Discussion. – These two tests are very different and not correlated in a stroke population. The RFT is a cognitive task assessing the VD with a static method, the second test is a postural task evaluating the effect of dynamic visual disturbance. Visual dependence is not an absolute concept but is depending on the task.

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A clinimetric study of lateropulsion measure by Verticam for patients recovering from a stroke

M. Jaeger*, A. Admirat, A. Marquer, A. Chrispin, P. Davoine, C. Piscicelli, D. Pérennou
Institut de rééducation, clinique MPR, CHU de Grenoble, avenue de Kinberley, 38130 Éch Rollies, France
*Corresponding author.
E-mail address: mjaeger@chu-grenoble.fr

Keywords: Lateropulsion post stroke; Measure by Verticam

Introduction. – After a cerebrovascular accident (CVA), clinical scales are used to qualitatively evaluate lateropulsion. Verticam is a system using a high-speed camera. It allows measuring lateropulsion quantitatively [1]. This study aims to analyze the clinimetric properties of this technique.

Methodology. – The trunk orientation of 30 patients was measured by Verticam at 30 ± 3 days after their first hemispheric stroke (age = 62 ± 17.7 years; sex: 14F/16 M; lesion side: 14L/16R), and two days later. Seven patients had a SCP (Scale for Contraversive Pushing) score > 0.5, which is the proposed criterion for clinical lateropulsion diagnostic [2]. Verticam quantified the trunk lateral inclination thanks to a measure of the average orientation of a segment between two markers (Tb & L3) (negative sign if the inclination was contralesional). The measures were performed in a sitting position during 30s, eyes open. Seventeen controls (mean age 52 ± 10 years) were also tested. A non-parametric statistical analysis was performed.

Results. – The average trunk orientation was −0.6 ± 1.3° within controls, which led us to set the pathological threshold to every measure below −3.5°. Surprisingly, the average orientation was not different within patients: −0.8 ± 7.8°. The trunk orientation of patients with lateropulsion characterized by SCP was not significantly different from other patients (−4.3 ± 15 vs 0.5 ± 19°), ns). One patient had a contralesional trunk inclination below −3.5°. The inclination measured by Verticam was not correlated with the SCP score (r = −0.29, P = 0.12). In patients, measures of trunk inclination two days apart were correlated (r = 0.52, P < 0.01).

Discussion. – This technique for measuring lateropulsion seems to be unreliable.

References

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New simplified 3D device for clinical gait analysis

O. Nocent*, D. Trafial, S. Piotin, A. Benassarou, M. Krajecki, F.C. Boyer, R. Taïar
*CreStIC, université de Reims Champagne-Ardenne, IUT de Reims Châlons Charleville, rue des Crayères BP 1035, 51687 Reims cedex 2, France
GRESPI, université de Reims Champagne Ardenne, Reims, France
Centre Image, université de Reims Champagne Ardenne, Reims, France
Pôle de médecine physique et de réadaptation, CHU de Reims, Reims, France
*Corresponding author.
E-mail address: olivier.nocent@univ-reims.fr

Keywords: Clinical gait analysis; New technology; Video

Introduction. – With its very low cost, the Microsoft KINECT camera is one of the last generation game controllers. KINECT is composed of a conventional video camera and an infrared depth sensor. Coupled with dedicated software, it is able to track the 3D posture of several players in real-time [1]. A depth sensor does not require any calibration and can work under variable lighting conditions. Recently, several depth sensors, relying on the same technology, have been released with an improved spatial precision. The objective of this study is to adapt and optimize this system for the clinical gait analysis.

Materials and methods. – In this study, we investigated the potential use of a depth sensor as a measure device for the human gait and posture analysis. For that purpose, we developed the following tested: an optical motion capture system (six 200 Hz VICON cameras) is used as a reference measure device in order to compare the performances (spatial precision, latency, etc.) of different depth sensors models for ten healthy subjects.

Results. – These experiments, jointly conducted by the computing and biomechanics laboratories, were used to assess a spatial accuracy from 4 cm to 5 mm. Even if the skeleton tracking algorithm provided by these depth sensors seems to be relevant for gesture based interfaces, the generated joints position and orientation cannot be matched precisely with the joints configuration of the real skeleton. We adapted a 2D feature point tracking algorithm [2] to overcome this problem. Using the depth map generated by the depth sensor, we obtained the segmental 3D position with a backward projection.

