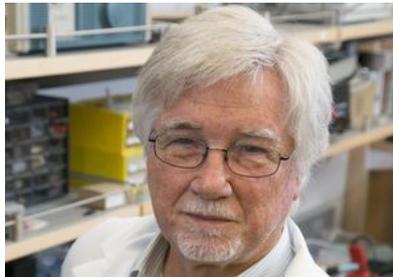


## 2016 Bench to Bedside Lecture

*Recovery of sensory-motor function after complete paralysis:  
How, Why and What is to follow?*



**V. Reggie Edgerton, PhD**  
Professor & Director, Neuromuscular Research Laboratory  
University of California Los Angeles

March 31, 2016 – 3:30 PM  
*Reception to follow*

USC Health Sciences Campus  
McKibben Lecture Hall - Room MCH 256  
333 San Pablo Street  
Los Angeles, CA 90033

For more information: [http://pt.usc.edu/Bench\\_to\\_Bedside/](http://pt.usc.edu/Bench_to_Bedside/)

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**Recovery of sensory-motor function after complete paralysis: How, Why and What is to follow?**

*V. Reggie Edgerton, Parag Gad, Roland R. Roy, Niranjala Tillakaratne and Yury Gerasimenko  
UCLA, Los Angeles, CA and Pavlov Institute, St. Petersburg, Russia*

It is well known that the sensory input representing the timing and level of loadbearing on the lower limbs is an important source of input to the central nervous system in sustaining postural and locomotor control. The degree to which this source of input is critical, however, continues to require further study. Experiments will be described demonstrating that after complete paralysis due to spinal cord injury the return of bipedal and quadrupedal loadbearing in response to lumbosacral stimulation can be used to restore postural standing in humans. Similar results have been achieved in rats, but in addition, full weight-bearing stepping can also be recovered in the presence of spinal epidural stimulation and pharmacological modulation largely involving serotonergic agonists. Finally we have observed that a progressive increase of the level of loadbearing on a daily basis in rats and humans further enhances the level of recovery of standing potential. The mechanisms of the recovery of motor function with these interventions are gradually being formulated from the perspective of how spinal networks can be fine-tuned to facilitate the performance of a wide range of complex motor tasks. This fine-tuning can be accomplished using a combination of neuromodulatory interventions, including multiple forms of electrical stimulation, sensory modulation and pharmacological modulation.