Activity Performance Curves of Individuals with Cerebral Palsy

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Background:
Development curves of motor capacity (using Gross Motor Function Measure, GMFM) have been established, but development curves of activity performance are unknown.

Aim:
To describe development curves of motor and daily activity performance from childhood into adulthood of individuals with cerebral palsy (CP).

Methods:
• Individuals with CP (n=421) had three or four (bi)yearly measurements in 4 PERRIN cohorts (baseline age: 1-2, 5-7, 9-13, 16-20 years) and those in the 9-13 and 16-20 cohort participated in a 13-year follow-up
• Participants had Gross Motor Function Classification System (GMFCS) levels I-V,
• 27% of participants had intellectual disability
• Subdomains of the Vineland Adaptive Behavior Scales were used:
  • Gross and fine motor performance (16-20 items)
  • Self-care, domestic and community activity performance (21-39 items)
• Non-linear mixed effects analyses were performed on domain scores with age
  • Separate for levels of GMFCS and also with/without intellectual disability for daily activity performance
  • Model parameters: Limit (max performance) and Age90 (age when 90% of limit was reached)

Results:
Motor performance curves
• Development was similar for individuals with and without intellectual disability
• Development was similar for gross and fine motor performance
• Limits of motor performance were lower with each higher level of GMFCS
• Age90’s:
  • Between 6-8 years for children with GMFCS levels I-III
  • Between 1-3 years for children with GMFCS levels IV-V

Daily activity performance curves
• Development was similar for individuals with GMFCS levels I-III without intellectual disability
• Age90’s for individuals without intellectual disability, with GMFCS levels I-III:
  • Self-care activities: 11-14 years
  • Domestic activities: 26-32 years
  • Community activities: 22-26 years
• Individuals with intellectual disability had lower limits and reached those at a younger age

Figures: Development curves of gross motor performance of individual with CP with and without intellectual disability (top) and domestic daily activity performance (bottom). Development of references indicated in gray.

Conclusions:
• Development curves can:
  • Guide expectations for future functioning of individuals with CP, their families and health care professionals
  • Inform treatment decisions regarding activity performance
• Motor performance development continues after motor capacity (GMFM) limits have been reached for individuals with GMFCS levels I-III
• Development of daily activity performance continues into adulthood, indicating a possible need for support during transition and into adulthood

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