

**Comparison of maximal voluntary isometric contraction and hand-held dynamometry in measuring muscle strength of patients with progressive lower motor neuron syndrome.**

- [Visser J](#), [Mans E](#), [de Visser M](#), [van den Berg-Vos RM](#), [Franssen H](#),
- [de Jong JM](#), [van den Berg LH](#), [Wokke JH](#), [de Haan RJ](#).

Department of Neurology (H2-222), Academic Medical Center, University of Amsterdam, PO Box 22700, 1100 DE, Amsterdam, The Netherlands. j.visser@amc.uva.nl

**Context.** Maximal voluntary isometric contraction, a method quantitatively assessing muscle strength, has proven to be reliable, accurate and sensitive in amyotrophic lateral sclerosis. Hand-held dynamometry is less expensive and more quickly applicable than maximal voluntary isometric contraction. **Objective.** To investigate if hand-held dynamometry is as reliable and valid as maximal voluntary isometric contraction in measuring muscle strength in patients with an adult-onset, non-hereditary progressive lower motor neuron syndrome. **Design.** Two testers performed maximal voluntary isometric contraction and hand-held dynamometry measurements in six muscle groups bilaterally in patients with progressive lower motor neuron syndrome to assess reliability and validity of both the methods. **Setting.** Outpatient units of an academic medical center. **Patients.** A consecutive sample of 19 patients with non-hereditary progressive lower motor neuron syndrome (median disease duration 32.5 months, range 10-84) was tested. **Outcome measures.** Comparison between maximal voluntary strength contractions as measured by hand-held dynamometry and maximal voluntary isometric contraction. **Results.** Low intra- and interrater variation in all muscle groups were found, intraclass correlation coefficients vary between 0.86 and 0.99 for both methods. Both methods correlated well in all muscle groups with Pearson's correlation coefficients ranged between 0.78 and 0.98. Scatter plots indicated a trend to under-estimate muscle strength above 250 N by hand-held dynamometry as compared with maximal voluntary isometric contraction. **Conclusions.** For longitudinal evaluation of muscle strength in patients with progressive lower motor neuron syndrome (i.e. between 0 and 250 N), muscle strength can be accurately quantified with both hand-held dynamometry and maximal voluntary isometric contraction. Hand-held dynamometry has the advantage of being cheap and quickly applicable. However, our results indicate that hand-held dynamometry is less sensitive than maximal voluntary isometric contraction in detecting subnormal muscle strength in strong muscle groups (i.e. >250 N), due to limited strength of the tester.

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