

# Validation of markerless video assessment with three-dimensional gait analysis in children and young adults with cerebral palsy.

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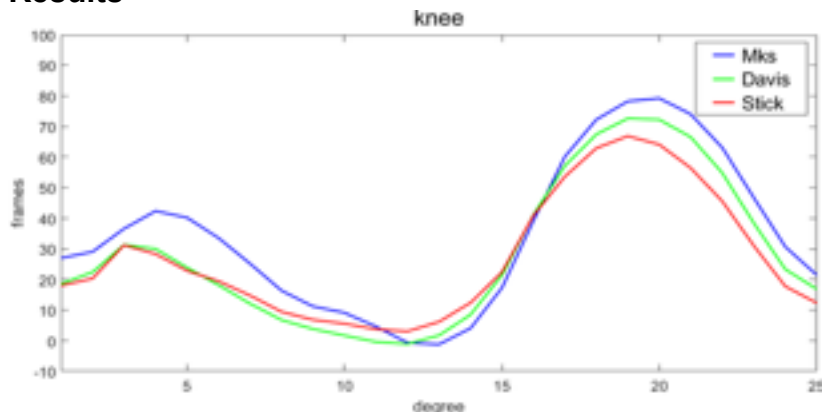
## Introduction

Crouch gait (walking with bent knees) is a common problem in children with bilateral cerebral palsy (CP). To be able to measure and monitor the degree and development of crouch gait it is important to use a reliable and feasible assessment tool. Three-dimensional gait analysis (3D GA) provides an objective dynamic measurement of gait and is considered the golden standard however not always accessible. The aim was to validate 2D markerless video assessment with 3D GA.

## Patients and Method

21 children with CP, mean age 13.6 years, participated. An RGB video camera (Microsoft Kinect one) and 3D GA system was used simultaneously during gait. The sagittal plane movement in the knee was calculated; the offset between graphs, the root mean square deviation describing the total movement deviation and the correlation.

## Results



One patient's sagittal knee movement during the gait cycle, one trial, for illustration. The 2D markerless assessment (blue) and the 3D GA (green).

The results of all trials (n=48) for 5 subjects revealed mean offset= 8.6 degrees, the root mean square= 5.25 and the correlation=0.95.

## Discussion and conclusion

We found a high correlation between the assessments. The offset is explained by the different definition of the body segments. We note that the difference is small in mid-stance (10-15 on the x-axis) where crouch is measured.

The 2D markerless video recording in the sagittal plane is reliable, portable and easily performed and can possibly be used to monitor the development of crouch gait in children with cerebral palsy over time.