The Effectiveness of an Inpatient Arm Exercise Program for Individuals with Stroke: A randomized controlled trial

OUTLINE

- Literature Review
- Study Rational and Purpose
- Methodology - Design
  - Outcome Measures
  - Intervention
  - Analyses
- Results
- Limitations
- Clinical Implications

LITERATURE REVIEW

Upper Limb Dysfunction Post Stroke

- Over 85% experience upper limb paresis in the sub-acute stage (Jorgenson et al., 1999; Parker et al., 1986)
- Recovery time for motor recovery is 3-5 weeks, functional recovery is 5-9 weeks (varies based on initial severity) (Jorgenson et al., 1999)

LITERATURE REVIEW

Treatment Interventions During Rehabilitation

- Evidence for the benefit of exercise programs on upper limb motor recovery, BUT
- Limited evidence for improvement in upper limb function

LITERATURE REVIEW

TREATMENT – Repetitive Techniques

Author	Design	Intervention	Results
Teasell et al., 2004; Van Peppen et al., 2004; Barreca et al., 2003; van der Lee et al., 2001	Systematic Review* of **randomized controlled trials**	Repetitive task or goal oriented treatment, increased time in therapy by ~ 30 min/d x 5d/w	Significant ($p<0.01$- 0.05) improvement in motor and functional recovery

Rationale for study

Increasing amounts and intensity of therapy

Better arm outcome

Clinician time is decreasing – both in minutes of therapy per week and for overall length of stay

Can we increase the amount of arm activity using other methods?

What we know:

Plastic changes occur in the brain after stroke

Repetition is effective for improving paretic arm function

Increasing the use of the paretic arm by at least 30 minutes per day is required

We have a million things to do with each client

PURPOSE

- To determine the effectiveness of a 4 week in-patient home-work based exercise program on upper limb recovery in individuals with stroke.

METHODOLOGY

- A multi-site randomized, single-blind, controlled trial.
- *Participants:* individuals with stroke admitted to rehab
- *Inclusion*: 1) palpable active wrist extension and visible active shoulder elevation
  2) MMSE 20 or above
  3) arm recovery as a goal of rehab team

Exclusion: 1) receptive aphasia
2) other neurological or orthopedic conditions that effect arm

Methodology

- Each site coordinator participated in a 2 day workshop
- Each site assessor participated in a 1 day workshop
- Inter-rater reliability established = ICC 0.98-0.99.

OUTCOME MEASURES

- *Primary Measure :* Chedoke Arm and Hand Activity Inventory
- *Secondary Measures:* Action Research Arm, Grip strength, Motor Activity Log

INTERVENTION

- 3 different exercise binders and kits were developed; severe, moderate, and mild
- Protocol targeted improvement in motor skills and function of the paretic upper limb

Intervention

- Schedule: 60 minutes/day a minimum of 5d/wk x 4wks
- Monitored by site coordinator 1-2x per week
- Control group: education manual

INTERVENTION

- Each participant was given an exercise kit and binder to keep
- Log sheet to track exercises and report problems
- Pain analogue scale

Based on repetitive goal and task oriented techniques

INTERVENTION ACTIVITIES

- Range of motion exercises
- Strengthening exercises
- Target board
- Functional tasks
- Fine motor skills

Start the ball rolling Advanced

➢Place your weaker hand in your lap and your stronger on the table.

➢Roll or push the ball and try to catch the ball with your weaker hand.

➢Continue until you have caught the ball with your weaker hand 20 times.

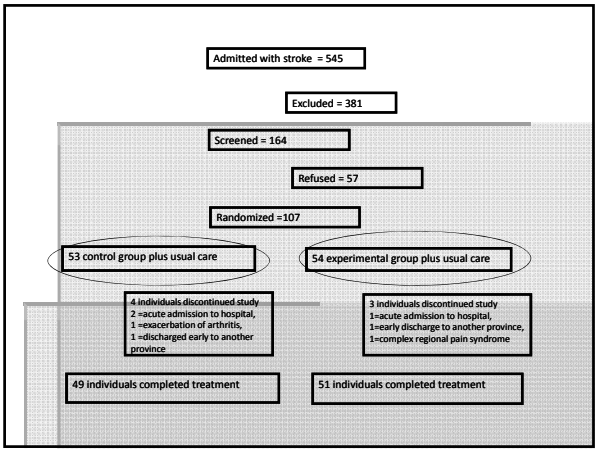
Start the ball rolling No partner

➢ Place your hands shoulder width apart.

➢ Roll or push the ball back and forth between your hands

➢ Continue until you have caught the ball with your weaker hand 20 times

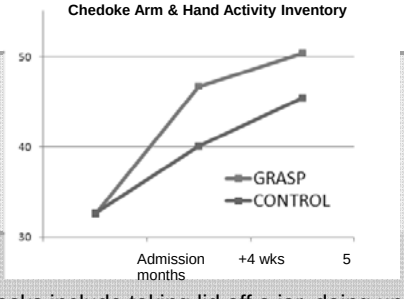
If this is **hard** for you, use the bean bag and push it towards each hand.



Results

Demographics	Experimental (n=51)	Control (n=49)
Age	69.1 (12.2)	70.3 (15.0)
Sex	28M/23F	26M/23F
Side of Lesion	33R/14L	26R/19L
Stroke Type (I/H/L)	32/12/6	33/11/5
Weeks post stroke	4.9 (2.5)	4.8 (2.8)
MMSE/30	26.9 (2.7)	26.8 (2.6)
Fugl-Meyer/66	35.8 (14.0)	35.0 (12.4)
Chedoke Arm and Hand Activity Inventory/63	34.1 (16.4)	32.8 (17.1)

GRASP improved arm and hand function



Tasks include taking lid off a jar, doing up buttons, putting toothpaste on a toothbrush

Results

- Translates to an increase in paretic arm use by the control group of 15% over the 4 weeks

BUT

Increase of paretic arm use by the exercise group of 30% over the 4 weeks

Results

- Grip Strength: Exercise group improved significantly over control group (p=0.04)
- Experimental group, on average, increase grip strength of paretic hand by 5lbs

Results

- Motor Activity Log: Exercise group improved significantly over control group (p=0.05)
- Increase use of the paretic limb in daily activities from “seldom, arm is not helpful” to “occasionally, arm is helpful when used in most daily activities”

LIMITATIONS

- Standardization of treatment
- Cross contamination
- Participants not blinded
- Is it the extra time or the method of treatment?

Those who had caregiver assistance with GRASP had better outcomes (regardless of starting impairment)

Those with caregiver assistance did more hours of GRASP

Caregivers can assist in increasing the therapeutic intensity of treatments

The role of caregiver involvement in upper limb treatment in individuals with subacute stroke. Harris, Eng et al. Phys Ther 2010

CLINICAL IMPLICATIONS

An inexpensive method to improve upper limb function

It is a **safe, effective, and efficient** method to promote upper limb use outside of therapy time

Helps to prevent "learned non-use" commonly found post stroke

Can use program as an therapy tool: inpatient, outpatient, community, individual or group, with rehab assistants

Fosters self-management of therapy and inclusion of family

ACKNOWLEDGEMENTS

Participants

Site Staff:
Maureen Eng and Julia Wilkes– Holy Family
Adele MacNeill and Julia – GF Strong
Julie Clarke and Cathy Patchell – Victoria General
Jeanette Deshayes and Lyn Watson – Kelowna General

Funding:
Heart and Stroke Foundation of Canada
Canadian Institute of Health Research
Michael Smith Foundation for Health Research