**Original Article**

# Effects of individual task specific training verses group circuit training on balance and ambulation in sub-acute stroke

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**Objective:** To determine if the group based task-oriented training would promote better balance and ambulation than in the form of individual therapy session of the same tasks and can be replaced by the usual individual based treatment in sub-acute stroke.

**Methodology:** This Randomized Controlled Trial included a total of 22 patients who had stroke less than three months of onset and were assigned in one of two groups. One group received group based task oriented circuit training and the second group received task oriented circuit training on individual basis. The treatment had 3 sessions of 50 minutes each for six weeks. We measured walking endurance, walking speed, balance and ambulation. We used motor assessment scale, Berg balance scale, dynamic gait index, ten meter walk test and six minutes' walk test. Data analysis was performed with SPSS version 16.

**Results:** All primary outcome measure were found to be equally improved in the two groups. But within group analyses showed improvement in the variables among two groups. The scores for berg balance scale, motor assessment scale, and dynamic gait index were at a similar level before and after the interventions.

**Conclusion:** Even the simpler form of group based or class based task oriented circuit training is equally effective in improving the balance and the walking ability, walking competency, walking endurance as the individual based task oriented circuit training. The group based treatment can be more efficient way of delivery of rehabilitation to a large number of patients and can be incorporated into the everyday practice. (Rawal Med J 202;45:233-235).

**Keywords:** Stroke, Circuit-Based Exercise, Stroke Rehabilitation, Gait

## INTRODUCTION

Stroke is the second leading cause of death and first leading cause of disability worldwide. Approximately each year 6.7 million people die worldwide.[1] Seventy percent of strokes occur in low and middle-income countries.[2] In Pakistan, the estimated incidence is greater than the rest of the south Asian countries, which is almost 250/100,000 translating to 350,000 cases every year.[3]

Group based therapy can reduce the burden of stroke care by providing stroke rehabilitation to a large number of patients treated by a relatively small number of physiotherapists.[4] The focus of task oriented therapy was on large number of repetitions of the activity.[5] Motor relearning program was designed to strengthen the affected lower limb musculature, improve gait speed, endurance and balance by practicing activities related to walking and were proved to improve walking competency.[6] Benefit of group training is the use of shorter time for intensive rehabilitation especially to a setting where there is a busy outpatient department.[7] Another benefit is motivation by adding a competition component to practice situation.[8] The objective of this study was to determine effects of task oriented circuit class training program on balance and walking competency in sub-acute stroke.

## METHODOLOGY

This study Quasi experimental study was carried out on sub-acute stroke survivors presenting in the Out Patient Department (OPD) of Armed Forces Institute of Rehabilitation Medicine from January to July 2016. Eighty-seven were screened and 22 patients met our inclusion criteria, out of which 11 were included in the control group and 11 in the experimental group by employing purposive convenient sampling technique. Patients aged 50 to 70 years, with stroke onset less than 3 months, who

were able to stand and walk for some distance with or without an assistive device were included in the study.

Once the patient were randomly allocated in either group, they were given a practical demonstration by researcher and baseline data was collected. A circuit training program was designed focusing on the major impairments of the stroke. This circuit was comprised of five stations including Sit to Stand training, Step up forward, backwards and sideways, trunk control and rotation, reaching out in various directions collecting an object and passing on other side.

Both groups practiced same circuits except the experimental group performed these tasks in the form of groups of two or more patients while the control group performed on individual basis. Patients were required to spend five minutes on each stations in order to provide intensive treatment experience and more frequent repetitions. Every week there was an increase in difficulty in the task which was in an attempt to increase challenge to the patient.

To quantify the walking competency, we used Motor Assessment Scale (MAS), Time Up and Go,[9] 10 Meter walk (10MW) test, 6 minutes' walk (6MW) test, Functional reach test, Dynamic Gait index (DGI), Ashworth's scale and Berg balance scale (BBS). Evaluations were performed once weekly for all the participants, the difference of outcome measures within and inter groups.

**Statistical analysis:** Data analysis was performed by using independence t-test and mann whitney test with the help of SPSS version 21.

## RESULTS

Patients included in this study was aged 52 to 72 years with mean age of 60.81.. Demographic data is presented in Table 1. In order to compare the differences between the groups independent T test was applied to the Berg balance scale, dynamic gait index, 10MWT and TUG at a 95% confidence interval and the results are displayed in Table 2. Table 3 gives results of mann whitney test for the motor assessment scale, functional reach test, modified ashworth scale, and six minute walk test.

