**P053-e**

**Organization of postural equilibrium in several planes in ballet dancers**

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**Keywords:** Balance; Dance; Adaptive strategies

**Abstract:** This study analyzed the balance strategies of ballet dancers during postural equilibrium in three single planes with and without vision and regard to age.

**Material and method.**--Dancers participating formed two groups of 20 dancers each, one aged between 8 and 16 years (young group) and the other aged between 17 and 30 years (adult group). Ground reaction forces-GRF (mediolateral [ML], anteroposterior [AP] components, vertical [V]) were recorded. Results analysis enabled us to extract some spatiotemporal data for each component of the GRF (number of GRF oscillations, variability and impulses). Three trials were tested for each condition. The significance level was set at \( P < 0.05 \) for all tests.

**Results.**--Young dancers are characterized, compared to adult dancers, by an instability combined with an increase of oscillations number and a decrease variability mainly visible on the ML component. In the two groups, the absence of vision implies an increase of AP, ML and V impulses and GRF variability. Balance with the gesturing limb to the rear increases the age and vision effect compared to balances with the limb forward or to the side.

**Discussion.**--Young dancers are less efficient at controlling their balance than adult dancers. This observation may be related to the number of hours practicing dance, which differs between groups. The dancers have a visual dependence to control the postural balance.

**Further reading**


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**P054-e**

**Correlation between Timed Up and Go test performance and kinematic and kinetic gait parameters in stroke patients**

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**Keywords:** Timed up and go; Hemiparesis; Gait analysis; Predictive factors

**Background and purpose.**--The Timed Up and Go test (TUG) is a test of functional mobility routinely used in the assessment of hemiparetic patients in clinical practice. This test, easy and rapid to perform, is composed of various motor tasks (stand up, walk, turn, sit down), which frequently occur in daily life. To our knowledge, the relationships between the results of clinical test frequently performed and results of 3D gait analysis which constitute the gold standard to assess accurately gait parameters of hemiplegic patients have until now never been assessed. The aim of this study was thus to determine if, in hemiparetic patients, TUG performance was related to specific spatio-temporal, kinematic and kinetic gait parameters of hemiparetic patients obtained using 3D gait analysis.

**Methods.**--Sixty hemiparetic patients performed the TUG test and underwent 3D gait analysis and clinical evaluation in randomized order.

**Results.**--The percentage of the gait cycle spent in single support phase was the most correlated factor with hemiparetic TUG performance and explained 67% of the variance. Our results also suggest that TUG performance is mainly related to paretic lower limb motor abilities.

**Conclusion.**--The present findings suggest that TUG performance in hemiparetic patients mainly depends on the motor ability of the paretic lower limb and especially on the patient’s ability to spend percentage of the gait cycle in single support phase on the paretic lower limb. This clinical test also provides an indirect indication of certain gait parameters that cannot be evaluated in clinical routine.

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**P055-e**

**Static disorders in hemiplegic patients: Evaluation on dual-plate force platform**

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**Keywords:** Hemiplegic; Dual-plate force platform; Center of pressure; Spasticity; Anteriorisation

**Objective.**--Description of static disorders of stroke patients using a dual-plate force platform.

**Patients and methods.**--Descriptive study, monocentric, including patients with a time post stroke.

**Results.**--Fifteen patients were included with these features: 10 right hemiplegic stroke patients and five left, a majority of ischemic stroke (11/15) and supratentorial location (13/15), mean age being 62 and mean Barthel’s score 74. 6 patients were spastic, 12 had a sensitivity disorder and three were hemi-neglect. The qualitative analysis found an anteriorisation of hemiplegic side COP for 10 patients, a shortening of the length for 13 patients and a decrease of the surface for 11 patients. The shortening of the hemiplegic side COP compared to the healthy side COP was significant (mean difference of 370 mm, \( P < 0.05 \)) but not the anteriorisation or the reduction of surface. The weight-bearing asymmetry between the two sides is significant: 63% of body weight for the healthy side and 37% for hemiplegic side, \( P < 0.05 \).

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Discussion.— This is a preliminary study about the hemiplegic posture, limited by a lack of power. The hypothesis of the anteriorisation of COP associated with spasticity is not statistically significant but was found with two patients who were assessed twice: anteriorisation of the hemiplegic side COP in the second pass associated with the development of spasticity. This study should be completed by the inclusion of more patients to look for a correlation between these statistical parameters, medical examination and clinical evolution.

