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Title
Neural Stimulation for enhanced standing and walking after paralysis or limb loss

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Summary
Neural Stimulation for enhanced standing and walking after paralysis or limb loss

Introduction
This presentation will summarize ongoing research projects in a comprehensive program to re-establish or improve personal mobility (standing, stepping, and wheelchair propulsion) after paralysis by spinal cord injury or other central nervous system dysfunction, and to restore natural sensation of lower limb loads after trans-tibial or trans-femoral limb loss.

Methods
Paralysis limits the ability to exercise, negotiate architectural barriers, retrieve and manipulate objects and interact with the environment, and gain access to many physical environments and life opportunities. Assistive technologies that communicate directly with the peripheral nervous system can facilitate or restore the independent performance of many functions compromised by CNS disease or trauma. Similarly, selectively activating the sensory nerves can provide natural and valuable information about interactions of lower limb prostheses with the environment to enhance standing balance and gait stability in amputees. This lecture will provide illustrative examples of how devices based on thorough understanding of the human neuromusculo-skeletal system and biomechanics are being developed, evaluated and translated to clinical feasibility trials. In particular, biomimetic control systems for stable bipedal standing balance and gait, new methods to selectively activate and maximize the output of muscular contractions, systems to improve seated posture and function, and the design of hybrid systems that integrate wearable exoskeletons with a user’s muscle activity to allow ambulation after complete paralysis will be discussed. Preliminary results on the feasibility of restoring natural sensation to lower limb amputees via neural stimulation will also be presented.
Results

Conclusion

References