COURAGE KENNY RESEARCH INITIATIVES IN SPINAL CORD INJURY REHABILITATION

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DISCLOSURE

- NONE

- Current Grant Support:
  - Weightman MM, PI; *Exploring the Role of Combined Cognitive and Motor Dual-task Assessment and Rehabilitation for Individuals with Residual Symptoms after mTBI*; Minnesota Spinal Cord Injury and Traumatic Brain Injury Research Grant Program, 2017-2019.
  - Weightman MM, Clinical Trial Site PI; *The WISE Trial - Walking Improvement for SCI with Exoskeleton*, Ekso Bionics Inc.

OBJECTIVES

- Describe research initiatives in spinal cord injury rehabilitation at Courage Kenny Rehabilitation Institute

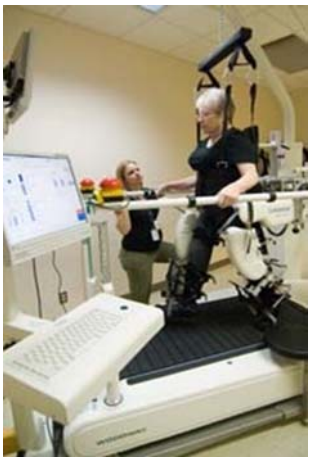
Courage Kenny Rehabilitation Institute Spinal Cord Injury Program

- SCI Program encompasses entire spectrum for peoples with SCI from inpatient rehabilitation to re-integration with community
  - Acute inpatient rehabilitation (ANW, United)
  - Transitional care unit (GV)
  - Outpatient SCI/neuro based therapies (ANW, GV, United, Stillwater)
  - Community based re-integration (driving, vocational rehab, adaptive technology)
  - Yearly continuity clinic (PT/OT/Psych/TR/RN/Physician visits)
  - Inpatient and outpatient RN CC providing close follow up for 2 years post-injury

Courage Kenny Rehabilitation Institute
Spinal Cord Injury Program

- The Spinal Cord Injury Program provides comprehensive medical and rehabilitative care to persons with spinal cord injury or spinal cord dysfunction through an interdisciplinary team approach.
- Patients discharged:

	2013	2014	2015	2016	2017
Number of Discharges					
Abbott Northwestern	89	90	111	104	97
United	30	23	25	20	21
Transitional Rehab--GV				46	44
CKRI Combined				170	162



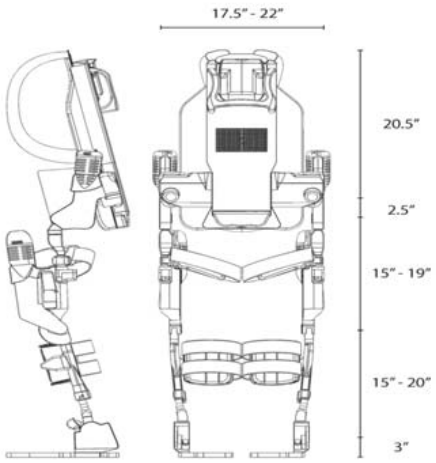
Courage Kenny Rehabilitation Institute
Spinal Cord Injury Program

- Emerging rehabilitation interventions/Evidence Based Practice
- Strong push for use of technology early in recovery period throughout CKRI
- SCI Program rolling out technology use guidelines for people with SCI
  - Lokomat
  - Ekso-exoskeleton
  - Functional E-stim (FES), Neuromuscular E-Stim (NMES)
  - Re-Walk-exoskeleton for home use
  - ABLE program (Neuro-Recovery Network)

The WISE Trial - Walking Improvement for SCI with Exoskeleton

A randomized, controlled trial comparing exoskeleton gait training with standard gait training or no gait training in community-dwelling participants with chronic incomplete spinal cord injury.

