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Combined effect of feldenkrais method and alexander technique on mobility and balance among elderly individuals: A case report

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Abstract
Background: Elderly persons, typically individuals aged 65 years and older often experience declines in balance and mobility increasing their risk of falls and dependence.
Objective: The objective of the study is to find the combined effect of Feldenkrais method and Alexander technique on mobility and balance in an elderly person.
Methodology: The pre-test used the Fullerton Advanced Balance (FAB) scale for balance and the Expanded Timed Up and go (ETUG) test for mobility. Subjects received Feldenkrais exercises and Alexander technique thrice weekly (30 min/session) for 5 weeks. Post-test assessments were assessed using the same tools.
Results: The study showed significant improvements in ETUG and FAB scores, indicating the effectiveness of the Feldenkrais method and Alexander technique in enhancing mobility and balance in an elderly person. The ETUG score has decreased from 13 seconds to 9 seconds and the FAB score has increased from 23 points to 26 points.
Conclusion: The findings of this study concluded that combined effect of Feldenkrais method and Alexander technique showed good improvement in mobility and balance in an elderly person.

Keywords: Alexander technique, balance, elderly, feldenkrais method, mobility

Introduction
Elderly persons, typically individuals aged 65 years and older, represent a growing demographic in healthcare as populations worldwide continue to age [1]. The global population of older adults is increasing by 2% annually and is projected to comprise 21% of the total population by 2050. Older adults have different perceptions and experiences of health compared with younger adults because of their normal age-related changes, chronic diseases, disabilities, and limitations [2].

Heart problems, visual problems, cognitive impairment, arthritis, and foot-related ailments are the most prevalent chronic illnesses that affect older adults over 65. Cardiovascular illness, hearing loss, hip fractures, falls, and Chronic Obstructive Pulmonary Disease (COPD) are other common problems. Another major concern is neurological illnesses, which affect the central nervous system (CNS), which includes the brain, nerves, and spinal cord. These illnesses are the top contributors to the development of disability and the second most common cause of death for those who are impacted. Elderly people are prone to vision impairments and frequently experience bone difficulties. Mobility is further complicated by age-related muscle changes, and mental health conditions have a major negative influence on older people's quality of life [3].

Balance, an important component of human motor performance, may be defined as “a motor skill that emerges from the interaction of multiple systems that are organized to meet functional task goals that are influenced by environmental context. A rapid and cooperative interaction of several physiological and cognitive components results in good balance, allowing for accurate and timely reactions to disturbances [4]. A reduced ability to maintain balance may be linked to a higher risk of falling. In older adults, falls often result in injuries, loss of independence, related illnesses, and premature death.

Decreased balance has been noted in 13% of 65-69 years elderly persons and in more than 46% of the people 85 or more years old. There is increased postural sway with aging under both static and dynamic conditions [1]. The elderly require good balance to function independently, effectively, and safely. Balance in turn relies on proper postural stability, and the ability to adjust body orientation dynamically to varying environmental conditions and task requirements [5].

Mobility is defined as the person's ability to change his position or location or move from one place to another by walking and basic ambulation. Therefore, mobility is regarded as a vital factor for maintaining healthy aging and ensuring a good quality of life [6]. Walking difficulties and mobility impairments in older adults often lead to negative physical, cognitive, and social outcomes. These challenges frequently result in reduced independence, physical disabilities, injuries, institutionalization, and increased hospitalizations. As a result, daily activities, including mobility-related tasks, tend to decline with age, contributing to depression, social isolation, and even mortality. Therefore, assessing mobility is essential in gerontology to identify potential impairments and mitigate associated risks, ultimately reducing morbidity [7].

