IMPROVEMENT OF DYNAMIC BALANCE IN OLD AGE PERSON THROUGH COMPTURIZED SIMULATION, (VIRTUAL GAMES).

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Abstract

Background: Computerized simulation is a computer-generated simulation of a three-dimensional environment that can be interacted with and explored by an individual. The user can experience a sense of presence in this artificial environment, often feeling as though they are physically present in that space. Patients can practice movements and tasks relevant to their daily lives or specific rehabilitation goals. This study aims to investigate the improvement of dynamic balance in old age person through computerized simulation, (virtual games).
Aim: To study the dynamic balance improvement through Computerized simulation (Computerized simulation games) in Older Person.
Methodology: For this study,60 patients are included in this study.
Inclusion Criteria:
Research design: Randomized Repeated Measure.
Age:60-80 years age old person.
Community dwelling person.
Physical activity of 30 minutes and normal vision.
Exclusion Criteria:
1.Orthopedic Disorder.
2.Neurological Disorders.
3.Circulatory Disorders
Result: In this study shows $p<0.05$ means in Group A Showing significant improvement after Computerized simulation
Conclusions: Computerized Simulation improves balance and postural stability. Improved confidence with functional activities.
Keywords: Computerized Simulation, environment, rehabilitation, balance, dynamic

Introduction: Computerized Simulation environments are designed to mimic real-world or fantastical spaces in three dimensions[1]. This means users can perceive depth and spatial relationships, creating a sense of presence within the virtual world Computerized Simulation environments are generated using computer software, which means they can be highly detailed and dynamic[2]. This also allows for the creation of immersive audio and visual experiences that respond to user actions in real-time. On the other side, Patients' perception of the difficulty or effort required to complete rehabilitation exercises can influence their willingness to adhere to the protocol[3]. If exercises are perceived as too physically demanding or uncomfortable, patients may be less inclined to participate regularly[4].
Advanced motion tracking technology and realistic physics simulations, computerized simulations can accurately mimic human movement and interactions with virtual environments. This level of fidelity allows patients to engage in activities within the virtual world that closely resemble real-world tasks and movements[5]. Combination of cognitive challenges with motor tasks can further stimulate brain activity and contribute to the plasticity processes that underlie motor learning and recovery[6]. Computerized Simulation games often feature dynamic and unpredictable environments, requiring players to adjust their balance constantly to navigate obstacles, avoid hazards, or interact with virtual objects. This dynamic nature Computerized Simulation games helps train the body's balance control mechanisms in real time. Computerized Simulation and games provide instant feedback on the player's performance, allowing them to adjust their movements and strategies to improve their balance.
Objective:
Study about the dynamic balance in old age person through Computerized simulation, (Virtual games).

Methodology:

From the Aashirwad Geriatric Old age home, 100 patients are assessed then 40 patients are excluded while 60 Patient are randomly categorized, They are divide into two groups, one is Intervention and other is Control group.

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Procedures:
In this study, the Elderly people are divided into two groups Group 1 and Group 2. Group 1 Patient given intervention Programme of 3 months. They have spare 30 minutes daily 5 times a week. During this period the elder person did many activities like fast walking, Lunges, Jogging, Running and hiking through Computerized simulation.The exercise are repeated everyday. Before and after the competition every Parameters are monitor without any obstacles that is Blood pressure, Pulse, Respiratory rate. After completing 3 months further Berg balance test measure and Depression questionnaire are filled by the reading record from the elders..
While, Group 2 Patient are instructed for the normal daily activities. They are perceiving simple task work of daily activities. Normal active movements of the limbs, Normal walking of daily routine as they usually did. No extra activities are suggested. The Physiotherapist instruct and help Old age person in performing Single Limb Stance, Walking Heel to Toe, Rock the Boat, Clock Reach, Back Leg Raises, Single Limb Stance with Arm, Side Leg Raise, Balancing Wand, Wall Pushups, Toe Lifts, Marching in Place, Hand and Finger Exercises and Calf Stretches. After completing 3 months further Berg balance test measure and Depression questionnaire are filled by the reading record from the elders.

