Inter-examiner and Intra-examiner Reliability of Static Paraspinal Surface Electromyography

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INTRODUCTION

Chiropractors have historically utilized various measures to monitor adaptability related to subluxation reduction in their patients. It is in the patient's best interests that objective and reliable methods are used in this regard. Static paraspinal electromyography is one such objective measure that chiropractors use to monitor the muscular and neurological components of vertebral subluxation. Normative data has been described, reliability has been studied and clinical studies have been performed.[1-28] The objective of this study was to expand on the reliability data and further evaluate the inter-examiner and intra-examiner reliability of static paraspinal surface electromyography.

MATERIALS AND METHODS

The static paraspinal surface electromyography functions of an Insight Millennium Subluxation Station® were evaluated for clinical reliability.

Following approval of the project and the consent process by the Institutional Review Board of Life University, 91 University students were recruited by announcements and personal contacts. Two practicing chiropractors trained in the use of paraspinal surface electromyography conducted the scanning.

The two examiners, blinded from data collection, scanned subjects according to the protocols established by Kent and Gentempo. The protocol involves static paraspinal SEMG scanning using hand held electrodes in the seated position at 15 paired sites (4 cervical, 7 thoracic, 3 lumbar and 1 sacral). Each subject was scanned twice by each examiner at one sitting.

Each subject was assigned a unique numeric and/or alphanumeric code and no names or other personal identifiers were recorded during the study.

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RESULTS

Paraspinal surface electromyography data on 91 subjects were collected using two raters and two trials per rater. The averaged left/right values were subjected to multiple regression-principal component analyses and revealed the findings noted in Table 1.

Principal component analysis (SPSS) was conducted on left-right averaged data and points. Two observers, two repeated measures for each observer, and 15 SEMG points from C1-S1. The rotated component matrix revealed a systematic clustering in the first four principal components. This segmentation (clustering) has a clear anatomical basis possibly related to different muscle groups at these four spinal levels.

Surface EMG values for each spinal level were non-randomly distributed and positively skewed. The ratio of skewness to standard error of skewness ranged from 7-12, well outside the acceptable range of +/- 2 standard errors. Being within +/- 2 standard errors would have allowed for the use of parametric statistics such as Pearson's R for computation of inter- and intra-investigator reliability. We applied a more robust measure, principal component analysis to a clean data set.

CONCLUSION

Health care is becoming more evidence based and as this occurs the chiropractic profession is under increasing scrutiny to provide objective evidence of its effectiveness. Technology such as SEMG exists to provide objective evidence of the components of vertebral subluxation, monitor adaptability, and document the results of chiropractic care. There have been some studies done to address the reliability of these techniques, however larger studies were needed. This study revealed excellent inter-examiner and intra-examiner reliability of static paraspinal surface electromyography in a large number of subjects.

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