



Effects of Vestibular Adaptation Exercises during Vestibulopathy on Pain and Dizziness on old age patients

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ABSTRACT:

Background: Damage to one ear causes severe dizziness with imbalance and difficulty in focusing, this condition is known as vestibulopathy. Adaptation treatment targets at VOR (Vestibulo ocular reflex) and VSR which May occur with as little as 1-2 mins. The aim of the present study is to determine the effect of vestibular adaptation exercise in vestibulopathy. To check improvement in patient after giving the vestibular adaptation exercises in vestibulopathy and also to check whether there are significant effects of vestibular adaptation exercise in vestibulopathy.

Methodology: 30 subjects fulfilling the inclusion and exclusion criteria will be allowed to participate in the study. Knowledge regarding the disease condition was given to the patient. Explanation about the study procedure was given to the patient written consent form, assessment Performa and DHI scale was filled by the investigator 30 patient were divided into two group, namely control group and study group. In control group no exercises were given and were just observed for improvement. While in study group caw thorne Cooksey exercise was given. At the end of duration again VAS (Visual Analog Scale) and DHI (Dizziness Handicap Inventory) was taken to determine whether there is effect of vestibular exercise in such patient.

Results: In control group no significant difference was found whereas in the exercise group significant difference was found after the vestibular rehabilitation exercise protocol.

Conclusion(s): This study has shown that patient with vestibulopathy improves in VAS and DHI by vestibular adaptation exercise.

Keywords: Vestibulopathy, Cawthorne Cooksey, Vertigo

Introduction

The vestibular system is the region of the inner ear where the semicircular canals converge, close to the cochlea. The vestibular system works with the visual system to keep objects in focus when the head is moving. Joint and muscle receptors also are important in maintaining balance. The brain receives, interprets, and processes the information from these systems to control balance. The vestibular system of the inner ear is responsible for the sensations of balance and motion. It uses the

same kinds of fluids and detection cells (hair cells) as the cochlea uses, and sends information to the brain about the attitude, rotation, and linear motion of the head. The type of motion or attitude detected by a hair cell depends on its associated mechanical structures, such as the curved tube of a semicircular canal or the calcium carbonate crystals of the saccule and utricle. Neurons within the ear respond to simple tones, and the brain serves to process other increasingly complex sounds. An average adult is typically able to detect sounds ranging

between 20 and 20,000 Hz. The ability to detect higher pitch sounds decreases in older humans. The human ear has evolved with two basic tools to encode sound waves; each are separate in detecting high and low frequency sounds. Georg von Békésy (1899-1972) employed the use of a microscope in order to examine the basilar membrane located within the inner-ear of cadavers. He found that movement of the basilar membrane resembles that of a traveling wave; the shape of which varies based on the frequency of the pitch. In low frequency sounds, the tip (apex) of the membrane moves the most, while in high frequency sounds, the base of the membrane moves most. [1] Damage to one inner ear causes severe dizziness and can also cause imbalance and difficulty with focusing the eyes. Unilateral Vestibulopathy is the technical name for this problem; unilateral indicates that the process affects one ear, and vestibulopathy is a general term referring to disease of the vestibular system. The process can also be classified as acute, meaning that it came on abruptly; chronic, meaning that it has been present long-term, or progressive, indicating that function is being lost in steps over time. Some people also lose hearing as they lose balance function, or may have ringing in the ears (tinnitus) with their spells. The primary symptom of damage to the vestibular system of one ear is dizziness. This can range from an internal sensation of spinning to violent vertigo in which the environment is seen to whirl about. Feelings of tilting or elevator sensations can also occur. Often this spinning sensation is accompanied by nausea to the point of vomiting. When the spinning feeling is very fast, it may impair balance. There may be a tendency to drift to one side while walking, or to bump against the doorframe when attempting to pass through a door. When function in one ear is lost suddenly, the symptoms are worst during the first couple of days and gradually taper off over the next several weeks to months. If function is lost very slowly, there may be little dizziness or only mild spells. When there is progressive loss of function over time, usually repeated spells of vertigo will occur. Sometimes these will completely resolve in a few hours, and others will require a few weeks of recovery.

