



Research report

Inter-examiner reliability of palpation for tissue texture abnormality in the thoracic paraspinal region

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ABSTRACT

Background: Palpation of soft tissue changes is claimed to be important for osteopathic diagnosis and treatment. Few studies, however, have examined the inter-examiner reliability for the detection of altered segmental paraspinal tissue texture.

Objective: To determine the inter-examiner reliability of the identification of abnormal tissue texture in the thoracic paraspinal region using palpation.

Method: Ten final-year osteopathic students examined the thoracic paravertebral gutter regions of ten subjects presenting with a recent history of thoracic symptoms. Each examiner palpated each subject to determine which of four predetermined areas exhibited the most obvious alteration or abnormality in tissue texture. One week prior to the study, all examiners received consensus training to standardise the method of palpation.

Results: The inter-examiner agreement for the site with the most marked tissue texture change was fair ($\kappa = 0.26$; $P_o = 0.46$; $P_e = 0.28$; 95% CI 0.19–0.33). When only the first five assessments from each examiner were analysed, the agreement improved slightly, but remained fair ($\kappa = 0.32$; $P_o = 0.52$; $P_e = 0.30$; 95% CI 0.16–0.47).

Conclusions: Inter-examiner reliability of palpation for abnormal tissue texture in the deep thoracic paraspinal region was only fair. The influence of either examiner fatigue or tissue change due to repeated palpation appeared to be small. Although the practice of palpating for segmental tissue texture abnormalities without concurrent reports of tenderness from the patient is not typical of clinical practice, this study suggests that assessment of texture change is complex and not highly reproducible between examiners.

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1. Introduction

Palpation is used by manual therapists from various disciplines in the assessment, diagnosis and manipulative treatment of patients with musculoskeletal pain and dysfunction. Somatic dysfunction, also termed 'segmental dysfunction' or 'intervertebral dysfunction', and comparable to the chiropractic profession's 'subluxation', 'chiropractic subluxation' or 'manipulable subluxation',^{1,2} is considered to be a musculoskeletal condition involving impaired or altered function of tissues of the musculoskeletal system, and is amenable to manipulative treatment.³ The clinical

diagnostic characteristics of somatic dysfunction have been summarised using the mnemonic 'TART': Tissue texture change (typically involving palpation of the paraspinal tissues), Asymmetry of the bony (or other) landmarks, Range of motion abnormality of the joint, and Tenderness on palpation of the area.^{4,5} Authors in the field of manual therapy claim that skilled practitioners are able to detect somatic dysfunction,^{4–8} however the validity and reliability of detecting the proposed clinical signs of somatic dysfunction have been questioned.^{9–11}

The cutaneous mechanoreceptor system of the hand is extremely sensitive to stimuli. Studies have determined that detectable pressure thresholds are as low as 10 μm of indentation of the skin, and that individuals can detect groove widths of less than 1 mm and differences in thickness of 0.08 mm.^{12–16} This suggests that palpation has the potential to be a highly sensitive tool for the detection of musculoskeletal abnormalities that are accessible to

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palpation. Of the TART criteria, however, only palpation for tenderness and pain provocation tests (reproduction of the patient's familiar pain) have been demonstrated to have acceptable reliability between different examiners.^{10,17,18} Poor inter-examiner agreement has been reported for motion palpation^{10,17,18} and static spinal asymmetry.^{19,20}

Despite reports of poor reliability for motion palpation, some studies suggest that it may potentially be reliable in some circumstances. Humphreys et al.²¹ reported that examiners could detect the presence or absence of 'fixation' in the cervical spine using motion palpation techniques in lateral flexion and rotation in patients with a congenitally fused vertebral segment. Landel et al.²² demonstrated good inter-examiner reliability for identifying the least mobile lumbar segment using posterior–anterior springing, however, the validity of these findings were questionable because they did not concord with intervertebral motion measured during the test using MRI.

In contrast to motion palpation, several studies investigating the reliability of palpating spinal tenderness have shown good to excellent reliability.^{10,17,18} Although tenderness and pain provocation have been claimed to be a useful tool for identifying symptomatic joints in the cervical spine,²³ the validity of motion palpation and pain provocation to accurately distinguish symptomatic from non-symptomatic joints has been disputed.²⁴ Widespread pain and referred tenderness are common clinical findings and localised tenderness does not always reflect the site of pathology.^{25,26} However, reproduction of pain may not be the only clue for joint dysfunction. For example, Jull et al.²⁷ have demonstrated that direct verbal reports of pain were not required for examiners to identify symptomatic joints in the cervical spine.

