

Improvement of hemiplegic patient's gait pattern over 8-month period after plantarflexors faciotomy: a case study

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INTRODUCTION

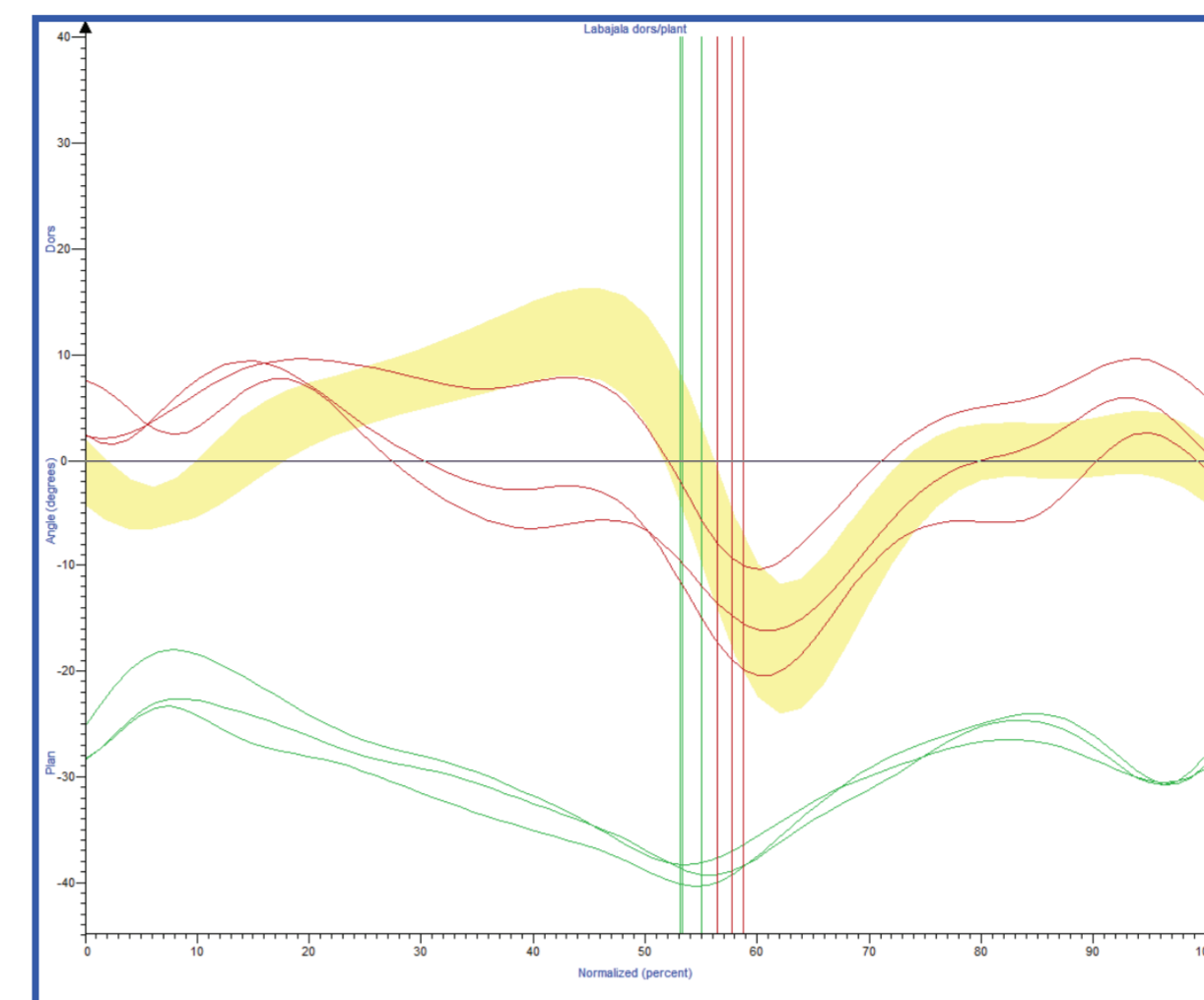
Clinical gait analysis (CGA) was conducted on an 8-year old female patient with spastic right hemiplegia (cerebral palsy, CP). The main problem of the patient is extremely tight Achilles tendon. Achilles tendon lengthening was done in early childhood, with no positive results. In addition, pre-faciotomy leg length discrepancy was 2,5 cm, resulting with posture problems. CGA was conducted pre-operatively, 1 month, 4 months and 8 months following faciotomy. The first two analysis were made barefoot, the last analysis was done with footwear, with correction for leg length discrepancy. After the surgery, the patient received three intensive rehabilitation periods, each lasted two weeks. In addition she had 20 robot-assisted treadmill training sessions and home exercises. The aim of this paper is to describe the changes of gait pattern over time after plantar-flexors faciotomy of hemiplegic patient.

