

## Multiple sclerosis

Tuesday, May 30, 2006, 17:00 - 18:30

### Test-retest reliability of QMA fatigue testing in an Italian cohort

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**Objective:** Fatigue is an important and disabling symptom related to multiple sclerosis (MS) and other neurological diseases. Objective quantification of fatigue is still an intriguing question due to its multi factorial nature, and a reliable fatigue index is extremely important to monitor drug or exercise efficacy in clinical practice and in therapeutic trials.

**Methods:** We used computer assisted, quantitative fixed myometry technique, i.e. quantitative muscle assessment (QMA), to measure maximal isometric voluntary contraction (MIVC), static (SF) and dynamic fatigue (DF) in a 20 to 60 years old population of 30 healthy subjects (15 male and 15 female). Fatigue severity scale (FSS), Fatigue impact scale (FIS), Becks depression inventory (BDI) and Epworth sleepiness scale (ESS) were firstly administered to all subjects to confirm the absence of self-reported fatigue and of depression or sleep disorders that can influence fatigue and motor performance. In 2 identical testing session separated by 2 days we tested MIVC and SF during a 30 sec isometric contraction of 6 different dominant and non dominant muscle groups: elbow extensor and flexor, ankle dorsiflexor, knee flexor and extensor and hand grip, where DF was also measured. For each muscle tested, we calculate 2 different fatigue indexes (FI) established in previous studies by Schwid et al. in 1997 and Surakka et al. in 2004 (FI1 and FI2), based on the calculated area under the force versus time curve. Intraclass correlation coefficients (ICC), as estimated from a one-way random effect analysis of variance model was used to test reliability of MIVC, FI1 and FI2.

**Results:** ICC of MIVC were very good varying from 0,84 to 0,94. ICC of FI1 were very good in each district, varying from 0,84 to 0,95, as well as for ICC of FI2. No statistically significant difference between dominant and non dominant muscle tested was found for MIVC, FI1 or FI2. ICC of dynamic fatigue was 0,65. MIVC correlate with FI1 of elbow extensor and flexor and hand grip ( $p > 0,05$ ).

**Conclusion:** QMA is a reliable method to test muscular fatigue, is well tolerated and has a good compliance in all subjects. Thus, could be considered as a useful tool, together with self reported fatigue tests, to objectively quantify fatigue and we should consider to use it in clinical trials to better estimate the different and overlapping components of fatigue.