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SCANNING PALPATION OF THE CERVICAL SPINE INTEREXAMINER RELIABILITY STUDY

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ON THE COVER:

SCANNING PALPATION OF THE CERVICAL SPINE INTEREXAMINER RELIABILITY STUDY

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ABSTRACT

In our clinical experience, scanning palpation has consistently shown that improvement of the patient's condition has followed the adjustment procedure. Prior to treatment, upper cervical scanning palpation detects muscle spasm and the presence of sensitive trigger points and often elicits symptoms of suboccipital neuralgia.

Ten volunteers were palpated by the method of scanning palpation. The subjects in the study ranged in age from 18 to 35, both male and female subjects were included.

The examiners in this study included two Doctors of Chiropractic, one Doctor of Dentistry, and one Doctor of Medicine. Each subject was examined at two to three different points during the study by each examiner. Each examiner recorded positive clinical findings between C1 and C4 on each side of the patient. Included in the examiners' evaluation were findings of spasm, trigger points, and facet joint rigidity. Although patient reaction was unsolicited during the study it is virtually impossible to eliminate entirely patient response to the examination procedure. The clinical data was analyzed by percent agreement test for interexaminer reliability. Results revealed a 75% agreement among experienced palpators.

INTRODUCTION

Examination of the cervical spine by the doctor is accomplished through a variety of methods. Digital palpation of the cervical spine provides the examiner with important diagnostic information. A variety of techniques involving digital palpation of the cervical spine are currently utilized clinically to evaluate muscle spasm, joint fixation and trigger points.

Motion palpation has been observed as a reliable measure of joint fixation in the lower cervical spine as reported by DeBoer et al.[4] Travell has reported the use of snapping palpation of trigger points evoking a local twitching in the effected muscle.[14]

Digital pressure applied to an active trigger point will usually elicit a "jump sign"[14] as the patient is observed. DeBoer concluded that the reliability of palpation methods has not been documented very often or very well in animals or humans.[3]

A few reports in the literature have dealt with reproducibility and reliability of palpation findings. Upledger and Karni[15,16] compared palpatory findings in the cranial bones as they related to EMG measurement. Johnston and colleagues[7,8] reported on palpatory findings related to mobility of the sacroiliac joint.

DeBoer points out that although there is a qualitative agreement on palpatory findings there is no rigorous statistical analysis on interexaminer reliability. "Notwithstanding this lack of evidence, a great deal of clinical practice is based on knowledge gained from palpatory information."[3]

More recently Carmichael reported that reliability is obtainable for the widely used Gillet test for sacroiliac joint dysfunction.[2] The Gillet test can generate reproducible palpatory findings in the examination room when performed by a conscientious examiner. He concluded further that the manipulative sciences must continue to subject their diagnostic techniques to reliability and validity studies in order to clarify the indications for and the effects of manipulation.

It would seem important, therefore, to objectively evaluate the scanning palpation procedure as a means of determining the presence of a chiropractic lesion (subluxation), and changes in the palpatory findings after treatment.

ANATOMICAL BACKGROUND

A detailed description of cervical anatomy is beyond the scope of this article, but can be found elsewhere.[1,5,6,11,13] In this section we shall describe the more significant relationships of the neurological components to the upper cervical vertebrae (C0-C3) and their articulations. The eight paired nerves of the cervical spine divide into ventral (anterior) and dorsal (posterior) rami immediately upon leaving the spine.

Ventral rami supply muscles and dermatomes of the cervical and brachial

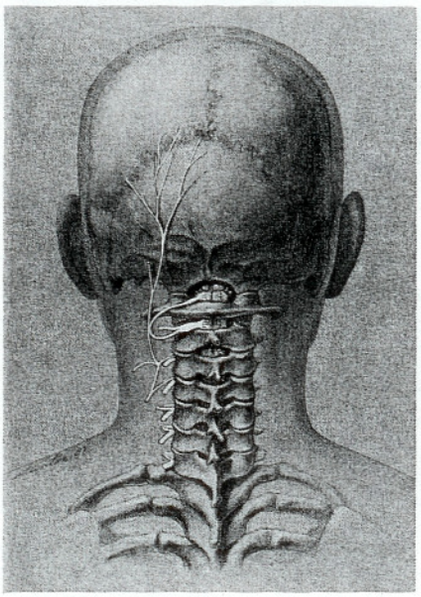

Figure 1: C1, C2 Dorsal Rami and Greater Occipital Nerve.