Discussion. – This methodology allows tracking points which are not recognized by the default system. The results obtained on the subject foot by placing colored stickers on the toe and the lateral and medial malleolus showed that the error related to the spatial position is less than 2 mm, using a short range depth sensor that we will present during the congress. Our method is with an original approach which will simplify the utilization of 3D system of movement analysis such as the Vicon system. The cost of the 3D equipment analysis will be strongly reduced and the interaction between the user and the subject or patient will be optimized.

References

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Postural adaptations to wearing safety shoes with convex soles

M.A. Choukou, S. Ghoulfi, R. Taïar
Groupe de recherche en science pour l’Ingénieur (GRESPI), université de Reims Champagne Ardenne, Campus du Moulin-de-la-Housse, BP 1039 51687 Reims cedex 2, France
E-mail address: amine_choukou@yahoo.fr

Keywords: Posture; Soles; Workstation; Risk

Aim. – Determine posturological effects of wearing different types of safety shoes meant to standing workstation optimization.

Material. – Posturological data [coordinates (X, Y), Total Area (A), Anteroposterior and Lateral Magnitude (Ant-M et Lat-M), Length (L) and Velocity (V) of the Center of Pressure] were measured using a baropodometric platform (WinPod, sampling frequency: 200 Hz) while the forces (Fx, Fy et Fz) were measured by a force plate (AMTI, sampling frequency: 1 kHz).

Participants. – Ten workers [age: 23.3 ± 6 years old, height: 1.80 ± 0.05 m, weight: 77.9 ± 8 kg, shoe size: 43–44].

Methods. – Participants were asked to maintain three times 120s standing position over WinPod which was embedded over the force plate to ensure synchronized acquisition, according to the following modalities: barefoot, safety shoes with conventional standards (λ), safety shoes (OREGON), recognized as more comfortable than λ, safety shoes with convex soles, meant to be more ergonomic (MBT). An Anova with Fisher post-hoc was done in order to compare the 4 conditions. A level was set at α = 0.05.

Results. – No significant variations were observed for X, Y and Lat-M. However, A, L, V and Ant-M were significantly higher when wearing MBT [F(3, 116) = 10.5; 94.3; 94.3; 9.5; respectively P < 0.05]. Only minimal Fy [F(3, 116) = 11.6] and maximal Fy [F(3, 116) = 6] absolute values were significantly higher (P < 0.05).

Discussion. – The results of the current study shows that space-time parameters (A, L, V, Ant-M) were amplified while wearing MBT, probably due to increase in Fy [1,2]. Surprisingly, this was not the case of the center of pressure.
Localisation which was not varied according to all conditions. This phenomena seems to be a posturological adaptation which allows to avoid a possible decrease in balance. Moreover, that was corroborated by nearly stable values of Fx (P > .05) [3]. To conclude, MBT shoes seems to favour the activity of the stretch shortening cycle of the anterior-posterior muscular chains.

References

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Haptic supplementation improves postural control in perturbed upright stance

L.M. Albertsen a,*, J.J. Temprado b

a Laboratoire analyse et restauration du mouvement, service de rééducation neurolomotorrice, hôpitaux universitaires Henri-Mondor, AP–HP, UPEC, 51, avenue du Maréchal-de-Lattre-de-Tassigny, 94010 Créteil, France
b Institut des sciences du mouvement Étienne-Jules Marey ; UMR 7287 CNRS et Aix-Marseille université, faculté des sciences du Sport, Marseille, France

*Corresponding author.
E-mail address: marie.albertsen@hmn.aphp.fr

Keywords: Haptic supplementation; Perturbed upright stance; Postural stability

Introduction.—Haptic information improves postural stability in static situations [1,2]. The present study aimed to explore their effects on perturbed posture in young and older participants.

Methods.—Thirty-three participants (n = 12 young, 27 ± 2 years; n = 11 older, 75 ± 6 years) have been tested on a moving force platform perturbing by anteroposterior translations (amplitude of perturbations 62 mm, velocity 0.1 m/s) in five experimental conditions (Anova: age *condition, P < 0.05). We compared a control condition (REF, perturbation without supplementation) with four conditions with haptic supplementation due to a light grip of an inclined cane touching the ground. The mobility of the cane has been manipulated: fixed cane (FC), mobile handle, blocked extremity (BC), mobile cane on slippery (SC) or rough surface (RC). The displacements of the centre of pressure in anteroposterior direction were analyzed: maximal amplitude (MA), correction time after the translation (CT).