PATIENTS / MATERIALS & METHODS

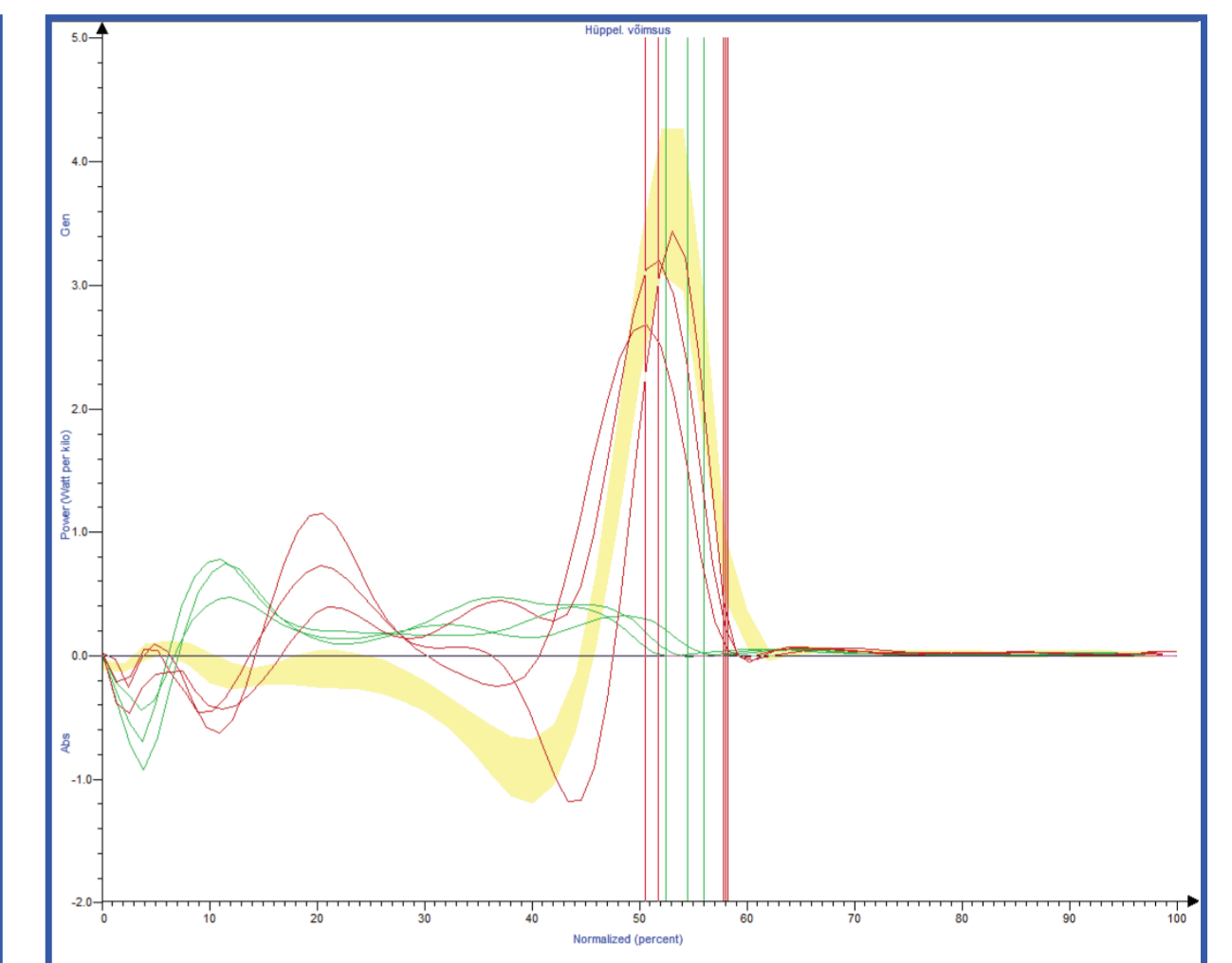
3D Vicon Gait Analysis System (8 Vicon MX-T20 cameras, 2 Basler cameras) and two AMTI dynamographic platforms were used to capture the data. Markers were placed according to Davis model. Before the gait analysis physiotherapeutic assessment was carried out. All assessments and gait data collection was carried out within one day by two physiotherapists. Data was captured with Vicon Nexus 1.7.1 software and presented for interpretation with Vicon Polygon 3.5.1 software. For interpretation 3 good gait trials were selected.

