The Assessment of Capacity for Myoelectric Control

Psychometric evidence and comparison with upper limb prosthetic outcome measures

av

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Akademisk avhandling

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Abstract


Evaluation of outcomes using validated prosthetic outcome measures (OMs) is a current priority in upper limb (UL) prosthetics, and OMs with psychometric evidence toward UL prosthesis users are thus necessary. The “Assessment of Capacity for Myoelectric Control” (ACMC) is a tool that assesses the ability to control a myoelectric prosthetic hand. Some psychometric aspects of the ACMC have been previously investigated, but others are still lacking. A major part of this thesis was thus to search and assess the psychometric evidence of the ACMC. Data were collected from prosthesis users of different ages, prosthetic sides, and sexes. Rasch analysis was used to search for validity evidence and activity influence on the users’ ACMC ability measures, while reliability statistics was used to search for reliability evidence. Overall, the validity evidence was satisfactory in terms of unidimensionality, item technical quality, item difficulty, and relation to prosthetic wearing time. In terms of activity influence, the majority of prosthesis users received similar ability measures in different activities. Reliability evidence was also satisfactory in terms of test-retest reliability and rater agreements (intra- and interrater).

Besides the ACMC, several other prosthetic OMs have been developed in recent years. A comparison of these OMs would help professionals to select appropriate tools for clinical practice. Thus, a comparison of the validated UL prosthetic OMs was performed with an emphasis on what health aspects they cover. Eight OMs were chosen, and their contents were linked to the “International Classification of Functioning, Disability and Health” (ICF). The results showed that the contents from different OMs were linked to the ICF categories in “Body functions,” “Activity and Participation,” and “Environmental Factors.”

In conclusion, the use of a mixture of OMs is recommended to cover different aspects of health. Based on the evidence in this thesis, the ACMC can be recommended to measure the ability to control a myoelectric hand.

Keywords: Capacity, Comparison, ICF, Myoelectric Control, Psychometric evidence, Upper limb prosthesis.

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