

Effectiveness of Treadmill Training on Quality of Walking in Post Stroke Subjects

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Abstract: **Introduction:** Stroke is defined by World Health Organization as a clinical syndrome characterized by rapidly developing signs of focal or global disturbance of cerebral function. Stroke is the leading cause of morbidity and mortality in elderly people according to Cheng et al., approximately 30% of stroke survivors are permanently disabled and require assistance in their daily activities. Stroke survivors commonly have impaired motor control and balance that seriously affect their walking ability leading to dependence. **Objective:** To find out whether treadmill training influences walking ability in stroke patients. **Method:** The study consisted of 12 Subjects participating in the study. The subjects were familiarized with treadmill walking prior to the treatment session. All the data were collected such as age, gender, height, weight and BMI was calculated. Pre and Post data collection forms were filled as per requirement Outcome measure were collected as per the Wisconsin gait scale Pre and Post score. **Result:** Result showed improvement Wisconsin gait scale score. **Conclusion:** Based on the statistical results and interpretations it was concluded that there is extremely significant difference in the Pre and Post Treatment Values. There is significant effectiveness of treadmill training on quality of walking in post stroke subjects.

Keywords: Treadmill, Wisconsin Gait Scale

1. Introduction

Stroke is defined by World Health Organization as a clinical syndrome characterized by rapidly developing signs of focal or global disturbance of cerebral function. Stroke is the leading cause of morbidity and mortality in elderly people. According to Cheng et al., approximately 30% of stroke survivors are permanently disabled and require assistance in their daily activities. Stroke survivors commonly have impaired motor control and balance that seriously affect their walking ability, leading to dependence.³

Gait training is therefore a major goal in stroke rehabilitation. New modalities have been introduced for gait rehabilitation in patients with stroke.³ If walking performance is poor after stroke, community activity may be limited and people may become household bound and isolated from society. One of the main aims of rehabilitation is to enhance community ambulation skills.¹ After stroke, individuals typically demonstrate reduced walking speed, decreased stride length and cadence.¹ Walking ability is an important element for independent living in stroke patients. A systemic review of ambulatory people after stroke reported mean stride length ranging from 0.50 to 0.64 m compared with 1.1 to 1.4 m in healthy. Previous studies have also reported mean cadence of 50 to 63 steps/minute compared with 102 to 114 steps/minute in healthy.¹ In summary walking parameter in ambulatory people after stroke are approximately half of the values expected in older.¹ Stride length is useful for determining how far you will walk in a given number of steps. It is measured from heel to heel or the distance between 2 successive placement of same foot and determine how far you walk with each step.⁷ Cadence is defined as number of steps per min. As stride length and cadence demonstrate how fast one can walk. Only et al demonstrated that treadmill training is a type of forced use and that it also could improve both quality and quantity aspects of walking. Current motor learning

principles suggest that optimal motor recovery is driven by task-specific repetitive practice⁶. Treadmill walking is well placed to provide task-specific repetitive practice as it permits the continuous practice of complete gait cycle. However treadmill walking may not be comparable to over ground walking⁷.

This study is an initial attempt to find out or investigate the effect of treadmill walking practice by examining the over ground walking immediately following treadmill walking practice. Treadmill walking will be structured to increase stride and cadence. To increase stride length, the treadmill will be run at comfortable speed and participant will be instructed to walk as slowly as possible

2. Material and Methods

Prior to the treatment the data collection sheet was filled with required information and assessment. All subjects were familiarized to treadmill walking prior to study participation. Duration of treadmill training without inclination was 10-15 minutes with the comfortable speed according to subjects until they reported feeling comfortable. The intervention were comprised of 4 weeks (1 session 5 days/week). Rest period were provided as required. A treadmill safety stop cord was attached to participants.

Interventions

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2.1 Outcome measures

Wisconsin Gait Scale

The Wisconsin Gait Scale is a useful tool to rate qualitative gait alterations of post-stroke hemiplegic subjects and to assess changes over time during rehabilitation training. It may be used when a targeted and standardized characterization of hemiplegic gait is needed for tailoring rehabilitation and monitoring results.

3. Statistical Analysis

Statistical analysis was done using

- 1) INSTAT software.
- 2) Inter group comparison (between group) using unpaired t test.

4. Result

The results shows comparison of mean values and standard deviation of scores of pre and post Wisconsin gait scale score. The values were compared by applying INSTAT software with paired t test. Pre-treatment (mean=30.83 and SD=3.15) and post-treatment (mean=27.58 and SD=4.77) values show that there is extremely significant difference in the Pre and Post Treatment Values. ($P < 0.0002$ and $t=5.376$)

Variable Sex M=6& F= 6 Age (years) 40-60 years

In the present study pre-interventional mean of Wisconsin gait scale score mean=30.83. whereas post- interventional mean of Wisconsin gait scale score mean=27. Post intervention analysis showed significant difference between pre and post Wisconsin gait scale score

5. Discussion

The study "Effectiveness of treadmill training on quality of walking in post stroke subjects was conducted to compare and find out the pre and post Wisconsin gait scale score to assess the improvement in gait parameters in post stroke subjects. Stroke is the leading cause of morbidity and mortality in elderly people. Stroke survivors commonly have impaired motor control and balance that seriously affect their walking ability, leading to dependence. One of the main aims of rehabilitation is to enhance community ambulation skills. After stroke, individuals typically demonstrate reduced walking speed, Decreased stride length and cadence. Walking ability is an important element for independent living in stroke patients. Study was conducted on 12 subjects. Pre consent was taken from each participant.

Treadmill walking is well placed to provide task-specific repetitive practice as it permits the continuous practice of complete gait cycle. However treadmill walking may not be comparable to over ground walking. This study is an initial attempt to find out or investigate the effect of treadmill walking practice by examining the over ground walking immediately following treadmill walking practice. This study shows significant difference in the pre and post treatment values. The present study supported null hypothesis which stated that there is significant difference of the effectiveness of treadmill training on quality of walking

in post stroke subjects. This was confirmed using statistical analysis by using 'Unpaired t-test'. In the present study, we found that after intervention there was significant improvement in the outcome score of Wisconsin gait scale. The values show that there is extremely significant difference in the Pre and Post Treatment Values. ($P = < 0.0002$ and $t=5.376$).

6. Conclusion

In conclusion, the present study provided evidence to support the use of treadmill training using Wisconsin gait scale to improve and assess quality of walking in post stroke subjects.

7. Future Scope

The Sample size used in this study was relatively small. This makes it difficult to extrapolate the results on general population. This study can be done on larger population.

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