Osteopaths commonly palpate for tissue texture changes in three paraspinal regions: the medial paravertebral groove (PVG) or 'gutter', which is located between the spinous processes of the vertebrae and the erector spinae muscles, the bulk of the erector spinae, and the iliocostalis muscle fibres overlying the angles of the ribs.^{4,28} Some authors claim that palpation of hypertonicity of the deep fourth layer of paraspinal muscles (semispinalis, rotatores and multifidus) in the medial paravertebral groove is a cardinal sign of somatic dysfunction.^{4,5} Segmental tissue texture changes are reported to include abnormal hardness, bogginess, or ropiness of the underlying paraspinal muscles.^{4,5}

Considering the proposed importance of palpation for paraspinal tissue texture abnormalities for the identification of somatic dysfunction, this criterion should be established as a reliable and valid finding. However, few researchers have investigated the reliability of palpating tissue texture abnormalities, and those studies available have reported only fair to poor reliability.^{10,17,29} Regions in the thoracic PVG identified as abnormal using palpation have been verified as having a lower mean pressure pain threshold than surrounding normal tissues,³⁰ and have been reported to display abnormally increased electromyographic activity,³¹ which suggests that palpation may be useful in identifying tissue abnormality in the paraspinal region.

Natural variability in the texture of paraspinal muscles may act as a confounding factor in reliability studies,³⁰ and careful pre-test training may minimise the effects of individual examiner interpretations of different tissue texture changes. Studies that have used pre-test consensus training or training in a standardised examination procedure suggest that training improves the agreement of findings between examiners palpating tissue texture changes related to spinal dysfunction or the presence of myofascial trigger points.^{32,33} Additionally, inter-examiner reliability of palpatory examinations has been reported to be slightly higher using symptomatic subjects,¹⁷ and so the use of subjects with a degree of symptoms may assist with establishing diagnostic reliability.

The reliability of palpation to detect the clinical features of somatic dysfunction is fundamental in establishing the concept of somatic dysfunction as a valid diagnosis. The inter-examiner reliability of palpation for abnormal tissue texture of the thoracic paraspinal muscles has not yet been established, thus the aim of this study was to investigate the inter-examiner reliability of palpation for abnormal tissue texture at pre-determined areas in the thoracic spine between a group of final year osteopathic students.

2. Methods

2.1. Participants

Ten subjects (5 male and 5 female, age range 19–23) were recruited from the student population at Victoria University (VU), Melbourne, Australia, in response to posted notices. In order to be included in this study, subjects were required to be over 18 years of age and have had an episode of mild thoracic spinal pain (less than 4 on a 10 point visual analogue scale) or stiffness within the two weeks prior to testing. None of the participants were symptomatic on the day of testing. Limiting inclusion to subjects with a recent history of thoracic symptoms was thought to increase the possibility of the subjects having regions of tissue texture abnormality and somatic dysfunction. Participants were excluded from the study if they suffered from severe thoracic pain, had any gross spinal deformities, had a diagnosed pain syndrome such as fibromyalgia, if palpation of thoracic tissues produced more than minor discomfort, or if they were unable to lay prone on a treatment couch for 20 min. Subject weight, height and prior thoracic pain history was not recorded, although no subject was visibly obese. In addition to the ten subjects, ten examiners (3 male and 7 female, age range 22–24) were recruited from the final year osteopathy student population at Victoria University. All participants signed informed consent forms and the procedures for this study were approved by the VU Human Research Ethics Committee.

2.2. Examiner training

In order to minimise individual variation in the application of examination techniques, pre-test training in a standardised examination procedure has been recommended.^{32,34} One week prior to the study, all examiners spent one hour with an experienced osteopath (Researcher 1) in an attempt to standardise the palpation techniques and arrive at agreement as to the state of the tissue under palpation. Examiners agreed to palpate the thoracic PVG with the index and middle fingers using moderately deep pressure and a short longitudinal sliding motion (Fig. 2). Sites were determined as having abnormal texture if the alteration was palpated in the floor of the PVG. Texture abnormality at the lateral border of the PVG (erector spinae bulk) was not considered.

2.3. Experimental procedure

The ten subjects were positioned prone on treatment couches arranged in a large room, and were assigned a letter from A to J. In each subject, Researcher 1 identified four areas within the thoracic PVG region and marked each with a line just lateral to the PVG (so that repeated palpation in the PVG would not remove the mark) with a skin pencil (Fig. 1). There was an attempt to include at least one area of increased tissue texture tone, judged by Researcher 1 as relatively 'hard', 'lumpy' or 'boggy'. The remaining areas were marked at random, with two marked areas on each side of the spine. The four areas were labelled from superior to inferior as numbers 1–4. The subjects were instructed not to talk to the

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