Muscle strength in adults with spinal cord injury: A systematic review of manual muscle testing, isokinetic and hand held dynamometry clinimetrics.

Master of Clinical Science
February 2014

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Abstract

Objectives
The objectives of this systematic review were to synthesise the best available evidence regarding the clinimetrics for manual muscle testing (MMT), isokinetic dynamometry (ID) and hand held dynamometry (HHD) in the assessment of muscle strength in adults with spinal cord injury (SCI) and determine whether there is research evidence to recommend HHD as the standard tool for measuring muscle strength in adults with SCI.

Inclusion Criteria:
Only studies related to adults with SCI and MMT and/or ID and/or HHD were included.

Search Strategy
The search sought to identify any relevant English language published or unpublished studies via a three step search strategy.

Methodological quality
Two independent reviewers assessed the methodological quality of the studies using the quality evaluation tool consensus-based standards for the selection of health status instruments (COSMIN).

Data collection
An original data extraction form was developed to extract quantitative data from the included studies.

Data synthesis

It was not appropriate to conduct a meta-analysis due to the heterogeneity of the included studies. Therefore, the results are presented in narrative text including raw data as presented in the included studies as well as the contextual data.

Results
Eleven studies met the inclusion criteria of this systematic review. The results demonstrated that MMT showed varying inter-tester reliability over 10 muscle groups tested, ID demonstrated good reliability for the shoulder but not the elbow, HHD showed good reliability and validity for the upper limb and trunk, as well as good results for responsiveness and interpretability. Positive correlations were seen between MMT, ID and HHD particularly at the lower MMT grades. However, change in muscle strength scores seen on ID and HHD testing were not always correlated with changes in MMT grade. Significant overlapping of scores was seen between MMT and HHD particularly for grades 4 and 5 with MMT unable to detect subtle changes in muscle strength compared with dynamometry.

Conclusions
In conclusion, when considering the clinimetrics of the 3 methods for assessing muscle strength in adults with SCI there does appear to be support in the literature to recommend the wider application of HHD compared with MMT and ID.

Student Declaration Statement

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint award of this degree.

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Kerry Peek

Dated:

Acknowledgements

I would like to thank my supervisors, Dr Robertson-Malt and Dr Munn, for their support and advice during my Master's candidature. A special thank you to Dr Catalin Tufunaru for his invaluable assistance.

My secondary reviewer, Prapaphan Pensuk, for her assistance with methodological quality assessment, reassurance and time.

My family, Brendan, Harry and Charlie, who encouraged me and gave me time and support to get on with it!