RESULTS

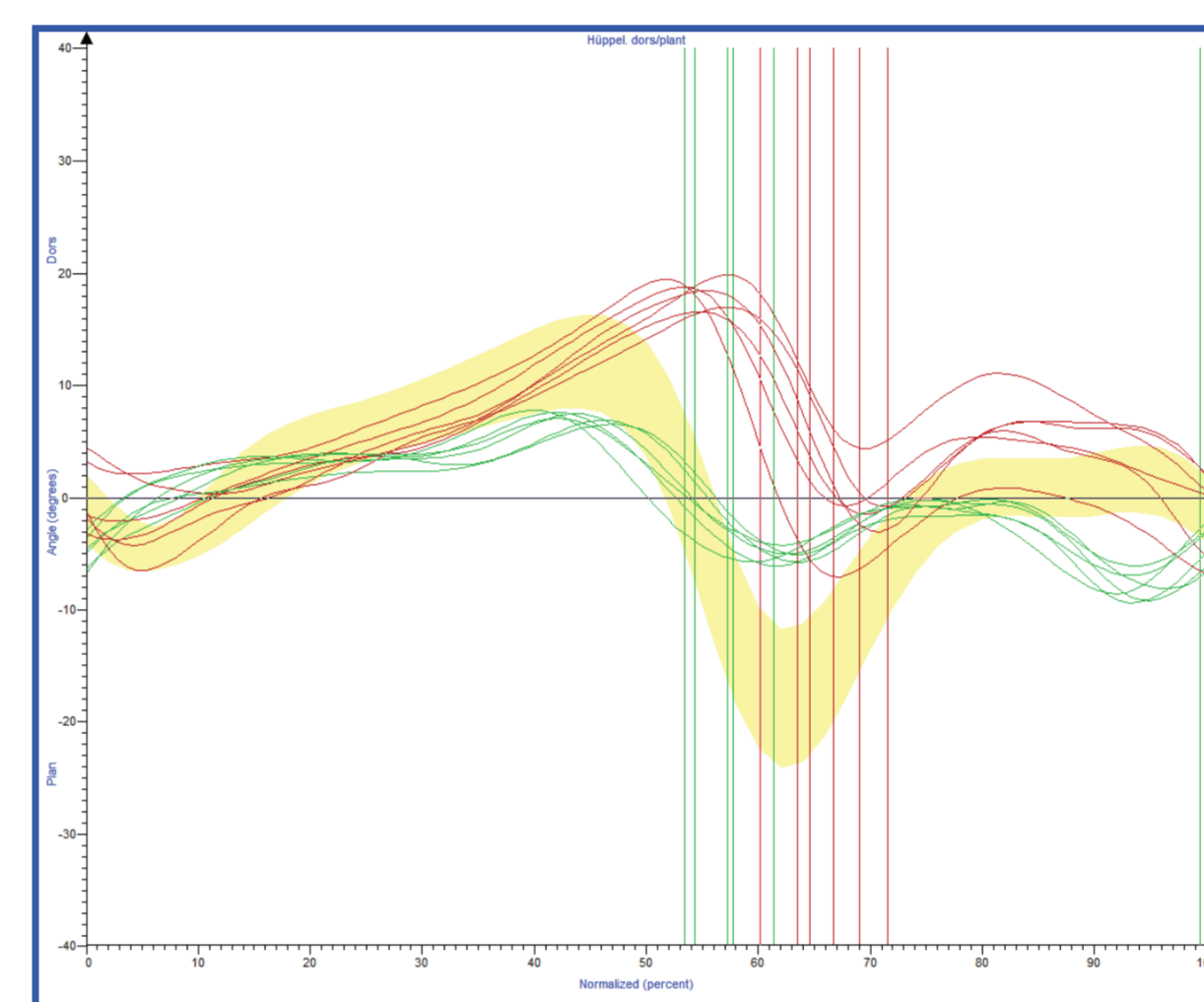
Before the surgery, there was a severe plantarflexion (over 25°) at initial contact on the right side. Plantarflexion lasted throughout the whole gait cycle, with no active dorsiflexion in swing phase. Push-off values for the right ankle were close to zero. One month post-op analysis showed great improvement of ankle dorsi-plantar-flexion movement. Initial contact was still made with ankle in plantarflexion, but the range was less than 10°. The graph has moved close to zero-line, with drop-foot in the swing phase. The pattern on ankle power graph is close to normal, but values are minimal. 8-month postop analysis showed improvement from mid-stance to toe-off; the patient has achieved 2nd and 3rd rocker. Initial contact is still made with ankle in plantarflexion and drop-foot continues because there is no active dorsiflexion. Push-off values on the ankle power graph have increased up to about 1/3 of estimated values.



