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A comparative study on the effectiveness of hemibridge technique with balance exercise and normal balance exercise in elderly population

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Abstract

Background of the Study: As the global elderly population increases, maintaining and improving balance becomes crucial for preventing falls and enhancing quality of life. Physiotherapy plays a key role in balance training, utilizing various techniques to improve stability.

Objective of the Study: To evaluate and compare the impact of the Hemibridge technique with balance exercises and standard balance training exercises on balance, stability, and functional mobility in elderly population.

Methodology: A randomized controlled trial was conducted with 30 elderly participants aged 60 years and above. Participants were divided into two groups: Group A underwent the hemibridge technique combined with balance exercises, while Group B performed standard balance training exercises. Both interventions were administered for 6 weeks, with sessions conducted thrice weekly. Outcomes were measured using validated tools like the Berg Balance Scale (BBS) and post-intervention (6 weeks).

Result and Conclusion: The subject who where supervised to attend all sessions were shown a difference in the BBS is -10.86. This study concludes that hemibridge technique with balance exercise is more effective than the standard balance exercise in improving balance and reducing fall risk.

Keywords: Hemibridge technique, balance training, elderly and fall prevention

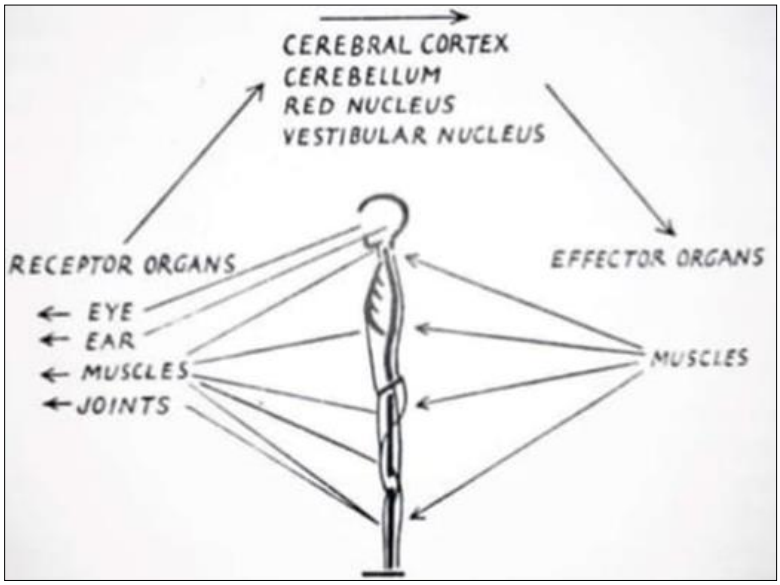
Introduction

Balance is a crucial aspect of physical function. It describes an individual, ability to maintain their line of gravity within their base of support. Balance is the body's ability to maintain a stable posture and control its position, whether at rest or in motion. It involves the coordination of multiple body systems like muscular, skeletal and nervous system. It is necessary for an individual to maintain posture, respond to voluntary movement and resist to external perturbation [1].

Classification

Balance can be classified as static, the ability to maintain stability when stationary, and dynamic, the ability to stay stable while in motion. Biomechanically, it includes reactive balance, recovering after unexpected disturbances, and proactive (anticipatory) balance, adjusting posture for expected movements [12].

Components of Balance



Balance in elderly population

Aging is associated with declining balance. This leads to more prone to injuries among elderly importantly increased the risk of fall result in balance problem [9].

Importance of balance in the elderly population

As people age, they often experience a decline in balance due to muscle weakness, reduced proprioception, slower reaction times, and changes in the vestibular and visual systems. Poor balance can increase the risk of falls, leading to injuries like fractures, which are a significant concern in elderly populations [8]. Improving balance through exercises that strengthen muscles, enhance proprioception, and increase flexibility can help older adults to maintain independence and prevent fall.

Importance of Balance Training Among Elders

Physiotherapy plays a significant role in improving balance and stability, which are essential for maintaining mobility and independence in older adults [9]. Various techniques have been developed including strengthening, coordination, postural control, Proprioception, Dual-Task Trail.

However, new techniques, such as the hemibridge exercise, have been introduced, which may offer additional benefits by targeting specific muscle groups and improving neuromuscular control. The hemibridge technique, which focuses on core and lower limb strength, aims to improve overall stability and balance, potentially making it a valuable alternative or complement to traditional balance exercises.

This study seeks to compare the effectiveness of the hemibridge technique with balance exercises in elderly populations [2]. By examining outcomes related to balance, stability, and functional mobility, this research aims to provide insight into whether the hemibridge technique can serve as a more effective intervention in preventing falls and promoting independence among older adults. The findings could help physiotherapist better tailor balance training programs to meet the specific needs of the elderly, ultimately contributing to reducing the burden of fall-related injuries.

