



The Ekso<sup>TM</sup> exoskeleton is a wearable bionic suit which enables individuals with any amount of lower extremity weakness to stand up and walk over ground with a natural, full weight bearing, reciprocal gait. Walking is achieved by the user's weight shifts to activate sensors in the device which initiate steps. Battery-powered motors drive the legs, replacing deficient neuromuscular function.

#### The Ekso exoskeleton:

Provides a means for people with as much as complete paralysis, and minimal forearm strength, to stand and walk.

- Helps patients relearn proper step patterns and weight shifts using a functional based platform
- Facilitates intensive step dosage over ground
- Provides functional based rehabilitation:
  - 1) Step generator software helps get patients walking in their first session to quickly achieve work on gait patterning or step dosage
  - 2) Progressive step modes facilitate patients' escalating skills
  - 3) A tool to enforce proper biomechanical alignments and symmetrical gait patterns over ground

#### Walk modes include:

##### First Step

- Physical therapist actuates steps with a push button. The user progresses from sit to stand, using a walker to walking with crutches.

##### Active Step

- User takes control of actuating their steps via buttons on the crutches or walker.

##### ProStep

- User achieves the next step by moving their hips forward and shifting them laterally. The device recognizes that the user is in the correct position and steps.

##### New ProStep Plus

- Steps are triggered by the user's weight shift plus the initiation of forward leg movement.



### Indications for Ekso Exoskeleton Use

The patient must have LE weakness or paralysis resulting from:

- Spinal Cord Injury
  - 1) Motor Complete paralysis C7 or below
  - 2) Motor Incomplete with functional bilateral UE strength or functional strength in one UE and one LE
- CVA/Stroke
- Hemiparesis or Hemiplegia
- Acquired Brain Injury (ABI)
- Multiple Sclerosis
- Guillain- Barre Syndrome
- Generalized weakness caused by other conditions

### Screening Requirements

The patient must:

- Have physician screening clearance before Ekso exoskeleton use
- Be involved in a standing program or pass a standing frame trial
- Weigh under 220 Lbs (100Kg)
- Be between 5'2" & 6'4" tall (some restrictions apply due to length of upper/lower leg segments)
- Have a standing hip width of 18" or less (across widest part of the hips)
- Have near normal range of motion in hips, knees and ankles

### Contraindications

- Hip Range of Motion – significant hip flexion contracture (>- 17° of hip extension) and/or bilateral hip flexion of less than 110°
- Knee flexion contracture of > 12°
- Unable to achieve neutral ankle dorsiflexion
- Leg length discrepancy
- Spinal Instability (or spinal orthosis) unless cleared by an MD
- Unresolved deep vein thrombosis (DVT)
- Uncontrolled Autonomic Dysreflexia (AD)
- Spasticity that prevents joint motion
- Open skin ulcerations on buttocks or surfaces in contact with EKSO device (anterior upper thighs, tibial crest, dorsum/plantar surface of foot, heel and back, abdominal and anterior shoulder region)
- Pregnancy

### Precautions

- Cognitive impairment resulting in motor planning concerns or impulsivity unable to follow 2-step commands
- Shoulder extension ROM of < 50° excludes crutch use during sit to/from stand transitions
- Healed sacral ulcers with weak/tenuous skin integrity-limit sit time during don/doff
- Uncontrolled orthostatic hypotension that limits standing tolerance
- Active Heterotopic Ossification(HO), hip dysplasia or hip axis abnormalities
- Colostomy