

# THE EFFECTIVENESS OF BILATERAL VERSUS UNILATERAL TASK RETRAINING USING THE SAEBOFLEX ORTHOSIS IN INDIVIDUALS WITH SUBACUTE OR CHRONIC STROKE

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## Background

One of the main concerns for occupational therapists when treating stroke survivors is recovery of the affected upper extremity (UE) for use in functional activities. The SaeboFlex dynamic orthosis ([www.saebo.com](http://www.saebo.com)) is an emerging intervention being used by occupational therapists to promote grasp and release of the affected UE. The extension spring system of this orthosis assists in sustaining the hand, wrist, and fingers in a biomechanical position in order to retrain the arm for more functional use in daily activities.

McCombe Waller and Whitall (2008) found that after a stroke many individuals find it difficult to participate in daily activities that require both upper extremities. This review further found that by incorporating both upper extremities in training, dependence on the unaffected upper extremity decreases. They concluded that individuals after stroke at all levels of function benefit from bilateral UE training (McCombe & Whitall, 2008).

## Objectives

- ◆ The purpose of this research was to examine the effectiveness of the SaeboFlex orthosis, comparing unilateral versus bilateral training with individuals in the subacute and chronic phases of stroke recovery.
- ◆ It was hypothesized that the use of bilateral upper extremity exercises using the SaeboFlex orthosis with individuals who have had a stroke will result in improved motor function compared to unilateral exercises.

## Methods

◆ **Participants:** Six participants have been recruited to date and placed into bilateral and unilateral task retraining groups using computer randomization. Two participants have completed a bilateral program and four have completed a unilateral task training program. The goal is n=12, with 6 participants in each group.

### ◆ Inclusion criteria:

- ✦ Participants must be at least 18 years of age
- ✦ At least 6 months post-stroke and diagnosis of first stroke
- ✦ Ability to follow multipart verbal directions
- ✦ Achieve a score of 26 or greater on the Mini-Mental Status Exam unless already a successful user of the Saeboflex orthosis
- ✦ 10 degrees active range of motion (AROM) shoulder flexion/abduction; 10 degrees elbow flexion; and one-fourth range of volitional finger flexion when the hand is positioned in wrist and finger extension.
- ✦ Capable of standing for greater than two minutes without an assistive ambulatory device
- ✦ No concurrent skilled therapy treatment or participation in any experimental rehabilitation or drug related studies.

### ◆ Protocol:

#### ◆ Week one: Pre-testing

#### ◆ Week 2 through 5: Intervention

- ◆ Two 90-minute clinic visits per week for program monitoring and modification
- ◆ Home Program twice per day, 1 hour each. Participant performs 6 individualized exercises for 10 minutes each

#### ◆ Week 6: Post-testing



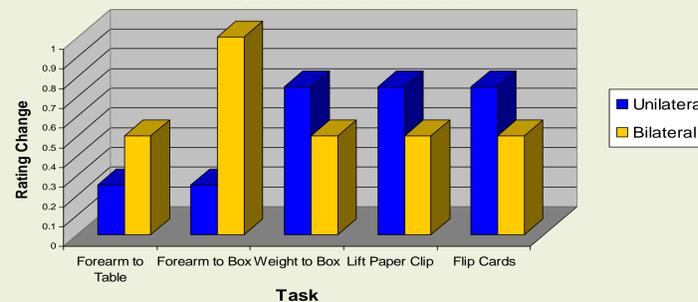
Photo by Genik Pamele, Columbia Daily Tribune

