Multidirectional Transparent Support for Overground Gait Training

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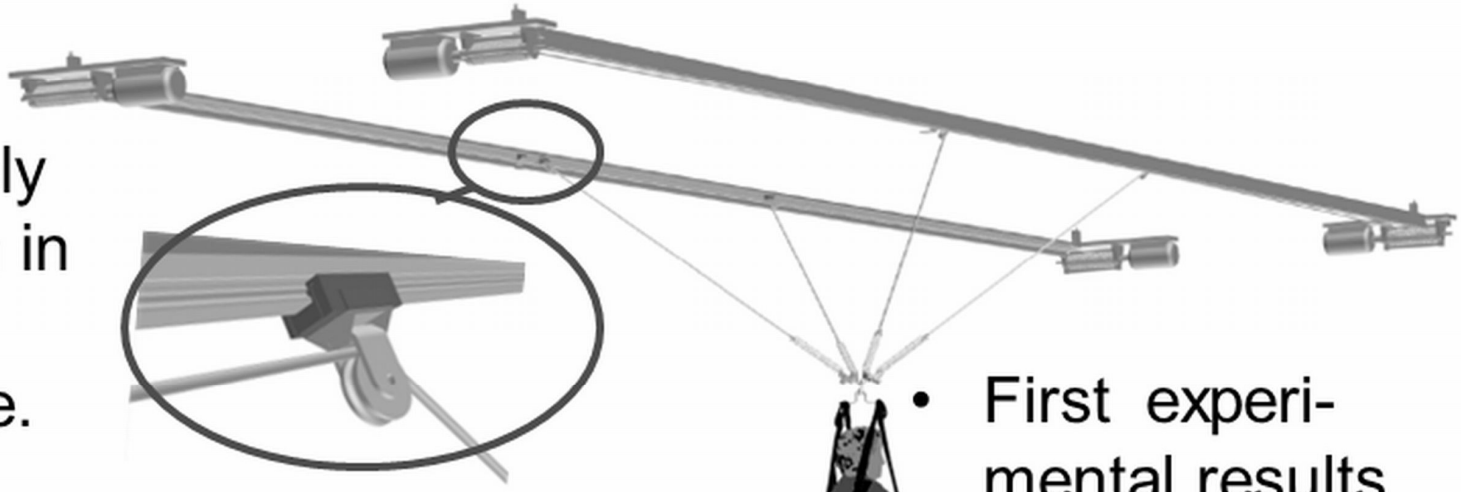
- FLOAT is a cable robot that can apply forces to a human in a large three-dimensional space.



- Apparent robot dynamics are minimal due to an underactuated concept with passively displaceable deflection units.

- First experimental results with human subjects will be presented.

Podium 5.1

Improving Transparency of Powered Exoskeletons Using Force/Torque Sensors on the Supporting Cuffs

D. Zanotto: University of Delaware, Newark, DE, USA
T. Lenzi: Rehabilitation Institute of Chicago, Chicago, IL, USA
P. Stegall and S. K. Agrawal: Columbia University, NY, USA.

- An "interaction-sensing-based" controller can improve transparency compared to the traditional force-feedback controller which exploits collocated torque sensors.
- Experimental results showed that:
  - the traditional controller lets the wearer carry the inertial loads generated by the robot links;
  - the interaction-sensing-based controller substantially reduced the interaction torques, thereby inducing smaller changes in the user's natural gait in terms gait kinematics, gait timing and muscle activations.

Podium 5.2

Leveraging Gait Dynamics to Improve Efficiency and Performance of Powered Hip Exoskeletons

M C Ryder, F Sup: University of Massachusetts, Amherst MA, USA

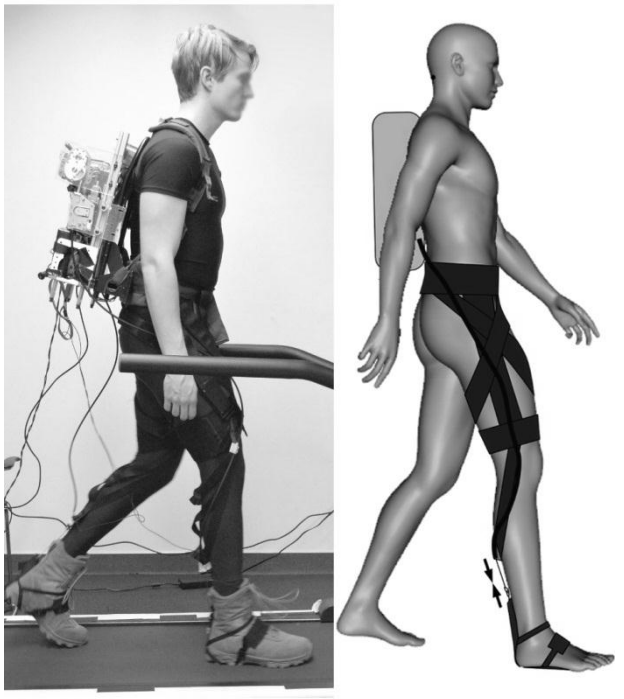
- A sinusoidal actuation mechanism has been designed to power the sagittal plane of the human hip
- Passive elements are used to absorb energy normally dissipated by muscle fascia
- Simulations show that large variations in the hip's torque profile can be reduced by this mechanism for reduced motor loading

Podium 5.3

Biologically-inspired Soft Exosuit

A Asbeck, R Dyer, A Larusson, C Walsh: Harvard University, USA

- A novel “exosuit” made of fabrics has been developed that applies forces to the body during walking
- Unlike traditional exoskeletons, the exosuit contains no rigid framing elements, yet can apply moments at the ankle and hip with magnitudes of >20% of those naturally generated in walking
- Measurements were taken of the suit’s stiffness and behavior during walking



Podium 5.4