

EFFECTS OF TRUNK REHABILITATION EXERCISE VERSUS SWISS BALL EXERCISE IN IMPROVING BALANCE AMONG STROKE PATIENTS

Physiotherapy

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ABSTRACT

BACK GROUND: Various studies have demonstrated the effects of therapeutic approaches used after stroke, for example-neurophysiologic, motor learning, strengthening exercises of limb muscles etc. But the evidence supporting the effectiveness of trunk rehabilitation and balance training is scarce. So this study was aimed at determining the effect of trunk rehabilitation and balance training on trunk control, sitting balance in post stroke patients.

AIM OF THE STUDY: The aim of the study was to compare the effect of trunk rehabilitation exercise versus swiss ball exercise in improving balance among stroke patients.

OBJECTIVES OF THE STUDY:

The main objectives of the study are:

- To assess the effect of trunk rehabilitation exercise in improving balance among stroke patients.
- To assess the effect of swiss ball exercise in improving balance among stroke patients.
- To compare the effectiveness of trunk rehabilitation exercises versus swiss ball exercises in improving balance among stroke patients

MATERIALS AND METHODS:

Thirty subjects were taken for the study based on inclusion and exclusion criteria. Trunk impairment scale and Berg balance scale were taken as the outcome measures.

RESULT:

The result showed extremely significant improvement in both the groups. However, it is, group A subjects who were treated with trunk rehabilitation exercise showed a significant improvement than when compared to group B subjects who were treated with swiss ball exercise.

CONCLUSION:

The study concluded that both the groups were effective in improving balance but group A is more effective than group B.

KEYWORDS

Trunk, rehabilitation, swiss ball exercise, balance, stroke

INTRODUCTION:

Stroke is the most common life threatening neurological dysfunction, which causes damage to brain. World Health Organization [WHO] – defined stroke¹ as a “rapidly developing clinical signs of focal disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin”. Balance is defined as the ability to maintain functional equilibrium. Balance⁵ is complex process which includes the integration and reception of sensory inputs and, the visual, proprioceptive and vestibular system, along with the central functions of planning and execution of movement.

Trunk control is related to measure of balance, gait and functional activity in patient with stroke. Trunk training exercises are given to improve the trunk stability and balance. Trunk training exercises² are effective to improve sitting and effective loading and activation of muscles of paretic leg. Another method is by means of the Swiss ball exercises, where there will be improved proximal trunk control³ which is prerequisite for distal limb movement and therefore prominent gait changes can be seen.

When the exercises are performed on the Swiss ball, the trunk musculature gets activated. Since the movement of a ball beneath the participants provides a postural perturbation to which muscles respond in order to maintain posture, it improves the balance. Training on swiss ball⁴ as a change in the stability, may influence trunk muscle activity due to different biomechanical demands of the exercises and hence influences the anticipatory postural adjustment which may improve trunk performance.

Balance training is aimed at retraining of postural control, development of effective specific strategies so that functional tasks can be performed in changing environmental contexts and improving gait performance after stroke⁶.

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- To compare the effectiveness of trunk rehabilitation exercises versus swiss ball exercises in improving balance among stroke patients.

Research Design And Methodology:

An experimental study design was conducted with 30 subjects within the age group of 40 to 70 years who fulfilled the inclusion and exclusion criteria.

Inclusion Criteria

- Age group 40-70 years.
- Willingness to participate in a 6 weeks study
- Either right hemiplegic and left hemiplegic patients.
- Patients with acute stroke.
- Presence of neuropathic symptoms.
- History of hypertension.

Exclusion Criteria

- Severe stroke with coma
- Recent gastrointestinal and genitourinary haemorrhage
- Recent myocardial infarction
- Previous intracranial haemorrhage
- Recent major surgery

Outcome Measures

- Trunk impairment scale (TIS)
- Berg balance scale (BBS)

Procedure:

Samples were selected based on the inclusion and exclusion criteria. The study consists of 30 both male and female hemiplegic patients within the age group between 40- 70 years. They were divided into 2 groups, namely Group A and B. After explaining the subjects about the

treatment, pre- assessment was taken prior to the commencement of treatment with outcome measure of TIS and BBS. The total population group of (n= 30) was divided into 2 groups. Trunk Rehabilitation exercise was given to Group A (n= 15) and Swiss ball exercise was given to Group B (n= 15).

Group-A: 15 SUBJECTS- Trunk Rehabilitation exercise

Group-B: 15 SUBJECTS- Swiss ball exercise

The total duration was 45minutes/day, given 3 days per week for 6 weeks.

