Exoskeletons

eksobionics.com

Perspectives in Assistive Technology, Stanford 2019

Katherine Strausser, PhD
Principal Controls Engineer

Who am I?

BS

Mechanical Engineering

MS, PhD

Mechanical Engineering

Principal Controls Engineer

Who is Ekso Bionics?

- Ekso Bionics® develops technology to enhance human mobility, strength, and endurance.
  - Lower extremity exoskeletons for military & medical
  - Upper extremity Ekso Vest for industrial applications
  - ZeroG arm for industrial applications

Industrial applications

Medical Applications

Current Exos

- EksoGT, Ekso Bionics
- ReWalk 6.0, ReWalk Robotics
- Indego, Parker Hannifin
- Rex, Rex Bionics

FDA approved

Diagnoses

- Spinal Cord Injury
- Stroke

- Multiple Sclerosis
- Traumatic Brain Injury
- Parkinsons
- Etc.

Benefits

- Gait Training
  - Repetitive stepping
  - Varied assistance
  - Balance training
- Long-Term Use?
  - Bone Density?
  - Bowel & Bladder Function?
  - Pain?
  - Circulation?
  - Emotions?

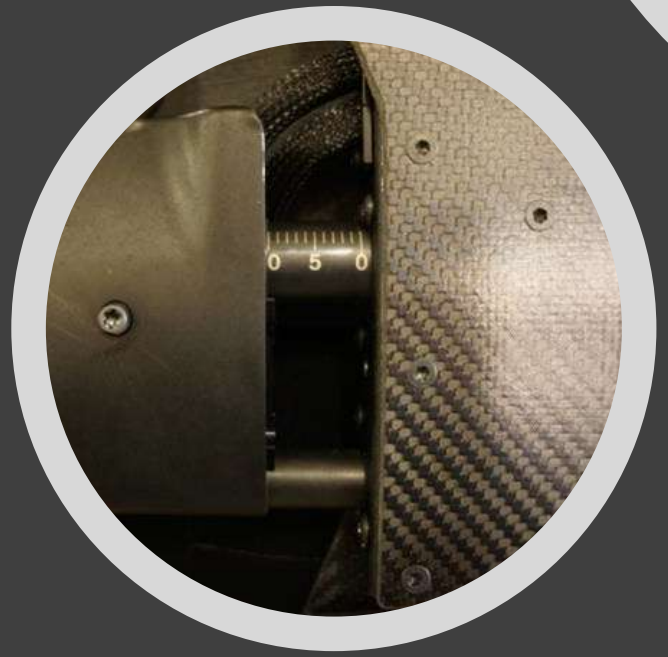
Designing an Exoskeleton

Brainstorm

- What would you consider when designing an exoskeleton for gait rehabilitation to be used in a rehab center?
- What features are important?
- How do you figure out if your design works?

Size Adjustment

- Exoskeletons must adjust to fit their user
- Fit is critical for maintaining comfort and safety
- Fast and accurate adjustments needed in clinical setting



Padding & Fit Kit

- Elimination of pressure points
- Ensure that the user stays aligned with the device

Donning & Doffing

User must be able to get in/out of the device safely and easily

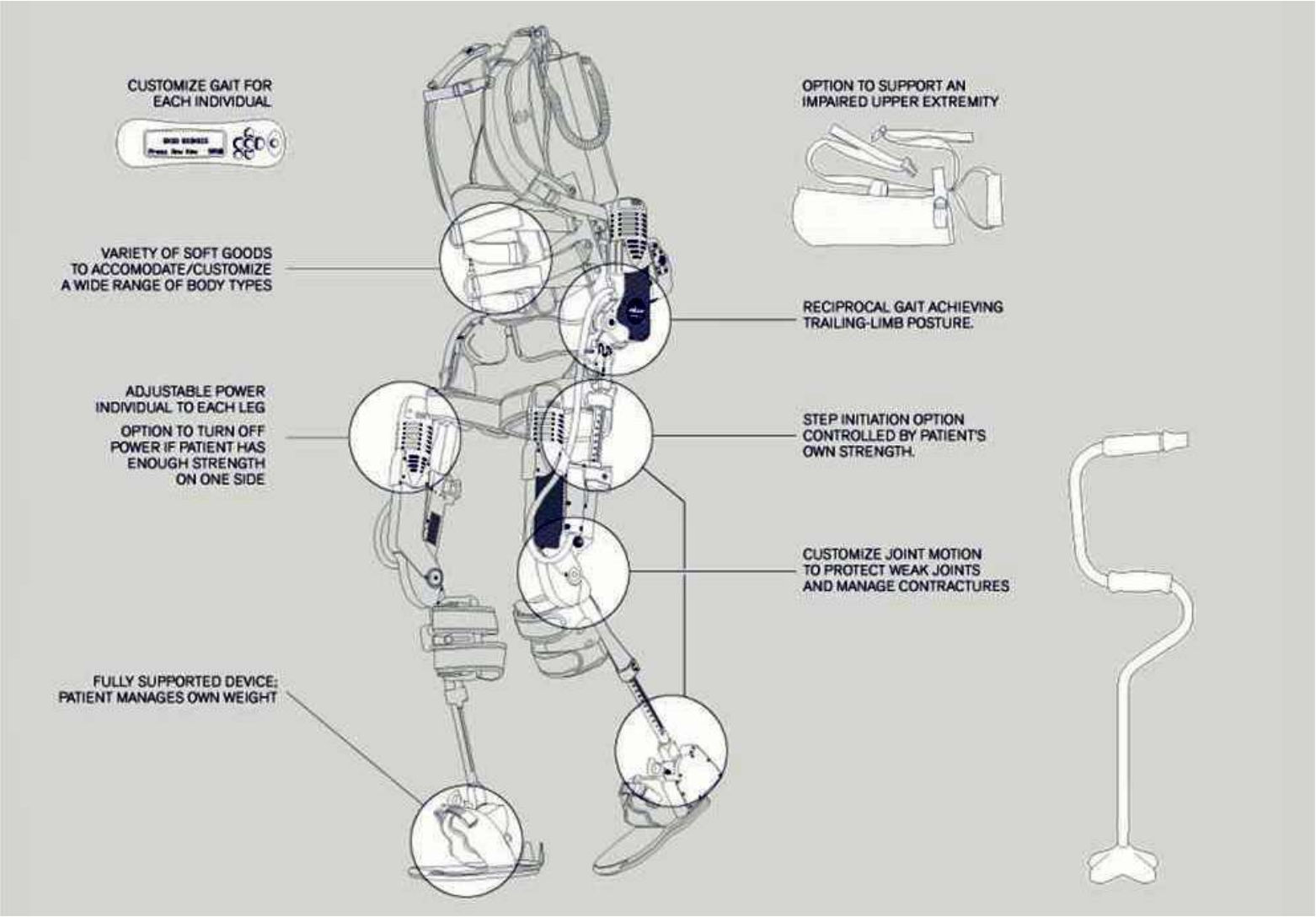
Safety- Fail Safe

- Hard stops & soft stops
- Adjustable settings for SW Joint limits
- Normally-on brakes

Ekso in Action with Fernanda

Play Video

Other Features



Thank you

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