THE CONCURRENT VALIDITY OF STRENGTH MEASUREMENTS FOR NECK FLEXION AND EXTENSION OBTAINED BY HAND-HELD DYNAMOMETRY. A COMPARISON WITH THE MULTI-CERVICAL UNIT.

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Background: While rehabilitation and prevention of sports-related concussions have become a field of interest in physiotherapy research, so far, the relevance of neck strength in association with concussion remains unclear. Valid devices and user-friendly measuring protocols for clinical practice are needed to further investigate the importance of neck strength in rehabilitation.

Purpose: The purpose of the present study was to evaluate the concurrent validity of a user-friendly and time-efficient protocol to measure cervical flexion and extension strength using a hand-held dynamometer (HHD) and the Multi-Cervical Unit (MCU) as a reference device.

Study Design: Descriptive Laboratory Study.

Methods: The MCU and an HHD measured neck flexion and extension strength of 30 active, healthy males (mean age 27.1 years) on one measuring day. Data analysis used maximum voluntary strength values in Newton (N). Concurrent validity was determined using paired t-test and Pearson correlation. Bland-Altman plots and boxplots were used to illustrate differences between the devices.

Results: Neck flexion and extension strength were significantly different between the devices (p < 0.01). Weaker correlations between the two devices were found for flexion (r = 0.35, 95% CI: -0.02 to 0.63, p < 0.06) than for extension (r = 0.63, 95% CI: 0.35 to 0.81, p < 0.001). Bland-Altman Plots revealed sizable limits of agreement for both directions.

Conclusion: Neck strength measured with an HHD and the protocol used were different from those obtained with the MCU. The strength of the tester and deviations in positioning potentially limited absolute agreement between the MCU and the HHD. Therefore, values retrieved through different devices should be interpreted with caution and not used interchangeably by clinicians. Future studies should focus on establishing a gold standard for neck strength measurements.

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