Materials and Methodology

An experimental study which consists of 30 elderly people age between 60-70 years, were taken on slection criteria. Geriatric population age 60-70 or above, elder population who are able to ambulate independently but with the episodes of frequent fall, berg balance scale (14-42), able to walk atleast 10m long and patient without any other neurological disorder. Lowerlimb deformity, cardiorespiratory disease, post-operative abdominal surgery, CABG within past 6 months, CVA, vertigo, diabetic neuropathy and chronic OA were excluded. This study done at outpatient department of adhiparasakthi college of physiotherapy, melmaruvathur. Then participants were randomly divided into two groups: group 1 and group 2. The group 1 (15) received hemibridge technique combined with balance exercise and group 2 received standard balance training exercise. The participants received intervention for the duration 6 weeks. Initially informed consent form was given to all subjects. Further demographic details & the condition related details received from the participant. Complete baseline assessment including pretest and posttest were collected using the berg balance scale.

Treatment Procedure

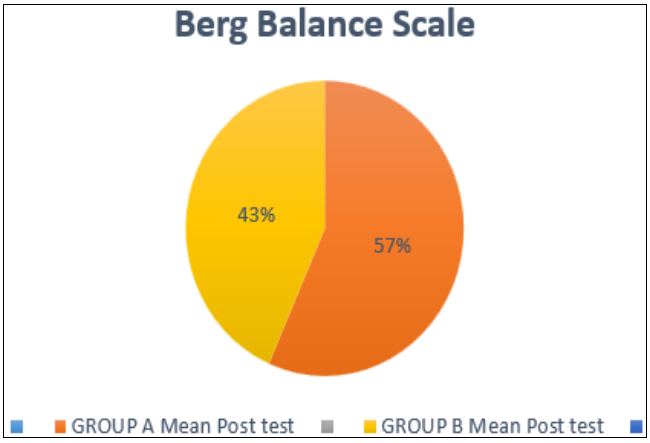
In this study, the treatment procedure involved two different exercise interventions: hemibridge technique combined with balance exercise and standard balance training exercise.

1. Hemibridge with ball and ballon exercise
2. Standard balance exercise

Tandem stands, tandem walk, heel walking, toe walking, single leg stands, Romberg stands.

Results

Using SPSS for statistical analysis, the study compared the effectiveness of the Hemibridge Technique with Balance Exercise (HBE) and Standard Balance Exercise (SBE) in improving balance. In the pretest–posttest comparison, the HBE group improved from a mean score of 26.93 (±4.82) to 37.80 (±4.57), while the SBE group improved from 25.20 (±4.60) to 29.00 (±4.29), showing greater gains in the HBE group. Paired samples t-test results indicated statistically significant improvements in both the HBE group ($t = -18.09$, $p = 0.000$) and SBE group ($t = -8.886$, $p = 0.000$), with the mean change being higher in the HBE group. Independent t-test analysis showed no significant difference between the groups at pretest ($t = 1.008$, $p = 0.322$), but a significant posttest difference favoring the HBE group ($t = 5.436$, $p = 0.000$).



Discussion

The results of this study demonstrate that both the Hemibridge technique with balance exercises and standard balance exercises lead to improvements in balance, but the Hemibridge technique proves to be significantly more effective. The comparison of pre-test and post-test scores in both groups provides clear evidence that the Hemibridge technique enhances balance to a greater extent.

In the Hemibridge technique group, the pre-test mean score was 26.93, which increased to 37.80 after the intervention, showing a substantial mean difference of 10.86. The statistical significance of $p = 0.000$ confirms that this improvement is not due to chance but rather the effectiveness of the Hemibridge exercise in enhancing balance. In contrast, the standard balance exercise group showed a smaller improvement, with a pre-test mean score of 25.20, increasing to 29.00 post-test. The mean difference of 3.80, though statistically significant ($p = 0.000$), is much lower than that observed in the Hemibridge group. This suggests that while standard balance exercises do improve balance, they may not be as effective as the Hemibridge technique.

Further statistical analysis using an independent t-test was conducted to compare balance improvements between the two groups. Before the intervention, there was no significant difference in balance levels, as shown by the pre-test p-value of 0.322, meaning both groups started with similar balance abilities. However, after the intervention, the post-test mean score of the Hemibridge group (37.80) was significantly higher than that of the standard balance group (29.00). The mean difference of 8.80, with a p-value of 0.000, confirms that the Hemibridge technique had a significantly greater impact on balance improvement compared to standard balance exercises.

Conclusion

- The Hemibridge Technique with Balance Exercise was more effective than the Standard Balance Exercise in improving balance.
- Both groups showed statistically significant improvements, but the HBE group had a significantly higher mean increase in balance scores.
- The study confirms that incorporating Hemibridge exercises enhances balance training outcomes more effectively than traditional methods.

Limitations and suggestions

- Long term effects of treatment were not assessed dut to short duration and small sample size so were recommend exploring the long-term effects on similar population in further research.
- The absence of control group could be considered as limitations in this study. So, further randomized control study could be implicated.

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