

(1), Encephalitis (1), Cerebellar ataxia (1) and TBI (1). Mean ABC was 65 ± 20.6 , DGI; 16.53 ± 4.7 and all had abnormal SLS scores. Data was inputted to Excel and PASW. The total SUS score out of 100 was calculated (highly usable products have scores in the high 70s or above). Spearman's correlation was used to investigate any relationships between SUS scores and age, ABC and DGI scores.

Results: System usability scores were high ($79 \pm 20\%$) with only two rating below 50%. There was a negative correlation of age with SUS scores ($r = -.463$; $P = 0.05$). There was no correlation between SUS scores and ABC or DGI scores. The average numerical rating scale (/10) for enjoyment of the session on the Wii was 7.9 ± 2 and 88% of subjects said they would like to use it in future treatment with 67% reporting more enjoyment and motivation than usual exercises. No falls were recorded during testing. Reported levels of immersion in the virtual environment varied across exercises.

Conclusions: This study has quantified the usability of the Nintendo Wii Fit Plus[®] as a treatment for balance impairment due to neurological disease showing high levels of usability and enjoyment. Future work will investigate the effect of Nintendo Wii Fit based balance rehabilitation.

Implications: This study aims to inform future research in the area of balance rehabilitation using the Nintendo Wii Fit Plus[®]. The results of this may assist physiotherapists in devising novel balance rehabilitation programmes, which provide patients with visual and auditory feedback on CoG placement. Use of the Nintendo Wii[®] in physiotherapy may help promote adherence to balance exercise programmes as the system has in this study shown to be interactive, motivational and enjoyable to neurological patients.

Keywords: Balance; Nintendo Wii[®]; Virtual reality

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Ethics approval: Ethical approval was obtained from the Beaumont Hospital Ethics Committee (Study 10/42) Dublin, Ireland.

Research Report Poster Display

Number: RR-PO-304-14-Thu Thursday 23 June 12:00

RAI: Exhibit Halls 2 & 3

INFLUENCE OF CHAIR HEIGHT IN THE PEAK TORQUE FORCES PRODUCED BY THE LOWER LIMB JOINTS DURING THE CHAIR RISE MOVEMENT

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Purpose: The main reason for this study was to analyze the influence of chair height on maximum peak torque forces (MPTF) produced by lower limb through three major joints: hip, knee and ankle when standing up.

Relevance: Standing up from a chair is a functional movement used every day. To have an idea how chair height influence the production of joints forces can be very useful for physiotherapists.

Participants: Eighty three subjects volunteered from a college community (students, employees and lecturers) and from a community of elderly people. All participants were functionally independent and able to walk without aids.

Methods: Participants were allocated in three different age groups: a YG (YG) from 18 to 30 years ($n = 30$), an AG (AG) from 31 to 61 years ($n = 30$) and an elderly group (EG) from 65 to 83 years ($n = 23$). All the participants rose from two chairs with 43 cm and 35 cm, with no arms support, feet on a force platform. The movement was video recorded, and the cinematic and dynamometric data were obtained by Apas and Acknowledge 3.8.2 softwares. Afterwards it was created a dynamic biomechanical model using OpenSim 2.0.2 software, and used an inverse dynamics method.

Analysis: Data were analyzed by the statistical software SPSS (version 17.0). After analyzing the normality distribution of the variables, t test for independent sample was used for comparisons between groups, and a t test paired was used for comparisons inside the groups. Statistical significance level was set at $\alpha = 0.05$.

Results: By reducing chair height in 8 cm there were a significant MPTF increase ($p < 0.05$) in all the joints in the YG and AG. Nevertheless in the EG there were only a significant MPTF increase in the hip and ankle joints. The MPTF pattern found in both heights for the three joints, by group was: YG produced major MPTF at hip joint, followed by knee and finally by ankle; AG and EG kept the hip as the joint with major MPTF followed by the ankle and at last the knee joint. In YG and EG female participants present significant major MPTF in all the joints ($p < 0.05$) than the males. Taking into account MPTF average produced in the three studied joints, when rising from a standard height chair (43 cm), each centimeter lower produces an increase in hip joint, knee and ankle MPTF respectively of 2.8 Nm (± 1.7), 1.4 Nm (± 1.0) and 0.6 Nm (± 0.6) in YG; AG increases hip joint knee and ankle MPTF respectively of 5.0 Nm (± 4.2), 2.4 Nm (± 2.5) and 2.8 Nm (± 3.0); EG increase in hip joint, knee and ankle MPTF respectively of 2.8 Nm (± 3.8), 0.7 Nm (± 2.7), 1.6 Nm (± 3.4).