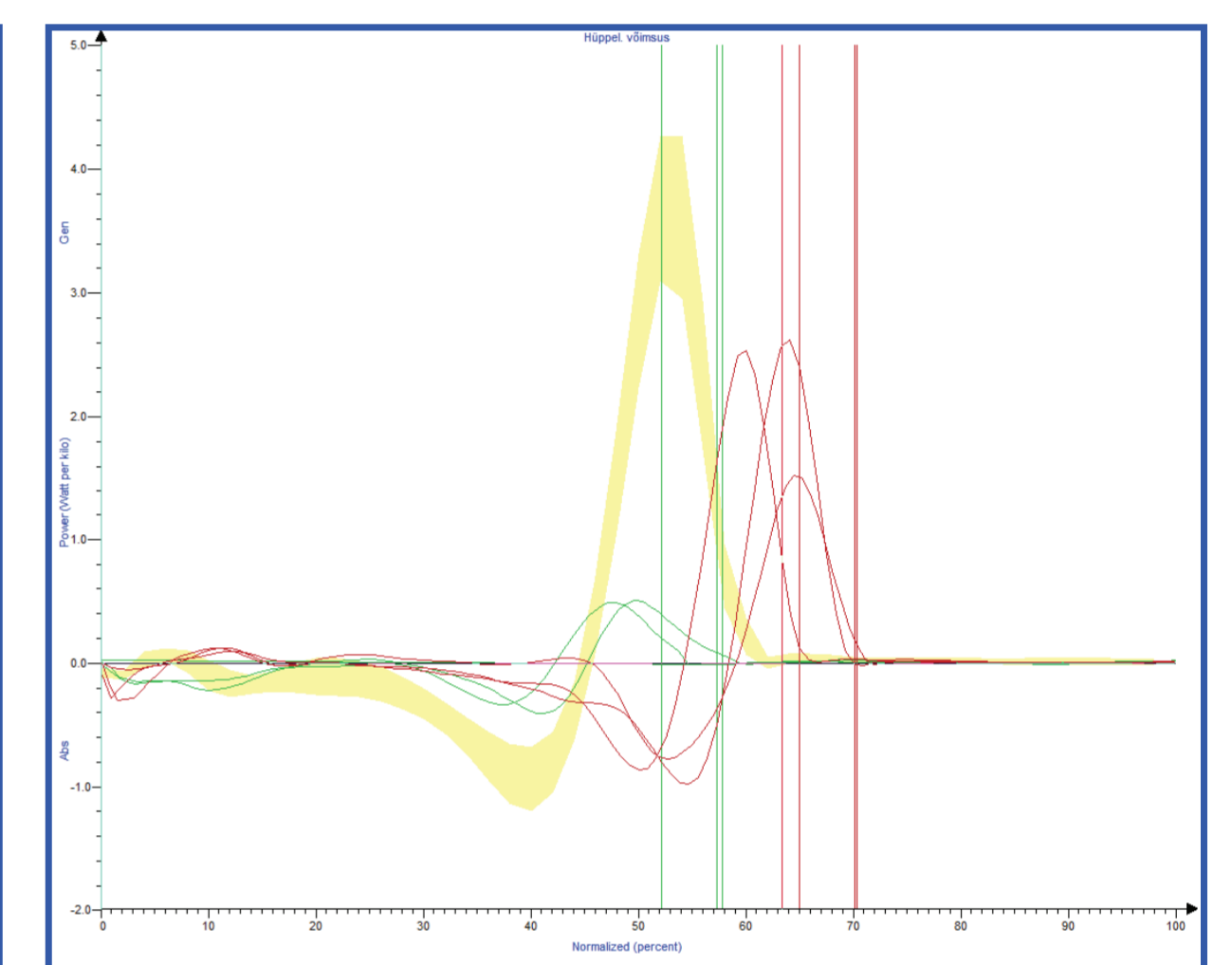
Pre-op ankle dorsi-plantarflexion



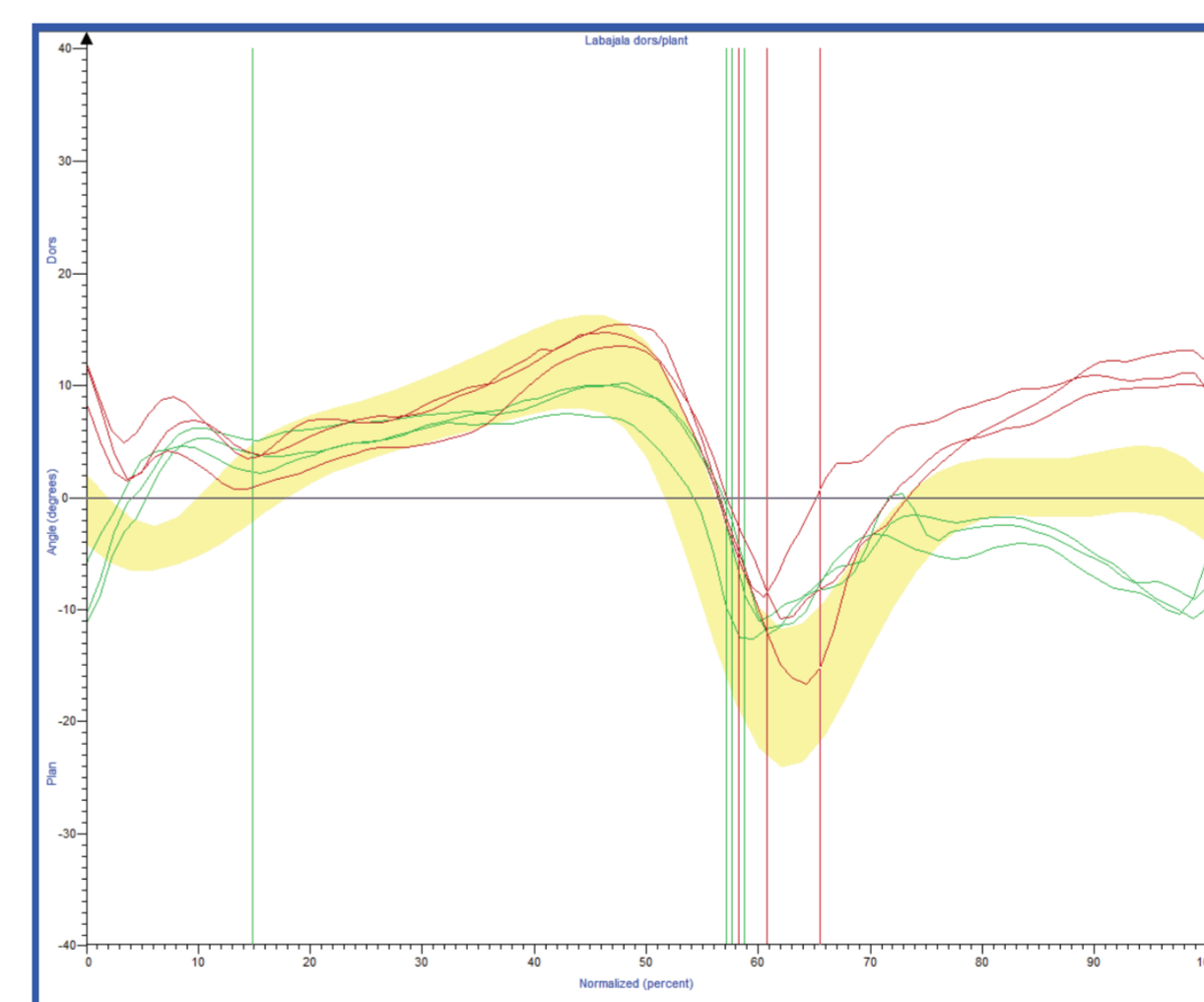
Pre-op ankle power



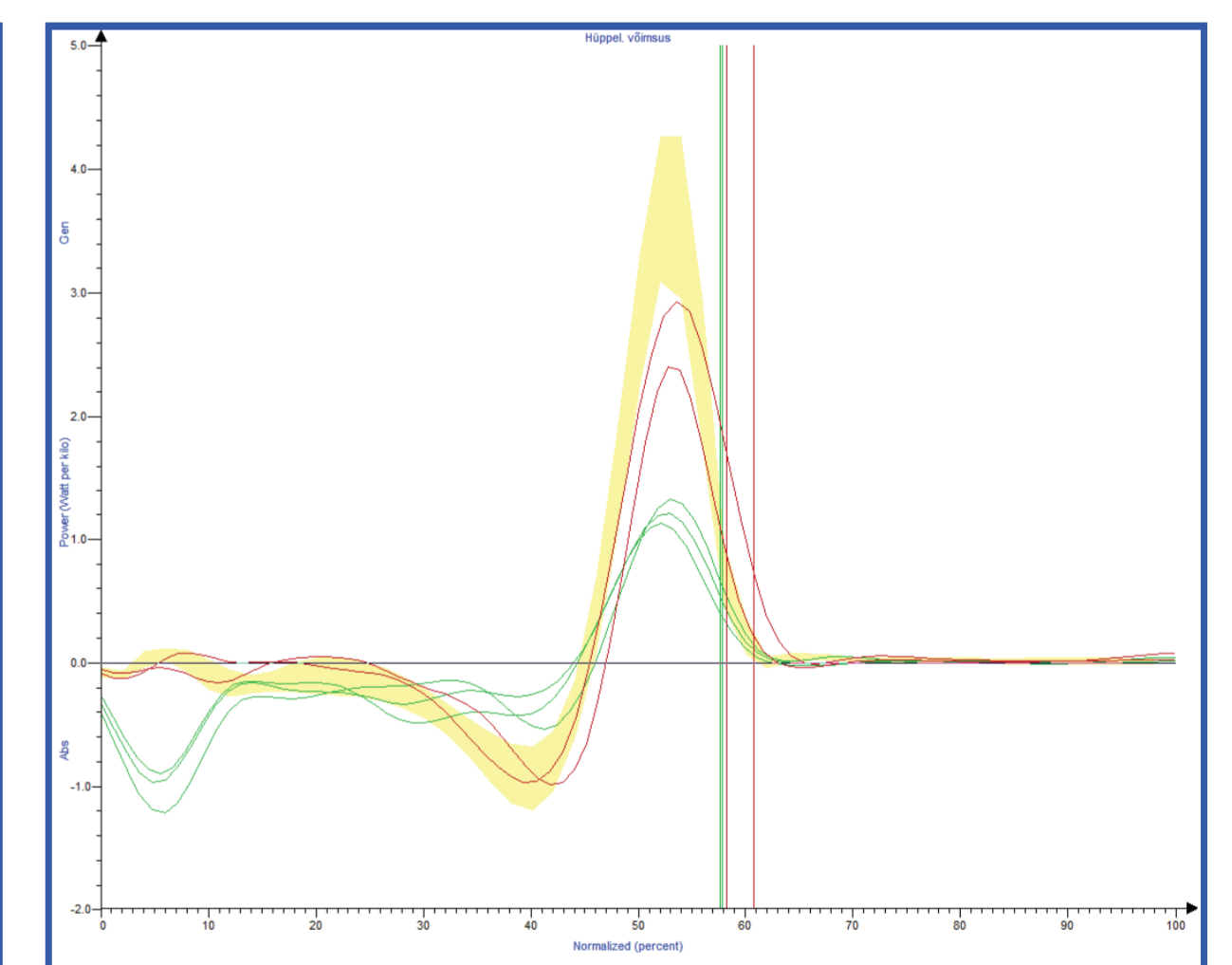
Ankle dorsi-plantarflexion 1-month post-op



Ankle power 1-month post-op



Ankle dorsi-plantarflexion 8-month post-op



Ankle power 8-month post-op

DISCUSSION & CONCLUSIONS

The faciotomy has been effective for improving the gait pattern of hemiplegic patient. Position of the right foot improved greatly. There was a great difference in the ankle joint position at the initial contact pre and post-op, but almost no change occurred during 1-month and 8-month follow-up studies due to no active dorsiflexion. Furthermore, drop-foot in the swing phase retained. Because of no further improvement in swing-phase and initial contact, AFO was recommended to support the dorsiflexion of right ankle. The push-off values increased constantly. The faciotomy showed good results in improving gait pattern an CGA is a good tool to describe and evaluate the efficacy of chosen intervention.