

# A Study to Compare the Effectiveness of Theraband Exercises versus Aerobic Exercises on Balance and Mobility among the Community Dwelling Elderly

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**Abstract:** Balance is the ability of an individual to maintain the body's center of gravity over the base of support. Static balance is measured when the base of support is stationary and is typically evaluated via postural sway measures. <sup>(1)</sup> Theraband can last for a long time proper care and use, thus acting as a commercial way for rehabilitation. Theraband has been tested in laboratory setting above 10,000 repetitions without any rupture. <sup>(6)</sup> Aerobic training has been shown to have a positive effect on discrete psychomotor skills in elderly people, but the effect of aerobic training on continuous psychomotor skills is unknown. <sup>(7)</sup> Thus the purpose of the study is to compare the effect of Theraband exercises and aerobic exercise in community dwelling elderly. 30 subjects were selected. Patients were evaluated using an assessment form, Time up and Go test and Berg balance scale and patients were informed about the procedure, merits and demerits of the treatment. consent form is obtained from each patients for voluntary participation. The intra-group analysis showed that both the treatments are effective in terms of average reduction in the value of measure 'TUG' and in terms of average improvement in the value of measure 'BBS'. However, the inter-group analysis showed that Treatment A is effective than Treatment B in terms of average reduction in value of TUG score and in terms of average improvement in the value of BBS. Hence, we conclude that Treatment A is effective than Treatment B in terms of both the measures – TUG & BBS.

**Keywords:** Balance, Theraband, Elderly, Time Up and Go, Berg Balance scale, Aerobic exercise

## 1. Introduction

Balance is the ability of an individual to maintain the body's center of gravity over the base of support. Static balance is measured when the base of support is stationary and is typically evaluated via postural sway measures. <sup>(1)</sup>

Balance is defined as the ability to maintain an upright posture during both static and dynamic tasks. Maintaining balance involves a complex interaction between intrinsic factors that include peripheral, visual, and vestibular sensation and muscle factors, as well as the interplay between the neural network and motor output, that are processed and mediated centrally.

All of these factors are affected by normal aging processes. Pattern of muscle use change as an individual ages. Strength and power decline, and the speed of neural processing and number of sensory receptors both decrease. These changes result in alterations to both volitional and reflexive motion because neural processing and sensory receptors are major contributors to effective control of postural balance. Poor balance is a major risk factor for falls. Fall rates increase with age, and the implications and costs of falling for individuals, and society, are high and projected to increase.

Lower limb weakness is a commonly reported and important fall-risk factor. Individuals exhibiting this sign have 4.9 times the risk of falling than people with normal strength. Resistance-or strength-training programs are gaining acceptability with older adults and have been reported to increase bone density, strength, and muscle mass with a concomitant decrease in physical limitation.

The mechanisms for the reported improvements were not discussed, although limitations of ankle range of motion have been demonstrated as an important factor affecting balance control. Assessment of postural sway involves identifying the center of pressure and evaluating its fluctuations during trails of quiet standing.

Ageing defined as a gradual decline in body's ability that responds to the environment. Muscle weakness, decreases in muscle mass, reduction in sensory information processing, decreases in flexibility, balance and co-ordination dysfunction are common physical dysfunctions reported in people aged over sixties.

Maintaining or improving the physical condition is of critical importance as our population ages. The World Health Organisation (WHO) estimated an increase in the number of older adults above the age of 65 years from 524 million in 2010 to 1.5 billion in 2050, which is an increase from 8% to 16% of the world's population. In addition to age related degenerations, a larger proportion of the population is expected to be affected by mobility related impairments due to chronic disease. Worldwide more than 500 million people suffer from a permanent reduction of the physical and functional capacity due to disease affecting the respiratory, cardiovascular, musculoskeletal or neurological systems.

The increasing population of elderly individuals and individuals with disease-related impaired mobility suggest that there is a need for mobility solutions to secure an independent daily life.

Effectiveness of Theraband exercises is for restoring muscle and joint functions, for building strength and conditioning. Resistance-bands exercises are hassle free because they can be used easily anywhere, unlike other resistance equipment but give the same benefits.

Theraband can last for a long time proper care and use, thus acting as a commercial way for rehabilitation. Theraband has been tested in laboratory setting above 10, 000 repetitions without any rupture. The color of the band to be used depends on the capacity of the participant and the results to be achieved with the strengthening schedule. <sup>(6)</sup>

Aerobic training has been shown to have a positive effect on discrete psychomotor skills in elderly people, but the effect of aerobic training on continuous psychomotor skills is unknown. Continuous skills comprise much of our daily activity, and if the information processing associated with these activities can be improved with aerobic training, activities of daily living also may improve. <sup>(7)</sup>

Thus the purpose of the study is to compare the effect of Theraband exercises and aerobic exercise in community dwelling elderly.

## 2. Methodology:

Data will be collected from outpatient department of various old age homes in and around Chennai only. Subjects who were above 60 years will be included in the study. Subjects will be selected based upon the fulfilment of inclusion criteria (Age 60 year and above, No visual and vestibular disorder, No pain limiting exercises performance, Ability to walk independently, No limitation of activities of daily living, No regular exercises in the previous 6 months). 30 subjects were selected. Patients were evaluated using an assessment form, Time up and Go test and Berg balance scale and patients were informed about the procedure, merits and demerits of the treatment. consent form is obtained from each patients for voluntary participation.

The purpose of the study will be explained to all subjects and consent from each subject will be obtained. The subjects were randomly assigned into two groups. Thirty subjects who fulfilled the inclusion criteria are randomly assigned as Group A, who received Theraband exercise and Group B, who received Aerobic exercise. The treatment duration was 30 Minutes per session per day, for 3 days per week for 5 weeks.

