Primerjava učinkov vadbe za ravnotežje na ravnotežni deski in pritiskovni plošči Gamma pri pacientih s kronično bolečino v križu

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Uvod: Ravnotežje je sposobnost vzdrževanja težišča nad podporno ploskvijo znotraj meja stabilnosti (1). Za izvedbo funkcijskih dejavnosti je potrebno statično in dinamično ravnotežje. Pri pacientih z bolečino v križu lahko pride do spremembe pri nadzoru drže in ravnotežja (2), zato bi morala biti vadba za ravnotežje sestavni del programa fizioterapije. Za vadbo ravnotežja obstajajo številni pripomočki in različne naprave, ki vključujejo uporabo videoiger (3). Uporaba videoiger se je izkazala za učinkovito zaradi večje motivacije pri vadbi (4). Namen raziskave je bil primerjati vadbo ravnotežja na klasični ravnotežni deski z vadbo na pritiskovni plošči Gamma (angl. Gamma dinamographic platform) z uporabo videoigre pri osebah s kronično bolečino v križu. **Metode:** Sodelovalo je 13 preiskovancev s kronično bolečino v križu (4 moški, 9 žensk). Vključeni so bili v standardni program, ki je obsegal hidroterapijo, skupinske ali individualne vaje in protibolečinsko elektroterapijo. Preiskovanci so bili naključno razdeljeni v 2 skupini. Prva skupina (skupina RD) je dodatno izvajala vadbo na ravnotežni deski, druga pa na sistemu Gamma (skupina GS). Vsi so vadbo na ravnotežnih podlogah izvajali prvič. Posamezna vadba je pri obeh skupinah trajala enako: 5 minut vadbe, 5 minut počitka, 5 minut vadbe. Potekala je 10 dni. Na ravnotežni deski so preiskovanci izvajali sonožno stojo, prenos teže lateralno in prenos teže naprej-nazaj. Na sistemu Gamma smo uporabili dve igri – sortiranje in kotaljenje žoge. Pred začetkom in po obdobju vadbe sta bila narejena test funkcijskega dosega (FD) in test stoje na eni nogi (levi in desni). **Rezultati:** Program je končalo 11 preiskovancev. Povprečna starost v skupini RD je bila 54,2 ± 15,5 leta, v skupini GS pa 57,2 ± 11,7 leta. Pri skupini RD se je FD po vadbi statistično značilno izboljšal ($p < 0,05$) za 5,8 cm (z 20,2 ± 9,5 cm na 26 ± 7,4 cm), pri skupini GS pa ne (za 1,5 cm, s 30,5 ± 4,4 cm na 32 ± 4,6cm), vendar križna primerjava z 2-ANOVA ni pokazala razlike v izboljšanju med skupinama ($p = 0,1257$). Pri testu stoje na eni nogi pri nobeni izmed skupin ni bilo ugotovljene statistično značilne razlike med vrednostmi pred vadbo in po njej. Prav tako ni bilo ugotovljenih razlik v izboljšanju med skupinama. **Zaključki:** Z raziskavo nismo ugotovili razlik v vadbi. Vadba na sistemu Gamma z uporabo enostavnih videoiger je bila zanimiva predvsem za starejše. Vzrok za slabšo učinkovitost sistema Gamma bi lahko bil pomanjkanje težavnostnih stopenj. O učinkovitosti sistema za zdaj ni dostopnih raziskav. Vadba na ravnotežni deski je bila za preiskovance precej zahtevna. Omogoča veliko možnosti za napredovanje vadbe in je lahko dostopna. Za ugotovitev morebitnih razlik bi bile potrebne nadaljnje raziskave na večjem številu preiskovancev.

Ključne besede: vadba ravnotežja, ravnotežna deska, sistem Gamma, videoigre, motivacija.

Comparison of the effects of exercise on balance on wobble board and Gamma dynamographic platform in subjects with chronic low back pain

Background: Balance is the ability to maintain the center of gravity over the support surface within the limits of stability (1). Static and dynamic balance is necessary for execution of functional activity. In subjects with low back pain there may be a change in the control of posture and balance (2), so training for balance should be a part of each physiotherapy program. There are many accessories and a variety of devices available for balance exercise, including the use of video games (3). The use of video games has proven to be effective for increasing motivation to exercise (4). The purpose of this study was to compare balance exercise on classical wobble boards with exercise on Gamma dynamographic platforms using video games in subjects with chronic low back pain. **Methods:** 13 subjects with chronic low back pain (4 men, 9 women) participated in this research. They were included in the standard program, which included hydrotherapy, group or individual exercises and pain electrotherapy. Subjects were randomly divided into 2 groups. The first group (RD group) had additional training on the wobble board, the other group on the Gamma dynamographic system (GS group). They were all training on balance devices for the first time. The duration of each session was the same for both groups: 5 min. exercise, 5 min. rest, 5 min. exercise. The program lasted 10 days. On the wobble board subjects performed standing on both legs with weight transfers laterally and weight transfers backwards and forwards. In the Gamma system two games were used - sorting and rolling balls. Before the beginning and at the end of the training functional reach tests (FD) and tests standing on one leg (left and right) were made. **Results:** The program was completed by 11 subjects. The average age in the RD group was 54.2 ± 15.5 years, in the GS group 57.2 ± 11.7 years. In the RD group the FD after training significantly improved ($p < 0.05$) by 5.8 cm (from 20.2 ± 9.5 cm to 26 ± 7.4 cm), while in the GS group it did not improved significantly (1.5 cm, 30.5 ± 4.4 cm to 32 ± 4.6 cm). Cross comparison with the 2-ANOVA showed no difference in improvement between the two groups ($p = 0.1257$). In the tests standing on one leg the differences between the values before and after training were not found to be statistically significant in any of the groups. There was also no observed difference in improvement between the groups. **Conclusions**: This study did not find differences in the results based on the type of training. Training on the Gamma system with easy to use video games was interesting especially for the elderly. The reason for poor effectiveness on the Gamma system could be the lack of setting difficulty levels. Research of the effectiveness of the system is currently not available. Practicing on the wobble board was quite difficult for the subjects. It allows for many opportunities for advancement and training is easily accessible. Determining possible differences would require further research on a larger number of subjects.

Keywords: balance training, wobble board, Gamma dynamographic system, video games, motivation.

Literatura/References

1. Horak FB (1987). Clinical measurement of postural control in adults. Phys Ther 67(12): 1881–5.
2. Della Volpe R, Popa T, Ginanneschi F, Spidalieri R, Mazzochio R, Rossi A (2006). Changes in coordination of postural control during dynamic stance in chronic low back pain patients. Gait Posture 24(3): 349–55.
3. Szturm T, Betker AL, Moussavi Z, Dessai A, Goodman V (2011). Effect of an interactive computer game exercise regimen on balance impairment in frail community-dwelling older adults: a randomized controlled trial. Phys Ther 91(10): 1449–62.
4. Fitzgerald D, Trakarnratanakul N. Smyth B, Caulfield B (2010). Effect of a wobble board-based therapeutic exergaming system for balance training on dynamic postural stability and intrinsic motivation levels. J Ortop Sports Ther 40(1): 11–9.