With the emergence of experimental therapies for DMD, it is crucial to understand the natural history of this disorder to properly design clinical trials. The aims of this study are: 1) to assess the motor function decline in DMD boys treated according to the standards of care; 2) to describe the rate of motor function decline in DMD boys stratified for genetic mutations; 3) to describe the natural history of young DMD boys treated with glucocorticoids below five years of age.

Through the UK NorthStar Clinical Network, which encompasses the collaborative efforts of 20 Neuromuscular Centres in the UK, clinical data from 2004-2013 on 513 DMD boys treated on glucocorticoids were included in the analysis. For the analysis of the sub-genotypes, we also included data from 127 DMD boys followed-up by the neuromuscular Italian clinical network.

### Conclusions

- Including all the steroid treatment groups after age 7, we observed a large variability of motor function. Overall the rate of decline was 4 NSAA units per year.
- Median loss of ambulation was 13 years; two years prior to lossing ambulation the average total NSAA score was 13 units (out of 34).
- When compared to the general DMD population, over a 24 month period boys with mutations skippable for exons 44 and 46 decline at a slower rate (by overall 4 units less); while boys with mutations skippable for exons 53 and 51 decline faster (2.5 to 4.5 additional units).
- Young DMD boys gain motor function up to age 7 (~1.5 NSAA unit a year); starting glucocorticoids before age 5 confers an advantage of an additional of ~2 NSAA units by age 7.

### NorthStar Ambulatory Assessment in boys >7 years of age

**NSAA mean score for sub-genetic mutations**

- A possible trend for duplications declining slower and point mutations declining at a faster rate did not meet significance.

### NorthStar Ambulatory Assessment in boys <7 years of age

**Effects of glucocorticoid therapy in young DMD boys**

- When compared:
  - 78 DMD boys who started daily or intermittent glucocorticoids early (in RED), before the age of 5 (mean age at start = 4.5 years)
  - with 163 boys who started GC between ages 5 and 6.5 indicated as late (in YELLOW) (mean age at start = 5.7 years)
  - the coefficient of interaction in our analysis was 1.3 (95%CI 3.0, 0.3, p = 0.1), favouring early starters by almost 1.5 NSAA units a year.
  - By age 7, the mean total NSAA was different between the two groups (p<0.01): 27 (95%CI 24.6, 29.4) in the early starters and 25 (95%CI 23.2, 26.9) in the late starters group.
  - 10 meter run was 4.7 seconds and 6.2 seconds respectively (p=0.05)

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