The Motor Function Measure (MFM): Sensitivity to change

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Background
The Motor Function Measure (MFM) is a scale designed for the evaluation of neuromuscular disorders (NMDs) and is applicable, whatever their degree of severity, to both ambulant and non-ambulant patients. The scale comprises 32 items in 3 functional dimensions: standing position and transfers (13 items), axial and proximal motor function (12 items), and distal motor function (7 items).

Its validation (Bérard, ref. 1) involved 303 patients aged 6 to 60 years with a confirmed diagnosis of one of the more common neuromuscular disorders. The validation data addressed reliability, construct and discriminant validity.

Objective
To quantify annual rate of change in MFM scores (total and 3 sub-scores) and relate this change to qualitative evaluations of change by patients and physicians.

Methods
A sub-sample of patients from the validation study were reassessed with the MFM after one year. Patients or their parents gave written consent. Physicians, physiotherapists, and patients or their parents completed clinical global impression scores (CGI) of change (motor improvement, stabilisation or deterioration since first MFM). The evaluation of the MFM was performed in most cases by the same physiotherapist as at the first visit. Differences in scores between the 2 visits were expressed as annual rates of change and Standardized Response Means were calculated (SRM=mean difference/SD difference). These SRM are interpreted as large (>0.80), moderate (0.50 to 0.79) or small (< 0.50).

Patients were classified in 3 groups according to the CGI scores: worsened, stable or improved. Comparisons of differences in MFM scores between these groups were performed using nonparametric tests (Mann-Whitney or Kruskal-Wallis).

Results
There were 152 patients, aged 24.1 ± 15.6 y (55% aged below 18), with a sex ratio of 109 M/43 F. Duchenne muscular dystrophy was the most important diagnostic group (N=41) (Fig. 1). 45% were non-ambulant and 21% were ventilated. Physicians rated the overall disability as severe or very severe in 62% of cases.

The second evaluation took place on average 16 months (9-24 months) after the first MFM. The mean annual change in total MFM was –2.4 ± 5.5 % (p < 0.0001). In the DMD group, the decrease was –5.8 ± 6.3 % (SRM=0.90), p<0.0001.

According to the 34% of patients who reported overall deterioration of their condition, the mean decrease of the total MFM score was –4.4 ± 6.4, which was significantly different from the 47% stable group (–2.0 ±5.6) and the 10% improved (+0.9 ±4.4) (p<0.01; left panel of Fig. 2).

Only one patient was rated improved by the physician. When comparing the physician-reported stable (51%) and deteriorated patients (49%), the annual rates of change of the total MFM were –1.2 ± 5.3 and –5.3 ±7.6 respectively (p<0.001; right panel of Fig. 2). Similar results were obtained with the physiotherapists assessments.

Conclusion
The MFM showed good overall sensitivity to change, especially in Duchenne patients. The results are in agreement with the subjective impression of the patients and their physicians. Further studies with larger groups of patients are required to confirm these results and for other NMDs as only data for small groups (N< 20) was available. A database on a secure website has been implemented to enable collection of MFM evaluations of all types of NMD. This database is open to all physicians and physiotherapists who wish to participate in the study group (see http://mfm-nmd.org for more information).