sacral displacement and oxygen consumption persisted when controlling for velocity, cadence or stride length, all known to co-vary with cardiopulmonary performance. Vertical sacral displacement data from 10 patients with varied rehabilitation diagnoses pre- and post-therapeutic intervention further demonstrates the clinical utility of this tool to assess specific biomechanical gait performance.

**Interrater reliability of observational kinematic gait analysis**

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Gait assessment using computer-aided motion analysis is becoming a more integral part in the objective evaluation of physical therapy treatment and rehabilitation of children with neuromuscular disorder. The purpose of this study was to determine the interrater reliability of a computer-aided gait analysis system. Ten licensed physical therapists with varying amounts of clinical experience served as raters. Four patients with cerebral palsy who demonstrated an abnormal gait pattern served as subjects for the videotape.

Three-dimensional trajectories of body surface markers for computing joint angle motion were acquired utilizing the Ariel Performance Analysis System (APAS). Three gait cycles were analysed for each patient. The raters analysed (hip, knee and ankle) joint motion, cadence, step length, stride length, stance time, and step width. Raters were asked to determine whether these variables were inadequate, normal, or excessive.

Interrater agreement for this study ranged from 0.22 to 0.48. Our results indicate that physical therapists APAS assessments are slightly to moderately reliable and that improved interrater reliability of the assessment of gait by physical therapists using this technique is needed. Reliability of marker placement and standardization of gait analysis training are required before the data are meaningful in making sound clinical decisions.

**Time series analysis of healthy gait to estimate the sources of variability**

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The prevailing theoretical approach to variability and motor control of gait is to treat the within-subject variability as a reflection of noise in the sensorimotor system. Another way to conceptualize noise is to consider the sensorimotor system as a non-linear dynamic system. Here noise is viewed as part of the dynamics and not as superimposed components. Thus noise contributes to the qualitative properties of the dynamic output and not merely to the quantitative properties. This formulation holds the interesting property that noise can be beneficial to the system in the sense of facilitating the adaptation to task demands.

With the help of two shoes with eight built-in force sensors and a portable data logger (Inotronic™) we recorded vertical force peaks during healthy gait during a time interval of 160 s. The data allows assessment of the stationarity of the time series. The time demand to get a stable gait pattern was monitored in dependence on the gait velocity. The stationarity is characterized at first by the recurrence plot, a graphical tool for the diagnosis of drift and hidden periodicities. Further analysis is performed to discriminate between a noisy periodic signal and deterministic chaotic dynamics. The aim of the investigation is to introduce the fractal dimension of the time series of essential gait parameters for the assessment of a practical number of degrees of freedom in the motor control of gait.

**Effect of walking speed on gait measurements of young men**

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The purpose of this study was to investigate the variability in performance during walking at three different speeds — slow, medium and fast (70, 90, 120 steps per min respectively). Ten subjects aged 22–29 (mean 26.3 ± 3.8) were used in this study. The subjects were tested over four separate days using three different speeds. Force plate and electrogoniometer were utilized. The electrogoniometer was placed so that the centre of the potentiometer was directly over the centre of the lateral articulation of the right knee joint. After the goniometer was applied, each subject was asked to walk for 5 min until he became accustomed to the device. Then he randomly selected one of three speeds. Other speeds were sequenced automatically in a randomized order settled before conducting the experiment. Three variables were investigated as follows: V1 knee angle at 50% of gait cycle; V2 vertical reaction force at 50% of gait cycle, V3 time spent in stance phase. Three trials for each speed, a total of nine trials for each subject every day were recorded and analysed.

The results obtained from this study indicates that the subjects' gait measurements may vary significantly from one day to another. The reliability of the 10 subjects used for this study was 0.94, 0.89 and 0.83 at slow, medium, and fast speed respectively. This variation may be less at slower speed, increasing as the speed of the subject increases.

**Measurement of the temporal parameters of gait from slow motion video**

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The purpose of this presentation is to demonstrate a novel use of a videorecorder to measure the temporal phases of the gait cycle, which are very short and