

HOW IMPAIRED IS HAND FUNCTION IN INDIVIDUALS WITH MULTIPLE SCLEROSIS?

Gloria von Geldern,¹ Scott D. Newsome,¹ Rhul Evans R. Marasigan,² Jiwon Oh,¹ Daniel S. Reich,³ Peter

A. Calabresi,

¹

Kathleen M. Zackowski ^{2, 4}

¹Neurology, Johns Hopkins University, Baltimore, MD, United States. ²Motion Analysis Laboratory, Kennedy Krieger Institute, Baltimore, MD, United States.

³

National Institute of Neurological Diseases and Stroke (NINDS), National Institutes of Health (NIH), Bethesda, MD, United States.

⁴

Physical Medicine and Rehabilitation, Johns Hopkins University School of Medicine, Baltimore, MD, United States.

Background: Little is known about the frequency and severity of hand dysfunction in individuals with MS. Hand function impacts quality of life, yet rating scales such as the Expanded Disability Status Scale (EDSS) heavily influenced by ambulation with little emphasis on hand function. There is very limited data on how to best measure hand function in MS.

Objectives:

To characterize hand dysfunction in subjects with MS and to identify predictors of grip strength and the 9-hole peg test (9HPT).

Methods:

79 subjects with MS were included (54 women, 53 relapsing-remitting MS, mean age 43+/- 1.32). Quantitative tests of hand function (grip strength, pinch strength, finger tapping, 9HPT) and leg strength were acquired and normalized to age and gender. Magnetic resonance imaging (MRI) of the brain at 3-tesla was obtained, and cerebral and cerebellar white and gray matter volumes were calculated. The relationships among the quantitative tests and MRI variables were analyzed with Spearman correlations and multivariate regression models that also included EDSS, symptom duration, walking speed, and disease type.

Results:

48 subjects (61%) showed abnormalities greater than 2 standard deviations from controls in at least one hand function test. Abnormalities in the 9HPT were most common (34 out of 79 subjects); grip and pinch strength were impaired in 25 and finger tapping in 20 subjects. Grip strength and 9HPT scores were only weakly correlated ($r=-0.14$). In stepwise regression models, leg strength was the most significant predictor of grip strength ($R^2=0.20$, $p<0.01$), while EDSS and cerebral white matter volume were the most significant predictors of 9HPT ($R^2=0.32$, $p<0.001$).

Conclusion:

Hand dysfunction is a common problem in individuals with MS. Grip strength and 9HPT are the most unique tests of hand function and not accounted for by the other measures in our model. These hand function assessments should be included when evaluating upper extremity disability in MS. Longitudinal studies are needed to determine the sensitivity of hand function

tests as meaningful and efficient outcomes to assess the effectiveness of new pharmacologic and rehabilitative therapies in MS.

Disclosure: Gloria von Geldern, Rhul Evans Marasigan, Jiwon Oh, Daniel Reich, Kathleen Zackowski: Nothing to disclose.; Scott Newsome: ;Biogen-Idec (Consulting Fee); Biogen-Idec, Teva (Honoraria); Peter Calabresi: Teva, Johnson&Johnson, Abbott, Vaccinex, Vertex, Genzyme, Novartis, Biogen-Idec (Consulting Fee); Teva, Vertex, EMD Serono, Bayer, Abbott, Novartis, Biogen-Idec (Other Financial Benefit)