

Accuracy of Motion Palpation Flexion-Extension Test in Identifying the Seventh Cervical Spinal Process

Luciana C. Póvoa, PT, MSc,^{a,b,c,d} Ana P.A. Ferreira, PT, MSc,^{a,b,c,d} José F.C. Zanier, MD, PhD,^c and Julio G. Silva, PT, PhD^{d,e}

ABSTRACT

Objective: The aim of this study was to evaluate the accuracy of a motion palpation procedure, the flexion-extension test, in localizing the spinous process of the seventh cervical vertebra (C7).

Methods: We analyzed 101 adult participants with metal markers that permitted the identification of the C7 spinous process. This analysis occurred during a flexion-extension test and was confirmed by radiography. Data sample characteristics were analyzed by descriptive statistics, and the relationship between independent variables (weight, height, sex, age, and body mass index [BMI]) and dependent variables (coincidence between the most prominent vertebra and the stationary vertebra, as determined by the flexion-extension test) was determined via logistic regression.

Results: The sample population was 48.5% male with a mean age of 56.8 years (standard deviation, ± 14.9) and a mean BMI of 25.54 kg/m² (standard deviation, ± 5.5). In 54.5% of cases, the C7 spinous process was correctly identified by the flexion-extension test. The agreement between the flexion-extension test and radiography in accuracy of localization of the C7 spinous process was significant ($P = .021$), as was the correct localization of C7 ($P = .05$).

Conclusion: The localization of the C7 spinous process was more accurate in individuals with a BMI < 25 kg/m² and whose most prominent vertebra coincided with the stationary vertebra as determined by the flexion-extension test. (J Chiropr Med 2018;17:22-29)

Key Indexing Terms: *Palpation; Cervical Vertebrae; Motion*

INTRODUCTION

Motion palpation is used to determine the position of structures and localize vertebral levels. It is an important tool for the evaluation and treatment of musculoskeletal

disorders and for diagnostic and therapeutic procedures in other areas, such as orthopedic surgery and anesthesia.¹ Specifically, in the musculoskeletal area, knowledge of palpatory procedures can be considered an essential requirement for physical examination of vertebral structures.² According to Najm et al,³ the beneficial results of vertebral manipulative procedures are based on skillful and appropriate treatments, which, in turn, are based on accurate diagnoses that are dependent on accurate palpatory procedures. Within the framework of medicine, physiotherapy, nursing, and osteopathy, palpation training is fostered in the early period; to unify this information, a systematic teaching of palpatory anatomy should be established.

Methods to correctly identify vertebral levels by palpation have been described for the lumbar, thoracic, and cervical regions; however, none are satisfactorily reliable.⁴ In a systematic review, Cooperstein et al⁵ pointed out that anatomically incorrect landmark benchmarks would hinder the accurate identification of spinal sites of clinical interest, beyond what is to be expected as a result of examiner error and variation among patients, which lends some value to a systematic review of the literature addressing other commonly used spinal landmark rules.⁵

^a Rehabilitation Science Postgraduate Program, Human Analysis Movement Lab, Augusto Motta University Center, Rio de Janeiro, Brazil.

^b Brazilian Osteopathic Institute, Rio de Janeiro, Brazil.

^c Department of Radiology, Estado do Rio de Janeiro University, Rio de Janeiro, Brazil.

^d Human Analysis Movement Lab, Praça das Nações, Rio de Janeiro, Brazil

^e Department of Physical Therapy, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil.

Corresponding author: Julio G. Silva, PT, PhD, Human Analysis Movement Lab, Praça das Nações, no 34 – 3º andar, Bonsucesso, Rio de Janeiro, Brazil, CEP 21.041-021. Tel.: +55 21 3882 9797 R.1012.

(e-mail: jglsilva@yahoo.com.br, jgsilva@hucff.ufrrj.br).

1556-3707

Paper submitted April 5, 2017; in revised form November 18, 2017; accepted November 20, 2017.

© 2017 National University of Health Sciences.

