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Ocena czynników wpływających na skuteczność terapii integracji sensorycznej u dzieci w wieku przedszkolnym i wczesnoszkolnym

Assessment of factors influencing the effectiveness of sensory integration therapy in preschool and early school-aged children

Praca fizjoterapeuty z osobami niepełnosprawnymi intelektualnie

Physiotherapist's work with intellectually disabled individuals

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Effects of structured exercise program on severity of dizziness, kinesiophobia, balance, quality of sleep, activities of daily living and quality of life in bilateral vestibular hypofunction: case study

Wpływ zorganizowanego programu ćwiczeń na nasilenie zawrotów głowy, kinestofobię, równowagę, jakość snu, czynności życia codziennego oraz jakość życia w przypadku obustronnego niedomagania przedsionkowego: Studium przypadku

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Abstract

Background and Purpose. The vestibular rehabilitation is an exercise-based method, aiming to maximize central nervous system(CNS) compensation at vestibular nuclear and other CNS levels for vestibular pathology. A minimal number of studies have documented the impact of Vestibular rehabilitation on the recovery rate of patients with Bilateral Vestibular Hypofunction(BVH). The purpose of this study was to investigate the effectiveness of structured vestibular rehabilitation (VR) programs on severity of dizziness, kinesiophobia, balance, quality of sleep, activities of daily living(ADL) and quality of life(QoL) in subjects with chronic BVH.

Case Description. Three participants diagnosed with BVH who suffered from severity of dizziness, kinesiophobia, balance, quality of sleep, ADL and QoL were included in the study.

Intervention. A structured VR program was applied in 50-minute sessions once a week and as a home exercise program 3 days a week over 8 weeks.

Outcomes. Participants were evaluated for severity of dizziness with the Visual Analog Scale (VAS), for kinesiophobia with the Tampa Scale of Kinesiophobia (TSK), for balance with the Semitandem, tandem, and standing tests, for quality of sleep with the Pittsburgh Sleep Quality Index (PSQI), for ADL with the Vestibular Disorders Activities of Daily Life (VADL) and for QoL with Dizziness Handicap Inventory (DHI) at the baseline (T0), at 4th week (T1), 8th week (T2), and 20th week (T3) after study started.

Conclusion. In conclusion, a twelve-week structured VR program may enhance severity of dizziness, kinesiophobia, balance, quality of sleep, ADL and QoL in participants with chronic BVH.

Keywords

bilateral vestibular hypofunction, dizziness, kinesiophobia, balance, Quality of Sleep, Quality Of Life

Streszczenie

Tło i Cel. Rehabilitacja przedsionkowa to metoda oparta na ćwiczeniach, mająca na celu maksymalizację kompensacji przez centralny układ nerwowy (CUN) na poziomie jąder przedsionkowych i innych poziomach CUN dla patologii przedsionkowej. Minimalna liczba badań udokumentowała wpływ rehabilitacji przedsionkowej na szybkość powrotu do zdrowia pacjentów z obustronnym niedomaganiem przedsionkowym (BVH). Celem tego badania było zbadanie skuteczności zorganizowanych programów rehabilitacji przedsionkowej (VR) na nasilenie zawrotów głowy, kinestofobię, równowagę, jakość snu, codzienne czynności życiowe (ADL) oraz jakość życia (QoL) u osób z przewlekłym BVH.

Opis przypadku. W badaniu wzięło udział trzech uczestników zdiagnozowanych z BVH, cierpiących na nasilone zawroty głowy, kinestofobię, problemy z równowagą, jakość snu, ADL oraz QoL.

Interwencja. Zastosowano zorganizowany program VR w 50-minutowych sesjach raz w tygodniu oraz jako program ćwiczeń domowych 3 dni w tygodniu przez 8 tygodni.

Wyniki. Uczestnicy byli oceniani pod kątem nasilenia zawrotów głowy za pomocą Wizualnej Skali Analogowej (VAS), kinestofobii za pomocą Skali Kinestofobii Tampa (TSK), równowagi za pomocą testów półtandemowych, tandemowych i stojących, jakości snu za pomocą Indeksu Jakości Snu Pittsburgh (PSQI), ADL za pomocą Inwentarza Codziennych Czynności w Zaburzeniach Przedsionkowych (VADL) oraz QoL za pomocą Inwentarza Uciążliwości Zawrotów Głowy (DHI) na początku badania (T0), w 4. tygodniu (T1), 8. tygodniu (T2) i 20. tygodniu (T3) po rozpoczęciu badania.

