



# Use of *Intelligently Controlled Assistive Rehabilitation Elliptical Trainer* to Improve Walking and Fitness during Acute Stroke Rehabilitation

Judith M Burnfield<sup>1</sup>, Adam P Taylor<sup>1</sup>, Thad W Buster<sup>1</sup>, Yu Shu<sup>1</sup>, Amy J Goldman<sup>1</sup>, Carl A Nelson<sup>2</sup>

<sup>1</sup> Movement and Neurosciences Center, Madonna Rehabilitation Hospital, Lincoln, NE, USA

<sup>2</sup> University of Nebraska - Lincoln, Lincoln, NE, USA



## Introduction

Regaining walking ability is a major goal for many individuals following a stroke. While devices exist to enable mass repetition of gait-like movements thought to be important for promoting neuroplastic changes, patients lack access due to the expense (e.g., robotic gait trainers) or need for multiple clinicians (e.g., partial body weight support treadmill training). *ICARE*, an *Intelligently Controlled Assistive Rehabilitation Elliptical* trainer, is an affordable training device developed to address these barriers.

## Purpose

To explore the feasibility of incorporating *ICARE* training into an inpatient stroke rehabilitation program.

## Participants

Ten acute stroke rehabilitation inpatients were enrolled within 96 hours of admission.

### Participant Characteristics, Mean (SD)

Age (y)	Height (cm)	Mass (kg)	FIM Locomotion
71 (16)	171 (9)	83 (19)	2 (1)

## Methods

### Instrumentation

- *ICARE* trainer including an elliptical with custom modifications for accessibility, safety, & movement assistance (Figure 1)

### Procedures

- Participants trained on the *ICARE* 3-5 times/week as an adjunct to physical therapy (mean total sessions=10; range=3-25)
- Initial velocity (VEL), stride length (SL), and body weight support (BWS) settings were individualized to each participant
- Total duration of exercise per session (DUR) and subsequent setting adjustments were determined based on participant's fatigue and cardiovascular response

### Data Analysis

- Each participant's heart rate (HR) and rating of perceived exertion (RPE) recorded at beginning (first two sessions averaged) and end (last two sessions averaged) were compared
- Self-selected overground walking velocity and *ICARE* training parameters pre and post *ICARE* training were assessed

### Statistical Analysis

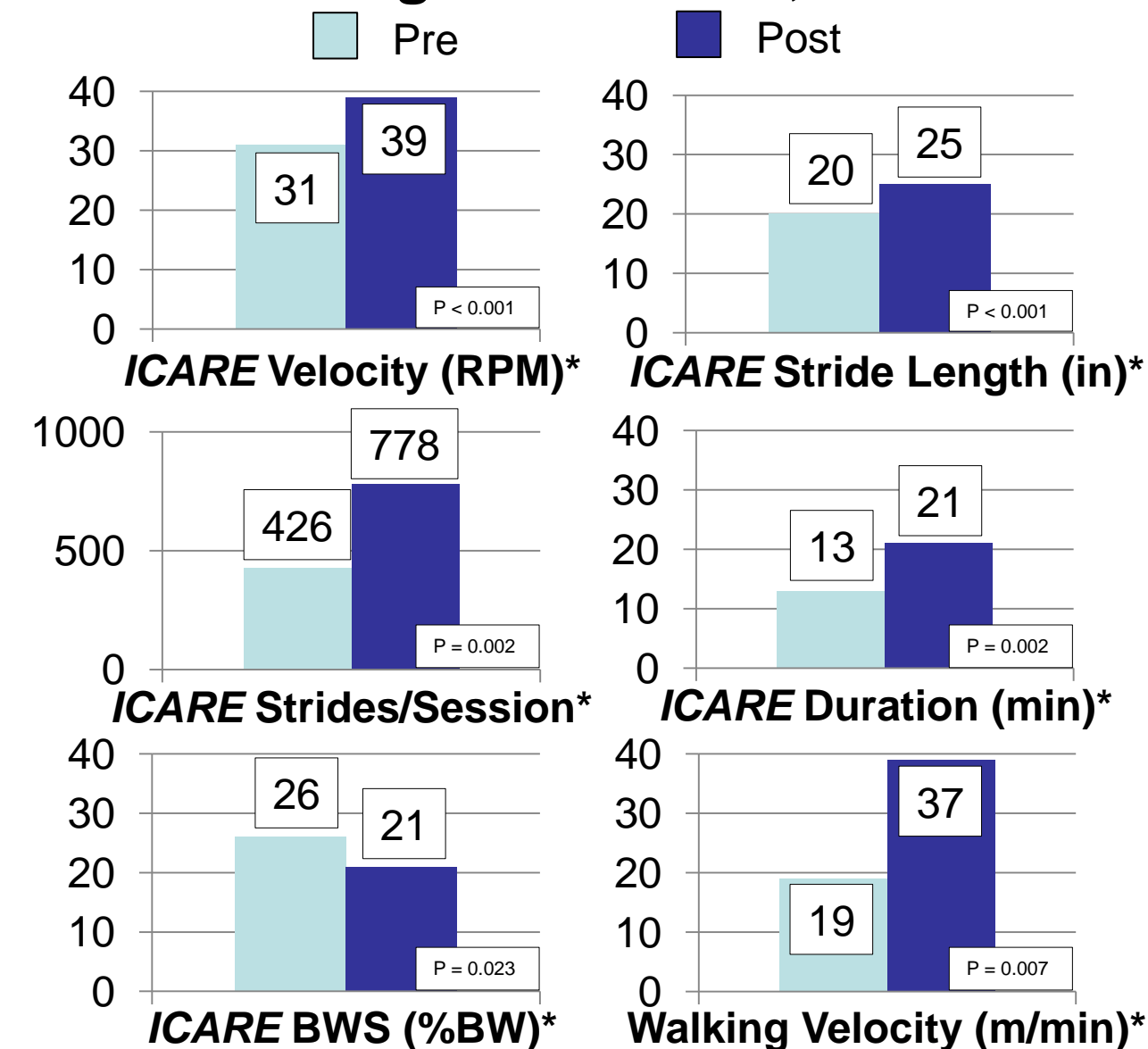
- Paired t-tests evaluated significant changes in training parameters (i.e., VEL, SL, total strides/session, DUR, and BWS)

## Results

Figure 1. Participant using *ICARE* Trainer



### Training Parameters, Mean



\* = Significantly Different

## Results (cont.)

### Participant Responses, Mean

Response	Pre	Post
Heart Rate (bpm)	87	93
RPE	12.4	12.6

## Conclusions

*ICARE* enabled mass practice of a simulated gait activity, as evidenced by the large number of strides/session. The augmentation of traditional therapy with *ICARE* was tolerated well. Important gains were noted in endurance and speed (both overground walking and *ICARE* training).

## Clinical Relevance

This study provides clinicians with essential data for prescribing innovative and affordable exercise interventions in conjunction with using the *ICARE* trainer and walking.

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