



# Examining the efficacy of physiotherapy utilizing equine movement in older adults: a pilot study

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## Introduction:

Physiotherapy incorporating equine movement is recognized as an effective tool in treating functional mobility and balance. The utilization of equine movement in physical therapy treatment with older populations is underrepresented in current research. In this pilot study we set out to assess the use of physical therapy utilizing equine movement in older populations, and to assess the impact of this treatment on participant's balance and functional mobility. In our preliminary 12-week pilot study we had nine individuals participate in weekly physiotherapy sessions utilizing equine movement as a treatment tool.

## Methods:

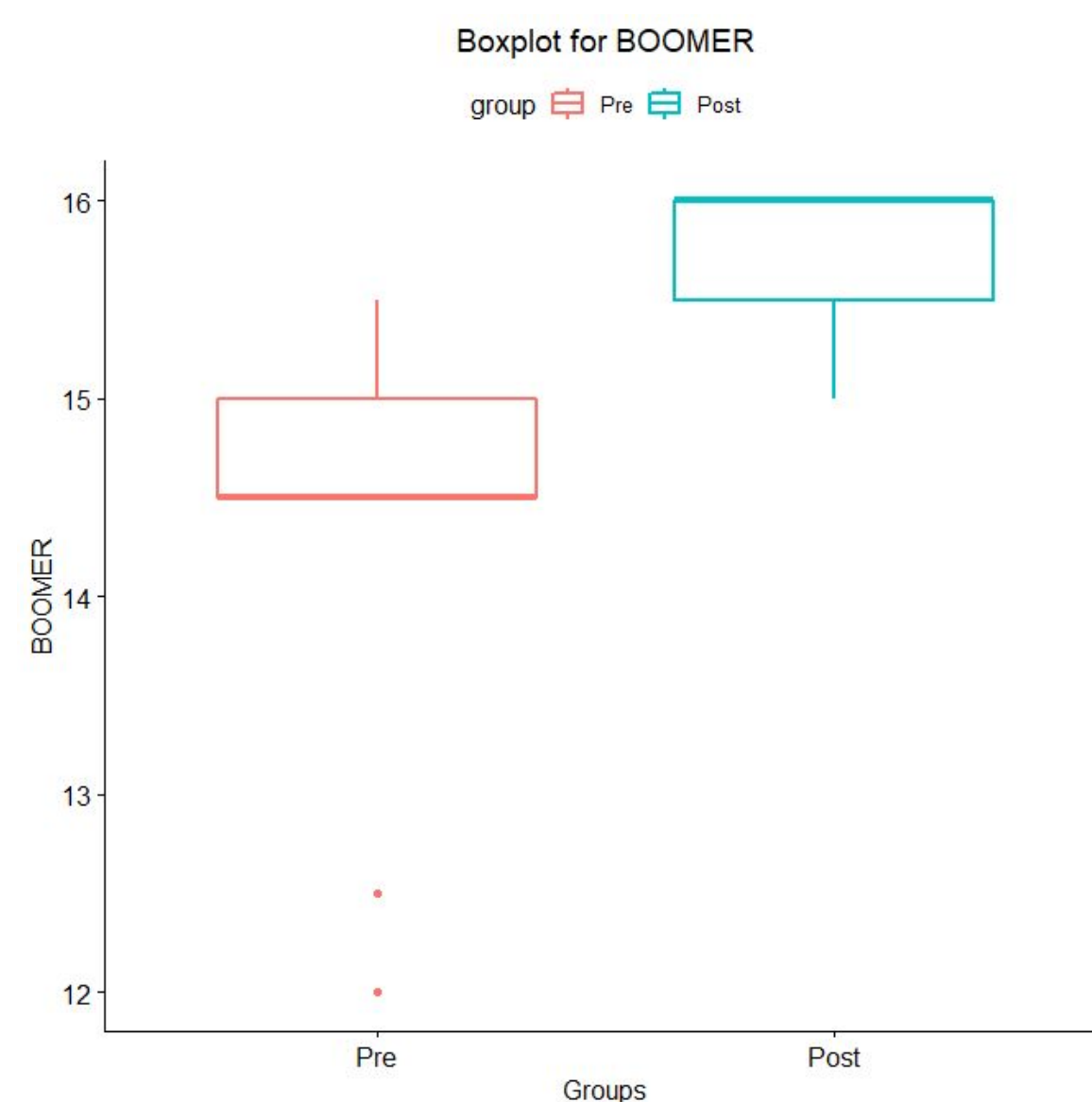
Nine healthy neurotypical community-dwelling individuals over the age of sixty years, (mean=71.4 years; median=73 years) were included in this study. Participants engaged in weekly 30-minute physiotherapy sessions using equine movement as the primary treatment tool. During each physiotherapy session utilizing equine movement participants completed various exercises. These exercises focused on balance, postural corrections, flexibility, coordination, strengthening, and dual tasking exercises. In this study we used The Balance Outcome Measure for Elder Rehabilitation (BOOMER) to assess balance and functional mobility in the participants. This objective outcome measurement tool is standardized to assess balance and functional mobility in the elderly. The BOOMER Rehabilitation consists of four elements, step test (ST), timed up and go (TUG), functional reach (FR) and timed static stance (TSS). Participants were assessed using The BOOMER prior to the 12-week physiotherapy sessions utilizing equine movement, and again after the completion of 12 sessions.