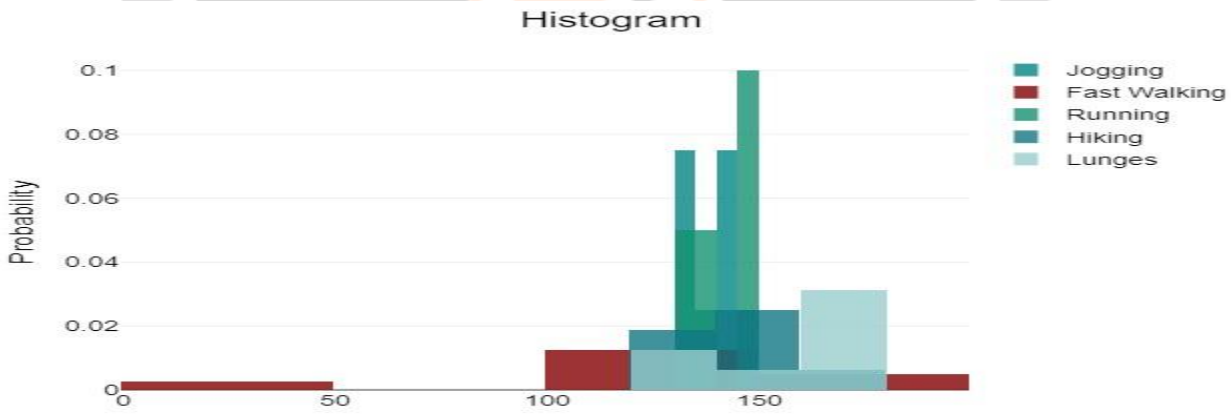
Result:

Table 1: Showing the Computerized simulation of various exercises in intervention group

	Jogging	Fast Walking	Running	Hiking	Lunges
Mean	138.87	131.88	140.53	147.13	153.13
Minimum	132	38	134	136	126.22
Maximum	147.28	156	147	174	166.32

	Jogging	Fast Walking	Running	Hiking	Lunges
Mean ± Std.	138.87 ± 5.71	131.88 ± 38.62	140.53 ± 5.7	147.13 ± 12.45	153.13 ± 16.14

Graph 1: The Graph showing Computerized simulation of various exercises in Intervention group



Histogram 1 : The Histogram showing Computerized simulation of various exercises in Intervention group

	Mean Rank
Lunges	3.63
Jogging	2.25
Running	2.38
Hiking	3.63
Fast Walking	3.13

Chi ^{2}	df	p
5.6	2	.05

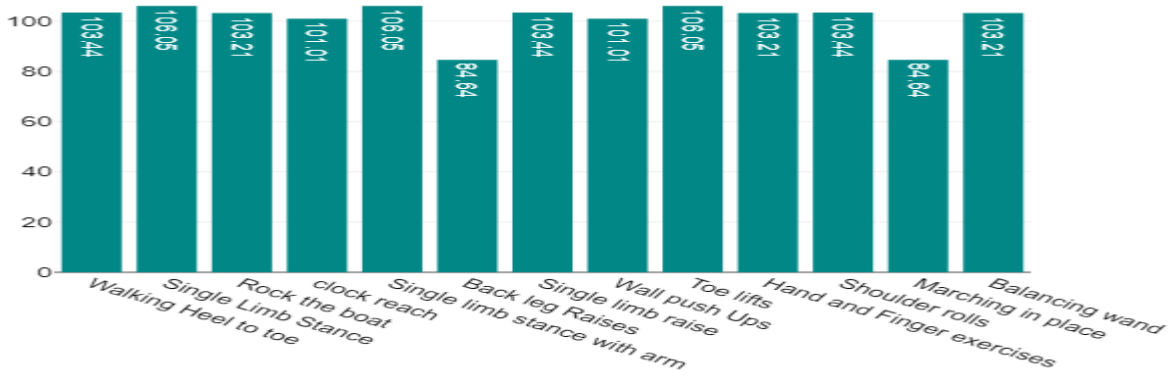
Here p<0.05 means in Group A Showing significant improvement after Computerized simulation.