Older adults are at extraordinary risk of mobility decline due to high levels of physical inactivity. Poor balance, limited mobility and are major risk factors for falls. A reduced ability to maintain balance may be linked to a higher risk of falling [8]. Maintaining functional fitness abilities including muscular strength, cardiovascular endurance, flexibility, agility, and dynamic balance is crucial for older persons to preserve their functional mobility and independent living. Therefore, mobility reductions (such as a decrease in gait speed, stride length, or cadence) and balance deficits are significant modifiable risk factors linked to falls in the elderly [9].

Various forms of exercise have been designed to enhance balance in older adults, with the primary goal of reducing fall incidence. Additionally, exercise has been suggested as a preventive measure to slow the progression from pre-frailty to frailty in this population. Exercise approaches to achieve these aims have varied from strength and balance training to specific balance exercises [10]. Adopting an active lifestyle depends not only on individual behaviors and choices but also on the interplay between individuals, their environment, and public policies.Various studies demonstrate that exercise and physical activity rank among the most significant determinants of older individuals' health [2]. Recent studies support the use of well-structured therapeutic exercises for balance and mobility enhancement as fall reduction measures for elderly persons [11]. Two options in the search for new intervention approaches is the Feldenkrais method and Alexander technique. The Feldenkrais method is an active, conscious mind-body workout that focuses on learning different movement patterns [12]. The Alexander Technique (AT) is a method of movement education that purports to improve postural control through augmented perceptual and cognitive strategies applied to task-based activities [5]. The Alexander technique and Feldenkrais method are somatic education approaches aimed at cultivating a heightened awareness of movement. Both techniques focus on improving functional and kinesthetic awareness during everyday activities.

While the Alexander technique emphasizes controlled, elegant and purposeful movement, the Feldenkrais method prioritizes spontaneous, graceful, and functional motion. Both approaches are predicated on the idea that movement results from the union of the body and mind, which ought to be viewed as one cohesive whole rather than as distinct entities [1]. The finding of this study can benefit mobility and balance in an elderly person. In that this treatment method can be applied in an elderly person to improve balance and mobility if the results are found to be positive. Hence a need was identified to find out the combined effect of Feldenkrais method and Alexander technique on mobility and balance in an elderly person.

Case Report

A 76-year-old retired female presented with progressive balance and mobility issues that have significantly impacted her daily activities over the past two years. The patient reported increased difficulty in maintaining stability during walking, particularly on uneven surfaces, and has experienced two near-fall episodes in the past six months. She avoids community ambulation due to fear of falling, resulting in reduced physical activity and social participation. The patient has a history of hypertension and mild knee osteoarthritis but no history of recent fractures, surgeries, or neurological conditions. There was no acute onset of symptoms or history of significant trauma. On clinical examination, the patient displayed significant balance and mobility deficits, with an Expanded Timed Up and Go (ETUG) test score of 13 seconds, indicating mild mobility limitations. The Fullerton Advanced Balance (FAB) scale score was 23/40, reflecting a moderate risk of falls and impaired balance. The examination revealed noticeable unsteadiness during dynamic balance tasks, particularly while turning and transitioning between positions, contributing to her mobility deficits. Additionally, there was a reduction in coordination and stability, as evidenced by difficulty in maintaining tandem stance and standing on one leg. These impairments were reflected in her Fullerton Advanced Balance (FAB) scale score of 23/40, indicating moderate fall risk.

Interventions

Feldenkrais method: The Feldenkrais method is an active, conscious mind-body workout that focuses on learning different movement patterns.[16] Patients were asked to perform following exercises in different positions.

Table 1: Feldenkrais exercises

Exercises	Dosage
Pelvic tilt	10 reps in 2 sets
Shoulder circles	10 reps in 2 sets on each side
Head and neck movements	10 reps in 2 sets on each side
Ankle circles	10 reps in 2 sets on each side
Spine flexion and extension	10 reps in 2 sets
Arm and leg lengthening	10 reps in 2 sets on each side
Side to side rocking	10 reps in 2 sets

Alexander technique

The Alexander Technique (AT) is a movement education method designed to enhance postural control by applying perceptual and cognitive strategies to task-based activities.[5] Patients were asked to perform following exercises in different positions.

