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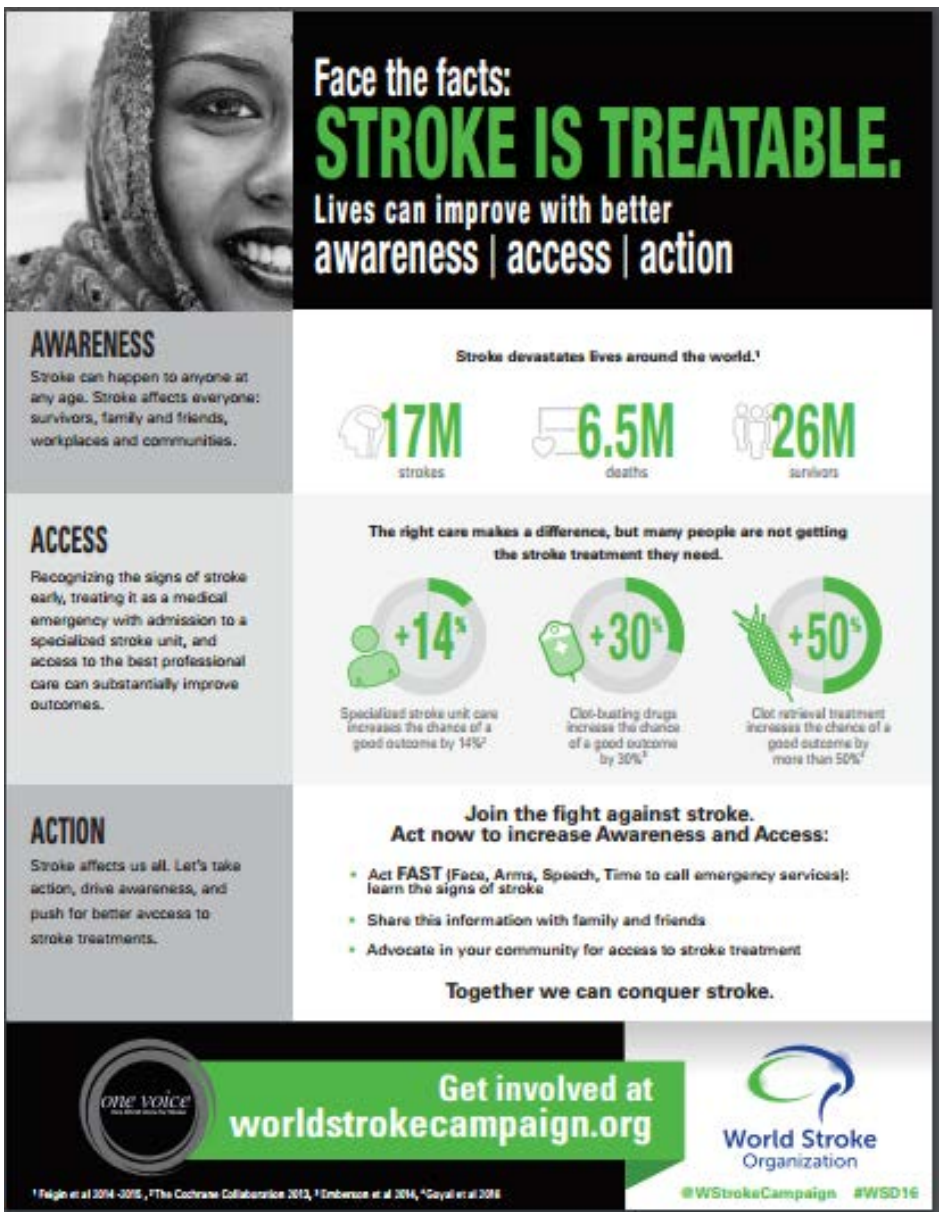
This month we are drawing your attention to the high incidence of stroke on a global scale. The World Health Organization considers it a major health problem. Here are statistics everyone should know:

- There are **17 million** strokes worldwide (1st time incidence)[1]. That's **1 stroke every 2 seconds**[2].
- Europe averages approximately 650,000 stroke deaths each year[3].
- US stroke incidence (**795,000, or 610,000** first time strokes)[6].
- Stroke occurs approximately 152,000 times a year in the UK[4].
- Stroke has a significantly higher incidence in low to middle income populations and presents significant health challenges.
- Stroke is the second single most common cause of death in the world causing **6.5** million deaths each year[5].