EksoGT



WISE Clinical Trial

- **Hypothesis**: Participants undergoing exoskeleton training for 36 sessions will demonstrate equal progress in walking speed as those participants undergoing standard gait training for 12 weeks/36 sessions. Participants in both the exoskeleton group and the standard gait training group will show greater progress after 12 weeks/36 sessions than the participants in the passive control group.
- **Design**: Multi-center, randomized, controlled study (Currently 10 sites).
- **Participants**: Chronic (> 1 year after the injury), community-dwelling men and women between the ages of 18 and 75 years, inclusive, diagnosed with motor incomplete spinal cord injury (AIS C and D), with minimal walking function, who may benefit from participating in a 12-week (36-session) outpatient rehabilitation therapy and who fulfill the inclusion/exclusion criteria.

WISE Clinical Trial Objectives

- Primary Objective: To demonstrate that a 12 week robotic gait training regimen can lead to a clinically meaningful improvement in independent gait speed on the 10 Meter Walk Test (10MWT) in community dwelling participants with chronic iSCI.
- ***ENDPOINT Gait Speed in 10MWT***
- Secondary Objectives:
  - 1. To examine the economic factors such as number of physical therapists/staff required during training.
  - 2. To analyze the physical burden on therapists assisting and supervising during training.
  - 3. To study the influence of factors that may modify the gait recovery in the chronic incomplete SCI population (demographic, clinical, functional, psychological, balance, etc.)

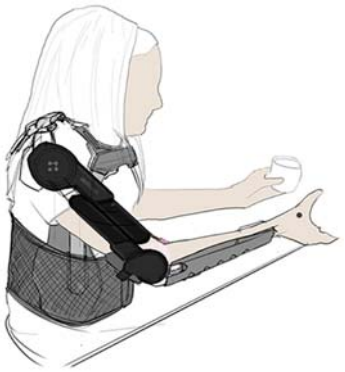
WISE Trial--THERAPIST OUTCOMES

- Number of therapists/staff required for each active group (Group 1 and 2), and set-up/donning time for cost effectiveness of the two active therapies
- Borg Scale for self-reported maximal RPE during either of the interventions
- NASA-Task Load Index for therapists' self-reported work load
- Video assessment of training posture for ergonomics
- Occupational safety measured by number and severity of therapist reports of orthopedic problems and/or pain

Research Study—product development

- Focus group with 6 individuals with chronic tetraplegia to *evaluate the user control interface* of an active powered prosthetic device proof-of-concept prototype.
- Subjects will provide feedback on device function and usability after manipulating the device on a mannequin.
- Focus group with Courage Kenny Research Institute Clinicians to *validate device safety features, performance and assess the potential clinical utility* of the device.

Active Powered Prosthesis (APEX)



- The Active Powered Prosthesis (APEX) (Abilitech Medical Inc., Minneapolis, MN) is a proof-of-concept shoulder-elbow-wrist prosthesis device intended to provide non-invasive active powered robotic assistive movement to upper extremities--designed for users with upper level cervical spinal cord injuries and motor impairment of their upper extremities.
- Phase I SBIR Grant. (1R43HD094440-01).
- The Abilitech Assist device is an upper limb lift and assist. The APEX device represents an advancement from the Abilitech Assist device by providing active power sources to lift and rotate the upper limbs.
- The increased range of motion will expand the activities of daily living (ADL's) for users of the APEX device.

Other studies

- NeuroRecovery Network (NRN) is leading research on spinal cord injury. Dr. Susan Harkema is the Director of this program. Courage Kenny Rehabilitation Institute's Activity-Based Locomotor Exercise *ABLE program* is one of only six community fitness and wellness facilities nationwide --part of the Christopher and Dana Reeve Foundation NeuroRecovery Network (NRN).
- *ABLE POWER* – This is a study for individuals on the waitlist for the NRN, and is designed to provide a one year baseline prior to participation in the NRN (N Flinn PI).
- *Wheelchair speed, endurance, maneuverability and community integration* – A cross-sectional study designed to identify the characteristics of wheelchair mobility that enable community integration (GPS component to validate). (A Wacek PI).

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