The longer the recovery period, the more severe the permanent damage is likely to be. The central vestibular system and the brain learn to adapt to the imbalanced signal coming in from the impaired peripheral vestibular sensory inputs. In case either one of the vestibular system is impaired, the two sensors is not in synchrony, the result is a sense of after motion with head movement and the VOR. [2] There are various forms of balance and vestibular exercise available. Non medical alternatives such as physical rehabilitation or vestibular exercise have been found useful in treating vestibular disorders including post labyrinthectomy, recurrent vestibulopathy chronic meniere disease and chronic vestibular disorders, vestibular exercise is a natural way to hasten the recovery. Patient will benefits from these exercise if it introduced early. The key mechanism involved in this mode of therapy is cerebral compensation early introduction of the vestibular exercise promotes rapid recovery from the vestibular symptoms. There are various benefits of vestibular exercise such as reducing symptoms of dizziness nausea and vomiting, there is increased postural control the individual has better balance control when walking standing or running, it helps the patient to accept the limitation they face and adapt accordingly, it stimulate and accelerate brain recovery and enhance balance, prevent or reduce accidents and falls with recovery of the vestibular function, reduces psychological adverse effects such as anxiety and panic faced by patient of chronic vestibular disorders, it improves quality of life and increase personal confidence level in performing activities of daily living. There are various forms of vestibular exercises like cawthorne Cooksey and customized cawthorne Cooksey, both exercises are effective in treating vestibular disorders. The customized cawthorne Cooksey exercise is found to be more effective in unilateral or bilateral vestibular disorders. Cawthorne Cooksey Exercises are one of the first general interventions for vestibular problems. These are a one page handout of activities that progress from simple head movement to complex activities such as throwing a ball. The major advantage of the Cawthorne-Cooksey exercises

is that they are very low cost and often effective. When combined with an accurate diagnosis and use of BPPV maneuvers instead of these exercises, if appropriate, this approach can be very effective. [3] Therefore the aim of the present study was to check the efficacy of vestibular adaptation exercises on patients with vestibulopathy on perceived level of Vertigo or giddiness and also the effect of vestibular adaptation exercises on ADL of these patients.

METHODOLOGY:

This was an Experimental study design done with convenient sampling of 30 patients with vestibulopathy for 3 weeks. Old age patients with 60 years of age or above and pre diagnosed with vestibulopathy were included in the study. Patients those who requires surgery as a treatment was excluded from the study. Knowledge and Explanation regarding the

disease condition and study was given to the patient. 30 patients were divided into two group, namely control group and study group. In control group no exercises was given and the patients was just observed for improvement. While in study group caw thorne Cooksey exercise was given to the patients. At the end of intervention VAS and DHI was recorded to analyze and determine whether there is any positive effect of vestibular exercise in such patients or not.

Results:

In present study 30 patients with vestibulopathy were assessed with DHI and VAS on day 1 before starting protocol and after 3 weeks in which 20 were males and 10 were females. The statistical analysis was done by using Graph pad prism version 5.0 for windows software. Mann Whitney *U* test was used for both the groups.

