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**題目 (Title):**

依據相片之關節角度量測：應用於腦性麻痺兒童之信度和同時效度

Photo-Based Range-of-Motion Measurement: Reliability and Concurrent Validity in Children With Cerebral Palsy.

**摘要中文翻譯****目的：**

探討依據智慧手機的相片應用程式測量腦性麻痺兒童的施測者內和施測者間信度、一致性及同時效度，並和通用型量角器做比較。

**方法：**

使用通用型量角器及依據相片測量粗大動作功能分類系統(Gross Motor Function Classification System)階級I到V的腦性麻痺兒童之髖關節外展、膝關節角和足踝背屈角度。利用二因子隨機效果組內相關係數(2-way random-effects intraclass correlation coefficients)和布蘭德-奧爾特曼繪圖(Bland-Altman plots)、標準誤測量和最小可檢測變化進行分析。

**結果：**

此應用程式和通用型量角器比較，有良到優的信度和同時效度，然而二種量測方法皆有大的測量誤差，建議須達 $10^{\circ}$ 到 $23^{\circ}$ 的改變才能確定不同時間點測得的改變不是來自測量誤差。

**結論：**

量測腦性麻痺兒童的關節活動度時，此依據相片應用程式之量角器可能是可靠、有效的工具。

## **Original Abstract**

### **PURPOSE:**

To investigate intrarater and interrater reliability, agreement, and concurrent validity of a smartphone photography-based application compared with a universal goniometer in children with cerebral palsy.

### **METHODS:**

Range of motion of hip abduction, popliteal angle, and ankle dorsiflexion was measured with a universal goniometer and a photography-based application in children with cerebral palsy, Gross Motor Function Classification System levels I to V. A 2-way random-effects intraclass correlation coefficients and Bland-Altman plots, standard error of measurement, and smallest detectable change were used for analyses.

### **RESULTS:**

The application had good to excellent reliability and concurrent validity compared with a universal goniometer, while the large measurement error of both methods suggests that changes of 10° to 23° are needed to be certain that changes over time are not results of measurement error.

### **CONCLUSIONS:**

A photography-based goniometer can be a reliable and valid tool when measuring range of motion in children with cerebral palsy.

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