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Assessing Motor Function in Congenital Muscular Dystrophy Patients Using Accelerometry

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Abstract

Background: When tested in a controlled clinic environment, individuals with neuromuscular-related symptoms may complete motor tasks within normal predicted ranges. However, measuring activity at home may better reflect typical motor performance. The accuracy of accelerometry measurements in individuals with congenital muscular dystrophy (CMD) is unknown. We aimed to compare accelerometry and manual step counts and assess free-living physical activity intensity in individuals with CMD using accelerometry.

Methods: Ambulatory pediatric CMD participants (n = 9) performed the 6-minute walk test in clinic while wearing ActiGraph GT3X accelerometer devices. During the test, manual step counting was conducted to assess concurrent validity of the ActiGraph step count in this population using Bland-Altman analysis. In addition, activity intensity of 6 pediatric CMD participants was monitored at home with accelerometer devices for an average of 7 days. Cut-point values previously validated for neuromuscular disorders were used for data analysis.

Results: Bland-Altman and intraclass correlation analyses showed no concurrent validity between manual and ActiGraph-recorded step counts. Fewer steps were recorded by ActiGraph step counts compared with manual step counts (411 ± 74 vs 699 ± 43, respectively; P = .004). Although improved, results were in the same direction with the application of low-frequency extension filters (587 ± 40 vs 699 ± 43, P = .03). ActiGraph step-count data did not correlate with manual step count (Spearman ρ = 0.32, P = .41; with low-frequency extension: Spearman ρ = 0.45, P = .22). Seven-day physical activity monitoring showed that participants spent more than 80% of their time in the sedentary activity level.

Conclusions: In a controlled clinic setting, step count was significantly lower by ActiGraph GT3X than by manual step counting, possibly because of the abnormal gait in this population. Additional

studies using triaxial assessment are needed to validate accelerometry measurement of activity intensity in individuals with CMD. Accelerometry outcomes may provide valuable measures and complement the 6-minute walk test in the assessment of treatment efficacy in CMD.

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