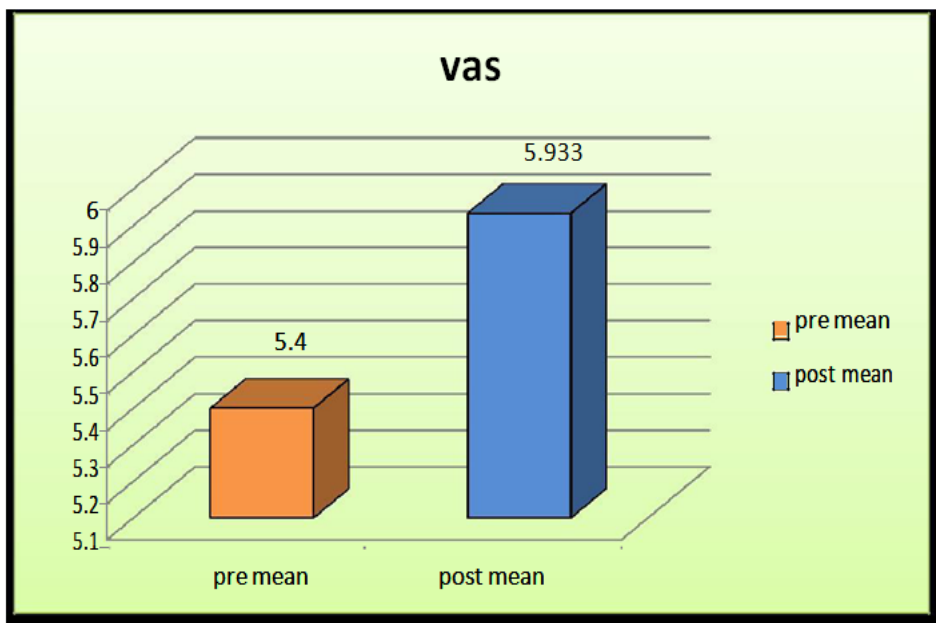
Table 1: Age distribution of subjects at baseline was found to be non significant

Group	N	Mean	S.D
Control Group	15	72	5.6
Study Group	15	67	7.2

Table 2: Mean differences for VAS for Control Group at baseline and after the intervention

VAS Scale	PRE	POST	<i>U</i> Value	<i>P</i> Value
Mean	5.4	5.9	80.5	0.1
S.D	1	0.8		

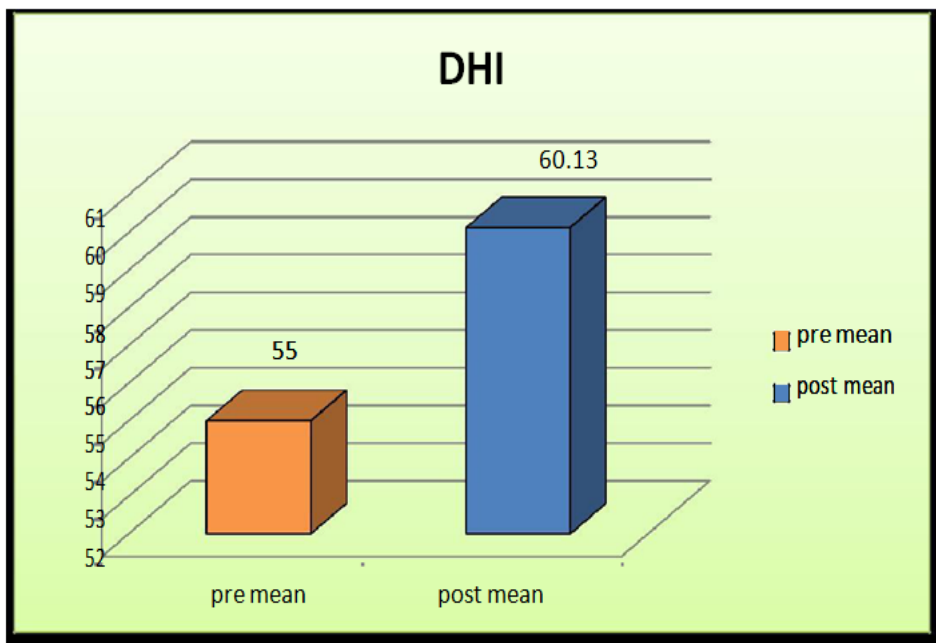
Statistical analysis of the data was done with Mann Whitney *U* test for pre and post intervention of Control Group. Value shows there is difference in Pre and post data for the VAS Scale for control group.



