

CLINICAL DECISION MAKING IN SPASTIC BILATERAL CP – PLANNING INTERVENTIONS USING CLINICAL GAIT ANALYSIS: A CASE STUDY

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INTRODUCTION AND AIM

Cerebral Palsy (CP) is one of the most common neurological problems in childhood which often results in spasticity [1]. To help these children to achieve the best functional outcome, the intervention of interdisciplinary team (IDT) is necessary. The goal of the team is to find out the most problematic features which interfere in activities of daily living.

The aim of this case-study was to explain the use of clinical gait analysis in clinical decision making within the patient population of spastic bilateral CP. The study was to explore the possibilities of evaluating spasticity during functional situations with gait analysis to add some extra information to usual evaluation in supine.

RESULTS

Clinical gait analysis was conducted, interpreted and the results of interpretation were presented during the patient session of the IDT. Following points were brought out: changes in the ankle joint with the increase of gait velocity (i) plantarflexion at the initial contact increased (**figure 1 and 2**), absent first rocker; (ii) throughout the midstance increased plantarflexion by 10°; (iii) increased plantarflexion at terminal swing (**graph 1**). Changes in the knee joint with the increase of gait velocity (i) increased flexion at the initial contact and loading response; (ii) decreased and delayed peak flexion during swing; (iii) increased flexion at terminal swing (**graph 2**).

The gait graphs were good illustrations for showing how spasticity increases with speed and alters the gait pattern adding valuable information about muscle work and effect of spasticity during function.

DISCUSSION AND CONCLUSIONS

Clinical gait analysis is an effective tool for assessment of spasticity during functional activities. It adds an extra value in making clinical decisions and treatment planning. In addition, gait analysis is a good illustrative tool for explanation of the effect of spasticity during walking to other IDT members.

Data from wireless EMG could be very useful for higher precision in detecting the muscles which contribute to various impairments during functional tasks.

REFERENCES

[1] James R. Gage et al. *The Identification and Treatment of Gait Problems in Cerebral Palsy* (2009)

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PATIENTS/MATERIALS AND METHODS

3D Vicon Gait Analysis System and two AMTI platforms were used to capture the data. Markers were placed according to Davis model. Physiotherapeutic assessment was carried out prior to the gait analysis. For interpretation 2 good gait trials from slow speed walking and 2 good trials from fast speed walking were selected. The patient was a 16-year old girl, diagnosed with spastic bilateral CP. During the first trials she was asked to walk as good as she was able to, in order to achieve as typical gait pattern as possible. During the last trials she was asked to walk as fast as she was able to. The two gait patterns were compared to each other to find out what changes occurred. According to the findings clinical decisions were made and discussed within the IDT.