Table 2: Alexander exercises

Exercises	Dosage / Time
Constructive rest	3 minutes
Conscious walking	3 minutes
Chair work	10 reps in 2 sets
Head and neck alignment	5-6 slow movements
Arm directions and reach	9-10 slow movements
Foot awareness	7-8 slow movements
Weight shifting	9-10 controlled shifts

Fig 1: Pelvic tilt

Fig 2: Shoulder circles

Fig 3: Chair work

Fig 4: Arm directions and reach

Fig 5: Head and neck alignment

Outcome measures

Fullerton Advanced Balance (FAB) scale Balance was evaluated using the Fullerton Advanced Balance (FAB) scale. It is an assessment tool designed to evaluate high-level balance performance particularly in older adults. It consists of 10 different tasks that challenge various aspects of balance, such as dynamic and static balance, reactive postural control, and sensory integration. The tasks are rated on a scale of 0 to 4, where higher scores reflect better balance performance.

The subjects were asked to perform the following tasks

1. Stand with feet together and eyes closed
2. Extend the arm forward to grasp an object positioned at shoulder height.
3. Turn 360 degrees in right and left directions
4. Step up onto and over a bench
5. Tandem walk (heel to toe)

6. Stand on one leg
7. Stand on foam with eyes closed
8. Two-footed jump for distance
9. Walk with head turns
10. Reactive postural control

A scale ranging from 0 (unable to perform) to 4 (able to execute independently) was used to score each task. The total score can vary from 0 to 40. Higher scores indicate better balance. Total score less than 24 indicates moderate fall risk and some balance deficits, total score less than 20 indicates high fall risk and significant balance problems. FAB scale has good test-retest reliability (ICC=0.94-0.98) and inter-rater reliability (ICC=0.97-0.99) [13].

Expanded Timed Up and Go test (ETUG)

The Expanded Timed Up and Go test was a comprehensive version of the Timed Up and Go test used to assess mobility, balance, and fall risks in older adults. The subject was asked to sit in a regular chair with armrests, ensuring their back was against the chair and their feet were flat on the floor. The subject was then asked to stand up from the chair, walk 3 meters forward at a normal pace, turn around at the mark smoothly, return to the chair, and sit down. As a dual task, the subject could be asked to perform cognitive tasks such as counting backward from 100 or naming as many items as they could. The time taken to complete each phase was recorded. Completing the test in less than 12 seconds was typical for healthy older adults. A time between 12-20 seconds suggested some mobility challenges, while a time exceeding 30 seconds indicated considerable mobility challenges and an increased risk of falls. Studies have shown high inter-rater reliability for the ETUG test with ICC exceeding 0.90, intra-rater reliability for ETUG test with ICC above 0.90 and shows good test-retest reliability with ICC ranging from 0.85-0.95 [14].

Results and Discussion

This study aimed to evaluate the combined effect of Feldenkrais method and Alexander technique on mobility and balance in an elderly person.

Table 3: Pre and Post data of Expanded timed up and go test (ETUG) and Fullerton Advanced Balance scale (FAB)

Component	Pre-data	Post-data
ETUG (sec)	13	9
FAB (points)	23	26

The study showed significant improvements in ETUG and FAB scores, indicating the effectiveness of the Feldenkrais method and Alexander technique in enhancing mobility and balance in an elderly person.

The present study was to find out the combined effect of Feldenkrais method and Alexander technique on mobility and balance among elderly persons. The elderly population, defined as individuals aged 65 years and above, is rapidly expanding and poses unique challenges to healthcare systems worldwide [3]. After 5 weeks of intervention, it was found that both Feldenkrais method and Alexander technique is effective in improving mobility and balance in an elderly person.

