

How to assess the upper limb function in persons with multiple sclerosis:
a european RIMS multicenter study investigating convergent validity and
floor/ceiling effects of measures at different ICF Levels

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Background: A recent review on upper limb outcome measures highlighted the need for more studies investigating their psychometric properties.

Objectives: The aim was to investigate the psychometric properties, in particular the convergent validity and floor/ceiling effects for this abstract, of frequently used as well as new upper limb outcome measures in multiple sclerosis.

Methods: 136 persons with MS from 11 centers across Europe (RIMS network) were assessed using different upper limb outcome measures on the three levels of the International Classification of Functioning (ICF). On body function and structures level, maximum isometric pinch, key, 3jaw grip strength were evaluated using a dynamometer. Visual Analogue scales (VAS) of spasticity, muscle weakness, sensory impairment, coordination and fatigability were used to evaluate the perceived presence of impairments on this level. On activity level, upper limb capacity was assessed by the nine hole peg test (NHPT), block and box test (BBT) and coin rotation test (CRT). The ABILHAND, Manual Ability Measure-36 (MAM-36) and Motor Activity Log were used to evaluate the perceived performance. Pearson correlation coefficients were calculated to investigate the validity of the outcome measures. Descriptive statistics were used to examine possible floor and ceiling effects.

Results: High correlation coefficients were found between the different grip strength measures (range $R = 0.75-0.80$, $p < 0.001$). The different VAS correlated low to moderately with each other (range $R = 0.31-0.58$). The NHPT, BBT and CRT are highly associated with each other (range $R = 0.67-0.78$, $p < 0.001$). A correlation coefficient of 0.80 ($p < 0.001$) was found between the MAM-36 and the ABILHAND. The MAL was only moderately related to the MAM-36 and ABILHAND (range $R = 0.41-0.45$, $p < 0.001$). Low to moderate correlation coefficients were found between the capacity and the perceived performance measures on activity level (range $R = -0.10-0.50$). No floor and ceiling effects were found in any of the included measures.

Conclusion: The results suggest that one type of pinch grip provides enough information about the strength in the hand. The correlation coefficients between capacity and perceived performance measures on activity level indicated that measures on these sublevels are interchangeable. One capacity (NHPT or BBT or CRT) and one perceived performance (MAM-36 or ABILHAND) measure would be enough to evaluate the upper limb on activity level.

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