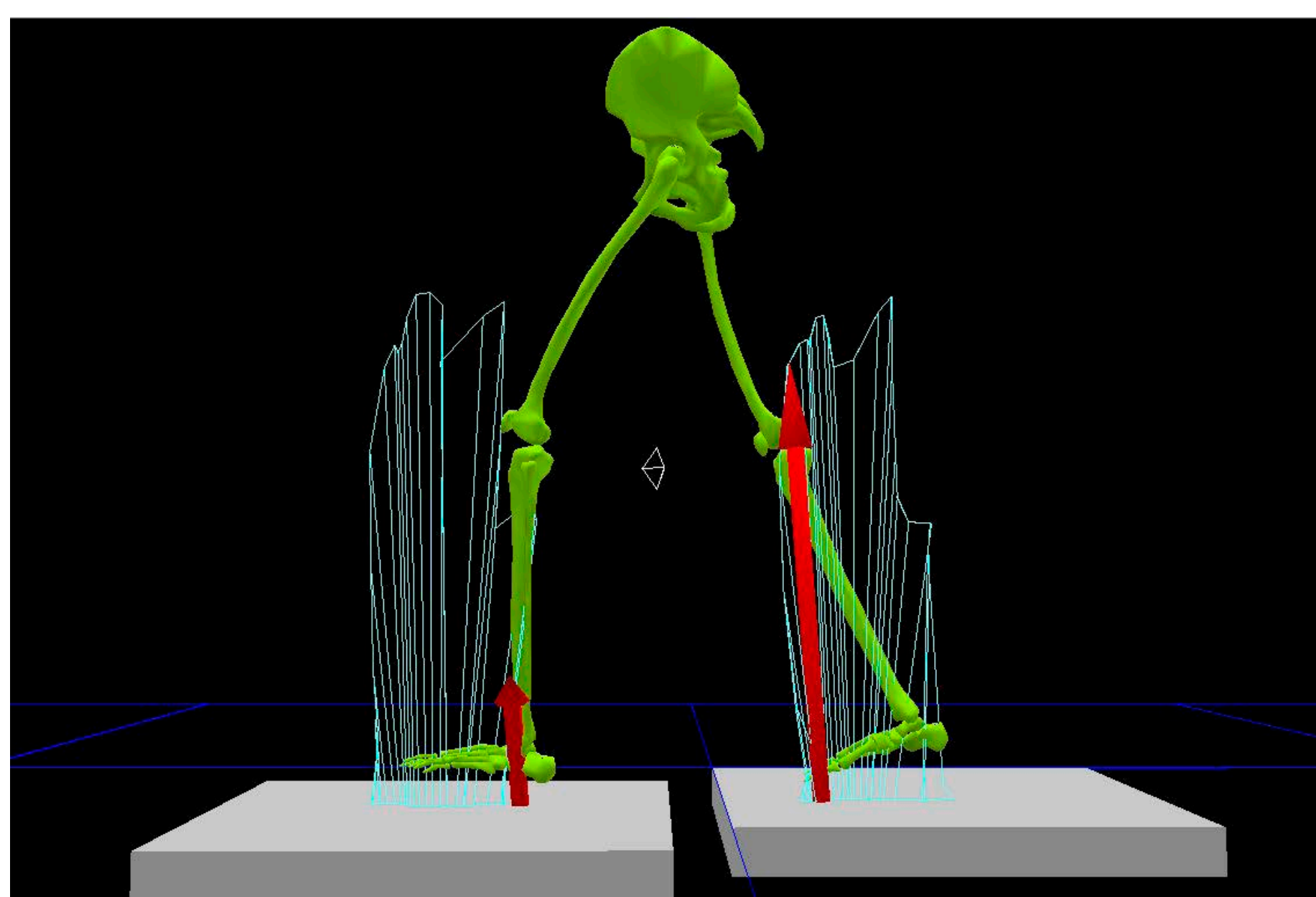


Figure 1. Ankle angles, flex/ext graph

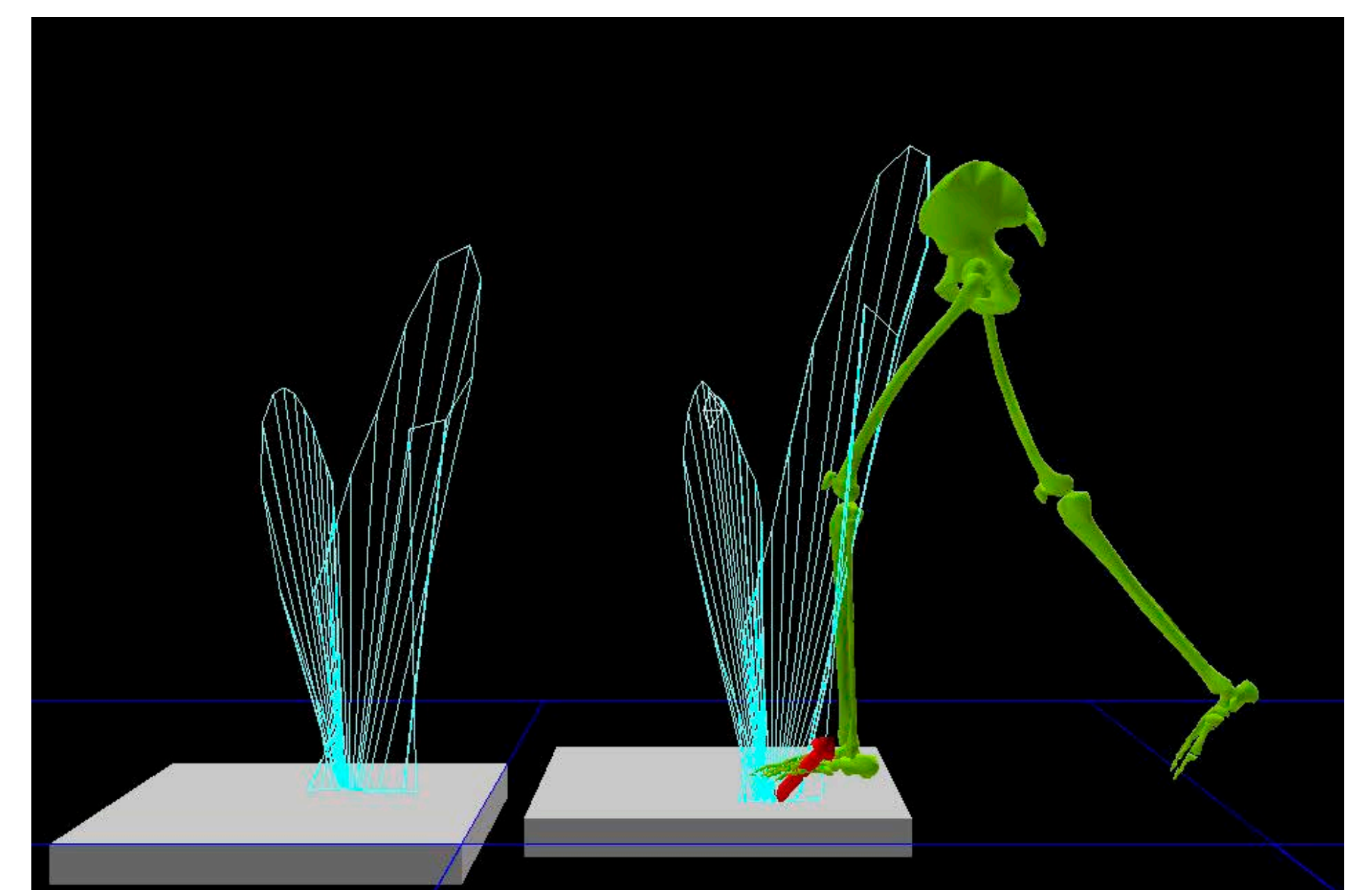
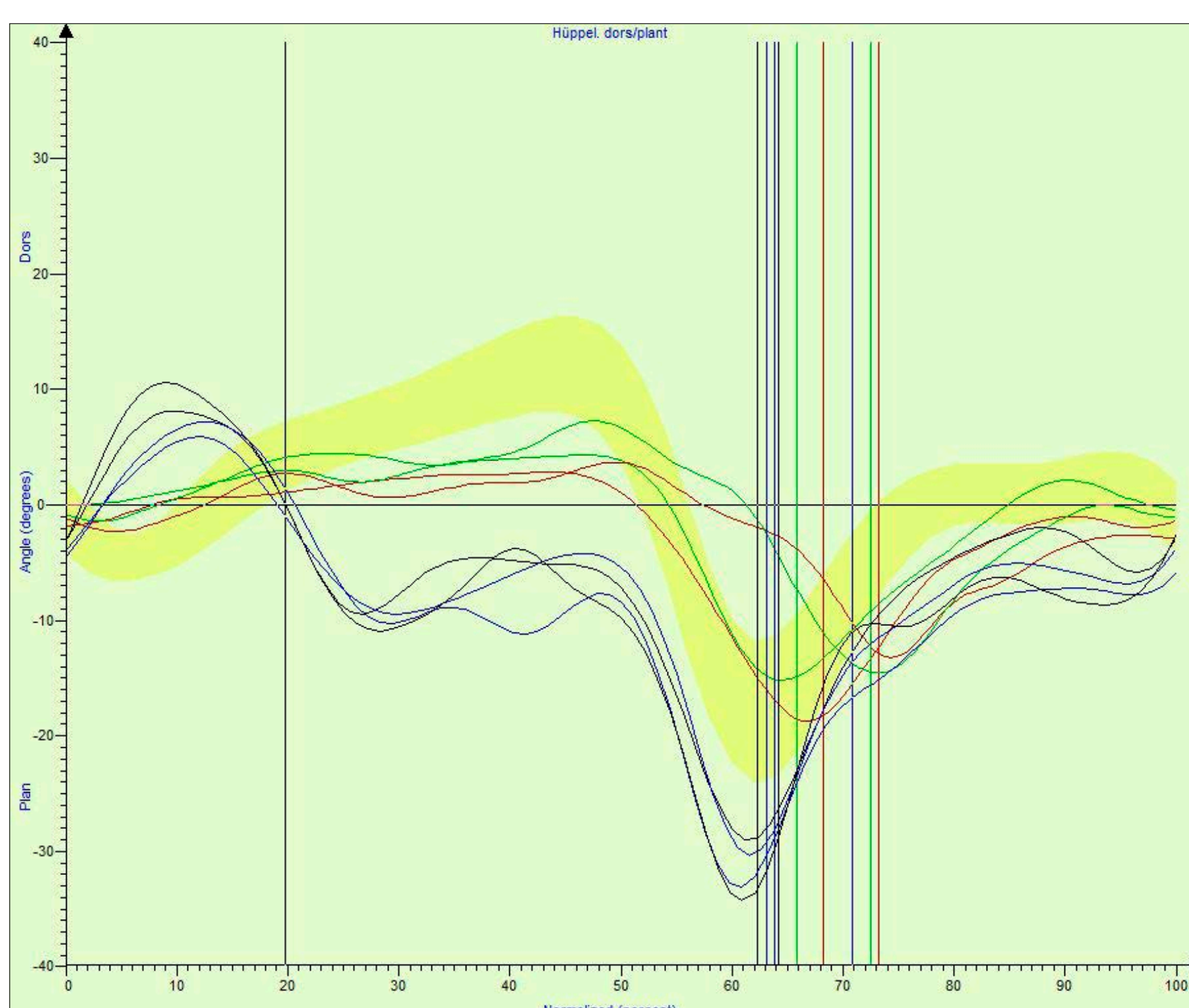
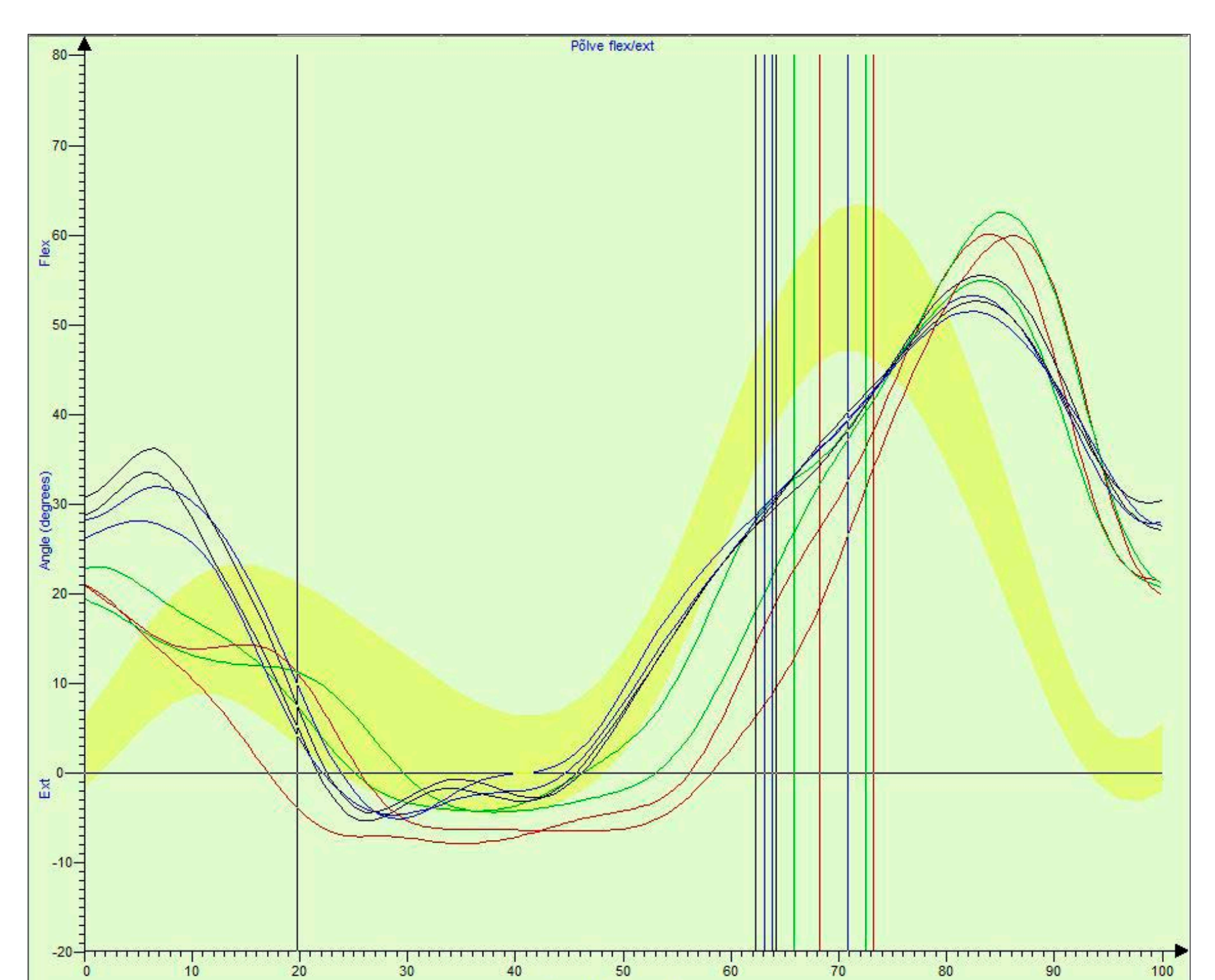


Figure 2. Knee angles, flex/ext graph



Graph 1. Left initial contact during slow gait

red - left ankle during slow gait
black - left ankle during fast gait
green - right ankle during slow gait
blue - right ankle during fast gait



Graph 2. Left initial contact during fast gait

red - left knee during slow gait
black - left knee during fast gait
green - right knee during slow gait
blue - right knee during fast gait



QR 1. This QR code leads to a video that illustrates the patient's gait during slow and fast pace. If you cannot scan the code, please use the following link: <https://www.youtube.com/playlist?list=PLqMqjapTqGijx77v1VPLU2ym-RoriiNPz>. The video will be available for viewing until 18.12.2015



Photo: Silver Raidla