## Results:

### The BOOMER: Balance Outcome Measure for Elder Rehabilitation

The results of this pilot study showed pre-test median BOOMER score of 14.5 out of a possible 16 points. After completing the 12 weeks, participants were re-tested, and the post-test median BOOMER was 16 out of 16.

### BOOMER Scores Pre-test and Post-test after 12-week treatment study



Pilot Study Group	Participants	Total Individual Scores	Median Score
Pre-test	9	12 – 15.5	14.5
Post-test	9	15 - 16	16

**Perturbation or Reactive Balance Training:** utilizes a task-specific approach to balance training, applying repeated exposure to unpredictable mechanical perturbations that mimic balance disturbances experienced in daily life



**Internal Perturbations** are voluntary tasks performed by the subject

- Moving extremities within the base of support (BOS)
- Reaching outside their BOS

**External Perturbations** are performed by a force outside the subject's control

- Predictable and unpredictable with auditory & visual feedback present or absent
- Low versus high amplitude perturbations
- Direction and the incorporation of three dimensional (3D) movements as well as graded centripetal forces

## The BOOMER: Balance Outcome Measure for Elder Rehabilitation



The **BOOMER** measurement tool is designed to assess balance and functional mobility in the older population. The Boomer consists of the following four tests:

**Step Test** – one foot placed on top of step and back to ground as many times as possible in 15 seconds

**Timed Up and Go** – from a seated position participant stands walks 3 meters turns around and walk back to chair and sit

**Functional Reach** – participant reaches as far forward as possible in a standing position without losing balance

**Timed Static Stance** – Standing with feet together and eyes closed

The four components of the BOOMER are scored from 0 through 4. The scale ranges from 0 = unable to perform test to 4 = excellent with a maximum score of 16.

## Discussion:

Equine Movement is an important treatment tool for physiotherapy since it stimulates the visual, vestibular, proprioceptive, and musculoskeletal systems required for functional balance and mobility. Improved balance and functional mobility could potentially contribute to a better quality of life in older populations.

In our study we analyzed the participant's pre and post-test BOOMER scores, and improvements were seen in our participants on their post-test BOOMER scores. The sensory and motor input elicited during the horse's movement demonstrated improvements in scores in the Step Test, the Timed Up and Go Test and the Functional Reach Test. Two participants showed statistically significant improvement of their BOOMER scores. These individuals also had some of the lowest pre-test functional mobility scores. This sparks curiosity as to whether individuals who have lower functional abilities may have a higher capacity for improvement with the use of equine movement as a treatment tool.

In the article "The Impact of hippotherapy for balance improvement and flexibility" (Journal of Bodywork and Movement Therapies) the Functional Reach Test component of the BOOMER showed the most dramatic improvements for most participants after the use of equine movement as a treatment tool. Future research on equine movement and its effects on aging should be examined to decipher why subjects seem to show more displacement of the trunk after experiencing the sensory input of equine movement.

The three-dimensional movement provided by the horse subjects our older populations to challenges that they would not typically experience. This opens a window of opportunity for challenging the brain with new sensory experiences. These new experiences may lead to brain changes defined as neuroplasticity. Neuroplasticity is a term that can be used generally to describe the brains' ability to change, modify, and reorganize itself in response to different experiences, particularly sensory experiences. Growing bodies of research suggest a large amount of variability in neuroplastic changes throughout the lifespan in both healthy and diseased brains "Dynamic Brains and the Changing Rules of Neuroplasticity: implications for Learning and Recovery, 2017".

The physiotherapy sessions were adjusted to each participant with a graded progression of balance and functional mobility challenges while on the moving horse. These challenges included upper extremity exercises, rotational exercises and decreasing visual stimulus with participant's eyes closed. These exercises done by the participant are internal perturbations.

The movement of the horse provided additional challenges as external perturbations that engage anticipatory, adaptive, and reactive core strategies.

In the article "Older adults can improve compensatory stepping with repeated postural perturbations" Frontiers in aging Neuroscience Oct 2015 "the degree to which it [balance] can be improved via training is important for the development of rehabilitation programs targeting fall prevention" in the future. Creating adaptive balance intervention strategies is relatively new as a physiotherapy treatment tool and one we feel is important to utilize in improving balance.

Equine Movement is an important physiotherapy tool that is an effective multimodal exercise-based intervention. We speculate the use of equine movement would therefore strongly contribute to successful balance recovery reactions.

## Goals for Further Research:

- To identify and establish the optimum equine movement treatment with respect to frequency, intensity, time, and type (FITT) principles in older adults
- To identify and establish progressive equine movement treatment aimed at improving functional mobility and balance outcomes
- To expand research on equine movement and its effects on our aging population
- To increase awareness and education of physiotherapists regarding the use of equine movement in older adults
- To increase the use of equine movement in the care plan of older adults
- To encourage other centers to become involved in investigating this growing demographic

With thanks to our wonderful older adult participants and Valley Therapeutic Equestrian Association

References available on request

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