

Diagnostika in fizioterapija pri pacientki z nestabilnostjo zgornje vratne hrbtenice – poročilo o primeru

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Uvod: Nestabilnost zgornje cervikalne hrbtenice se največkrat odkrije kot dodatna diagnoza v okviru skrbne preiskave vratne hrbtenice (1). Dejstvo odkritja nestabilnosti vsekakor pomembno vpliva na vrstni red in izbor metod terapije, ki zahteva obravnavo radikulopatije. Namen: Predstaviti fizioterapevtsko diagnostiko s testi stabilnosti vratne hrbtenice, testiranje prevodnosti vertebralne arterije (2), preiskavo mobilnosti živčevja (3) in obravnavo nestabilnosti vratne hrbtenice (4) ter mobilizacijo živčevja (5). **Metode:** Poročilo prikazuje primer preiskovanke, ki je prišla na obravnavo s simptomatiko radikulopatije C 7 (3) in z okcipitalnimi glavoboli. V preiskavi, v katero so bili vključeni testi hipermobilnosti zgornjih vratnih segmentov (1) in provokacijski test za vertebralno arterijo po De Klejnu ter preizkus po Hautantu (2), je bilo ugotovljeno, da dodatno trpi še za nestabilnostjo zgornje vratne hrbtenice. Na podlagi fizioterapevtske ocene in imobilizacije nevrologa so bile uporabljene te fizioterapevtske tehnike: mobilizacija medianega in ularnega živca (5) in terapevtske vaje za stabilizacijo vratne in prsne hrbtenice (4). **Rezultati:** Po sedmih obravnavaх je preiskovanka dobila dober občutek za pravilno stabilizacijo vratne hrbtenice pri aktivnostih vsakdanjega življenja. Mravljinčenje in bolečine, zaradi katerih je preiskovanka prišla v ambulanto, so se v poteku obravnave zmanjšali. Refleks mišice triceps brachii se ni opazno spremenil. Tudi zmanjšana mišična moč se je le nekoliko poboljšala. **Zaključek:** Ker stabilizacija vratne hrbtenice in obravnavo radikulopatije zahtevata dolgoročno terapijo, štejemo zaradi razmeroma naglega poboljšanja splošnega občutka (nočni spanec, glavoboli) in s tem kakovosti življenja fizioterapevtsko obravnavo kot uspešno.

Ključne besede: manualna terapija, mobilizacija živčevja, stabilizacija, vratna hrbtenica.

Diagnosis and physiotherapy of a patient with instability in upper cervical spine – a case report

Background: Instability of upper cervical spine is often detected as an additional diagnosis within a diligent examination of the cervical spine (1). The fact of having discovered instability certainly has a significant impact on the order and selection of methods and therapies required in the treatment of radiculopathy. Purpose: To present a physiotherapeutic diagnosis of cervical spine stability tests, a conductivity test of artery vertebralis (2), an investigation of mobility of the nervous system (3), including a treatment of cervical spine instability (4) and mobilization of the nervous system (5). **Methods:** The report shows an example of a woman patient who came to be treated for the symptoms of radiculopathy of C 7 (3) and occipital headaches. Investigation which included the tests of hyper mobility of the upper cervical segments (1) and provocation tests of the artery vertebralis according to De Kleijn and Hautant (2) revealed the existence of further suffering - the instability in the upper cervical spine. Based on physical therapy evaluation and immobilization by the neurologist the following physical therapy techniques were applied: mobilization of median and ulnar nerve (5) and medical training to stabilize the cervical and thoracic spine (4). **Results:** After seven treatments the patient got a good feeling for the proper stabilization of the cervical spine in her activities of daily living. The tingling and pain, which guided her to the health care, reduced in the course of treatment. M. triceps reflex did not significantly change and the decreased muscle strength also only slightly improved. **Conclusion:** Since the cervical spine stabilization and the treatment of radiculopathy requires a long-term therapy and the present physiotherapeutic treatment resulted in a relatively rapid improvement of general good health (sleep, headaches) and consequently in the quality of life, the therapy is considered to be successful.