Słowa kluczowe

obustronne niedomaganie przedsionkowe, zawroty głowy, kinestofobia, równowaga, Quality of Sleep, Quality Of Life

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Introduction

Bilateral Vestibular Hypofunction (BVH) is a disease characterized by peripheral abnormalities of the bilateral labyrinths or the eighth cranial nerve (vestibulocochlear nerve), causing decreased vestibulo-ocular reflex, oscillopsia, and instability [1].

Kinesiophobia, which is defined as the restriction of the patient's movements and activities, can be caused by a painful experience as well as dizziness. In addition, kinesiophobia can lead to social isolation [2]. VOR ensures gaze stability during head movement by producing eye movements equal and opposite to head movement. Chronic postural imbalance in posture and walking is one of the primary complaints of patients diagnosed with chronic BVH. In BVH, the effects on balance and ocular-motor areas also cause an increase in the risk of falling [3-5]. It has been established that the vestibular system can regulate REM sleep as a consequence. Patients with vestibular hypofunction reported to sleep for fewer hours, wake up more frequently, and have poorer quality of sleep [6]. Activities of Daily Living (ADL) and quality of life (QoL) considerably deteriorate as functions including postural control, gaze stabilization, and balance; this may result in social isolation [7, 8].

Zhao et al. emphasized the superiority of vestibular rehabilitation versus drug therapy in patients with BVH [13]. Vestibular hypofunction treatment includes vestibular rehabilitation, noisy galvanic vestibular stimulation, posturography training, virtual reality and instrumental rehabilitation [9, 10].

The purpose of this study was to investigate the effectiveness of a structured vestibular rehabilitation program on severity of dizziness, kinesiophobia, balance, quality of sleep and QoL in patients with chronic BVH.

Case descrıptıon

Case-1

A 40-year-old female patient diagnosed with BVH. The patient was 163 cm height, 58 kg weight and had no chronic disease. She was moderately physically active and did not use cigarettes, alcohol, or any medication. The patient went to the emergency twice because of dizziness attacks. The process led to sporadic increases in dizziness after initially experiencing mild vertigo at work. She described her dizziness as a feeling that her foot was slipping off the ground, followed by a feeling of lightheadedness. She complained about her inability to get regular sleep as well as the quality of sleep. She experienced poor balance when moving while her eyes were closed and felt the need to hold on to independent bathroom activities because of balance problems. She claimed that as a result of all these symptoms, she struggled at work and in her interpersonal relationships, and her QoL worsened.

Case-2

A 42-year-old female patient diagnosed with BVH. The patient was 152 cm height, 84 kg weight and had no chronic disease. She was mildly physically active and used cigarettes, and did not use alcohol or any medication. The patient's major complaint, dizziness, was so severe that it kept her from stepping out on her own. Dizziness was triggered in the narrow, dark, crowded and noisy environment. The patient claimed that when she went shopping, she ran into the shelves and was unable to maneuver the market by herself. The patient had difficulty in rapid head movements (eg, looking to the right and left while crossing the street), looking down (eg, while wearing shoes), looking up (eg, reaching for items on shelves) and climbing up to a high place, as dizziness was triggered. The patient needed to hold on while turning in the bed and getting up from the bed. She avoided physical activity and unnecessary movements, since she felt that if he exercised, her dizziness would worsen. She had a sleep disturbance.

Case- 3

A 62-year-old female patient diagnosed with BVH. The patient was 160 cm height, 76 kg weight and had no chronic disease. She was mildly physically active and did not use cigarettes, alcohol or any medication. The feeling of unsteadiness and dizziness was one of the patient's main complaints. She felt as though he was swaying while walking and had a balance difficulty. She needs to hold on when ascending and descending stairs. She claimed that he felt the ground slipping out from under him during the quick head movements. When her dizziness was provoked, she stated that it was difficult for her to bend over to pick something up off the ground or reach out on a shelf above head height. Dizziness was triggered in the narrow, dark, crowded and noisy environment. She avoided physical activity and unnecessary movements, since she felt that if he exercised, her dizziness would worsen.

Intervention

Participants were asked to continue their routine activities for the first 4 weeks. A structured vestibular rehabilitation program was applied to the patients with BVH for the second 4 weeks. A structured vestibular rehabilitation program was applied to the patients with BVH for the third 4 weeks and the program was continued at home via telerehabilitation for 8 weeks. The structured vestibular rehabilitation program was shown in Table 1.