<https://doi.org/10.1016/j.jcm.2017.11.005>

Compared with reliability studies, the accuracy of palpation has not received the same emphasis in the literature. This may be due to the difficulty of finding a gold standard to objectively measure the vertebral level being palpated and consequently the accuracy of this procedure.⁶ Despite the importance of motion palpation, information on the validity and reliability of palpatory methods is scarce in the literature.^{7,8}

In their systematic review, Stochkendahl et al⁹ found numerous criticisms of the methods for palpatory studies, mainly because of uncontrolled factors such as the inclusion of asymptomatic participants only, inexperienced observers, parallel testing, less conclusive definitions of positive findings and rating scales, and weak descriptions of the results; all of these factors drive the need to improve the quality of studies. In addition, the possible relationships between anthropometric variables, such as weight, height, body mass index (BMI), age, and sex, and the accuracy of localization of the C7 spinous process have not been well explored in the literature. Studies that have tried to analyze the relationship between BMI and sex have reported inconclusive results, only highlighting these factors as potential study limitations.^{4,10} In their last systematic review, Póvoa et al¹¹ identified few studies that evaluated the validity of manual palpatory procedures for examining bony landmarks of the cervical spine. They reported fair to good methodologic quality with poor external validity as a result of the sampling heterogeneity.

Based on these studies and the lack of rigorous methodologic research in palpation, there is a need to systematize palpation of the cervical spine. Investigation of the accuracy of the procedure and how anthropometric features (weight, height, BMI, and age) may affect outcomes is needed. Therefore, the objectives of this study were to (1) assess the accuracy of the motion palpation procedure (flexion-extension test) in locating the C7 spinous process; (2) determine the agreement between the localization of the most prominent vertebra and the localization of the stationary vertebra (C7) using the flexion-extension test; and (3) verify the possible agreement of the accuracy of the C7 spinous process localization with the independent variables of weight, height, sex, age and BMI and the dependent variables of agreement between the most prominent vertebra and the stationary vertebra, as determined by the flexion-extension test.

METHODS

This study used a convenience sample, with a total population selected consecutively. The structure of the study is shown in [Figure 1](#).

Sample

The study analyzed 101 adult participants, outpatients and inpatients, who had received referral for chest-area

imaging at the radiology sector of the Pedro Ernesto University Hospital (HUPE) at the University of the State of Rio de Janeiro. Participants included individuals of both sexes, aged >18 years, who had a previous medical prescription for chest radiography.

Exclusion criteria for participants were previous surgery on the cervical spine; osteomyoarticular congenital malformation of the cervical region; intubation or use of devices or equipment that prevented palpation access; any adverse reaction to the tape used to set the marker reported by the participant; and failure of the radiography image to capture the marker (ring) used to circumscribe the desired spinous process. This work was approved by the Research Ethics Committee of HUPE/University of the State of Rio de Janeiro under number 501 745.

Procedures

Data on height, weight, age, and sex were recorded through participant self-reporting in an evaluation form. Participants went to the radiography examination room and were instructed to sit up straight without supporting their backs on their chairs and to keep their heads in a neutral position (looking forward, toward the horizon). At this time, the assessment was initiated and was always performed by the same evaluator.

1. The evaluator was at the left side of the patient to start the procedure of palpating the C7 spinous process. This approach identified the most prominent vertebra localization in the cervicothoracic region during passive flexion of the cervical spine. The examiner positioned the pulp of the middle finger of the dominant hand (right) on the desired vertebra and passively returned the volunteer's head to the neutral position.^{4,12}
2. With this previous localization of the most prominent vertebra localized in step 1, flexion-extension testing was performed to confirm the localization of C7. The evaluator kept his middle finger on the most prominent vertebra and placed his index finger on the spinous process of the overlying vertebra. With his other hand, the evaluator conducted an active-assisted extension of the cervical spine (the evaluator pushed the patient's head in a backward direction to provoke extension of the cervical spine). The purpose of this test was to identify the first vertebra that stays still while the aforementioned vertebra moves during the test. The rationale for this assumption is that the free C6 spinous process of the cervical spine is the last (lower cervical spinous process) vertebra to move during the test; therefore, the underlying vertebra, which is the first stationary vertebra, should be C7.⁴
3. Then the evaluator shifted his middle and index fingers in the cranial direction and repeated the

Download English Version:

<https://daneshyari.com/en/article/8559456>

Download Persian Version:

<https://daneshyari.com/article/8559456>

[Daneshyari.com](https://daneshyari.com)