Mobility in the elderly population is commonly impaired by factors such as muscle weakness, joint stiffness, balance difficulties, neurological degeneration, psychological influences and reduced overall quality of life [15]. This study demonstrated that, after 5 weeks of intervention, combined effect of Feldenkrais method and Alexander technique has improved mobility among elderly persons. These findings are reinforced by Remi Berland *et al*. (2022) who stated that Feldenkrais method may be more adequate than conventional physical therapy and improves mobility, balance and quality of life in elderly people, and also in patients with neurodegenerative diseases [12]. Another study validated by Michael Gleeson *et al*. (2015) concluded that Alexander technique improved mobility among past multiple fallers [16].

Balance in the elderly population is frequently compromised due to age-related declines in muscle strength, flexibility, and sensory perception as well as some of the neurological conditions while psychological factors, such as fear of falling, may reduce confidence and exacerbate instability [6].

In the present study, it was found that, after 5 weeks of intervention, combined effect of Feldenkrais method and Alexander technique has improved balance among elderly persons. Similiar research was performed by Elizabeth Tunnicliffe *et al*. (2021) where they found that Alexander technique has improved balance and movement, thereby reduced fear of falling in participants over 60 years [8]. Another study conducted by Farid Aditya Wardana *et al*. (2024) compared the effectiveness of the Feldenkrais method and a balance-enhancing exercise program (BEEP) in older adults, concluding that both approaches are effective in improving balance and reducing fear of falling in this population [10].

In the current study, Fullerton Advanced Balance (FAB) scale was used to assess balance, while the Expanded Timed Up and Go (ETUG) test was utilized to evaluate mobility. The Fullerton Advance Balance (FAB) scale is a performance-based measure that comprehensively addresses the multiple dimensions of balance, through static and dynamic balance activities performed in different sensory environments [17]. Mellisa Payton *et al*. (2016) determined that the Fullerton Advanced Balance (FAB) scale has a good inter-rater test-retest reliability (ICC=0.94-0.96) and is a feasible and useful scale for assessing balance [18]. Also, another study undertaken by Yong-Jin Jeon showed that Fullerton Advanced Balance (FAB) scale can predict fall risk, when used for independently-functioning community-dwelling older adults [13].

Expanded timed up and go (ETUG) test is a comprehensive version of the Timed Up and Go test used to assess mobility, balance and fall risks in older adults. A study done by Pernille Botolfsen *et al*. (2018) reported that ETUG test showed a good inter-rater reliability as well as intra-rater reliability and concluded that it is a reliable and valid test and an interesting alternative to existing clinical tests of mobility [19]. Likewise, another study by M. Ali Aslankhani *et al*. (2015) also suggested that ETUG test identify individuals at higher risk of falls, and monitor changes in mobility during rehabilitation.[14]

This study is based on exploring the combined effect of Feldenkrais method and Alexander technique on mobility and balance among elderly persons. These methods emphasize improving body awareness, posture, and movement efficiency, which are essential for reducing fall risk and enhancing independence in older adults [20]. By addressing habitual movement patterns and neuromuscular coordination, this study highlights a holistic approach to mobility and balance rehabilitation in the elderly population [11]. This combined approach may not only improve physical function but also enhance overall quality of life by promoting safer, more efficient movement strategies [1].

This study had some limitations. Firstly, the study doesn't elaborate on potential external factors such as concurrent

therapies or changes in medication during the study period, which could influence outcomes. Secondly, this is a single case study; it can be repeated on a larger sample size. Gait related exercise (Conscious walking) was given but the gait parameters were not considered as an outcome measure. Also, the study's duration was limited to 5 weeks, and it is uncertain about the long-term effects. Future research can address this gap by incorporating a larger sample size, extending the duration of exercises, and including diverse outcome measures. The findings of this study indicate that both interventions have a positive influence in an elderly patient, emphasizing their potential in improving mobility and balance.

Conclusion

The findings of this study concluded that combined effect of Feldenkrais method and Alexander technique showed improvement in mobility and balance in an elderly person.

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