Results.—During the perturbation, the MA equaled for both groups. It increased for all participants in all conditions of supplementation (REF: 23 mm, FC: 38 mm, BC: 36 mm, SC: 40 mm, RC: 39 mm). After the perturbation, the CT of older was shorter than of young participants in the condition REF (280 ms vs 610 ms). The CT of younger decreased due to HI (REF: 610 ms, FC: 320 ms, BC: 300 ms, SC: 350 ms, RC: 320 ms) but not of older participants (REF: 280 ms, FC: 300 ms, BC: 310 ms, SC: 290 ms, RC: 320 ms).

Discussion.—These results suggested that young and older participants use their body sway to improve the perception of sensory cues. Concerning young participants, after the perturbation, haptic supplementation enabled them to accelerate their postural response. On the contrary, the very short correction time of older participants observed in the condition without supplementation (REF) suggested a difference in postural control strategy associated to an increased rigidity possibly due to an apprehension to fall. These results underline the importance of a multifactorial approach in postural rehabilitation of older adults.

References

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The politics of falls prevention in pole ST Hélér

H. Poulain a,*, G. Denis, A. Guillomet, M. Kuchenbush, E. Lemoigne, V. Pussat, N. Trochon, M. Touchais, V. Sarchet, B. Nicolas, P. Gallien

Pole Saint Hélér, 14, avenue saint-Hélér, 35000 Rennes, France
*Corresponding author.
E-mail address: philippe.gallien@wanadoo.fr

Keywords: Fall; Quality; Prevention

Introduction.—The fall of a patient can result in an important and durable functional loss. From extrinsic and intrinsic risk factors described in the recommendations of the HAS in 2005 and an assessment of professional practices, a multidisciplinary team has established in 2007 a predictive score of falling.

Methods.—At each arrival of a patient, the risk of falling is estimated between 0 and 6. From score 3, patients are considered at risk. Assessment score and the list of the precautions are located in a specific form in the computerized patient record. Starting from score 5, the contention is discussed in multidisciplinary team and prescribed. Score is reassessed every week.

Results.—Currently, 84% of fallers had scores between 3 and 6. Since January 2012, a multidisciplinary team meets once a month to analyze declarations of falls. In 2012, 201 falls were reported. Serious consequences were reported for three patients. The quantitative analysis has highlighted a more accurate profile of fallers. Patients with stroke account for 50% of these fallers. In 60% of cases, we note that thefall occurs in the first month of hospitalization. Patients are for 64% wheelchair users. In 70% of falls, the patient is alone.

Conclusion.—Areas of improvement of politics to prevent falls in the year 2013 include the awareness of patients about their risk of falling. Following assessment by the physician at the patient’s admission, preventive measures are implemented to reduce the number of falls.

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Effect of a dance therapy workshop on social participation and integration of adults with motor deficits: An exploratory study

B. Lachance a,*, F. Ponchet a, C. Proulx Goulet a, T. Durand b, F. Messier b, P. McKinley c, B. Swaine b

a Centre de réadaptation Lucie-Bruneau, centre de recherche interdisciplinaire en réadaptation (CRIR), 2275 Laurier Est, H2H 2N Montréal, Canada
b Centre de recherche interdisciplinaire en réadaptation (CRIR) Canada, université de Montréal Canada, université de Poitiers, France

* Corresponding author.
E-mail address: blachance.crlb@ssss.gouv.qc.ca

Keywords: Dance therapy program; Participation

Introduction.—A dance therapy program (DTP) has been offered to clients at the Lucie Bruneau Rehabilitation Centre in Montreal, Canada since 2010. DTP is based on the principal components (body, space, effort and shape) of Laban movement theory (Laban, 2003), and consists of a 1.5 hr session per week over a 12 week period. The goal is to facilitate social integration and participation in adults with motor deficits while improving balance, endurance, and mobility. Until now, the effectiveness of this program has not been formally investigated.

Objective.—to explore the effect of a 12-week DTP workshop on social integration and participation of adults with motor deficits.

Methods.—Design: pre and post analysis. Four outcome measures were used to evaluate the effectiveness of the workshops conducted in 2012-2013:

- flow State Scale (FSS2);
- timed up and go (TUG);
- assessment of life habits (LIFE-H 3.0), and;
- semi-structured exit interview on participant satisfaction with the program.

Results.—At the end of the 12-week sessions, the TUG (n = 16) was significantly improved (P = 0.001), with a decreased time of execution (from 15 + 6s to 11 + 6s); concomitantly, the risk for falls in the participants decreased from 100% to 25%. The FSS2 (n = 14) score significantly increased over time.