

## **Exploring whether wearable sensors can be used as an alternative to the goniometer to measure passive wrist extension in children with cerebral palsy.**

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*Overview:* Children with cerebral palsy (CP) require repeat measurement of passive wrist extension to monitor secondary musculoskeletal changes. Typically, joint range is assessed using goniometry, however wearable sensors are also available. This study assessed: i) the consistency of peak passive wrist extension measures between wearable sensors and the goniometer, and ii) whether absolute difference is impacted by age and/or wrist extension technique (fingers flexed versus fingers extended). We found that wearable sensors may be used as an alternative to the goniometer when measuring passive wrist extension in older children. Poor agreement between the tools for younger children is thought to be influenced by increased subcutaneous tissue, and the difficulty of this young age group to follow instructions and tolerate the assessment procedure.

## **Early changes: a comparison of wrist and elbow kinematics in young children with and without cerebral palsy**

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*Overview:* Musculoskeletal impairments associated with cerebral palsy (CP) can limit upper limb active range of motion (ROM), often resulting in activity limitations. It is not known how early reductions in movement begin to occur. This study aimed to assess wrist and elbow kinematics in young children with and without CP during play tasks. We found that reduced active extension of the wrist and elbow joint in children with CP are apparent in children under the age of 5 years. Furthermore, impairment in active ROM was evident in early childhood in the presence of full passive ROM.