ABLE

Restoring the pleasure and empowerment of walking

In collaboration with:

With the support of:
Problem: DISABILITY

5M people have Spinal Cord Injury (SCI)

Muscular atrophy

Pressure ulcers

Osteoporosis

Circulatory and digestive problems
Problem

People with a SCI could walk if they had a robotic exoskeleton

However…

Exoskeletons are:

Only found in:
Target patients

No control at knee and ankle
Market: patients with lower SCI

Worldwide: 1,5M
- Europe: 99K
- Spain: 9K
- North America: 117K
- Worldwide: 1,5M
Available options for these patients

- Wheelchair
- Standing frame
- Orthopedic supports (OS)
- Exoskeleton
Powering an orthopedic support to **restore the ability to walk in a natural and intuitive way**

- **Health**
- **Self-esteem**
- **Independence**
- **Quality of life**
Solution

Orthopaedic support + Electric motor + Sensor

(Images of different components and a diagram showing the integration of these components into a prosthetic leg.)
**Clinical evidence**

ABLE allows the patient to walk faster, and with a more stable and symmetric gait.

<table>
<thead>
<tr>
<th>Case 1: the patient walked with orthopedic supports</th>
<th>Case 2: the patient walked with ABLE</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Metric</th>
<th>Case 1</th>
<th>Case 2</th>
</tr>
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<tbody>
<tr>
<td>Gait speed</td>
<td>45%</td>
<td>69%</td>
</tr>
<tr>
<td>Stride length</td>
<td>7%</td>
<td>30%</td>
</tr>
<tr>
<td>Cadence</td>
<td>16%</td>
<td>23%</td>
</tr>
<tr>
<td>Lateral disp.</td>
<td>-19%</td>
<td>-19%</td>
</tr>
<tr>
<td>Hip flexion</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Symmetry</td>
<td>23%</td>
<td>23%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exoskeleton</th>
<th>Price</th>
<th>Weight</th>
<th>Home-used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ekso (Ekso Bionics, USA)</td>
<td>130,000 $</td>
<td>20 kg</td>
<td>No</td>
</tr>
<tr>
<td>ReWalk (ReWalk Robotics, Israel)</td>
<td>77,000 $</td>
<td>18 kg</td>
<td>Yes</td>
</tr>
<tr>
<td>HAL (Cyberdyne, Japan)</td>
<td>96,000 $</td>
<td>12 kg</td>
<td>No</td>
</tr>
<tr>
<td>Indego (Parker Hannifin, USA)</td>
<td>80,000 $</td>
<td>12 kg</td>
<td>Yes</td>
</tr>
<tr>
<td>Phoenix (suitX, USA)</td>
<td>40,000 $</td>
<td>12 kg</td>
<td>No</td>
</tr>
<tr>
<td>ABLE (UPC, Spain)</td>
<td>5,000-10,000 $</td>
<td>5 kg</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Team

Alfons Carnicero  
CEO  
- Industrial Engineer  
- Passionate about medical devices and innovation  
- Worked in both institutions (UPC, Institut Guttmann)

Dr. Josep M. Font  
CSO  
- Industrial and Biomedical Engineer  
- Director & Founder BIOMECC Lab, CREB  
- Rehabilitation engineering, robotics and biomechanics

Dr. Joan Vidal  
CMO  
- Medical specialist in Physical Medicine and Rehabilitation  
- Head of the Spinal Cord Injury Unit at Institut Guttmann  
- Spanish representative at the International Spinal Cord Society

Jesús De Miguel  
Technical Officer  
- Automatic Control and Robotics Engineer
<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Collins</td>
<td>Project Mentor</td>
<td>COO at Consortia for Improving Medicine with Innovation &amp; Technology (CIMIT, Boston)</td>
</tr>
<tr>
<td>Elena Canetti</td>
<td>Tech Transfer Advisor</td>
<td>Co Managing Partner at Inveniam Group</td>
</tr>
<tr>
<td>Elena López-Cano</td>
<td>UPC TTO</td>
<td>Project Manager at Valorization Unit of the UPC</td>
</tr>
<tr>
<td>Bart Huiskien</td>
<td>Project Advisor</td>
<td>Serial entrepreneur in IoT and SaaS</td>
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</table>
“I would love to go to a concert and see the stage again”

Ramón, 32 years old SCI patient