Effects of lower limb strengthening on balance and function in persons who suffered a stroke

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Introduction

Cerebrovascular diseases, and among them, cerebral vascular accidents, are one of the main causes of morbidity and disability at European Union countries. Clinical framework resulting from these diseases include important limitations in functional ability of the these patients

Postural control dysfunctions are one of the most common and devastating consequences of a stroke interfering with function and autonomy and affecting different aspects of people's life and contributing to decrease quality of life.

Neurological physiotherapy plays a central role in the recovery of movement and posture, however it is necessary to study the efficacy of techniques that physiotherapists use to treat these problems.

Objectives

The aim of this study was to investigate the effects of a physiotherapy intervention program, based on oriented tasks and strengthening of the affected lower limb, on balance and functionality of individuals who have suffered a stroke.

In addition our study aimed to investigate the effect of strength training of the affected lower limb on muscle tone.

Materials & Methods

Subjects were recruited at Physiotherapy Department of Hospital Fernando Fonseca. N=16 (all male)

Mean age 58±6y, with unilateral stroke in middle cerebral artery territory

Time since stroke: 16±4 days

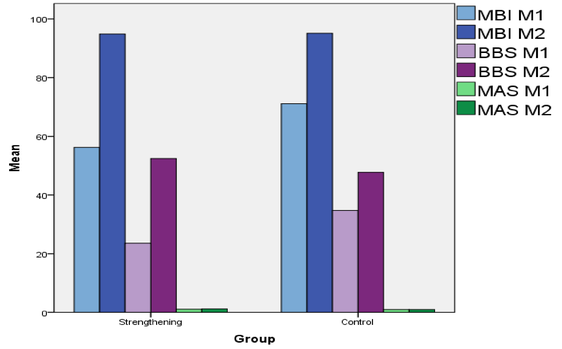
Subjects were randomly allocated to one of two groups: experimental group (N=9) or control group (N=7).

Experimental group performed an intervention program based on oriented tasks plus strengthening of the affected lower limb. Control group followed a program based on oriented tasks only. Outcome measures were Berg Balance Scale, Modified Barthel Index and Modified Ashworth Scale. Both groups completed 4 treatment sessions per week of 65 minutes each session, during 12 weeks.

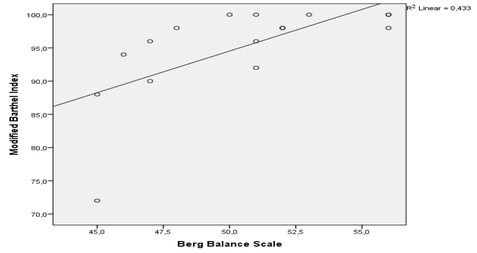
	Position / Type	Activities / Exercises	Duration / Frequency
Oriented-tasks	Seated	Head and trunk movements	4 times / week 20 minutes
		Reaching activities	
	Standing	Dexterity	
		Head and body movements	
		Reaching activities	
		One leg standing	
Exercises for strength training of the affected lower limb	Warm-up	MOTOmed®	4 times / week 10 minutes
	Strength training	Weightbearing kinetic chain exercises Free weights exercises	2 sets / 8 to 10 repetitions for each exercise Progression: 3 sets/ 10 repetition 4 times / week 20 minutes
	Cool-down	Stretching and muscle relaxation	4 times / week 5 minutes
Gait	Gait training	Treadmill training starting as soon as the patient is able to walk	4 times / week 10 minutes (stop before the patient feels tired)

Table 1 – Plan of sessions of oriented tasks and strength training of the affected lower limb

Results & Discussion



Graph 1. Differences between groups before and after intervention



Graph 2. Correlation between MBI and BBS after intervention. Spearman rho=0,743

Conclusions

1. Physiotherapy intervention program with oriented tasks and strengthening of the affected lower limb, seems to be more effective in increasing balance than a program based on oriented tasks only.
2. Both programs proved to be effective in increasing function levels
3. Muscle tone in the affected lower limb did not increased in both groups.
4. Positive correlation between balance and function suggests the importance of early starting of physiotherapy intervention, focused on treating balance dysfunctions after stroke, in order to promote autonomy and functional independence.