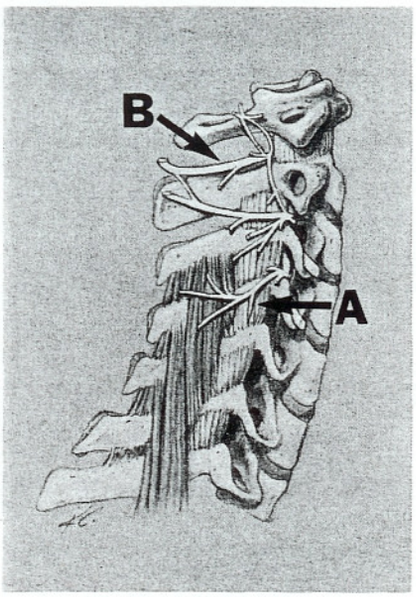

Figure 2: Cervical facet innervation from the medial articular branch of the dorsal ramus (A), C2 dorsal ramus (B).

plexus distribution, joints of the upper cervical vertebrae, the cervical vertebral bodies and the upper limb, the anterior and anterolateral vertebral muscles located within prevertebral fascia, meninges of the cervical canal and posterior cranial fossa, and the diaphragm. They are involved in the distribution of cervical sympathetic ganglia fibers and sensory fibers to peripheral blood vessels, erector pili muscles and sweat glands of the anterior neck and upper limb. Ventral rami distribute vasomotor and sensory fibers to the spinal and vertebral arteries and their central nervous system branches.

Dorsal rami of cervical nerves supply the typical cervical facet joints, the deep vertebral muscles located within prevertebral fascia and the overlying dermatomes. They carry motor and sensory fibers associated with the sympathetic distribution to the back of the neck and scalp.

The upper cervical vertebrae and their neural relationships differ from those of the typical cervical level. The first cervical nerve exits from the vertebral canal between the occipital bone and the posterior arch of the atlas on the inferior surface of the vertebral artery. The first cervical dorsal ramus is larger than the ventral ramus and emerges superior to the posterior arch of the atlas (C1) and inferior to the vertebral artery. A filament from the branch of the obliquus capitus inferior muscle joins the dorsal ramus of the second cervical nerve. The nerve occasionally gives off a cutaneous branch which accompanies the occipital artery to the scalp and communicates with the greater and lesser occipital nerves.

The second cervical dorsal ramus is slightly larger than the ventral and all the other cervical dorsal rami. It emerges between the posterior arch of the atlas and the lamina of the axis (C2) below the obliquus capitus inferior muscle (Fig. 1). This ramus receives a communicating branch of C3, courses superiorly over the posterior arch of the atlas, the semispinalis and the trapezius muscles to join the occipital artery. The dorsal and ventral rami of C3-C8 arise from the spinal nerves in close approximation to the intervertebral foramina (Fig. 3).

The C0-C1 (atlantooccipital) and C1-C2 (atlantoaxial) articular facets receive innervation from the articular branch of the ventral ramus. The cervical articular facet joints from C2-C3 to C7-T1 are supplied by the medial articular branch of the dorsal ramus (Fig. 2 & 3).

METHODS

Examination Procedure and Hand Contacts

Scanning palpation is conducted as follows:

The examiner's left hand cradles the forehead of the patient (Fig. 4). The right side of the patient's neck is examined with the distal end of the middle finger of the right hand (Fig. 5). The left side of the patient's neck is examined with the distal end of the thumb of the right hand (Fig. 4).

The location of the facet joints from C2-C7 are the areas for application of digital pressure in the middle and lower cervical spine. Initially, in the upper cervical spine, digital pressure is applied over the C1 spinal nerve area inferior to the occiput and superior to the posterior lateral aspect of the posterior arch of C1.

Next, digital pressure is applied inferior to the posterior arch of C1 and superior to the laminae of C2, over C2 spinal nerve ganglion. The palpation should begin on the right at C1 and continue inferiorly to C7. The procedure is then repeated in the same order on the left.