Outcomes

Demographic information was taken from participants at the beginning of the study. Participants were evaluated for severity of dizziness with the Visual Analog Scale (VAS), for kinesiophobia with the Tampa Scale of Kinesiophobia (TSK), for balance with the Semitandem, Tandem, and Standing tests, for quality of sleep with the Pittsburgh Sleep Quality Index (PSQI), for ADL with the Vestibular Disorders Activities of Daily Life (VADL) and for quality of life with Dizziness Handicap Inventory (DHI) at the baseline (T0), at 4th week (T1), 8th week (T2), and 20th week (T3) after study started.

Case-1: The VAS score, which we used to evaluate the severity of dizziness, was 5 before the treatment and decreased to 2 after the treatment. The TSK score, which we used to evaluate kinesiophobia, was 42 before the treatment and decreased to 30 after the treatment. While the score of standing on one leg

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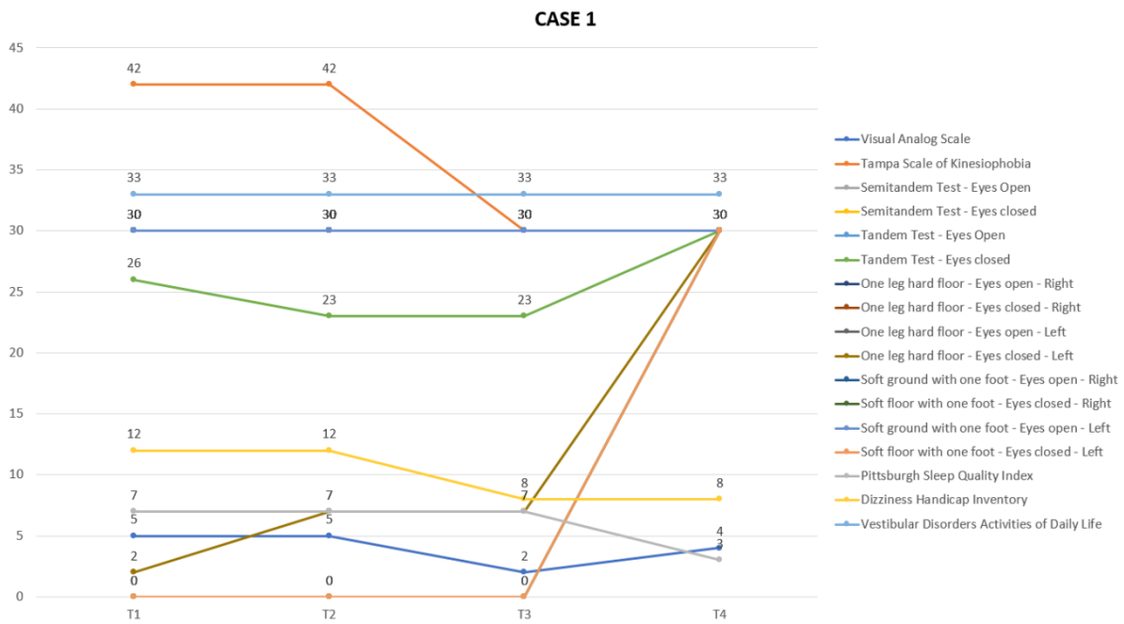
Table 1. Structured Vestibular Rehabilitation Program

	Definition	Exercises
Vestibular Adaptation Exercises	With repeated exposure to a stimulus, stimulus desensitization is targeted. It includes pursuit and saccadic eye movements, head movements, coordination tasks, whole body movements and exercises for balance.	-In standing feet together / semi tandem / tandem position, the finger is fixed and turning the head to the right-left / down-up while looking at the finger -While looking at the target, turning the head to the right-left, hands to the side / back, normal walking -Looking around, eyes closed, hands to sides/back, normal/backward walking -Standing feet together, turning head left and right - eyes closed
Oculo-Motor Exercises	Require visual fixation on a target during head movements. It includes pursuit and saccadic eye movements.	-Moving the head to the right-left / down-up while the finger is fixed in the sitting position and looking at the finger -Following the finger with the eye right-left / up-down in sitting position -Looking around, eyes closed, hands to sides/back, normal/backward walking
Static and Dynamic Balance Exercises Posture Exercises	The support area includes the support floor, arm position, and eye variables. It includes the neck, shoulder and back muscles.	-Hands crossed at side/back/shoulder, eyes open/closed, normal/backward gait -Crossed eyes open / closed normal / back-to-back walking -Standing on one leg with eyes open/closed on normal/soft ground -Four-way head movement in sitting/standing position -Shoulder mobilization -Strengthening the back extensors
Recommendations given on the first day of treatment	●You should minimize the intake of salt, tea, coffee ●You should limit the tea to 2-3 glasses a day and be careful not to drink coffee. ●You should take 1 mineral water a day. ●You should drink at least 1.5 liters of water daily. ●You should cut down/quit smoking. ●If you are deficient in B12, iron, vitamin D, you should take supplements.	

