Discussion: In 7 patients, i.e. 47 % of the examined group, the maximal strength of the muscles spanning the knee joint was decreased. In the others, although normal, was close to the lower border of the normal range. At the same time nearly all TS patients had decreased pelvic tilt, which could be sign of the weakness of the muscles responsible for the pelvis orientation. The abnormalities of upper and lower body found during clinical evaluation of body posture also suggested decreased muscular strength. It is known that girls with TS have poorer motor development, which could result in decreased muscular strength, and our findings support this thesis. Decreased muscular strength could also negatively influence the locomotor abilities. In contrast to Mizuta we did not find any anatomical problems within the knees, which could influence the functional performance TS patients.

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P021

The effect of botulinum toxin treatment on activity level of patients with spastic hemiparesis after stroke

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Summary: The purpose of the study was to investigate the effect of botulinum toxin treatment on the activity level of people with spastic hemiparesis after stroke.
Conclusion: Activity level of people with spastic hemiparesis after stroke slightly increased after treatment with botulinum toxin.
Introduction: Botulinum toxin treatment is frequently used in people with spastic hemiparesis after stroke in order to decrease muscle tone and spasms. The effect of this treatment at the level of the muscle has been demonstrated previously [1,2]. However, until now, the effect of this treatment on the activity level of the patient is unknown. The aim of the current study is to investigate the effect of botulinum toxin treatment on the activity level.
Patients/Materials and Methods: Five men and three women with a spastic hemiparesis after stroke (mean age 47 (37–59) years) participated. All subjects where scheduled to receive botulinum toxin treatment (Botox®, Allergan) in muscles of the affected leg, as was decided with help of clinical gait analysis. Measurements were performed before the intervention (T1) and nine weeks after the intervention (T2: when the effect of the botulinum toxin is supposed to be maximal). The primary outcome measure was the level of daily activity. This activity level was measured using the DynaPort ADL monitor [3] (McRoberts, The Netherlands) for a period of 24 hours. From these data the relative time spend on lying/sitting (sedentary), standing and in locomotion was derived. In addition, the movement intensity (average acceleration) was calculated. Secondary outcome measures were walking velocity, step length and symmetry [determined during a 20m walk test, using the DynaPort GaitTest (McRoberts, The Netherlands)] and general health (measured using the SF-36 questionnaire). The non-parametric Wilcoxon test was performed to detect statistical significant differences over time ($p = 0.05$).
Results: A statistical significant difference was found on the relative sedentary time (T1: 83%, T2: 78%, $p = 0.028$), relative standing time (T1: 12%, T2: 16%, $p = 0.028$) and for movement intensity during these activities (sedentary: T1: 0.035m/s^2, T2: 0.050m/s^2, $p = 0.046$; sitting: T1: 0.028m/s^2, T2: 0.036m/s^2, $p = 0.046$). No statistical significant differences were found on locomotion time and movement intensity during locomotion. Besides, no statistical significant differences were found for walking velocity, step length, walking symmetry and for the SF-36, although a borderline effect was found on the sub-item general health of the SF-36 ($p = 0.054$).
Discussion: Activity level of the subjects changed slightly after treatment with botulinum toxin: the subjects were less involved in sedentary activities (sitting or lying) and spent more time standing. In addition, movement intensity increased during these activities which means that more vigorous movements were made. No effect was found on time spent on locomotion, movement intensity during locomotion and walking velocity. Maybe the power of the study was too low because of the small sample size. Besides, possibly some periods of walking movements were to short or were of too low an intensity to be classified as walking and appeared as standing time in the analysis. Because the standing time and movement intensity increased, it could be concluded that the subjects became more active after treatment. This, however, had no clear effect on the experienced general health (SF36).
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P022

Using the Gillette Gait Index as a measure of congenital talipes equinovarus involvement

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Summary: The Gillete Gait Index (GGI) for a sample of Congenital Talipes Equinovarus (CTEV) patients were compared to those of an able bodied control sample.
Conclusions: The differences between the population means were shown to be statistically significant, indicating that the GGI can distinguish a CTEV population from a control population.
Introduction: CTEV affects approximately 1 in 1000 births in the UK. Patients present with the hindfoot in equinus and varus, and the forefoot adducted and supinated. Corrective treatment, including physiotherapy, splinting and soft tissue surgery, is undertaken immediately following birth in order to provide the growing child with as flexible a foot as possible. Patients may be sent for gait analysis in later years to assess future treatment options – in severely affected patients bony surgery and lower leg correction using an Illizarov frame may be recommended. In most

cases CTEV does not significantly affect the temporal parameters of gait. However mild foot drop, external hip rotation, internal foot progression and foot adduction are commonly presented [1]. The GGI [2] is a widely used single value measure of overall gait pathology, originally developed as a measure of cerebral palsy involvement. Previous work to validate the GGI indicated that pathologies other than cerebral palsy could be distinguished using their GGI [3]. The aim of this study was to show that the GGI could also be used to differentiate a CTEV patient population from an able bodied control population.