Keywords: manual therapy, nerve mobilization, stabilization, cervical spine.

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Teoretične osnove in dokazi o učinkovitosti mobilizacije fascij

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Uvod: Ekstraartikularna bolečina, značilna za miofascialne bolečinske sindrome, se pogosto širi oziroma seli z enega dela telesa na drugega (1). Nov postopek v manualni terapiji je mobilizacija fascij. Njen namen je ponovna vzpostavitev fizioloških biomehanskih pogojev za delovanje mišično-skeletnega sistema. Z globoko frikcijsko masažo naj bi se vzpostavilo drsenje med različnimi plastmi fascij ter med fascijami in drugimi tkivi (2). To naj bi omogočilo fiziološko delovanje mehanoreceptorjev, zmanjšano draženje nociceptorjev in posledično vplivalo na izboljšanje gibanja (3). Namen: Predstaviti teoretične osnove in dokaze o učinkovitosti mobilizacije fascij. **Metode:** Narejen je bil pregled literature v angleškem jeziku, neodvisno od leta objave. **Rezultati:** Večina raziskav je preučevala anatomijo in fiziologijo fascij. Dokazi o učinkih postopka mobilizacije fascij so redki. Pri pacientih s patelarno tendinopatijo (n = 18) je bilo ugotovljeno značilno zmanjšanje bolečine takoj po terapiji, ki je pri ponovnem testiranju ostala nespremenjena ali se je dodatno zmanjšala (4). Pri pacientih s kronično bolečino v rami (n = 28) so avtorji ugotovili, da bi ta postopek lahko bil učinkovit za zmanjšanje bolečine (5). Pri pacientih z zvinom gležnja (n = 25) se je po terapiji značilno izboljšalo ravnotežje, kar se je ohranilo pri ponovnem testiranju (6). V raziskavi z naključno izbrano kontrolno skupino pri pacientih s subakutno nihajno poškodbo vratne hrbtenice (n = 18) je bilo ugotovljeno značilno večje izboljšanje obsega aktivne gibljivosti v skupini z mobilizacijo fascij kot v skupini s standardno obravnavo (kinezioterapija, sklepna mobilizacija) (7). **Zaključki:** Mobilizacija fascij je obetajoč fizioterapevtski postopek, vendar je za potrditev učinkovitosti potrebnih več raziskav. Prav tako je treba pojasniti mehanizme delovanja tega postopka.

Ključne besede: miofascialna bolečina, anatomija fascij, manualna terapija.

Theoretical backgrounds and effectiveness of fascial mobilization

Background: Extraarticular pain typical for myofascial pain syndromes is often irradiating or moving from one body segment to the other (1). Fascial mobilization is a new therapeutic procedure in manual therapy. Its aim is to reestablish physiological biomechanical conditions for optimal function of musculoskeletal system. By means of the technique similar to deep friction massage, the gliding between the layers of the fascia and fascia and other tissues is restored. This should enable physiological function of mechanoreceptors, inhibit the nociceptors and lead to effective movement (3). Purpose: To present theoretical basis and evidence based effectiveness of fascial mobilization. **Methods:** Review of English literature, regardless to the year of publishing. **Results:** The most research was dedicated to the anatomy and physiology of fascia. The evidences of the effectiveness of the technique were only a few. In patients with patellar tendinopathy (n=18), significant pain relief was documented immediately after the therapy which even improved in the follow up (4). In patients with chronic shoulder pain (n= 28) the authors found out that fascial mobilization could be effective treatment for pain relief (5). In patients with ankle sprain (n=25) the balance improvement was observed and it remained so also in follow up (6). The research with randomly selected control group which observed the patients with subacute whiplash injury of the cervical spine (n=18) reports significant improvement of the active range of motion in the group treated with fascial mobilization in comparison to the group treated with standard procedure (kinesiotherapy, joint mobilization) (7). **Conclusions:** Fascial mobilization is a promising therapeutic procedure. To confirm its effectiveness more studies are needed.