Group A: Trunk Rehabilitation Exercise

The following exercises were trained for the patients:

- Forward reach
- Lateral Trunk Flexion
- Trunk Rotation (Twists)

Group B: Swiss Ball Exercise

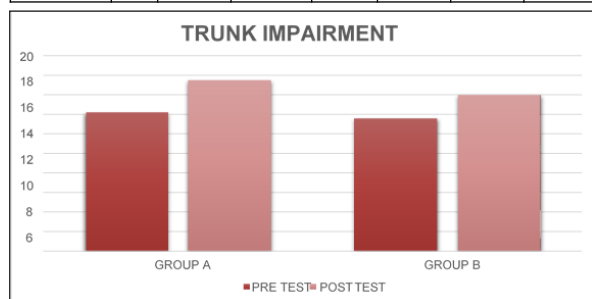
The following exercises were trained for the patients on swiss ball:

- Bridging
- Back extension
- Forward reach
- Lateral flexion
- Wall squats with knee bending against swiss ball

Data Analysis And Interpretation

Table: 1.1 Trunk Impairment Scale

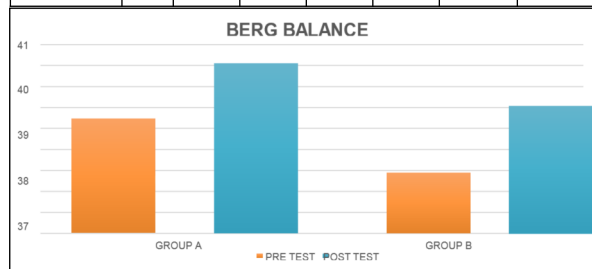
TRUNK IMPAIRMENT		MEAN		SD		T-VALUE	P-VALUE
SCALE	N	PRE TEST	POST TEST	PRE TEST	POST TEST		
GROUP A	15	14.20	17.50	2.66	2.17	3.0393	0.0071
GROUP B	15	13.60	16.00	2.32	1.94	2.5082	0.0219



Graph: 1.2: Trunk Impairment Scale

Table: 2.1: Berg Balance Scale

BERG BALANCE		MEAN		SD		T-VALUE	P-VALUE
SCALE	N	PRE TEST	POST TEST	PRE TEST	POST TEST		
GROUP A	15	37.50	40.10	3.51	2.96	2.2036	0.0408
GROUP B	15	34.90	38.10	3.14	2.88	1.9296	0.0696



Graph: 2.2: Berg Balance Scale

Results:

- The TIS value of Group A is statistically significant at $p < 0.0071$
- i.e. Trunk Rehabilitation Exercises are effective in improving balance among stroke patients.
- The BBS value of Group A is statistically significant at $p < 0.0408$
- i.e. Trunk Rehabilitation Exercises are effective in improving balance among stroke patients.
- The TIS value of Group B is statistically significant at $p < 0.0219$

- i.e Swiss Ball Exercises are effective in improving balance among stroke patients.
- The BBS value of Group B is statistically significant at $p < 0.0696$

i.e Swiss Ball Exercises are effective in improving balance among stroke patients

On comparison of both the groups A and B, Group A is comparatively more significant than Group B in both the outcome measures TIS and BBS.

DISCUSSION:

The aim of the study was to compare the effect of trunk rehabilitation exercise versus swiss ball exercise in improving balance among stroke patients. The study consists of 30 both male and female hemiplegic patients within the age group between 40- 70 years. They were divided into 2 groups, namely Group A and B. Trunk Rehabilitation exercise was given to Group A (n= 15) and Swiss ball exercise was given to Group B (n= 15). The outcome measures used were Trunk Impairment Scale (TIS) and Berg Balance Scale (BBS). The result of the study revealed that trunk rehabilitation exercise more effective than Swiss ball exercise in improving balance among stroke patients. A study by Verheyden et.al also favors this hypothesis. In their study, 10 hrs of additional task specific trunk exercises along with regular rehabilitation had improved the trunk control in patients with sub-acute stroke. Training of Swiss ball⁸ has an effect on trunk muscle activity as it influences the anticipatory postural response which may influence the trunk control. A Quasi experimental study by Nayak et.al concludes that Swiss ball training improves the trunk control after stroke.

After trunk rehabilitation⁷, the majority of the participants scored better in dynamic double and single stance items of the BBS, Furthermore, more studies by Dean et.al found that, there was an improvement of standing balance^{9,10} following dynamic sitting balance training in patients with stroke.

CONCLUSION:

It is concluded that the both Trunk Rehabilitation Exercises and Swiss Ball Exercises were effective in improving balance among stroke patients. However, it is, on comparison of both the groups A and B, Group A trained with Trunk Rehabilitation Exercises was comparatively more significant than Group B trained with Swiss Ball Exercises.

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