

Utilization of a Novel Digital Measurement Tool for Quantitative Assessment of Upper Extremity Motor Dexterity

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BACKGROUND: Current methods for assessing upper extremity motor strength and dexterity rely on subjective testing. These methods introduce inter and intra-rater variability. We propose to utilize a novel digital measurement device, the MediSens Handgrip, to quantitatively assess the upper extremity dexterity and motor function of patients with cervical spondylotic myelopathy (CSM). **OBJECTIVE:** To determine the reliability of the MediSens Handgrip for assessment of motor dexterity and function pre- and post-operatively following surgical decompression. **METHOD:** This is a proof-of-concept study with seven patients between the ages of 55 and 86 who received surgical decompression for CSM. Assessments were conducted preoperatively, at the two week and at the three month postoperative follow up. Patients were tasked with varying their handgrip strength accurately to follow a sine function curve. The test results are measured in Mean Absolute Error (MAE) between the sine curve and the patient's performance. Quantitative data from the testing was compared against patient's reported outcomes based on Oswestry Disability Index (ODI). **RESULTS:** Patients have been categorized into *functional* and *non-functional* groups based on their postoperative ODI. The Medisens handgrip test results after surgery also show significant differences between the two groups (one-tail p=0.080). Patients in the functional group show handgrip performances improvement (average improvement of 27.73% with standard deviation of 10.05%). The non-functional group shows either no change or degradation in their handgrip performance. **CONCLUSION:** Our preliminary data suggests that the Medisens Handgrip may be useful for: tracking the functional progress of CSM patients after surgery, screening the degree of dysfunction prior to surgery and estimating the level of expected recovery after surgery.

References:

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