**International Journal of Current Advanced Research**
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 8; Issue 02(C); February 2019; Page No.17331-17334
DOI: http://dx.doi.org/10.24327/ijcar.2019. 17334.3284

**Research Article**

# A CLINICAL STUDY ON BALANCE BOARD TRAINING (BBT) FOR PATIENTS WITH HEMIPLEGIA – OCCUPATIONAL THERAPY REHABILITATION

**Kalaichandran K**

Department of Physical Medicine Rehabilitation, RMMCH, Annamalai University, T.N, India

**A R T I C L E I N F O**

**Article History:**
Received 6th November, 2018
Received in revised form 15th December, 2018
Accepted 12th January, 2018
Published online 28th February, 2019

**Key words:**
Hemiplegia, Balance Board Training (BBT), Functional Reach Test
FRT: Functional Reach Test

**A B S T R A C T**

**Aim:** The aim of the study was to find out the efficacy of Balance Board Training (BBT) programme for patients with hemiplegia
Methods: Thirty six subjects with hemiplegic patients who are poor balance were selected for this study. FRT Functional Reach Test was used for the objective measurement of patients with poor balance. The pre and post therapy values were statistically analyzed on the effect of balance board training (BBT) programme for patient with hemiplegia.
**Result:** The statistical analysis of functional reach test scores between pre-treatment mean value is 5.333 S.D is 0.687 and post-treatment mean value is 9.333, S.D 1.878, paired t-test value is -15.4346 and P value is <0.000. The result is significant at P (<0.0001).
The statistical analysis shows that, there is significant difference between pre and post stages. Balance was comparatively better with early stages of hemiplegia.
**Conclusion:** Balance Board Training (BBT) programme can be used effectively as one of the interventions in occupational therapy rehabilitation, improves balance in patients with hemiplegia



## INTRODUCTION

Stroke is a preventable and treatable disease. It can present with the sudden onset of any neurological disturbance, including limb weakness or numbness, speech disturbance, visual loss or disturbance of balance. Over the last two decades, a growing body of evidence has overturned the traditional perception that stroke is simply a consequence of aging which inevitably results in death or severe disability.[1]

Stroke is an acute onset neurological dysfunction due to abnormality in cerebral circulation with resultant signs and symptoms that correspond to involvement of focal areas of the brain. Stroke is one of the most neurological disorders leading to chronic disability. Hemiplegia resulting from stroke has motor, sensory, balance, speech and percepteuo-cognitive deficits.[2]

Falls are among the most common and serious problems facing persons in hemiplegia. Even if survivors of stroke are ambulatory, there is an increased risk of falling mainly on paretic side, difficulty in walking on uneven terrain etc., it is associated with considerable morbidity, reduced functioning and prolonged hospital stays.[2,3]Hemiplegics have decreased trunk control, poor bilateral integration and impaired automatic postural control resulting in balance dysfunction. Postural instability has been suggested as one of the main causes leading to falls in this population. The incidence of falls ranging from 25% to 75% among stroke patients residing in different settings, with greater incidence of falls occurring after discharge to home.[3, 4]

The functional reach test was developed by Duncan – *et al* as a screening tool to assess fall in hemiplegic patients score of less than 7 inches are indicative of a frail who may have limited mobility activities of daily living (ADL) skills and demonstrates increased risk of fall.[4]
The recovery of the ability to maintain balance during activities of daily living is essential functional independence and safety of these patients.

Literatures suggest that balance training helps to prevent falls in hemiplegic patients, only a few studies have mentioned about the balance board training programme for patients with hemiplegia [2 - 6]

Therefore, in this study, evaluation done on the efficacy of Balance Board Training (BBT) programme for patients with hemiplegia

### *Need for the Study*

To avoid fall in hemiplegic patients, Balance Board Training (BBT) programme is essential to avoid certain complications such as Fracture, Head injury, Laceration

**Corresponding author:* **Kalaichandran K**
Department of Physical Medicine Rehabilitation, RMMCH, Annamalai University, T.N, India

# METHODOLOGY

# METHODS

This study includes 36 hemiplegic patients with poor balance were selected and these patients were identified from a list obtained from medical record division of the hospital in and around Chidambaram.