## Measures

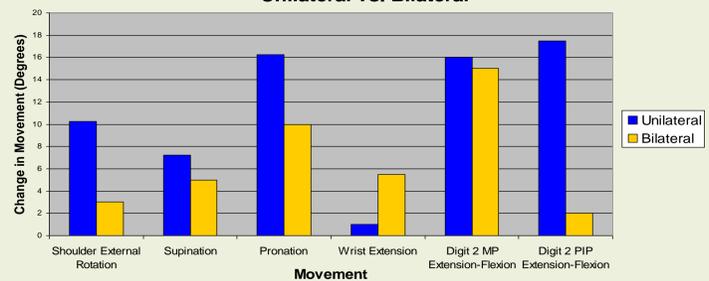
- ◆ **Wolf Motor Function Test (WMFT):** Measures use of affected arm and hand in functional activities.
- ◆ **Range of Motion (ROM):** Measures the degree of joint movement that an individual has the ability to attain actively.
- ◆ **Modified Ashworth Scale (MAS):** Measures the degree of muscle tone in an individual's affected UE on an ordinal scale of 0-4.
- ◆ **Canadian Occupational Performance measure (COPM):** Unstructured interview where participants provide therapists with information regarding performance of and satisfaction with meaningful and valued occupations
- ◆ **Motor Activity Log (MAL):** Scripted interview where participants rate the amount and how well they use their affected extremity in functional activities.

## Results

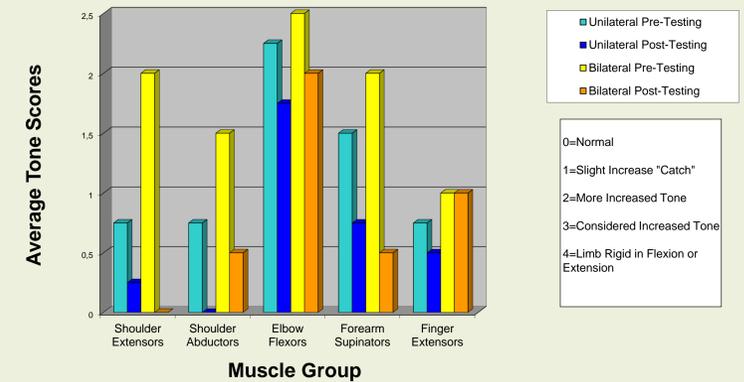
### Wolf Motor Function Test Unilateral vs. Bilateral



### Range of Motion Unilateral vs. Bilateral



### Modified Ashworth Scale Muscle Tone Results



### Canadian Occupational Performance Measure Results

	Unilateral	Bilateral	Overall
Pre-Test Performance Score	4.65	1.4	3.57
Post-Test Performance Score	5.6	1.5	4.23
Pre-Test to Post-Test Change	0.95	0.1	0.66
Pre-Test Satisfaction Score	2.85	1.1	2.27
Post-Test Satisfaction Score	4.65	1.3	3.53
Pre-Test to Post-Test Change	1.8	0.2	2.2

### Motor Activity Log Results

	"Amount Scale"		
	Increases in Performance	No Change in Performance	Decreases in Performance
Unilateral Group	14/13 test items (46%)	7/30 test items (23%)	9/30 test items (30%)
Bilateral Group	6/30 test items (20%)	22/30 test items (73%)	2/30 test items (7%)

	"How Well Scale"		
	Increases in Performance	No Change in Performance	Decreases in Performance
Unilateral Group	15/30 test items (50%)	7/30 test items (23%)	8/30 test items (27%)
Bilateral Group	6/30 test items (20%)	22/30 test items (73%)	2/30 test items (7%)

## Discussion

◆ **WMFT:** All participants demonstrated increased motor performance in their affected arm on both rote and functional tasks. The unilateral group demonstrated greater increases when compared to bilateral group.

◆ **ROM:** Both the unilateral and bilateral groups gained active range of motion. Overall, the unilateral group showed more increase in movement.

◆ **MAS:** Tone decreased in all 12 movements measured in both the unilateral and bilateral groups. The unilateral group demonstrated a greater decrease in tone when compared to the bilateral group.

◆ **COPM:** An increase in task performance and satisfaction was identified in both groups. The unilateral group showed a greater increase in task performance and satisfaction.

◆ **MAL:** Both groups reported increases in task performance and satisfaction with the unilateral group reporting a greater rate of improvement.

References available upon request.