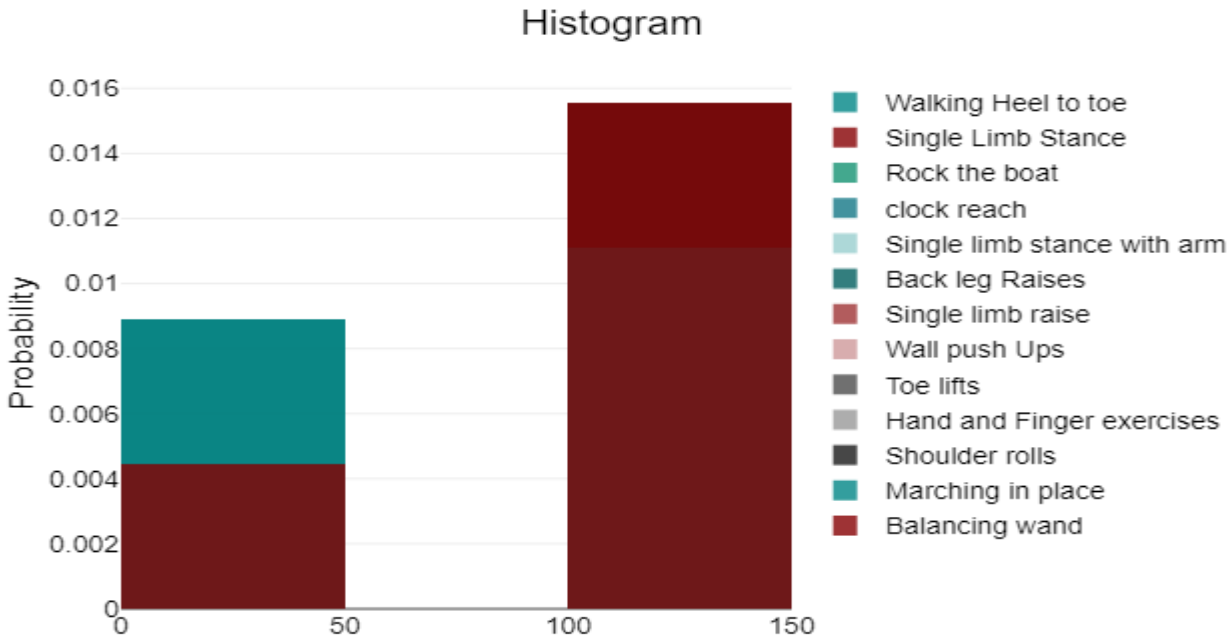
Table 2: Showing the various exercises in Control group

	Walking Heel to toe	Single Limb Stance	Rock the boat	clock reach	Single limb stance with arm	Back leg Raises	Single limb raise	Wall push Ups	Toe lifts	Hand and Finger exercises	Should rolls
Mean	103.44	106.05	103.21	101.01	106.05	84.64	103.44	101.01	106.05	103.21	103.4
Std. Deviation	53.95	57.64	54.27	55.25	57.64	47.96	53.95	55.25	57.64	54.27	53.95
Minimum	10.82	5.03	9.43	3.87	5.03	32	10.82	3.87	5.03	9.43	10.82
Maximum	147.23	144.42	145	136	144.42	138	147.23	136	144.42	145	147.2

	Type III Sum of Squares	df	Mean Squares	F	p	η^2
Treatment	5790.97	12	482.58	2.19	.018	0.21
Error	21158.83	96	220.4			

Graph 2:The graph showing the various exercises in Control group





Histogram 2 : The Histogram showing simulation of various exercise of that group

	Type III Sum of Squares	df	Mean Squares	F	p	η^2
Treatment	5790.97	12	482.58	2.19	1	0.21

Here p>1 means in Group B Showing no significant improvement after conventional exercise.

Discussion

In this study, both the Computerized Simulation and the Control group showed a difference in balance. The Computerized Simulation game group showed increase in dynamic balance than the Control group, which reveals that dynamic balance exercise can also affect static balance abilities. In this regard, the effect of introducing Computerized simulation based interventions is positive[7] , because they can provide immediate visual and auditory feedback concerning the exercise results, thereby increasing the exercise learning effect. In this study, the Computerized simulation game group also revealing improved balance abilities. A study by Walker et al[8] , in which traditional physical therapy and balance training using visual feedback training and verbal and tactile signals, proved the effects of visual perception feedback training by improving the Balance time. . A study by Geiger et a[11], in which biofeedback/force plate training and existing balance improvement exercise were compared, also showed improvements in balance ability, since reduced after the intervention. In the present study, which compared functional balance factors before and after the experiment, the Computerized simulation game group showed

significant differences between before and after the experiment, whereas no significant difference was found in the normal exercise group. The above comparison results between the two groups showed that the elderly individuals did not move within a predetermined movement boundary but rather moved into larger areas to perform.

Conclusions:

Computerized Simulation system improves balance and postural stability. Improved confidence with functional activities was also reported. Although no significant change was revealed from the depression scale in either group, both groups median scores were in the normal range of 0-9

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