***The Sample was Selected on the Following Criteria***

***Inclusion Criteria***

- Patients with an informed consent
- Age group between 30-70 years of only hemiplegic patients
- Both male and female subjects
- No side limitation
- Able to communicate

***Exclusion Criteria***

- Neurological diseases other then hemiplegia
- Altered visual and sensory dysfunction
- Functional reach test scores of more than 7 inches

***Settings***

Hospital and Patients home setup

***Evaluation Procedure***

All the 36 patients were screened by using functional reach test (**FRT**) as a tool. A leveled Yardstick is mounted on the wall and positioned at the patients shoulder height (acromion).The patient stands next to the wall with the shoulder flexed to 90 and elbow extended. The hand is fisted. An initial measurement is made of the position of the 3rd metacarpal along the yardstick. The patient is then instructed to lean as much as forward as possible without losing balance or taking a step. A measurement is then subtracted from the initial measurement. The three trials of functional reach test where performed and the average of all three trials were recorded.

***Training Procedure***

After screening, patients with poor balance were identified and trained by Balance Board Training (BBT) programme, balance were measure using record sheet and scoring key.

***Protocols***

Frequency : Twice weekly for 8 weeks.
Duration : 45 minutes

At the end of every two week, functional reach test will be taken and recorded in the given record sheet. This is continued for 8 consecutive weeks and finally the scores of functional reach test will be statistically analyzed on the effect of Balance Board Training (BBT) programme

# MATERIALS

***The Materials used for the Study are***

- ✓ Functional reach test
- ✓ A record sheet for recording functional reach test score
- ✓ Resources such as inch tape, marker etc.

***Data Analysis and Results***

**Table 1** Functional Reach Test scores pre and post treatment (in inches)

| Sl no | Gender with age | Pre-test scores | Post – test values | | | |
|---|---|---|---|---|---|---|
| | | | Trial I | Trial II | Trial III | Total (average of trial 2 and 3 only) |
| 1 | M / 47 | 6 | 6 | 9 | 11 | 10 |
| 2 | M / 51 | 5.5 | 6.5 | 8.5 | 11.0 | 9.75 |
| 3 | M / 49 | 5 | 5 | 6 | 7 | 6.5 |
| 4 | F / 53 | 4.5 | 6 | 7.5 | 8.5 | 8 |
| 5 | M / 61 | 6.5 | 7 | 9.5 | 10 | 9.75 |
| 6 | M / 49 | 6 | 6 | 7.5 | 10.5 | 9.0 |
| 7 | M / 63 | 5.5 | 6.5 | 9.5 | 12.5 | 11 |
| 8 | M / 54 | 5 | 6 | 8 | 10 | 9 |
| 9 | M / 44 | 5 | 5 | 7 | 10 | 8.5 |
| 10 | F / 49 | 6 | 7 | 10 | 14 | 12 |
| 11 | M / 52 | 4 | 5 | 7 | 10 | 8.5 |
| 12 | M / 61 | 5 | 7 | 9 | 11 | 10 |
| 13 | M / 47 | 6 | 6 | 9 | 11 | 10 |
| 14 | M / 51 | 5.5 | 6.5 | 8.5 | 11.0 | 9.75 |
| 15 | M / 49 | 5 | 5 | 6 | 7 | 6.5 |
| 16 | F / 53 | 4.5 | 6 | 7.5 | 8.5 | 8 |
| 17 | M / 44 | 5 | 5 | 7 | 10 | 8.5 |
| 18 | F / 49 | 6 | 7 | 10 | 14 | 12 |
| 19 | M / 52 | 4 | 5 | 7 | 10 | 8.5 |
| 20 | M / 61 | 5 | 7 | 9 | 11 | 10 |
| 21 | M / 61 | 6.5 | 7 | 9.5 | 10 | 9.75 |
| 22 | M / 49 | 6 | 6 | 7.5 | 10.5 | 9.0 |
| 23 | M / 63 | 5.5 | 6.5 | 9.5 | 12.5 | 11 |
| 24 | M / 54 | 5 | 6 | 8 | 10 | 9 |
| 25 | M / 47 | 6 | 6 | 9 | 11 | 10 |
| 26 | M / 51 | 5.5 | 6.5 | 8.5 | 11.0 | 9.75 |
| 27 | M / 49 | 5 | 5 | 6 | 7 | 6.5 |
| 28 | F / 53 | 4.5 | 6 | 7.5 | 8.5 | 8 |
| 29 | M / 44 | 5 | 5 | 7 | 10 | 8.5 |
| 30 | F / 49 | 6 | 7 | 10 | 14 | 12 |
| 31 | M / 52 | 4 | 5 | 7 | 10 | 8.5 |
| 32 | M / 61 | 5 | 7 | 9 | 11 | 10 |
| 33 | M / 61 | 6.5 | 7 | 9.5 | 10 | 9.75 |
| 34 | M / 49 | 6 | 6 | 7.5 | 10.5 | 9.0 |
| 35 | M / 63 | 5.5 | 6.5 | 9.5 | 12.5 | 11 |
| 36 | M / 54 | 5 | 6 | 8 | 10 | 9 |