Patients/Materials and Methods: All data was collected at the Ryegate Gait Laboratory, Sheffield, using a Vicon system (6 cameras working at 50Hz) and processed using Plug In Gait modelling software. The CTEV sample group consisted of 14 patients (six boys, eight girls) of mean age 11.0±3.4 years (5 to 17) with 23 affected limbs. Patients who had been previously fitted with Illizarov frames were not included in the CTEV study group, but all subjects had had some level of previous treatment in infancy to correct deformity. The control group consisted of 4 patients (8 limbs) selected from the Sheffield normal patient database. GGI calculations were made in Matlab using an internally developed programme, and subsequent statistical analysis was performed using Analyse-it for Microsoft Excel software (version 2.09).

Results: Kolmogorov-Smirnov tests deemed the control and CTEV samples to be normally distributed, and an independent 2-tailed Students t test was used to calculate the mean GGI for each sample. With confidence level 95% the mean GGI for the control population is 34.4±9.2 and for the CTEV population 72.9±19.2. The difference between the two population means was shown to be statistically significant ($p < 0.001$).

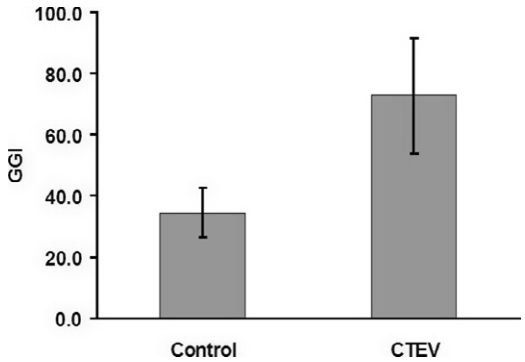

Figure 1. GGI (95% confidence) for control and CTEV populations.

Discussion: The GGI is an easily understood measure of overall gait pathology that is routinely calculated for all patients who attend for gait analysis at the Ryegate Gait Laboratory. The study builds on previous work to demonstrate that the GGI, although initially developed for use as a measure of cerebral palsy involvement, is sensitive enough to distinguish between the gait of a population of patients affected by CTEV and that of an able-bodied population. This study could be developed by examining pre- and post-surgical data for CTEV patients who are recommended for surgery following gait analysis. There is also potential for using the Oxford Foot Model to obtain more kinematic information regarding the hindfoot and forefoot segments.

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P023

Gait initiation analysis of a patient with Huntington's disease using wearable sensors for acceleration: a case study

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Summary and Conclusions: Gait initiation of a patient with Huntington's disease (HD) was studied for 5 years. It was found that the degree of disease had direct relation with time of gait initiation.

Introduction: Huntington's disease is clinically characterized by abnormal, involuntary movements (mainly chorea), together with psychiatric signs and progressive dementia. This hereditary, neurodegenerative disease (with dominant, autosomal transmission) is caused by mutation of the IT15 gene located on chromosome 4. The principal motor-related manifestations of adult-onset HD include hyperkinetic symptoms, such as chorea. Bradykinesia (i.e. slowness or difficulty in executing a movement), rigidity, hypokinesia (i.e. a decrease in the amplitude of a movement) or dystonia are infrequent in the disease's early phases but dominate in the late stages, when an akinetic-rigid syndrome is frequently present. The aim of this research is to study the indexes of gait initiation in a patient with HD.

Patients/Materials and Methods: In this research, gait initiation of a 45 years old woman who had HD was studied for 5 years. For this study we used wearable sensors for measuring acceleration. The accelerometer is attached to the thighs, shanks and waist. Also special software was developed which records, analyzes and represents factors like maximum acceleration as a function of time, and time of gait initiation.

Results: Times of gait initiation in HD were long with progress of disease. Statistical evaluation of the results revealed that there is significant correlation between the hypokinesia on gait initiation in HD and time of the disease.

Discussion: With regards to the results, we understand that progress of the disease decreases time of gait initiation. By comparing the recorded data with the diagnosis time we determined that the degree of disease had direct relation with time of gait initiation.

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