with eyes closed was 2 seconds on the right side and 2 seconds on the left side before the treatment, it was 30 seconds on the right and left sides after the treatment. The PSQI score, which we used to evaluate sleep quality, was 7 before the treatment and decreased to 3 after the treatment. The DHI score we used to evaluate dizziness was 12 before the treatment and decreased to 8 after the treatment. At the end of the treatment, the patient stated that she did not experience vertigo attacks during the treatment process, that she did not experience dizziness during sudden movements at work, and thus she was less stressed. In addition, she verbally reported that she observed an increase in her performance the next day because she slept well at night. The VADL score we used to determine the degree of independence was 33 before the treatment and did not change after the treatment (Figure 1).

Case-2: The VAS score, which we used to evaluate the severity of dizziness, was 4 before the treatment and decreased to 1 after the treatment. The TSK score, which we used to evaluate kinesiophobia, was 45 before the treatment and decreased to 23 after the treatment. While the tandem score was 30 seconds with eyes open and 5 seconds with eyes closed before treatment, it was 30 seconds with eyes open and 30 seconds



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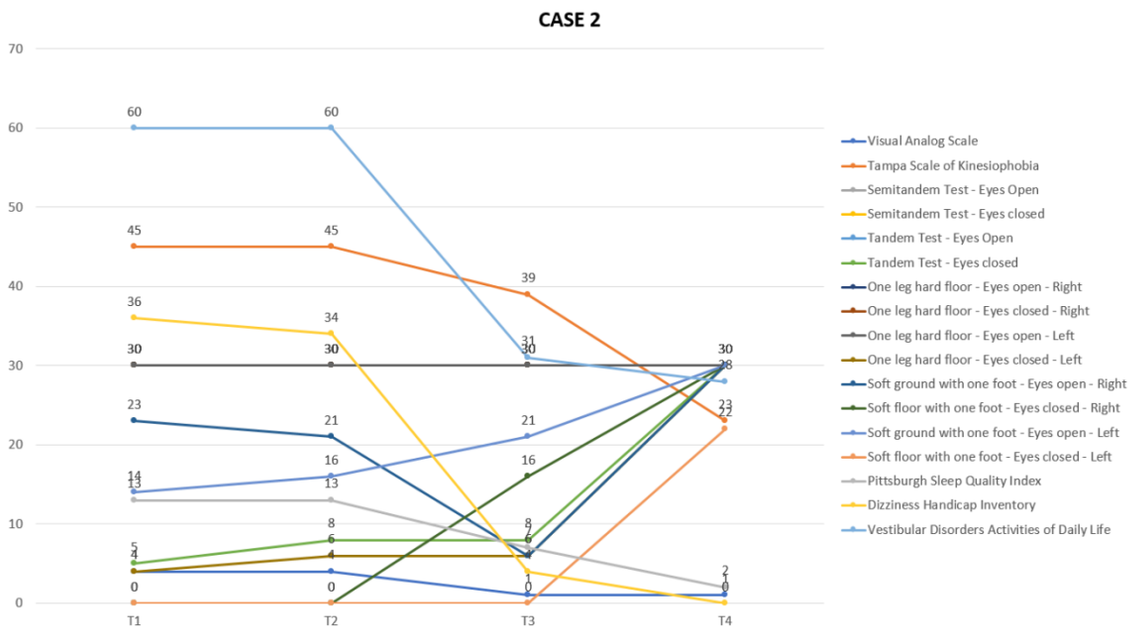
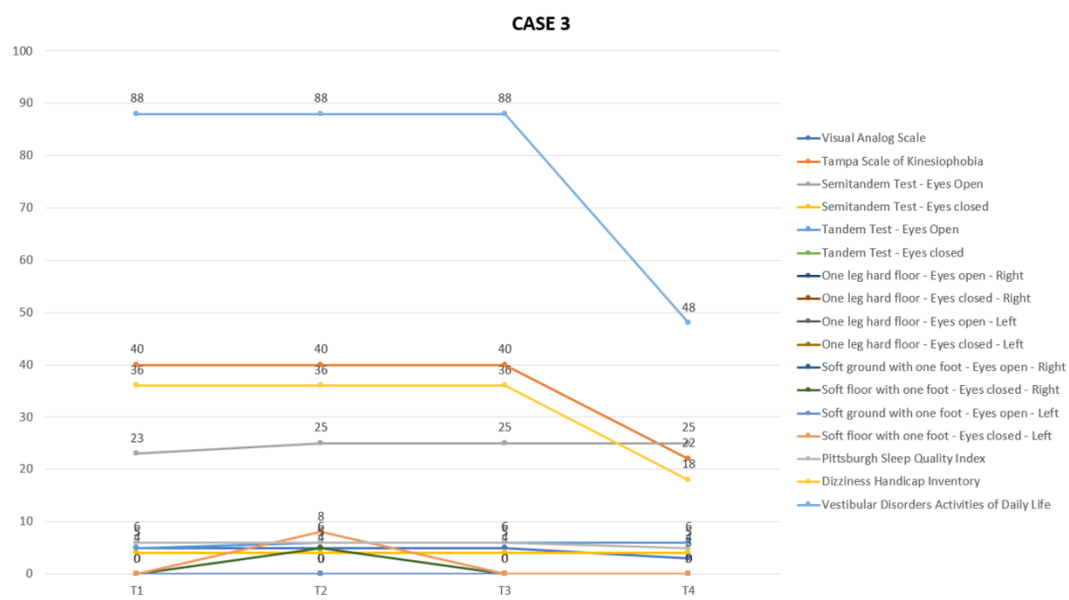
with eyes closed after treatment. While the score of standing on one leg with eyes closed was 4 seconds on the right and left sides before the treatment, it was 30 seconds on the right and left sides after the treatment. The PSQI score, which we used to evaluate sleep quality, was 13 before the treatment and decreased to 2 after the treatment. The DHI score we used to evaluate dizziness was 36 before the treatment and decreased to 4 after the treatment. The most important satisfaction of the patient was that while she could not go out alone before the treatment, she was able to go out independently after the treatment, due to the decrease in her kinesiophobia. The patient reported that her quality of sleep improved, that she felt better and that she felt less tired and more energetic during the day. The VADL score we used to determine the degree of independence was 60 before the treatment and decreased 28 after the treatment. (Figure 2).