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P056-e

Isokinetic study of the impact of styloid fracture with a volar plate osteosynthesis on pronosupination strength

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Keywords: Fracture styloid; Force; Supination; Isokinetic

Hypothesis.— Recent studies have shown that the presence of an associated ulnar styloid fracture does not adversely affect the clinical and functional outcomes in patients with a distal radius fracture. The purpose of this study was to evaluate a series of patients with an internally fixed fracture of the distal part of the radius to test the null hypothesis that there is no difference in isokinetic evaluation between those patients with an untreated fracture of the ulnar styloid base and those with no ulnar fracture or a tip fracture.

Methods.— Ten consecutive patients were recruited at 1 year after ORIF with a volar locking plate of the distal radius. The patients were divided in two groups: group 1: patients with a concomitant untreated fracture of the base of ulnar styloid; group 2: patients without fracture of the ulnar styloid or just a tip fracture. A control group (Group 3) was composed of six healthy patients without history of trauma of the wrist.

All the patients were tested bilaterally for isokinetic and isometric pronation and supination strength. Clinical outcomes such as grip strength, range of motion, Mayo Clinic Wrist score (MWS), DASH score and Lidstrom classification were evaluated by an independent observer and correlated with isokinetic results.

Statistical analysis was performed with Kruskall-Wallis test and Wilcoxon test (P < 0.05).

Results.— There were no significant differences in range of motion; grip strength; MWS and DASH scores and isometric strength of pronation and supination.

Isokinetic evaluation showed a significant decrease of the supination strength between group 1 compared to group 2 and 3 at 45°/s (P < 0.01).

Discussion.— This study suggests that fracture of the base of the ulnar styloid has no effect on upper extremity specific questionnaires. However, a significant decrease in isokinetic supination force is expected. More specific health questionnaires may confirm the clinical effect of this loss of strength. Consequently, more aggressive treatment for the ulnar styloid may be proposed in case of fracture of the radius associated with ulna in young and active patients.

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P057-e

The control of force is affected in a general, not just in a task-specific manner in writer’s cramp

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Keywords: Writer’s cramp

Objective.— Writer’s cramp is an acquired task-specific focal dystonia and involves involuntary sustained muscle contractions causing abnormal writing and hand posture. Previous studies have shown that patients with writer’s cramp apply higher than normal forces during writing with the affected hand (Hermosö-Rier et al., 2011). This has also been shown for the asymptomatic hand (Serrien et al., 2000). Furthermore, cortical mapping of digit representations in these patients revealed not unilateral but bilateral abnormalities (Meunier et al., 2001). We consequently hypothesized that writer’s cramp affects the control of force in the hand in a non-specific fashion. Therefore the objective was to show that deficits occur in both hands and in tasks other than writing.

Methods.— We have developed a grip force task that allows for the quantification of the degree of control (i) during a non-writing task, and (ii) for the writing and the non-writing hand. The task requires visuomotor tracking of isometric power grip force in a ramp-hold-and-release paradigm. We quantified the precision and the variability of the tracking as well as two aspects of timing: force onset and release duration. Two levels of hold-force have been tested: 5N and 10MVC. This was done in both hands and also in a bimanual force-matching paradigm. Eleven patients were compared to 17 age-matched control subjects.

Results.— In the unimanual task and compared to control subjects, patients showed increased tracking error and greater force variability in the affected as well as in the unaffected hand. This was more pronounced at lower hold-forces (5N) than at 10% MVC. Moreover, patients displayed longer release durations, again in both hands. In the bimanual force-matching condition, patients showed differences compared to the performance in control subjects.

Discussion.— These preliminary results show that patients with writer’s cramp have force control deficits not just in the affected but in both hands, and that these deficits, particularly at low forces, are not task-specific, i.e. not only expressed during writing. The results are in line with the hypothesis that the control of force is affected in a general, not in a specific way in writer’s cramp.

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P058-e

Effect of formed plantar orthosis on postural control in upright stance

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Keywords: Postural control; Plantar orthosis; Cutaneous stimulation

Introduction.— The balance control system depends on basic components concerning biomechanics, and a set of reflexes that triggers equilibrium response based, on visual, vestibular and somatosensory senses [1]. In this study we have examined whether extensive stimulation of a sensory sensor can modify postural balance?

Materials and methods.— Two groups of subjectively healthy subjects (21.6 ± 1.0 years) were randomly assigned to posturographic measurements wearing formed plantar orthosis (15 subjects) or flat (not formed but in same material) soles (15 subjects), in condition eyes opened and then eyes closed A similar test was performed in the same conditions after 1 week wearing formed or flat orthosis.

Results.— In the condition eyes opened, we observed a significant reduction of the area of body sway, and of the medial-lateral amplitude in the group using