With a view to find the effect of fall prevention training programme in increasing the functional reach test score of the responding, the measurements had been obtained. On the functional reach test scores before and after treatment (in every two week for 6 consecutive weeks) indicated by pre and post therapy values. To examine whether the treatment has produced significant results, paired‘t’ test has been applied for the data given in table – 1A. The null hypothesis to be tested is H0: M1=M2, Which implies that the functional reach test scores do not differ significantly before and after treatment. The results of paired `t’ test are given in table 1A

**Table 1 A** Comparison of Functional Reach Test Scores between Pre and Post treatment in Trial I, II & III

| Functional reach test scores (inches) | Mean | S.D | Paired t-test (t-value) | P-value |
|---|---|---|---|---|
| Pre- test | 5.333 | 0.687 | | |
| Post-test 1st Trial (end of 4th week) | 6.0833 | 0.5347 | 4.875 | P<0.0001 (S.S) |
| Post-test 2nd Trial (end of 6th week) | 8.2083 | 1.3940 | 10.38 | P<0.0001 (S.S) |
| Post-test | 10.4583 | 0.2854 | 12.64 | |

| | | | | |
|---|---|---|---|---|
| 3rd Trial (end of 8th week) | | | | P<0.0001 (S.S) |
| Post-test (Average of trial 2 and 3 only) | 9.333 | 1.878 | -15.4346 | P<0.0001 (S.S) |

The above table reveals that the mean, S.D, paired t-test and p-value of the functional reach test scores between pre-treatment and post-treatment in Trial I, II & III.

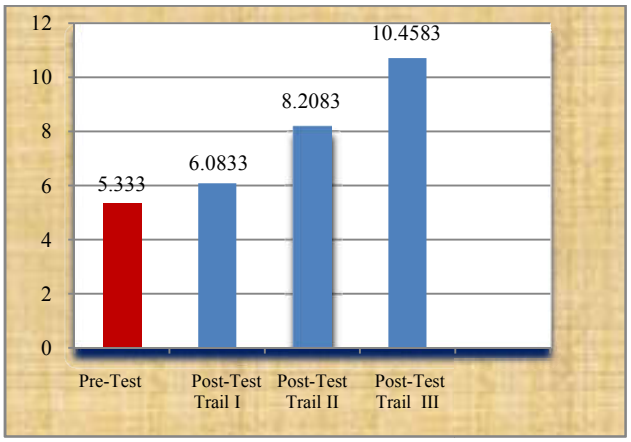
The functional reach test scores has shown an increase in the mean values between pre-treatment and post-treatment in Trail I, II & III (Graph - 1).

**Table 2** Comparison of Functional Reach Test Scores between Pre and Post treatment

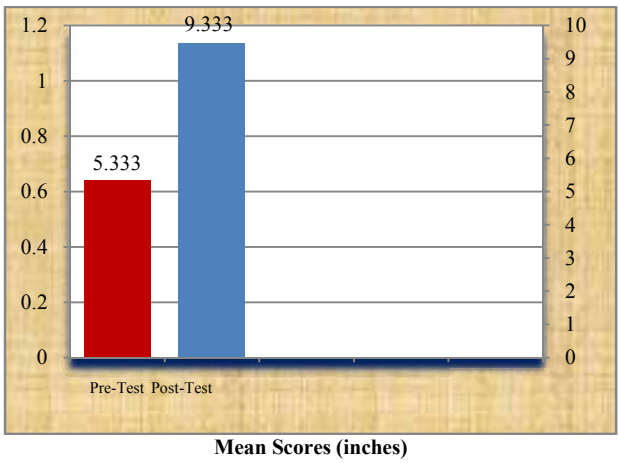
| Functional reach test scores (inches) | Mean | S.D | Paired t-test (t-value) | P-value |
|---|---|---|---|---|
| Pre- test | 5.333 | 0.687 | | |
| Post-test (Average of trial 2 and 3 only) | 9.333 | 1.878 | -15.4346 | P<0.0001 (S.S) |

The functional reach test scores have shown an increase in the mean values of pre-treatment and post-treatment (Graph - 2). The table shows statistically significant result between pre-treatment and post treatment in IV weeks at P<0.001 level.