Keywords: myofascial pain, fascial anatomy, manual therapy.

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Manualna terapija in drugi fizioterapevtski postopki na področju glave

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Uvod: Fizioterapevti skrbimo za vzpostavljanje, vzdrževanje in krepitev zdravja in funkcionalnosti gibalnega sistema pri ljudeh. Večina se ukvarja z udi in trupom. H gibalnemu sistemu spada tudi glava, sicer le z eno premično kostjo, a z veliko mišicami in patološkimi stanji (1, 2). Namen prispevka je pregled najpogostejših okvar gibalnega sistema na področju glave in fizioterapevtskih postopkov za njihovo odpravljanje. **Metode:** Narejen je bil pregled strokovne literature, predvsem s področja manualne terapije. Pregledana so patološka stanja na glavi oziroma težave, ki se na glavi izražajo kot prenesena bolečina. Zaradi obširnosti so predstavljeni le največkrat uporabljeni postopki fizioterapije na področju glave. To so mobilizacija fascij (3), terapevtska obravnava miofascialnih prožilnih točk (4, 5), sklepna mobilizacija (7), metoda Cyriax (8) in proprioceptivna nevrnomuskularna facilitacija (7). **Rezultati:** Za obravnavo čeljustnega sklepa ter mišic na glavi in sprednjem delu vratu je veliko primernih tehnik manualne terapije in kinezioterapije, ki ponujajo dobre rezultate. Večina tehnik ima specifične teste, s katerimi se ocenjuje predvsem kakovost izvedenih gibov oziroma se ugotavlja simetrija mišične kontrakcije ali simetrija sklepnega gibanja. Pri čeljustnem sklepu so postopki usmerjeni v mobilizacijo sklepa, mišične tehnike pa večinoma v relaksacijo oziroma okrepitev za ponovno pridobitev simetrije. V vseh primerih je potrebna aktivna udeležba pacientov pri zdravljenju, ki obsega izvajanje vaj in terapijo doma. Z aktivno udeležbo pacienti tudi prevzamejo odgovornost za svoje zdravje. **Zaključki:** Za celovit pristop obravnave pacientov je treba obravnavati tudi glavo. Večina terapevtskih postopkov zahteva dodatno učenje, širino znanja in individualni, celostni pristop k pacientu. Dobra fizioterapija ni terapija le dela telesa. Že Hipokrat je navajal: »Delu nikoli ne more biti dobro, če celoti ni dobro.«

Ključne besede: glava, manualna terapija, fizioterapija, čeljustni sklep, bolečina.

Manual therapy and other physiotherapeutic methods on region of the head

Background: The purpose of physiotherapy is to maintain, regain and improve health and functionality of human locomotion system. Most physiotherapists perform their work on trunk and extremities and not on head region that also belongs to the locomotion system. It truly has only one mobile joint, but also a lot of muscles and a lot of pathological conditions (1, 2). The aim of the present study is to describe the most common head pathologies and physiotherapeutic methods of diminishing them. **Methods:** The source was professional literature on manual therapy. The main emphasis was given to pathological circumstances and conditions on the head itself and on the head as a referred pain. Due to so many methods, only the most common ones are described. Those methods are fascial mobilization (3), miofascial techniques (4, 5), joint mobilization (6), Cyriax method (7) and proprioceptive neuromuscular facilitation (8). **Results:** There are a lot of good manual and kinesio therapeutic techniques for temporomandibular joint, head muscles and muscles on the frontal side of the neck. Most of them have their own tests for movement evaluation, mostly for quality of movement and symmetry of muscles contraction. In the treatment of temporomandibular joint there are mainly mobilization techniques and in muscles pathology relaxing techniques or techniques of improving muscle strength and regaining muscle symmetry. Patient's activities at home, such as exercises and home therapy are expected. The role of an active patient is an important factor of its own health responsibility. **Conclusions:** Considering holistic approach, the therapy of head is necessary to be a part of physiotherapy. Most methods can be learned in additional courses and require widespread knowledge and individual approach to a patient. Good physiotherapy is not only a therapy of a certain part of the body. Hippocrates said: »A Part can never be well unless the whole is well«.

