



# **Design & Control of Exoskeletons for Rehabilitation**

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# Outline

## The Exoskeleton

- Motivation

## Design of an Exoskeleton

- Design requirements
- Design features

## Demo / Q&A

# Exoskeletons: Helping People Move



Indego  
Parker.com



Rex  
Rexbionics.com



ReWalk  
Argomedtec.com

# Ekso



# Who can benefit?

- Spinal cord injury
- Traumatic brain injury
- Stroke
- Multiple Sclerosis
- Etc.



# Why exoskeletons?

- Gait training
  - Repetitive stepping
  - Varied assistance
  - Balance training
- Long-term use
  - Bone density?
  - Bowel & bladder function?
  - Pain?
  - Circulation?
  - Emotional



# Ekso on the Market

- For sale in hospitals
  - New Model: Ekso GT
- FDA clearance
- Studies



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# Design Requirements

- Brainstorm time!



# Size Adjustment



# Size Adjustment



# Fit Kit & Padding



# Donning / Doffing



# Safe Motion / Fail Safe

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



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# Thank You

