



The Effects of Age and Amplitude on Wrist Proprioceptive Acuity

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Abstract

This study examined wrist proprioception in a cross-sectional sample of 44 children aged between 8- to 14- years and a control group of 10 neurologically and physically healthy adults. Using a 3-degrees of freedom robotic device, participants performed an ipsilateral joint position matching task in which target amplitude (40% or 80% functional range of motion [fRoM]) and degrees-of-freedom (Flexion/Extension [FE], Radial/Ulnar deviation [RUD], Pronation/Supination [PS]) were manipulated. Results indicated that proprioceptive function became more accurate and consistent over the developmental spectrum, but that the ability to utilize proprioceptive feedback did not reach adult levels till the age of 10-11 years. Furthermore, proprioceptive acuity was influenced by target amplitude, such that movements were more accurate for the 80% fROM compared to the 40% fROM target for both the RUD and PS DoFs, independently of age. The present results provide critical information about the typical development of wrist proprioception that will enable clinicians to chart the course of development and dysfunction in neurological disorders in children, and help establish protocols for the robotic diagnosis and assessment of neurodevelopmental disorders.