sciatic nerve excursion can only be inferred from the slump-sitting exercises that were utilized. Data on sciatic nerve excursion are only relevant to recordings taken at the level of the posterior midhigh and may be different at regions beyond that location. This study did not comment on the clinical efficacy of these techniques and did not attempt to make any inferences regarding nerve mechanics in pathological populations.

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