7 World Stroke Campaign, Stroke Unit Trialists

Incidence of Stroke around the World

World Stroke Day, on October 29th recognizes that stroke is a complex medical issue. Yet, it is treatable. Whether it be an ischemic or hemorrhagic stroke, "around 1 in 10 people make an excellent recovery when cared for in a specialized stroke unit"[7].

From U.S. to Abroad, Stroke Patients are Walking in Ekso Bionics exoskeletons

Royal Buckinghamshire Hospital is the first private facility in England to have used Ekso Bionics® exoskeleton, the Ekso GT™ robotic

exoskeleton. Stroke patient Ramy Harb walks in the suit with his physical therapist. See how physiotherapists utilize Ekso GT™ robotic exoskeleton to help patients with neuro-rehabilitation.

Watch video here.

Conference Recap

We were pleased to see so many of you at AAPM&R or AMRPA. We hope to see you next at ACRM and would like to invite you to our Product Theater presentation and demonstration.

SAVE THE DATE:
Ekso Bionics Presentation and Demonstration at ACRM ACRM EXPO Hall Product Theater Wednesday, November 2, 2016 6:00pm to 6:45pm

Please follow us on Twitter @Eksobionics, LinkedIn and Facebook for more frequent updates.

Technology in Stroke Rehabilitation

Stroke is the 2nd leading cause of disability in Europe. Villa Beretta, a leading Italy rehabilitation centre with 30 Physical Therapists measured the Ekso GT Robotics Exoskeleton suit to help their patients relearn proper step patterns and weight shifts. The objective was to measure both the number of steps taken and quality in task-oriented gait training.

Read More Here.

CASE STUDY
Villa Beretta

Impact of Exoskeletons on Post-Stroke Gait Training at Villa Beretta

Organization Description
Villa Beretta is a 90-bed non-profit rehabilitation center with 30 PTs, 4 OTs, and 15 MDs located in Costa Masnaga, Italy. With inpatient and outpatient facilities, the center provides high-quality, compassionate medical care and rehabilitation for individuals with traumatic brain injury, spinal cord injury, stroke and neuromuscular disease.

Program Overview
Stroke is the second leading cause of disability in Europe and the sixth leading cause worldwide. Post stroke hemiparesis can lead to impairment of upper and lower limb motor control with related coordination deficits. Literature shows motor deficits are not only associated to the affected side, but also to the non-affected one. Investigating locomotor responses during robotic training is fundamental to understanding how robotic exoskeletons may improve locomotor functions following a stroke.

Challenge
The Villa Beretta staff wanted to measure the impact that robotic exoskeletons could make on a stroke patient's efforts to regain walking ability. Additionally, the staff wanted to gauge how that impact might vary with the time between the stroke and the introduction of the robotic exoskeleton to their rehabilitation. It was critical to the staff to measure not simply the number of steps patients were able to take, which has been done in other studies on spinal cord injury patients, but also the quality of their gait.

Proposed Solution
Villa Beretta selected the Ekso GT™ in concert with a measure of surface Electromyography (sEMG) to provide a quantification of the interaction between subject and robot and demonstrate the effectiveness of robotic exoskeletons in improving stroke patients' walking ability. Ekso is a wearable bionic suit that enables individuals with weakness or paralysis of the lower limbs, due to spinal cord injury (SCI) and stroke, to stand up, sit down and walk over ground in a rehabilitation institution.* The exoskeleton can be used as a therapeutic device, in which patients can relearn proper step patterns and weight shifts using a functional based platform, or as an assistive device, in which the device essentially moves the patient's legs through a kinematic pattern.

> **"With the Ekso, we can get the patient standing and walking early in the rehabilitation process with an intelligent supported gait. As the patient progresses the Ekso will adjust to their development, and the clinical team has the possibility to easily customize the device after each patient to improve patient outcome."**
>
> Franco Molteni, MD
> Director Dpt Rehab and Movement Analysis Lab Medicine
> H. Valduce Villa Beretta Costa Masnaga

Implementation/Approach
Twenty-two stroke patients were recruited to walk in the Ekso GT robotic exoskeleton. The walking ability of the hemiparetic subjects in this study ranged from non-ambulatory to mildly impaired. An evaluation of acute changes of sEMG pattern of both sides during a robotic over-ground walking was performed.

Early Findings
Data collected in post stroke subjects revealed important changes of sEMG of the lower limbs' neuromuscular pattern passing from standard to Ekso guided training. In particular, an improvement in sEMB activation patterns, both in terms of timing and amplitude, was registered for affected and non-affected sides, passing from standard to wearable robotic training condition.

