

Effects of Joints Weight Bearing Exercises Combine with Range of Motion Exercises on Affected Limbs in Patents with Stroke

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Received date: May 15, 2017; Accepted date: May 31, 2017; Published date: May 31, 2017

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Abstract

Background: Weight bearing exercises have great role in joint nutrition, bone density and proprioception thus helping in neuro muscular control.

Objective: Objective of study was to find the effects of weight bearing exercises on affected limbs on neuromuscular control in patients with recent stroke.

Methodology: We selected 05 patients, 03 males and 02 females, with recent stroke on volunteer basis with informed consent. Inclusion criteria was recent stroke 10 to 15 days back, age between 25-35, both male and female, no previous history of fracture, no significant history of osteoporosis, hemiplegic right or left, intact vision and intact cognition. Selection of subjects was made by visiting to medicine and ICU wards of different hospitals including government and private hospitals of city. Patients were informed about the treatments protocol free of costs. Setting of study was outdoor physical therapy clinic. Duration of study was 02 months, 05 days in a week, 1 h daily. Interventions were weight bearing on affected limb with range of motion exercises. Standing time, 06 minutes' walk test, functional independent measure and disability rating scale were outcome measurement tools. Study design was pre to post trial. Pre-intervention measure was measured 03 to 05 days before starting the interventions on all outcome measurements tools. Post intervention measure was measured after 02 months. Pre to post measurements were compared by using Wilcoxon signed rank test. **Results:** Pre interventional score on standing time test, 06 minutes' walk test, functional independent measure and disability rating scale were 0, 0, 25 ± 05, 05 ± 01 respectively. Post interventional score on standing time test, 06 minutes' walk test, functional independent measure and disability rating scale were 129 ± 09, 38 ± 05, 94 ± 09, 18 ± 02 respectively. Wilcoxon signed rank statistics (0.000) showed significant change.

Conclusion: Study conclude that weight bearing exercises have significant role to improve standing time, walking distance, balance, motor skills and functional skills in patients with recent stroke.

Keywords: Stroke; Hemiplegia; Paralysis; Range of motion; Weight bearing; FIM

Introduction:

In 2008 Stroke was the fourth leading cause of death in United State, after that there is significant decrease in mortality rate due to stroke [1]. Stroke serves as long term disability cause. Long term functional dependence depends on cognitive decline immediate after stroke [2]. According to American stroke association there is a significant increase in stroke survivors from early 1970 [3]. According to center for disease control and prevention (CDC) obtained from 2006 to 2010 there is no further increase in self-reported stroke prevalence [1]. According to WHO estimation Stroke risk is found increase both in male and female in age 25-85 years [4]. Almost 60% people suffering from stroke have moderate impairment that can be treated by using rehabilitation techniques [5].

Hypertension and other cardiac diseases are major contributing risk factors for stroke. Physical activity and physical fitness tends to maintain blood pressure and prevent from other disease of heart [6]. Physical activity improves long term outcome of stroke and decrease the economic burden as it increases the concentration of nitric oxide which act as a vasodilator for blood vessels and lower blood pressure [7]. Increased BMI and weight are major risk factors for ischemic stroke [8]. Physical activity is directly proportional to decrease in obesity and increase in quality of life [9]. Studies by Lee and Bliar, Hu et al., Guilm et al. and Folsom et al. prove that being inactive produce risk factor for stroke and other cardiac diseases [10-12]. Being involved in physical activity is related to 25-45% reduction in risk factor of stroke [13]. In regard to this study reported by Jacob and colleagues showed that physical activity in leisure time reduce the risk factor for haemorrhagic and ischemic stroke. Different techniques and therapies have been used in the rehabilitation of stroke. We used weight bearing exercises with range of motion exercises in patients with recent stroke.

Weight bearing exercises stimulate the proprioceptors in joints capsule and tendons of the muscles crossing the joints and works like constant stimulation of these receptors. Constant stimulation causes a motor response in muscles and thus there is a batter neuromuscular control. We also use range of motion exercises to remember the pattern of movements because brain controls the movements not the muscles. So combine effects of weight bearing and range of motion causes more significant change in patients with upper motor lesion like stroke.

Methodology

We selected 05 patients, 03 males and 02 females, with recent stroke on volunteer basis with informed consent. Inclusion criteria was recent stroke 10 to 15 days back, age between 25-35, both male and female, no previous history of fracture, no significant history of osteoporosis, hemiplegic right or left, intact vision and intact cognition. Selection of subjects was made by visiting to medicine and ICU wards of different hospitals including government and private hospitals of city. Patients were informed about the treatments protocol free of costs. Setting of

study was outdoor physical therapy clinic. Duration of study was 02 months, 05 days in a week, 01 h daily. Interventions were weight bearing on affected limb with range of motion exercises. Standing time, 06 minutes' walk test, functional independent measure and disability rating scale were outcome measurement tools. Study design was pre to post trial. Pre-intervention measure was measured 03 to 05 days before starting the interventions on all outcome measurements tools. Post intervention measure was measured after 02 months. Pre to post measurements were compared by using Wilcoxon signed rank test.

Results

Pre interventional score on standing time test, 06 minutes' walk test, functional independent measure and disability rating scale were 0, 0, 25 ± 05, 05 ± 01 respectively. Post interventional score on standing time test, 06 minutes' walk test, functional independent measure and disability rating scale were 129 ± 09, 38 ± 05, 94 ± 09, 18 ± 02 respectively (Table 1).

Tool	Pre-Assessment	Post-Assessment	Test Statistics
06 Minutes' walk test (Distance in meter) (with minimum assistance)	0	129 ± 09	0.000
Standing time in minutes (without support)	0	38 ± 05	0.000
FIM	25 ± 05	94 ± 09	0.000
Disability rating score	05 ± 01	18 ± 02	0.000

Table 1: Disability rating scale

Conclusion

Study concluded that weight bearing exercises have significant role to improve standing time, walking distance, balance, motor skills and functional skills in patients with recent stroke.

Discussion

Actual problem in stroke brain is loss of movements not the paralysis of muscles. If any intervention in the form of moving the joints like range of motion exercises or functional movements of the limbs are repeated, then brain remind these movements. On the other hand joint weight bearing produced strong sensory stimulations to produce the motor response. Weight bearing on whole limb is act as stimulation of whole limb. By weight bearing on joints the proprioceptors in joints are stimulated and thus help to produce motor response. Weight bearing in different angles of joints also improved the motor function, because it is challenging for body to maintain control in bending positions of joints. Our balance system works on challenge, greater the challenge for body to maintain the balance the greater will be the motor control and adaptations. There is tendency of decrease foot weight bearing on paralytic limb. Due to decreased weight bearing on paretic limb; the muscle activity is lower in these patients [14]. So we can increase muscle activity by weight bearing exercises in patients with stroke and paralysis. Secondary osteoporosis after hemiplegia can also be prevented by weight bearing exercises [15]. Weight bearing exercises can be modified with minimum support to maximum weight bearing. Partial body weight supported treadmill training, isolated

joints loading, manual approximation of bony components and multiple angel joints loading are some modification of weight bearing exercises.

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