



ORIGINAL RESEARCH PAPER

Physiotherapy

EFFECTS OF TRUNK CONTROL EXERCISES IN POST STROKE HEMIPLEGIC PATIENTS - A REVIEW OF LITERATURE

KEY WORDS: : Trunk control Exercise, stroke patients, hemiplegic

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ABSTRACT

Trunk Control exercises approaches for improving trunk performance and functional balance in stroke patients. The purpose of this review of literature to review the effects of trunk rehabilitation exercises on trunk control. The purpose of this paper to extensively review the literature about the topic. And summarise the existing knowledge on the effects of trunk control exercises in post stroke hemiplegic patients. This paper gives a precise review of literature in this area. In future, this review identifies areas for further research and makes recommendations for clinical practice.

Stroke or cerebrovascular accident is the rapid loss of neurological function caused by disruption of blood flow to the brain.⁽¹⁾ Hypertension, diabetes mellitus, atrial fibrillation and high cholesterol are the highest ranking controllable risk factors for stroke, whereas alcohol consumption, smoking and obesity are reported to be the most important life style risk factors for stroke.⁽²⁾

Postural control has been extensively investigated in healthy subjects as well as in individuals with musculoskeletal disorders. Postural control is organised in relation to the individual, the task and the context in which the task is being performed, and one of the most important functions of the central nervous system (CNS) is to coordinate posture and movement to stabilise the body during self-initiated movements and externally triggered disturbances.⁽³⁾

Trunk control is the ability of the trunk muscles to allow the body to remain upright, adjust weight shift, and performs selective movements of the trunk so as to maintain the center of mass within the base of support during static and dynamic postural adjustments.⁽⁴⁾

The various body segments are linked together in a functional kinematic chain connecting the eyes to the feet in which the trunk serves at the centre. Trunk control is thus an essential component of postural control and is a complex, ever changing and dynamic neuromuscular function.⁽⁵⁾

MCA is the largest branch of the internal carotid artery, and is the main supplier to the hemisphere's convexity including the frontal, parietal, temporal and occipital lobes as well as the insula. These areas include large parts of the motor and sensory cortices, including the area of representation for the trunk which lies between the arm and leg areas A study on electromyography analysis observed that the anticipatory postural adjustment of trunk muscles activity is impaired in patients with stroke.⁽⁶⁾

Worldwide, 15 million people suffer a stroke each year. Of these, 5 million die each year and another 5 million live with permanent disability. In the developed countries, stroke is the third most common cause of death, although stroke mortality rates have dropped by approximately 40% in the last decades.⁽⁷⁾

The incidence of stroke is declining in many developed countries due to improvements in primary and secondary prevention; however, the total number of strokes is still increasing due to an ageing population.⁽⁸⁾

Rajrupinder Kaur Rai et al (2014) analysed the Efficacy of Trunk Rehabilitation and Balance Training On Trunk Control, Balance and Gait in Post Stroke Hemiplegic Patients. And concluded that trunk rehabilitation exercises and balance training are effective in improving trunk control, balance and gait in post stroke hemiplegic patients.⁽⁹⁾ Seong et al (2013) proposed a literature to examine the effects of core stability-enhancing exercises on the lower trunk and muscle activity of stroke patients. And shows that mean TIS score and muscle activity of the lower trunk increased in the experiment group significantly after performing the core stability-enhancing exercise (P<0.05).⁽¹⁰⁾

Junsang Yoo et al (2014) demonstrated the Effect of Trunk Stabilization Exercise Using an Unstable Surface on the Abdominal Muscle Structure and Balance of Stroke Patients. They concluded that unstable surface trunk exercise is useful in the rehabilitation stroke patients.⁽¹¹⁾

A study done by Tanaka et al (1998) on muscle strength of trunk flexion extension in post stroke patients. Shows that peak torque of trunk flexion and extension in hemiplegic patients was significantly smaller than that of healthy controls, except isometric trunk flexion.⁽¹²⁾ And Marianne et al (2001) also did a research on Rehabilitation of postural disturbances of hemiplegic patients by using trunk control retraining during exploratory exercises. And concluded that treatments designed to improve spatial cognition deficits probably enhance postural disorder recovery in hemiplegia.⁽¹³⁾

S Karthikbabu et al (2011) found a comparison of physio ball and plinth trunk exercises regimens on trunk control and functional balance in patients with acute stroke: a pilot randomized controlled trial. And analysed that trunk exercises performed on the physio ball are more effective than those performed on the plinth in improving trunk control.⁽¹⁴⁾ According to Ruth Dickstein et al (2016) the activation of selected trunk muscles during symmetric functional activities in poststroke hemiplegic patients. Thus, the assertion that the muscles on the paretic side are activated to a lesser extent than their counterparts on the non-paretic side during symmetric trunk movements.⁽¹⁵⁾

Richard et al (1989) informed that trunk muscle strength is impaired multidirectionally after stroke. The results show that trunk muscle strength is impaired multidirectionally in patients with stroke. Such impairments have the potential to affect function.⁽¹⁶⁾

In a study done by Gregory J Lehman et al (2005) analysed trunk muscle activity during bridging exercises on and off a Swissball. And shows that the addition of a swiss ball during supine bridging did not influence trunk muscle activity for any muscles studied.⁽¹⁷⁾ Lucia Spinazzola et al (2003) demonstrated a study on Impairments of trunk movements following left or right hemisphere lesions. The findings are consistent with the view that the left hemisphere is dominant for praxis and suggest that this dominance be extended to trunk praxis.⁽¹⁸⁾

According to Dickstein et al (2000) the activation of Flexor and Extensor Trunk Muscles in Hemiparesis, do not support the claim of unilateral deficits in the function of trunk muscles in post-stroke hemiparetic patients.⁽¹⁹⁾ Another study done by Gerard Urrutia et (2013) al on trunk training exercises approaches for improving trunk performance and functional sitting balance in patients with stroke. And found that Trunk training exercises, performed with either stable or unstable surface, could be a good rehabilitation strategy and might help improving trunk performance and dynamic sitting balance after stroke.⁽²⁰⁾

Sea Hyun Bae et al (2013) conducted a study on the effects of Trunk Stabilization Exercises on Different Support Surfaces on the Cross-sectional Area of the Trunk Muscles and Balance Ability. And analysed that exercise on the unstable support surface enhanced the size of the cross-sectional area of the trunk muscles and balance ability significantly more than exercise on the stable support surface.⁽²¹⁾ One more study done by Seong-Hun Yu et al (2013) on the effects of core stability strength exercise on muscle activity and trunk impairment scale in stroke patients. And shows that the core stability-enhancing exercise is effective in improving muscle activity of the lower trunk, which is affected by hemiplegia.⁽²²⁾

CONCLUSION:

This review of literature shows significant increase in trunk control after trunk rehabilitation excercises in post stroke hemiplegic patients. And also improve standing, sitting or walking balance.

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