



Benefits of a virtual environment program at the level of functional physical fitness in non-institutionalized elderly

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ABSTRACT

Introduction: The ankle sprain is one of the most prevalent traumatic injuries in sport, associated with a significant risk of developing Chronic Ankle Instability (CAI) [1,2]. This condition involves postural control deregulation expressed in feedback and feedforward mechanisms and stiffness as a consequence of incorrect or ineffective sensorial input that compromise the ankle joint stability [3]. This study aims to analyse the functional stiffness and postural stability in single leg stance on an unstable surface with dual tasking subjects with CAI.

Material and methods: A cross sectional study was performed with a sample of 28 athletes of modalities of increased risk for ankle sprain. Participants were divided into two groups according to the presence ($n=14$ (11 with mechanical ankle instability; 8 with CAI in the non-dominant limb), age 22.0 ± 2.225 years) or absence of unilateral CAI ($n=14$, age 22.5 ± 1.75 years) identified through the Ankle Instability Instrument and the Foot and Ankle Outcome Score. The ground reaction forces, and centre of pressure (CoP) were assessed during dominant and non-dominant single leg stance during 30 sec on an unstable surface while the participants performed the Stroop test. The measures of CoP displacement, root mean square (RMS), standard deviation, velocity and area and functional stiffness were assessed through the data obtained by a force plate. Functional stiffness was assessed through the relation between the moment of force and the angular position of the ankle according to the method proposed by Winter [4]. This study was approved by the School of Health's Ethical Committee and was performed in a research centre.

Results: The CAI group showed an increase in the functional stiffness for mediolateral direction in the lesioned limb when this limb was the dominant one ($U=1.000$; $p=.001$) but also when this limb was the non dominant one ($U=15.000$; $p=.033$) and in the contralesional dominant limb ($U=7.000$; $p=.004$). An increase in the RMS in the antero-posterior direction was observed in the lesioned limb ($U=13.000$; $p=.017$), and a decrease in the CoP displacement in the non lesioned limb ($U=25.000$; $p=.034$), in comparison to the control group but only when these limbs were dominant.

Discussion and conclusion: Subjects with CAI seem to present increased bilateral functional stiffness as a possible strategy to increase postural stability in single leg stance, however stiffness assessments based on kinematics should be performed to confirm these findings. Rehabilitation should consider strategies to promote more efficient bilateral postural control mechanisms in subjects with chronic ankle instability.

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Benefits of a virtual environment program at the level of functional physical fitness in non-institutionalized elderly

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ABSTRACT

Introduction: Balance is one of the main concerns in the elderly population since there is a decline in the somatosensory system functions which may lead to a high probability of falling [1]. The risk of falling is one of the main problems

among the elderly population due to its multifactorial causes [2]. One strategy to promote greater adherence and motivation to intervention in Physical Therapy is the use of virtual environment programs. This associated with a balance exercise program is an effective method for preventing falls, because it improves balance levels [3]. The purpose of this study is to analyse the benefit of a virtual environment exercise program in non-institutionalized elderly at the end of six weeks.

Materials and methods: In this randomised controlled trial 68 non-institutionalized elderly from a day care institution in Corroios, were included. Thirty two subjects, age 80.6 ± 7.0 yrs constituted the experimental group (EG); and 36, age, 81.7 ± 7.1 yrs constituted the control group (CG). The EG was submitted to 6 weeks of a virtual environment exercise program performed on a Nintendo Wii, and to a set of recreational activities. The CG only performed the activities. The instruments used in the present study to evaluate performance were Tinetti's index which evaluates the static balance and the gait to quantify the risk of fall, and the Fullerton's functional fitness tests to assess physical parameters such as strength, aerobic endurance, flexibility and agility/balance [4]. All subjects sign an informed consent. This study follows all the principles of the Declaration of Helsinki.

Results: At the end of the 6 weeks of intervention in a virtual environment, significant improvements in upper limb strength, agility and static balance were observed. In the intragroup comparison, it was possible to verify improvements in all tests of the battery of physical fitness. The values of the functional fitness test were significantly different ($p < .05$) between EG and CG groups for the following variables: 30-second chair stand 14.4 ± 2.5 vs. 10.0 ± 3.4 times ($p = .037$); arm curl 16.1 ± 3.9 vs. 13.5 ± 5.9 times ($p = .041$); 8-foot up-and-go 9.2 ± 2.1 vs. 15.3 ± 6.6 sec ($p = .021$); two min. step 120.0 ± 35.8 vs. 75.3 ± 38.4 steps ($p = .016$), respectively; as well as for the Tinetti index.

Discussion and conclusions: Performing an exercise program through a virtual environment with biofeedback can provide several benefits in the elderly population due to the provision of instant feedback. Studies suggest that an exercise program with virtual environment may be an effective tool to improve balance levels and specific components of physical fitness, such as aerobic capacity, speed, agility, muscle strength and flexibility [5], which was verified in this study.

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Benefits of condylar distraction in patients with temporomandibular dysfunction

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ABSTRACT

Introduction: Temporomandibular disorders (TMD) are considered as a heterogeneous group of psychophysiological disorders of the stomatognathic system [1]. They are frequently initiated by pain, joint sounds and limited function/mandibular movement, being considered one of the main cause of orofacial pain of non-dental origin [2]. Among the TMD of articular origin, disc displacements with and without reduction, osteoarthritis and osteoarthritis are the most frequent alterations in patients [3]. Conservative and non-invasive treatment is considered as the first choice [4] and physical therapy is indicated as one of the most frequently recommended types of treatment [5]. The objective of the present study is to analyse the effects of the condylar distraction technique after four weeks of intervention regarding pain, joint noises and amplitude of mouth opening.

Materials and methods: A prospective, quasi-experimental study, was performed. We include 16 patients with a diagnosis of temporomandibular joint dysfunction according to the Research Diagnostic Criteria for temporomandibular