The pressure applied to the cervical spine during the exam should be sufficient to produce moderate compaction of the soft tissue posterior to the neuro-

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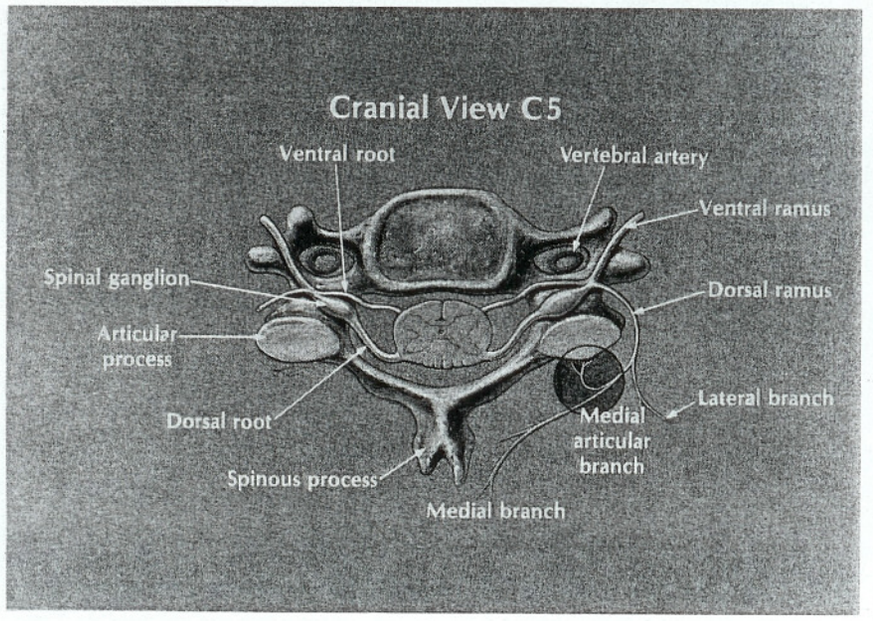

Figure 3: Cranial view C5 revealing facet joint innervation by the medial articular branch of the dorsal ramus.

Figure 4: Hand contact for examination of left side of neck during scanning palpation.

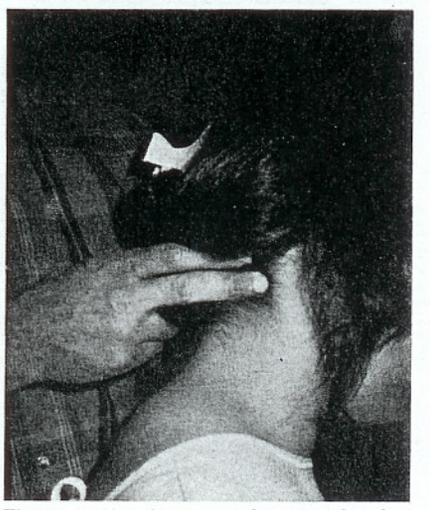

Figure 5: Hand contact for examination of right side of neck during scanning palpation.

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logical and articular structures (Fig. 7a & 7b). The pressure should be applied over these structures as every attempt is made to examine each of the paired articulations independently. The cervical lordosis should be considered during the exam as the objective is to apply digital pressure perpendicular to the plane of the facet joints (45° to the horizontal axis) from C2 to C7 (Fig. 6, 7a & 7b).

The procedure is conducted immediately before and immediately after the spinal adjustment in the chiropractic setting. Findings from the examination are classified as including taut muscle fibers, trigger points and edematous soft tissue. Palpation in the cervical spine may also reveal osseous prominences and facet joint rigidity. We have observed, under fluoroscopy, approximation of the facet joint surfaces during this palpation from C2 to C7 (Fig. 8).

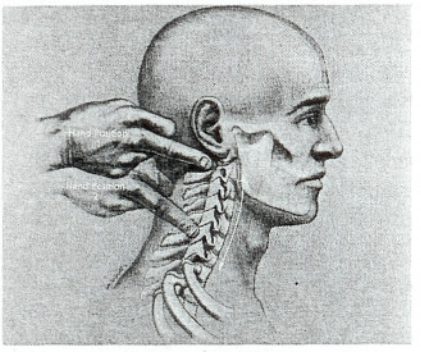

Figure 6: Hand position for scanning palpation of the C-spine considering cervical lordosis and plane of facet joints. Hand position 1—C1, C2 palpation; Hand position 2—C6, C7 palpation.

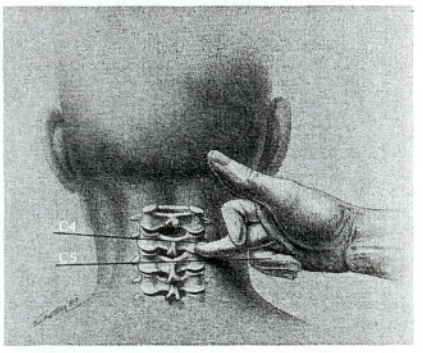

Figure 7a: Compression of facet joint with scanning palpation.