Keywords: head, manual therapy, physiotherapy, temporomandibular joint, pain.

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Znanstveno dokazan pristop vadbe za obravnavo skolioz

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Uvod: Znanstveno dokazan pristop vadbe za obravnavo skolioz (angl. Scientific Exercise Approach to Scoliosis - SEAS) izhaja iz lyonske šole (1). Glavne značilnosti obravnave so: izboljšanje pacientovega zavedanja o deformaciji hrbtenice, aktivna samopoprava drže, izboljšanje stabilnosti hrbtenice, vključevanje aktivne samopoprave drže v stabilizacijske vaje, ki vključujejo nevro-motorično kontrolo, proprioceptivni trening in vaje za ravnotežje ter izvajanje posebnih vaj za skoliozo v stezniku, pri čemer se steznik uporabi kot vadbena orodje (2). Aktivna samopoprava drže v treh prostorskih ravninah je najpomembnejši del individualne obravnave. Prva stopnja učenja popravljanja drže se začne v frontalni ravnini. Obravnava obsega učenje zavedanja premika vrha krivine proti konkavni strani. V drugi stopnji sledi poprava drže v sagitalni ravnini. Pacient ponovno vzpostavi prsno kifoza in ledveno lordozo. Tretja stopnja je združevanje gibov iz frontalne in sagitalne ravnine. Izvajanje korekcijskih gibov v dveh ravninah sproži vključitev gibanja v tretji, transverzalni ravnini, v kateri pride do rotacije vretenc v nasprotno smer (3, 4). Pacient se mora naučiti, da med izvajanjem vaj vedno kontrolira pravilno izvedbo izbrane poprave drže. Pri tem mu pomagajo štiri standardna vprašanja, ki si jih zastavi med izvedbo giba: Ali je moja hrbtenica vzravnana? Ali je moje telo po izvedbi poprave drže bolj simetrično kot prej? Ali sem sposoben zadržati popravljeno držo med izvajanjem vaje? Ali opazim, da se po izvedbi poprave drže moje telo vrne nazaj v položaj, v katerem je bilo pred izvedbo poprave? (2) Namen povzetka je predstaviti metodo SEAS. **Metode:** Preiskovanje na spletu dostopnih podatkovnih zbirk: Google, Google Scholar, PubMed, Scoliosisjournal. Kriterij za izbiro članka so bili prispevki o metodi SEAS, objavljeni v angleškem jeziku. **Rezultati in zaključki:** Metoda SEAS se od drugih pristopov razlikuje v tem, da pri oblikovanju terapevtskega programa upošteva in daje popolna pozornost pacientu in posebnostim njegovih skoliotičnih krivin. Program vaj se spreminja glede na pacientovo sposobnost izvedbe vaj. SEAS je aktiven pristop, ki zahteva aktiviranje globokih mišic ob hrbtenici in deluje na načelu miselno-vedenjskega pristopa. Rezultati znanstvenih raziskav potrjujejo, da se z obravnavo po metodi SEAS zmanjša potreba po predpisu steznika, SEAS izboljša parametre skoliotičnih krivin, z obravnavo po SEAS-u se ponovno vzpostavi normalno ravnotežje in koordinacija telesa, aktivna poprava drže po načelu SEAS vpliva na zmanjšanje velikosti krivin na rentgenskih posnetkih, obravnava po SEAS-u izboljša rezultate terapije v primeru nošnje steznika, z vajami v stezniku, za povečanje prsne kifoze po metodi SEAS se najbolje izkoristi korekcijski pritisk steznika na krivino. Številni objavljeni članki o učinkih metode SEAS dokazujejo, da gre za z dokazi podprto metodo. Za pacienta je učenje temeljnih principov SEAS-a precej enostavno. Metoda se lahko uporabi pri obravnavi krivin vseh velikosti.