## 3. Procedure

### Group A: Theraband Exercise:

The exercises were performed two times for one set, three days per week for five weeks.

Time duration is 15 to 20 minutes

Theraband exercise were as follows;  
Knee flexion to extension while sitting,  
Knee extension to flexion while sitting,  
Hip extension to flexion while standing,  
Hip flexion to extension while standing,  
Hip adduction to abduction while standing.

### Group B: Aerobic Exercise:

The subjects in this group B will receive Aerobic exercises. 10 to 15 minutes three sessions per week for five weeks under the supervision of trained therapists. In the first week, the duration of each session was decided to be 10 minutes and then increased by 5 minutes per week so that the duration of the last session reached 30 minutes. After 10 minutes of practice in each session the participants were allowed 5 minutes rest.

1st week-10 minutes

2nd week-15 minutes

3rd week-20 minutes

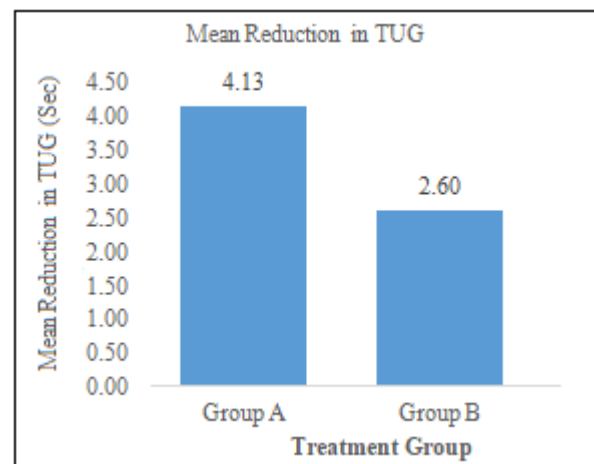
4th week-25 minutes

5th week-30 minutes

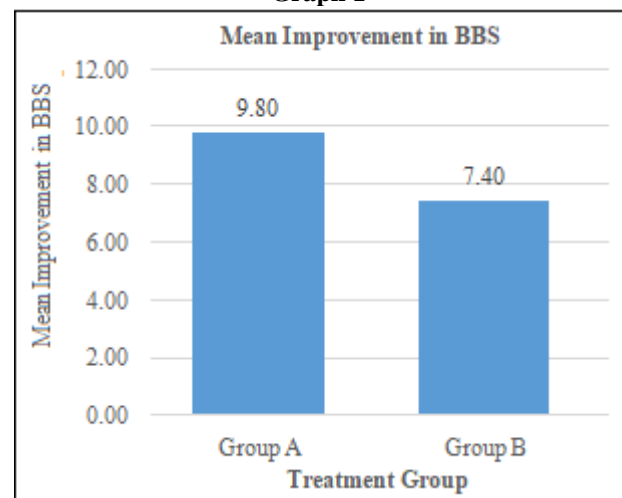
### Statistical Analysis

The present study included 30 subjects, in which 15 subjects were on Group A (Theraband Exercise) and 15 subjects were on Group B (Aerobic Exercise). [Table 1] represents demographic data of the study participants

Within group comparison of pre-test and post-test scores in both groups demonstrated reduction in TUG scores [Graph 1] with P-value = 0.000 < 0.05, BBS Score [Graph 2] with P = 0 > 0.05, TUG Score [Graph 3] with P = 0 < 0.05.



Graph 1



Graph 2

#### 4. Conclusion

The intra-group analysis showed that both the treatments are effective in terms of average reduction in the value of measure 'TUG' and in terms of average improvement in the value of measure 'BBS'. However, the inter-group analysis showed that Treatment A is effective than Treatment B in terms of average reduction in value of TUG score and in terms of average improvement in the value of BBS. Hence, we conclude that **Treatment A** is effective than **Treatment B** in terms of both the measures – TUG & BBS.

#### 5. Acknowledgement

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Table 1

S. no	Group	Age	Gender	TUG_pre	TUG_post	BBS_pre	BBS_post
1	A	61	M	15sec	11sec	35	47
2	A	64	M	18sec	14sec	37	48
3	A	62	M	17sec	13sec	38	49
4	A	60	M	14sec	11sec	39	47
5	A	60	F	14sec	11sec	40	49
6	A	62	F	16sec	12sec	36	45
7	A	60	F	19sec	13sec	38	47
8	A	61	F	18sec	13sec	34	46
9	A	66	F	20sec	15sec	36	46
10	A	60	M	14sec	11sec	42	51
11	A	65	M	16sec	12sec	37	45
12	A	63	M	16sec	12sec	38	50
13	A	60	M	15sec	11sec	44	53
14	A	61	F	17sec	12sec	38	47
15	A	62	F	16sec	12sec	37	46
16	B	65	M	19sec	17sec	31	40
17	B	60	M	16sec	13sec	38	46
18	B	71	F	20sec	17sec	27	34
19	B	63	F	18sec	15sec	40	47
20	B	61	F	15sec	13sec	34	42
21	B	60	F	15sec	12sec	39	50
22	B	68	F	18sec	15sec	37	44
23	B	64	F	16sec	14sec	41	46
24	B	67	M	15sec	13sec	32	40
25	B	60	M	14sec	12sec	36	41
26	B	70	F	20sec	17sec	29	36
27	B	63	M	15sec	13sec	30	39
28	B	61	M	15sec	12sec	35	41
29	B	62	M	17sec	14sec	33	40
30	B	64	M	18sec	15sec	31	38