



# Stroke Boot Camp: An Integrated Clinical Education (ICE) Model for Intensive Chronic Stroke Rehabilitation

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## Introduction

- Inter-professional Education (IPE) experiences are gaining prominence in many educational programs and leading health organizations<sup>1,2</sup>.
- Integrated Clinical Education (ICE) is an active-learning model shown to help students establish clinical relevance of classroom concepts and enhance student motivation for learning.
- Stroke is a leading cause of disability in the US yet access to rehabilitation and wellness services is often limited<sup>3,4</sup>.
- Task oriented intensive circuit training is associated with improvements in strength, balance, gait speed, velocity, endurance and perception of quality of life<sup>4-6</sup>.
- Community based interventions can improve general mobility, self-satisfaction and participation scores, gait velocity and cadence, and functional independence.<sup>7</sup>

## Purpose

- To provide *pro bono* inter-professional intensive rehabilitation and wellness program (Stroke Boot Camp) for individuals with chronic stroke.
- To develop a community-based ICE program involving health sciences graduate students supervised by licensed clinicians and faculty as part of Chapman University's IPE.

## Participants

- Community dwelling adults (N=16) with chronic (> 6 months) stroke,
- Graduate students (N=68) enrolled in Chapman University's DPT, MFT, PA, Pharm. D, and Communication Sciences & Disorders programs and their faculty and clinical instructors.



Fig. 1. Students, participants, and clinicians in SBC

## Methods

- Baseline and follow-up inter-professional examinations were carried at the beginning and end of Stroke Boot Camp (SBC)



Fig. 2A-D. Examples of DPT Assessments

- Assessments included:
  - Interview/History (DPT, PA, MFT)
  - Physical examination (DPT, PA)
  - Other PT Examinations
    - Gait Rite/10MWT
    - Berg Balance Test (Berg)
    - Timed Up and Go (TUG)
    - Upper Extremity Tests (Fugl-Meyer, Box/Block, SIS-Hand, Grasp/grip strength)
  - Assessment of Stroke Impact (Marriage and Family Therapy (MFT))
  - Medication Reconciliation/Consult (Pharm D.)



Fig. 3 A-C: Group Activity; Cardio Balance Training (Surfing)

- SBC Components included:

- 6 Hours/day x 2 weeks
- Large group, small group, & individual activities
- DPT: Patient-centered/goal-oriented:
  - Gait training, Cardio, Balance Training
  - Upper Extremity/Fine Motor Activities
  - Functional Mobility/ADL Training
  - Therapeutic Exercise, Game-based Therapies
  - Caregiver Support Services
- Stroke Education
- Daily "Themes" to make it festive:



Fig. 4 A-C: A. Disney Day, B. Pirate Day, C. Birthday Day

- SBC Components also included:

- Socialization Activities
  - Communal lunches and parties; graduation event
  - Team and group activities and classes
- Special Activities
  - Adapted yoga & Tai Chi
  - Music Therapy
  - Therapeutic Drumming
  - Adapted Dancing
  - GRAIL Training
  - Mindfulness/Relaxation Training
  - MFT: Caregiver Support and Individual/Family Consultations
  - CSD: Speech Therapy Sessions
- IPE Activities
  - Orientation/preview
  - Role-playing/observation/participation
  - De-Briefing/"Grand Rounds"



Fig. 5. Examples of "Special and IPE Activities."

## Results

	Pre-test (Mean ± SD) (Range)	Post-test (Mean ± SD) (Range)
Fugl-Meyer Assessment (FMA) Total* (Normal = 66)	39.4 ± 19.7 (9 – 65)	41.3 ± 21.1 (6 – 66)
FMA Proximal* (Normal = 36)	21.8 ± 10.4 (5 – 36)	23.6 ± 11.1 (6-36)
FMA Coordination (Normal = 6)	3.8 ± 1.6 (1 – 6)	4.2 ± 2.0 (0 – 6)
FMA Wrist/Hand (Normal = 24)	13.8 ± 8.6 (0 – 24)	13.6 ± 8.7 (0 – 24)
Box & Blocks* (Normal = 75.2)	19.7 ± 20.9 (0 – 52)	21.9 ± 21.6 (0 – 59)
Berg* (Normal = 56)	41.4 ± 10.5 (20 – 56)	44.8 ± 10.7 (20 – 56)
SIS-16* (Normal = 5)	3.9 ± 0.9 (2.3 – 4.9)	4.0 ± 0.9 (2.1 – 5.0)
SIS-Hand* (Normal = 5)	2.5 ± 1.6 (1 – 4.8)	2.8 ± 1.5 (1 – 5)
10m walk (s)* (Normal = 13.6)	33.0 ± 45.7 (5.5 – 155.6)	24.0 ± 31.4 (4.3 – 126.5)

Table 1. \*FMA Total, FMA Proximal, Box & Blocks, Berg, SIS-16, SIS-Hand, and 10 m walk significantly improved (p<0.05) following SBC. FMA Total (p=0.05), FMA Proximal (p=0.01), Box & Blocks (p=0.01), Berg (p<0.01), SIS-16 (p=0.01), SIS-Hand (p=0.01) and 10 m walk (p<0.01). N=20.

Fig. 6. Changes in Gait Cadence

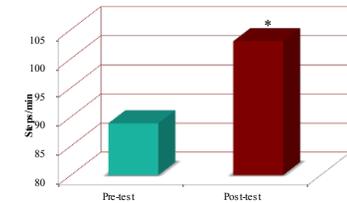


Fig. 6. SBC participants significantly improved their gait cadence.

Example of DPT student assessment of the program: "Stroke Boot Camp was one of my favorite opportunities that Chapman provided. The experience improved my clinical hands-on skills, knowledge of current evidence for stroke treatment, and confidence in my ability to provide high quality care. The opportunity to work alongside MFT and other students was a great way to promote, and learn about inter-professionalism and the importance of treating the whole person.—EG, Class of '19"

- SBC participants with stroke 'strongly agreed' (92%) or 'agreed' (8%) that they benefited from the SBC.
- Clinical Instructors for subsequent full-time clinical rotations report that students are better prepared as a result of SBC participation.
- All students met the criteria for clinical competency for this IPE ICE experience and report greater benefits than those for traditional IPE learning activities such as simulations and cases.

## Discussion & Conclusions

SBC is an effective model for providing:

- Community-based, intensive intervention for individuals with chronic stroke;
- Integrated Clinical Education that incorporates an inter-professional, holistic, "hands-on" approach to patient care.
- Benefits to participants, caregivers, students, faculty, educational programs, and the community;
- An example of ICE, IPE that can be applied to other populations.

## Recommendations

Health Profession Education programs that are interested in incorporating ICE, IPE, and Service Learning into programs for those with chronic stroke or other chronic health conditions should consider using the SBC model.

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For Further information

