#### Poster Session I

of a walking subject successfully locates the intended circular trajectory, and if foot angle parallels the arc's tangent at that location, then the average ratio of stride length (L') to stride angle ( $\Theta'$ ) should similarly equate to the trajectory's radius of curvature, such that  $L'/\Theta' = R$ . These arguments led to the hypothesis that a walking subject achieves an intended trajectory curvature by the simultaneous expression of appropriate linear and angular amplitudes of locomotor output per stride. Experimentally each of 8 blindfolded subjects walked once round a previously seen circle of 0.914 meters radius. The average value of  $L'/\Theta'$  for all subjects and all strides was 0.956 ( $\pm 0.155$  SD, n=84 steps), supporting the general principles implied by the hypothesis. Surprisingly two blindfolded subjects were each able to continue the task for 7 min without wall contact.

### P1.013 Thymo-cognitive input and postural regulation: a study on obsessive-compulsive disorder patients

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**Context:** To show that emotional and cognitive information acts upon the postural balance system in a way comparable to that of the other known inputs (vision, vestibular, proprioception).

**Method:** Controlled case study on 90 subjects. One group was composed of 45 subjects suffering from obsessive-compulsive disorder (OCD) in accordance with the Yale–Brown scale, while the other was the control group. All of the subjects underwent recording of their orthostatic posture on a force platform with eyes open and eyes closed.

**Results:** As regards the postural findings, the 2 groups appear to be quite different. The OCD patients present a considerably reduced area and velocity of sway regardless of whether their eyes were open or closed. We have observed the same phenomenon as regards the extent of center of pressure displacement.

**Conclusion:** These results are coherent with regard to those of other studies establishing the link between postural balance and psychological status. Recent morphological studies likewise tend to confirm the existence of neuronal networks common to postural regulation and cognitive and emotional functioning. When interpreting symptoms, these interactions should be taken into account. Moreover, this reciprocal link could constitute a promising therapeutic pathway.

## P1.014 Cognitive and postural effects of a traumatic emotional episode

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**Introduction:** In normal subjects, an Eyes Closed (EC) condition classically yields anterior displacement of the center of pressure (CP) in comparison with Eyes Opened (EO) conditions. Moreover, connections between thymo-cognitive factors and postural disorders have already been established. The purpose of our study is to show that individuals having undergone a traumatic emotional episode, even long ago, undergo posturographic modifications consisting in posterior displacement of their center of pressure under EC conditions.

**Method:** A prospective study of 379 patients. All of them benefited from recording on a force platform and then from a semi-directed interview specifically meant to detect the existence of a traumatic emotional episode.

**Results:** 271 subjects see their CP pushed forward with their eyes closed and none of them recall a traumatic emotional episode. 108 subjects see their CP pushed backward under EC conditions; in 100 of them, we find the trace of a traumatic emotional episode, which is often old. The chi<sup>2</sup> test is significant (p < 0.001).

Discussion/Conclusion: This postural behavior may be likened to phobic avoidance. Suppression of visual information under EC conditions favors the vestibular passages of which the interconnections with the limbic system and the tonsil – and consequently with thymo-cognitive information – have been duly noted. This posturographic sign seems to indicate

the nociceptive action of the trace of an unresolved traumatic emotional episode – and the need to detect and treat the latter.

### P1.015 Gait improvement by 60 Hertz stimulation of the subthalamic nucleus in advanced Parkinson's disease: a double blind clinical study

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**Background:** Gait disturbances and freezing episodes are 2 of the most disabling symptoms of advanced Parkinson's disease (PD). In its final stages, the disease becomes resistant to drug treatment and high-frequency subthalamic nucleus deep brain stimulation (STN DBS).

**Objectives:** To investigate the clinical management of STN DBS parameters in advanced PD patients, complaining of severe gait disorders.

**Methods:** Using the Stand–Walk–Sit (SWS) Test, we blindly assessed the effect on gait of 2 different STN DBS frequencies: 60 Hz (lower gamma band) and 130 Hz (upper gamma band) with progressively greater voltage (between 2 and 5.5 mV) versus no stimulation.

**Patients:** Thirteen PD patients undergoing chronic STN DBS were studied; all had complained of the appearance of severe gait disorders several years after electrode implantation and which were resistant to optimal dopaminergic treatment.

**Results:** Under 60 Hz STN DBS, we observed decreases in the SWS completion time, the number of steps and freezing episodes, with a better effect at high voltage (>3.5 mV) than usual voltage ( $\leq 3.5 \text{ mV}$ ). Under 130 Hz STN DBS, a significant worsening of these 3 parameters was noted, without differences in term of UPDRS III scores.

**Discussion:** This finding suggested distinct, specific frequency effects for limb and gait control respectively. The optimal stimulation combination seems to be 130 Hz at usual voltage ( $\leq 3.5 \text{ mV}$ ) initially, followed by 60 Hz at high voltage (>3.5 mV) in patients complaining of severe gait disorders ( $\geq 5$  years after initiation of STN DBS).

# P1.016 Comparison of gait strategy between autistic subjects and Idiopathic Toe-Walkers using gait analysis

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**Background and Aims:** Autistic subjects (AS) are generally characterised by an unusual gait pattern with a variety of walking abnormalities that sometimes resemble Idiopathic Toe-Walkers (ITW). As some aspects of AS gait have not been yet elucidated quantitatively, the aim of this study was the quantification of the differences between AS and ITW gait pattern.

**Methods:** 10 autistic and 12 ITW children were evaluated by ADOS scale and GA [8-camera optoelectronic system (BTS, Italy), two force plates (Kistler, CH) and a video system (BTS, Italy)]. 20 healthy subjects was considered as controls. The gait of the two pathological states were characterised quantitatively with indices obtained from GA. Patients' IQ were considered as well.

**Results:** All patients showed reduced step length compared with healthy controls. As concerns kinematic strategy, the main differences appeared more at proximal joints rather than at distal joints. AS pointed out pelvic tilt in a more anterior position than ITW, without any differences on frontal and transversal plane; as concerns hip strategy, AS revealed more extended position at initial contact with a limited range of motion, if compared to ITW. No differences were found at knee and ankle joints: in both pathological groups knee was closed to controls and ankle was plantarflexed during all gait cycle.

**Conclusions:** GA revealed to be useful to make a distinction between AS and ITW gait pattern; in particular these data may be useful in the clinical