Case-3: The VAS score, which we used to evaluate the severity of dizziness, was 5 before the treatment and decreased to 3 after the treatment. The TSK score, which we used to evaluate kinesiophobia, was 40 before the treatment and decreased to 22 after the treatment. The PSQI score, which we used to evaluate sleep quality, was 6 before the treatment and



decreased to 5 after the treatment. The DHI score we used to evaluate dizziness was 36 before the treatment and decreased to 18 after the treatment. The patient said that she could not do balance exercises regularly, so she did not feel any change in her balance. The patient reported that she was no longer afraid to move and could perform her ADL more comfortably. The VADL score we used to determine the degree of independence was 88 before the treatment and decreased 48 after the treatment (Figure 3).



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Dıscussıon

Although being one of the initial treatments that are thought of in BVH patients, pharmacological therapy has been shown to have no effect on physical functions. Vestibular rehabilitation, which has been shown to be beneficial in relieving symptoms including dizziness and balance problems, can only demonstrate its effectiveness when it is individualized for each patient [7]. Therefore, a structured vestibular rehabilitation program was applied in this study.

According to Maslovara et al., an 8-week vestibular rehabilitation program administered to BVH patients decreased the severity of the disease's symptoms and substantially enhanced the patients' functionality and level of activity participation [14]. In our study, it was observed that 12-week vestibular rehabilitation in BVH patients considerably enhanced QoL and ADL. We predict that the patients' dizziness and kinesiophobia complaints have been less severe, and that overall balance and quality of sleep have improved.

Limitations

One of the limitations of this study was that the physical activity levels of the subjects were not evaluated. Another limitation of the study was that although it is a scale directly related to BVH, we did not use the Visual Vertigo Analog Scale because it did not have Turkish validity and reliability.

Summary

In conclusion, a twelve-week structured vestibular rehabilitation program may enhance severity of dizziness, kinesiophobia, balance, quality of sleep, and QoL in participants with chronic BVH.

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