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Tanja H. Kakebeeke^{a,b*}, Jon Caflisch^{a,b}, Oskar G. Jenni^{a,b,c}

^a*Child Development Center, University Children's Hospital Zurich, Zurich, Switzerland;*

^b*Children's Research Center, University Children's Hospital Zurich, Zurich, Switzerland;*

^c*University of Zurich, Zurich, Switzerland*

Percentiles of neuromotor functions from 6 to 80 years

The aim of the study was to investigate the dynamics of neuromotor functions from 6 to 80 years and to provide reference curves for clinical and research use. Neuromotor data on 1620 individuals (828 females) measured with the Zurich Neuromotor Assessment between 1983 and 2023 in the region of Zurich, Switzerland were analyzed. Performance on 14 motor tasks was modeled as a function of age and sex. The age of peak performance was identified for each task. Motor performance was converted into standard deviation scores (SDSs) and combined into the 5 motor components: fine motor, pure motor, balance, gross motor, and contralateral associated movements. The effect of body mass index (BMI) was investigated. The data showed a rapid increase in motor functions during youth, particularly before age 10 years, a levelling in performance between the ages of 20 and 40 years and a decrease thereafter. The age of peak performance and the rate of decline varied greatly between the tasks: Motor functions in tasks requiring muscle force deteriorated faster than those involving isolated movements. Males reached peak performance on average one year later than females. High BMI (SDS > 1) negatively impacted balance and gross motor functions but not other neuromotor domains. Neuromotor functions undergo dynamic changes throughout the lifespan from early childhood to older adulthood, with peak performances and declines depending on type of motor task and sex. In presenting percentiles for all motor functions over the lifespan, rapid and aberrant deteriorations in degenerative diseases can be easily detected.

Keywords: motor development, aging, Zurich Neuromotor Assessment (ZNA), body mass index (BMI), lifespan

Biography

Since 1981 physiotherapist; since 1984 Bobath-instructor; since 1991 human movement scientist; since 1999 PhD in neurophysiology; since 2008 Venia Legendi; since 1984 adjunct professor in neurophysiology; currently connected to the University Children's Hospital Zurich