Graph 1: Graph1: Mean differences between pre and post VAS for Exercise Group

Table 3: Mean differences between pre and post DHI for Control Group

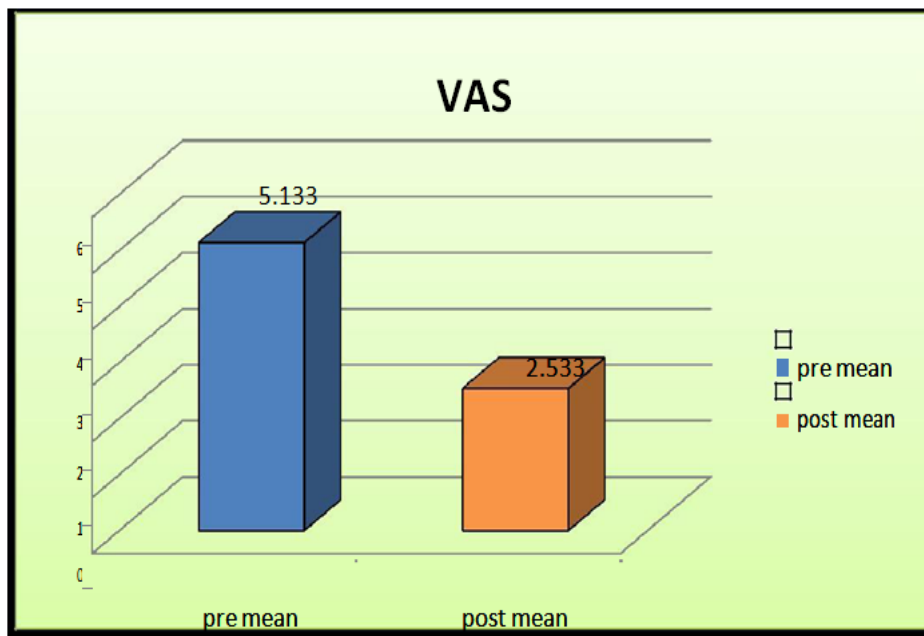
DHI Scale	Pre	Post	U Value	P value
Mean	55	60.13	99.50	0.60
S.D	9.13	8.9		



Graph 2: Mean differences between pre and post DHI for Exercise Group

Table 4: Mean differences between pre and post VAS for Exercise Group

VAS Scale	Pre	Post	U Value	P Value
Mean	5.13	2.53	6	<0.001
S.D	1.18	0.63		



Graph 3: Mean differences between pre and post VAS for Exercise Group

Table 5: Mean differences between pre and post DHI for Exercise Group

DHI Scale	Pre	Post	U Value	P Value
Mean	50.67	31.33	2	<0.001
S.D	5.32	4.51		

DISCUSSION:

The result found from experimental study on 30 patients for 3 weeks shows that there is significant effect of vestibular adaptation exercise in vestibulopathy. The present study analyze the effects of vestibular adaptation exercise in vestibulopathy patients. The mean age of patient in group 1 was 72.00 years and mean age of patients in group 2 was 67.67. 2 groups were made in which group 1 was controlled group and group 2 was exercise group. The intensity of vertigo and functional status of patient was evaluated by the VAS and DHI which were obtained at 3 weeks in both groups. Improvement

in vertigo in the exercise group was significantly higher than in the control group by the VAS and DHI obtained at 3 weeks after initiation of vestibular adaptation exercise. The improvement in patients with vestibulopathy was due to adaptation exercise known as caw thorne Cooksey exercise. There are various benefits of this vestibular adaptation exercise such as reducing symptoms of dizziness nausea and vomiting. There is increased postural control, the individual has better balance control when walking standing or running, it helps the patient to accept the limitation they face and adapt accordingly, it stimulate and accelerate brain recovery and enhance balance, prevent or reduce

accidents and falls with recovery of the vestibular function, reduces psychological adverse effects such as anxiety and panic faced by patient of chronic vestibular disorders, it improves quality of life and increase personal confidence level in performing activities of daily living.. Limitation of the study includes a smaller duration of intervention and loss of follow up. Although smaller size of the sample was also one of the major limitation of the study.

References:

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