

Effectiveness Of 8 Weeks Of Vestibular Exercises Auditory And Visual Reaction Time In Young Adults

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Abstract

Background: It was hypothesized that vestibular stimulation causes improvement in auditory and visual reaction time in young adults.

Objective: The present study was undertaken to observe the effectiveness of 8 weeks of vestibular exercises on auditory and visual reaction time in young adults.

Materials and methods: A total of 40 male and female young adults were part of the study after obtaining informed consent. They were grouped into control and intervention groups by random numbers generated by the software randomizer.org. Reaction time was recorded by the reaction time apparatus. Post-intervention values were recorded after 8 weeks of intervention and compared.

Results: There was a significant improvement in the auditory and visual reaction times in young adults who followed by the intervention.

Conclusion: The present study results suggest that vestibular exercises have a positive impact on reaction time. The study highlights the need for further detailed studies in this area.

Keywords: Cognitive functions, Vestibular exercises, Adjunctive therapy.

INTRODUCTION:

Cognition is the thinking process of the brain. Reaction time is the most appropriate test for the assessment of cognitive functions. It is the time interval from the time of application of the stimulus to the time the subject responds to the stimulus. Cognitive functions are essential for young adults. This is to perform their academic performance satisfactorily. Vestibular stimulation begins early in fetal life and it is necessary to stimulate vestibular system throughout life. Vestibular system is well connected with all the brain areas that are involved in the cognitive functions. Infact normal function of vestibular system is needed for normal cognition. For example, the hippocampus which is key area for the process of consolidation undergoes atrophy followed by the lesion of vestibular apparatus.¹⁻³ the present study was undertaken to observe the effectiveness of effectiveness of 8 weeks of vestibular exercises on auditory and visual reaction time in young adults.

MATERIALS AND METHODS:

Study design: The present study was an experimental study.

Study setting: The present study was conducted at R.D. Gardi Medical College in collaboration with KIMS, Amalapuram.

Study participants: A total of 40 male and female young adults were part of the study after obtaining the informed consent. They were grouped into control and intervention groups by random numbers generated by software randomizer.org.

Inclusion criteria: Willing participants of both genders within the age group of 18-24 years were included in the study.

Exclusion criteria: Participants with severe complications, undergoing some other adjunctive therapies already were excluded from the study.

After recruiting the participants were grouped into two groups with 20 participants in each group.

Group 1 (n=20): Intervention group: vestibular exercise for 8 weeks

Group 2 (n=20): Control group: No intervention for 8 weeks

Vestibular exercises: Vestibular exercises comprising of three steps with the time period of 45 minutes per session were administered to the participants of the intervention group. Two sessions per week were administered as mentioned in the literature.⁴

Assessment of reaction time: The reaction time apparatus was used to assess the auditory and visual reaction time. The instrument was purchased from Anand Agencies, Pune.⁵

Ethical considerations: The present study protocol was approved by the institutional human ethical committee. Confidentiality of data was maintained. Voluntary, informed consent was obtained from all the participants.

Statistical analysis: Data was analyzed using SPSS 20.0 version. Student t-test was applied to assess the significance of the difference between the groups. A probability value of less than 0.05 was considered significant.

Results: Data was presented in table 1 to table 3. Table 1 presents the demographic details of the participants. There was no significant difference in the demographic data of the participants. There was a significant improvement in the visual reaction time for red and green light and auditory reaction time high pitch and low pitch sound followed by the intervention.

Table 1: Demographic data of the participants

Parameter	Intervention group (n=20)	Control group (n=20)	P value
Age (years)	19±0.67	19±0.45	1.000
Height (cm)	168±9.39	172±12.07	0.7951
Weight (kg)	82±6.26	78±6.71	0.6654

Data were presented as mean and SEM.

Table 2: Stress, sleep, and cognitive parameters of the participants before the intervention

Parameter	Control group (n=20)	Intervention group (n=20)	P value
Visual reaction time red	0.325±0.00313	0.329±0.00470	0.4828
Visual reaction time green	0.352±0.00537	0.342±0.00984	0.3779
Auditory reaction time high pitch	0.414±0.00827	0.402±0.010	0.3815
Auditory reaction time low pitch	0.444±0.0116	0.458±0.00402	0.2623

Data were presented as mean and SEM.

Table 3: Stress, sleep, and cognitive parameters of the participants after the intervention

Parameter	Control group (n=20)	Intervention group (n=20)	P value
Visual reaction time red	0.299±0.00716	0.326±0.00425	0.0025**
Visual reaction time green	0.311±0.00246	0.338±0.00116	0.0288*
Auditory reaction time high pitch	0.378±0.00514	0.401±0.00827	0.0235*
Auditory reaction time low pitch	0.401±0.00492	0.448±0.00850	0.0001***

Data were presented as mean and SEM. ***P<0.001 is significant. **P<0.01 is significant. *P<0.05 is significant.

DISCUSSION:

The present study was undertaken to observe the effectiveness of 8 weeks of vestibular exercises on auditory and visual reaction time in young adults. There was no significant difference in the demographic data of the participants. There was a significant improvement in the visual reaction time for red and green light and auditory reaction time high pitch and low pitch sound followed by the intervention. Vestibular apparatus comprises of very minute receptors present in the inner ear. Their major physiological function is balance and equilibrium maintenance. However, due to its immense connections, vestibular system has multiple roles in homeostasis. One such function is cognitive function. Cognitive function is most essential for young adults for their academic performance. It was reported that vestibular stimulation improves the reaction time action on both sensory and motor systems especially the motor system through its connections.⁶ Further there is increase in the tactile sensitivity followed by the vestibular stimulation.⁷⁻¹⁰ The present study agrees with earlier studies as we have observed similar results. Further detailed studies are recommended in this area.

CONCLUSION:

The present study results suggest that vestibular exercises have a positive impact on auditory and visual reaction time. The study highlights the need for further detailed studies in this area.

CONFLICTS OF INTEREST:

None declared

SOURCE OF FUNDING:

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