**Table 1. Demographics.**

| Variables | Total | Exp group | Control |
|---|---|---|---|
| **Gender** | | | |
| Male | 13 (59.1) | 7 (64) | 6 (55) |
| Female | 9 (40.9) | 4 (36) | 5 (45) |
| **Stroke** | | | |
| Ischemic | 16 (72.7) | 7 (64) | 9 (82) |
| Hemorrhagic | 6 (27.3) | 4 (36) | 2 (18) |
| **Syndrome** | | | |
| MCA | 9 (40.9) | 7 (64) | 2 (18) |
| PCA | 7 (31.8) | 3 (27) | 4 (36) |
| ACA | 6 (27.3) | 1 (9) | 5 (45) |
| **Hemiplegia** | | | |
| Right | 11 (50) | 7 (64) | 4 (36) |
| Left | 11 (50) | 4 (36) | 7 (64) |

**Table 2. Statistics and P-values from the independent T test.**

| Variable | Experimental Group | Control group | P-Value |
|---|---|---|---|
| BBS Pre Test | 12.27±1.19 | 13.45±3.05 | 0.252 |
| BBS Post Test | 40.91±1.22 | 40.55±5.16 | 0.363 |
| DGI Pre Test | 2.72±1.55 | 3.45±1.69 | 0.307 |
| DGI Post Test | 16.91±3.14 | 16.55±3.11 | 0.788 |
| TUG Pre Test | 23.55±1.5 | 23.55±1.3 | 1.00 |
| TUG Post Test | 13.1±1.38 | 13.63±1.96 | 0.460 |
| 10MWT Pre Test | 49.18±6.62 | 47.45±4.59 | 0.485 |
| 10MWT Post Test | 36.18±8.53 | 35.27±5.47 | 0.769 |

**Table 3. Statistics showing median, and P value from Mann Whitney test.**

| Variable | Median ± IQ (Experimental) | Median ± IQ (Control) | P-Value |
|---|---|---|---|
| MAS Pre Test | 7.0±0 | 7.0±2.0 | 0.551 |
| MAS Post Test | 19.0±5.0 | 17.0±5.0 | 0.045 |
| FRT Pre Test | 7.0±3.0 | 6.0±2.0 | 0.208 |
| FRT Post Test | 15.0±12.0 | 14.0±6.0 | 0.692 |
| Ashworth scale Pre Test | 2.0±1.0 | 2.0±0 | 0.136 |
| Ashworth Scale Post Test | 1.0±1.0 | 1.0±1.0 | 0.824 |
| SMWT Pre Test | 180.0±22.0 | 175.0±31.0 | 0.716 |
| SMWT Post Test | 192.0±25.0 | 199.0±22.0 | 0.519 |

## DISCUSSION

There was no significant difference in the outcome measures among groups while a significant difference within the groups in the pre and post intervention data. At retest, exercise participants had improved significantly more than their control counterparts on measures of balance while stepping, sit to stand and gait. There were no clinically

important or statistically significant between-group differences at retest for the measures of strength (knee extension and flexion), balance while standing or minimal sit-to-stand height. [10]

The results of our study are also resembling with a study which used task oriented circuit training in the form of class for the stroke survivors, as they found significant difference in the walking speed of subjects in the 10 meter walk test in contrast to the control group.[6]

Another study found no statistical significant or clinical effective difference among the circuit class based therapy and the individual type of task oriented therapy.[11] In this study, it was evident that more patients were able to walk independently at the end of program and were more satisfied about the rehabilitation than other individuals.

Circuit class therapy can also be assumed as the cost effective method of treatment but no randomized controlled trial was available in the Pakistan. Therefore, in future incorporating the cost effectiveness of circuit class therapy in the other research aspect could be more beneficial in deciding the common use of circuit class therapy. In circuit class therapy the participants had more time to be involved in practicing the specified task which in routine physiotherapy is often neglected.

The patients included in this study and other similar studies conducted in past selected those participants who were comparatively active, good compliance with the treatment, have milder form of impairments. But clinically we confront to other forms of impairments as well. The common ones are cognitive impairments and aphasia. While designing a circuit class therapy program there should also be some activities include which these patient can also take part.

## CONCLUSION

There were similar results in terms of the effects of class based task oriented circuit training for the experimental group and individual task oriented circuit training in the balance and ambulation. Group circuit training was feasible, effective, and safe for use in the early phase of rehabilitation such as sub-acute stage.

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