It is observed that, the t value is grater then the table value, the null hypothesis is getting rejected. It implies that there is significant difference in the mean values prior to and after treatment. Hence, it is concluded that, the treatment significantly improve functional reach test scores.




**Graph 1** Comparison of functional reach test scores between pre-treatment and post-treatment in Trail I, II & III Functional Reach Test Scores (in inches)




**Graph II** Comparison of Functional Reach Test Scores between Pre and Post treatment Functional Reach Test Scores (in inches)

## DISCUSSION

The aim of the study was to find out the efficacy of Balance Board Training (BBT) for patients with hemiplegia

In this study, out of 36 patients, 30 male and 6 female patients were selected and treated. 24 patients were right sided and 12 patients were left sided. The duration ranging from 2 months to one year, all of them were ambulant. For this study, evaluation done on the efficacy of balance board training programme for patient with hemiplegia,

The statistical analysis of functional reach test scores between pre-treatment mean value is 5.333, S.D is 0.687 and post-treatment (VIII$^{th}$ Week) mean value is 9.333, S.D 1.878, paired t-test value is -15.4346 and P value is <0.000. The result is significant at P (<0.0001). This statistical analysis shows that according to functional reach test, there is significant difference between early stages than later stages. The rate of falls was comparatively reduced for patients with hemiplegia.

Wancy Lundebjery stated that, intrinsic factors such as balance disorder, lower extremity weakness, functional impairment or external factors such as poor lighting, loose carpets and lack of bathroom safety equipment etc., may increase the risk of falls. Many of these factors are controllable. There are no studies that address with control of these contributing factors. Hence, all forms of therapy were available, this study was done to justify balance board training programme for patient with hemiplegia,

### *Limitation and Recommendations*

### *Limitation*

One serious limitation of the functional reach test is that it measures sway in only one direction (forward)

### *Recommendations*

- ✓ Balance Board Training programme can be compared with Fall prevention training programme
- ✓ Study can be done on the factors associated with fall risk and its prevention

## CONCLUSION

Balance Board Training (BBT) programme can be used effectively as one of the interventions to improve balance and preventing falls in patients with hemiplegia.

## References

1. Stroke: National Clinical Guideline for Diagnosis and Initial Management of Acute Stroke and Transient Ischaemic Attack (TIA). NICE Clinical Guidelines, No. 68 National Collaborating Centre for Chronic Conditions (UK).London: Royal College of Physicians (UK); 2008. https://www.ncbi.nlm.nih.gov/books/NBK53302/
2. kalaichandran k Effectiveness of Fall Prevention Training Programme for Patients with Hemiplegia, *Indian journal* .com http://www.indianjournals.com/ijor.aspx?target=ijor:ijpot&volume=9&issue=3&article=038
3. Catherine A. Trombly - Occupational Therapy for physical dysfunction - 5th Edition. William and Wilkins.

4. Susan B.O' Sullivan: Physical rehabilitation – Assessment and treatment: 4th Edition 2001: Stroke:520
5. Diane M. Wrisley, Kathryn E. Brown Therapeutic exercise: treatment planning for progression Balance: 160 – 162.
6. Terry haines Dr.Richard osbrone: 2000:- effectiveness of an exercise program in addition to usual subacute cares for the prevention of falls. 1 – 18
7. Susan B.O' Sullivan: Physical rehabilitation – Assessment and treatment: 4th Edition 2001: Assessment of Motor Function: 196.
8. Terry P. Haines, Kim L Bennel, effectiveness of targeted falls prevention programme in subacute hospital setting: randomized control trial BMJ 2004: 328: 676, 1 – 6.
9. DARCY a. Umphreed: Neurological rehabilitation fourth edition – 2001, Alternative and complementary therapies: Beyond traditional approaches to intervention in neurological diseases, syndromes and disorders: Taichi p;no – 968
10. Duncan PW, student SK.S, *et al* functional reach predictive validity in a sample of elderly male veterans. J Gerontol 1992: 47: M 93-8.
11. Wolfson L, Whipple R, *et al*; Training balance and strength in the elderly to improve function. JAM heriatr soc 41 : 341- 343, 1993.

**How to cite this article:**

Kalaichandran K (2019) 'A Clinical Study on Balance Board Training (bbt) for Patients with Hemiplegia – Occupational Therapy Rehabilitation', *International Journal of Current Advanced Research,* 08(02), pp.17331-17334.
DOI: http://dx.doi.org/10.24327/ijcar.2019.17334.3284

*******