Conclusions
This data suggests that a combination of limb loading and highly tuned interlimb/interjoint coordination is able to modulate the motor output (sEMB) of the muscles analyzed; in fact all patients in this group were able to walk with the robotic device, even those non-ambulatory in standard condition. Wearable robotics allow a completely new strategy – task oriented gait training after stroke with an effect of modulation on motor control that potentially could induce neuroplasticity and long-term potentiation.

www.eksobionics.com

2016 NATIONAL PHYSICAL THERAPY MONTH
AMERICAN PHYSICAL THERAPY ASSOCIATION
www.MoveForwardPT.com

Please visit our social media channels and tell us what you think. #NPTM

Fall 2016 Conference Schedule

This fall, Ekso Bionics will be participating in 6 major industry conferences. Please visit us at our booths.

ACRM American Congress of Rehabilitation Medicine

Oct 30 – Nov 4
Visit us at Booth # 300 – 302

ASNR NEURO REHAB CONFERENCE

NOV 10-11

MEDICA

Nov 14-17, Düsseldorf, Germany
Visit us at Booth #Hall 4, Booth K14

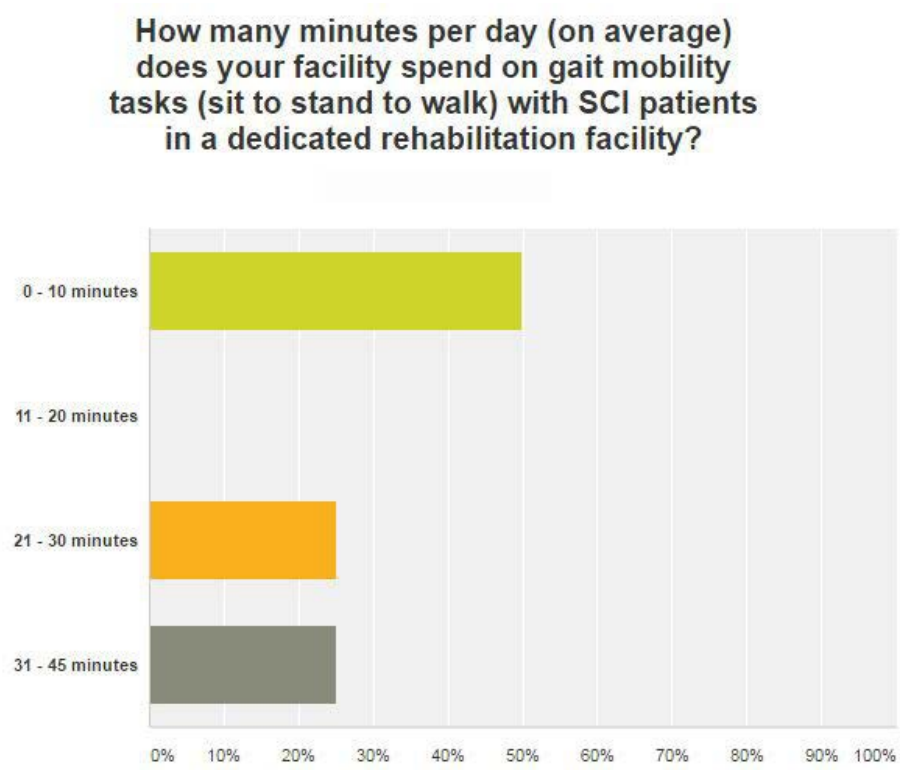
TherapyExpo

NOV 23-24, Birmingham, UK
Visit us at Booth #Booth TD42

We want to learn from you!

In honor of National Physical Therapy Month #NPTM Ekso Bionics is surveying Physical Therapists on how they incorporate Exoskeletons into their practice.

Take survey here.



Sources:
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2. stroke.org https://www.stroke.org.uk/sites/default/files/stroke_statistics_2015.pdf
3. Source: World Health Report 2002 Worldwide Statistics
http://www.strokecenter.org/patients/about-stroke/stroke-statistics/

4. Source: Stroke Association/Stroke In the U.K.
UK Stroke Incidence – Stroke org UK 2015

5. https://www.stroke.org.uk/sites/default/files/stroke_statistics_2015.pdf
World Health Organization 2014, Top 10 Causes of Death
6. http://www.cdc.gov/stroke/facts.htm

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