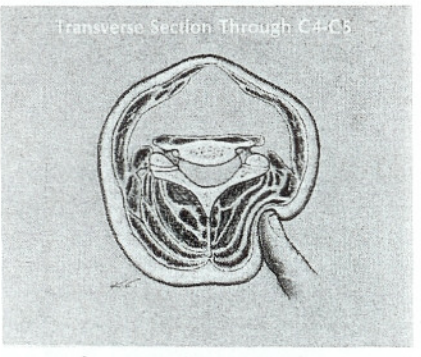

Figure 7b: Transverse section through C4-C5 with soft tissue compaction and facet joint compression.

TABLE I

PERCENTAGE OF AGREEMENT OF FINDINGS AT LEVEL C1-C4

	TOTAL FINDINGS			
	% AGREEMENT			
Examiner Pairs	No Pos. Findings	Pos. Findings	Total	No Agreement
1 & 2	40	35	75	25
2 & 3	40	30	70	30
1 & 4	25	35	60	40
1 & 3	25	30	55	45
2 & 4	25	20	45	55
3 & 4	20	20	40	60

In this study findings were recorded as either being present or absent in the cervical spine upon each examination performed. Each examiner recorded positive clinical findings between C1 and C4 on each side of the patient. Included in the examiners' evaluation were findings of spasm, trigger points and facet joint rigidity. Although patient reaction was unsolicited during the study it is virtually impossible to eliminate entirely patient response to the examination procedure.

EXPERIMENTAL PROTOCOL

Ten volunteers were palpated by the method of scanning palpation. The subjects in the study ranged in age from 18 to 35, both male and female subjects were included. The examiners for the project included two Doctors of Chiropractic, one Doctor of Dentistry and one Doctor of Medicine. Each subject was examined at two to three different points during the study by each examiner. The clinical data was analyzed by percent agreement test for interexaminer reliability.

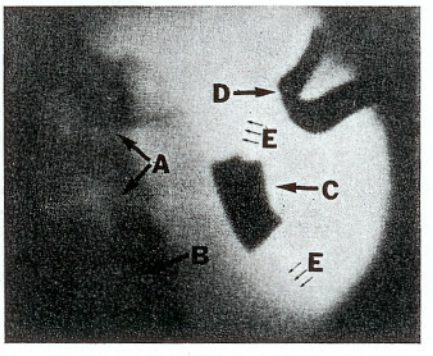

Figure 8: Cervical facet palpation under fluoroscopy, right side of C-spine; cervical facet joints (A and B), middle finger of right hand lead tipped (C), thumb of right hand lead tipped (D), soft tissue compaction (E).

RESULTS

Total combined agreement on positive clinical findings and on no findings was 75% between pairs of experienced palpators and only 40% between pairs of inexperienced palpators (Table I). In this particular experimental design, chance agreement was 50%, indicating a better-than-chance agreement of 25% for experienced palpators and a worse-than-chance agreement for inexperienced palpators.

DISCUSSION AND CONCLUSION

Scanning palpation is used in our clinics to help evaluate the patient's need for chiropractic care. In our experience the procedure has consistently revealed the presence of clinical symptoms and has demonstrated their removal after treatment. Upper cervical scanning palpation detects muscle spasm and the presence of sensitive trigger points and often elicits symptoms of suboccipital neuralgia. In patients with positive scanning palpation findings prior to treatment, there is a consistent reduction of pain, tenderness and spasm after treatment.

The preliminary results found in this study indicate that for experienced palpators there is a fair agreement (75%) on the presence of positive clinical findings considering side of involvement in the upper cervical area (C1-C4). The agreement between examiners is similar to that reported for other studies.[2, 10, 12]

As expected, inexperienced examiners exhibited poorer agreement (40%) than experienced examiners with regard to mere presence of clinical findings. Due to the scarcity of data in this pilot study,

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however, the actual statistical significance cannot be determined at this time.

It is not clear in palpation studies that there is concurrence on the exact criteria that constitute a positive finding and its relative grade, even among experienced investigators using the same palpation system. A more careful design for an experiment to test the actual strength of this system should include substantial pre-experiment training of experienced examiners in the identification of positive findings and the criteria for their grading on the scale used in this study. ■

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