Conclusions: Reducing chair height produces an increase in MPTF in lower limb joints in young and adult people. Elderly did not suffer any increase in knee joint.

Implications: The movement of rising from a chair is one of the most used in people's daily life, and knowing that lowering the seat level will increase forces in joints is impor-

tant for physiotherapists on exercise prescription and patient advisement.

Keywords: Rising from a chair; Peak torque forces; Lower limb

Funding acknowledgements: None.

Ethics approval: Ethical approval was obtained from the school ethics committee and all participants signed an individual informed consent.

Research Report Platform Presentation

Number: RR-PL-2903

Tuesday 21 June 10:45

RAI: Elicium D203-204

THE IMPACT OF A SPECIFIC, MODERATE AND SAFE HOME-BASED EXERCISE PROGRAMME ON FALL RISK FACTORS IN OLDER PORTUGUESE PEOPLE

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Purpose: The impetus for this study was that a high percentage of older Portuguese people are sedentary and therefore the aim of this study was to design, implement and assess a nine month home-based, moderate, specific exercise programme focusing on fall risk factors for Portuguese older people over the age of 65.

Relevance: There are multitude of falls prevention programmes reported in literature but evidence based specific exercise programmes focusing on fall risk factors are not well represented. The exercise programme designed for this study contained exercises that were easy to understand and perform, did not require equipment, were individually tailored and progressed and were specifically focused on fall risk factors.

Participants: Sixty healthy older people, between the ages 65 and 84 years, from a Portuguese health centre volunteered to participate in the study. The participants were functionally independent in the community, and able to walk without aids.

Methods: Participants were randomly allocated into two groups by permuted blocks: the intervention ($n=26$) and the control group ($n=34$). The intervention group undertook an exercise programme for nine months and the control group continued their normal activities. Sit to stand (STS) was used to measure lower limb strength, timed up and go test (TUG) for balance and gait mobility, forward reach test (FRT) and lateral reach test (LRT) for balance, voluntary stepping test (VST) for the time taken to perform a fast voluntary step in all directions, active dorsi and plantar flexion for range of movement (AROM), and thoracic curve measurements for posture of the spine. All the measures were taken before the

start of the programme and at three and nine months from the start in both groups.

Analysis: Analysis of the effects of the programme involved the GLM approach to repeated measures analysis of variance (SPSS 17.0 version), with time as a within subject factor (baseline, 3 and 9 months) and the group as a between-subject fixed factor (intervention and control). For three comparisons the significance level was adjusted with a $p < 0.016$.

Results: After three months of exercise the intervention group showed statistically significant improvements ($p < 0.01$) in STS, FRF and VST in all directions when compared with the control group. After nine months of exercise, improvement had also been achieved in TUG ($p < 0.002$), LRT ($p < 0.0001$), AROM of both ankles (< 0.02). The programme had no statistically significant influence on reducing thoracic kyphosis. Three months after the start of the programme there was a 79% adherence rate and at nine months the adherence was 74%.

Conclusions: A specific home-based exercise programme for older people, that was easy to administer could improve ankle flexibility, lower limb strength, balance, time of voluntary stepping, all of which are considered fall risk factors.

Implications: The outcomes showed that a moderate intensity exercise programme was effective in producing positive changes, being important for physiotherapists as traditionally it is believed that they should use high intensity resistive exercises often requiring equipment.

Keywords: Home-based; Specific exercise programme; Older people

Funding acknowledgements: None.

Ethics approval: Ethical approval was obtained from the health centre ethics committee and all participants signed an individual informed consent.

Research Report Poster Display

Number: RR-PO-208-1-Thu Thursday 23 June 13:00

RAI: Exhibit Halls 2 & 3

FUNCTIONAL GAIT TEST: A NOVEL TEST FOR ASSESSING GAIT PERFORMANCE DURING MULTIPLE TASKS

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Purpose: The aim of this study was to analyze results following the application of a novel test for assessing gait under multiple-task conditions, comparing performance of young adults, healthy elderly, and Parkinson's Disease (PD) patients.

Relevance: This dependency on attention in gait control tends to increase during the aging process. Consequently,