Ključne besede: SEAS, vaje za skoliozo, adolescentna idiopatska skolioza, vaje v stezniku, konservativna obravnava.

Scientific Exercise Approach to Scoliosis

Background: SEAS is an acronym for Scientific Exercise Approach to Scoliosis and originates from the Lyon approach where a number of the basic characteristics to the approach had been developed (1). This includes: improving the patient's awareness of their deformity, active self-correction (ASC), improvement of the spinal stability, associating ASC with stabilizing exercises, that include neuro-motor control, proprioceptive training and balance, the performance of in-brace scoliosis specific exercises using the brace as a training tool (3). Active Self-Correction on the three spatial planes is the most important individualized therapeutic moment. The first phase includes becoming aware of curve apex translation toward concavity on the frontal plane. The second phase includes becoming aware of correction of the sagittal plane. The patient must ensure thoracic kyphosis and lumbar lordosis. The third phase is associating ASC movements of the frontal and sagittal planes. An action done on two spinal planes causes an involvement of the third plane, transversal where the cross-sectional derotation occurs (3, 4). During the performance of the exercise, the patient is asked to always verify the correct maintenance of the selected self-correction. In order to facilitate this control the patient uses a series of standard questions that they ask themselves during the treatment. These questions are: Is my spine supported? Is my body now more symmetrical than before? Whilst doing the exercise am I able to maintain the correction? Am I able to see that my body returns back to the original position it was before performing the self-correction? (2) The main object of the summary is to present the SEAS method. **Methods:** Findings published in English language in the following bibliographic databases were summarised: Google, Google Scholar, PubMed, Scoliosisjournal. The criteria for choosing the articles were articles about SEAS in English. **Results and Conclusions:** Strength of the SEAS approach is in the absolute attention and consideration of the patient's individual characteristics for the design of the treatment program. Exercise program changes according to patient's ability to perform the exercises. SEAS is the active intrinsic approach that works on the principals of a cognitive-behavioral approach. Scientific results of SEAS proves that SEAS treatment reduces the need for bracing, SEAS treatment improves scoliosis parameters, SEAS treatment normalizes balance and coordination in scoliosis patients, ASC according to SEAS principles reduces the radiographic curve, SEAS treatment improve results in case of bracing, SEAS kyphotisation exercises is the most useful to help bracing push work. A lot of published articles about the results obtained with SEAS prove that this is an evidence-based approach. From the patient point of view it is relatively simple way to accomplish the basic principles of the SEAS. SEAS can be used for treatment of all size curves.

Keywords: SEAS, exercises for scoliosis, adolescent idiopathic scoliosis, scoliosis in-brace exercises, conservative treatment.

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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 stoji, 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 stoji na eni nogi (levi in desni). **Rezultati:** Program je končalo 11 preiskovancev. Povprečna starost v skupini RD je bila $54,2 \pm 15,5$ leta, v skupini GS pa $57,2 \pm 11,7$ leta. Pri skupini RD se je FD po vadbi statistično značilno izboljšal ($p < 0,05$) za 5,8 cm (z $20,2 \pm 9,5$ cm na $26 \pm 7,4$ cm), pri skupini GS pa ne (za 1,5 cm, s $30,5 \pm 4,4$ cm na $32 \pm 4,6$ cm), vendar križna primerjava z 2-ANOVA ni pokazala razlike v izboljšanju med skupinama ($p = 0,1257$). Pri testu stoji 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.

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