NeuroTekTronix, Inc.

ParaCycle®

Motion Training with Functional Electrical Stimulation

Made in IRAN

Prevent Secondary health conditions as a result of having

- Spinal Cord Injury
- Parkinson
- Multiple Sclerosis (MS),
- Cerebral palsy (CP),
- Head injury

Spinal cord injury (SCI) is a serious medical condition that causes functional, psychological and socioeconomic disorder. Individuals with SCI develop and experience a number of secondary health conditions as a result of having a SCI.

The most common secondary conditions are:

- Respiratory complications
- Cardiovascular complications
  - *Orthostatic hypotension*
  - *Autonomic dysreflexia*
- Urinary and Bowel complications
  - *Bladder dysfunction*
  - *Neurogenic Bowel*
  - *Urinary tract infection*
- Spasticity
- muscle atrophy
- Pain
- Pressure ulcers
- OSTEOPOROSIS AND BONE FRACTURES
- Depression

PARACYCLE®

The ParaCycle is a new motor neuroprosthesis system that enables peoples with spinal cord injury, traumatic brain injury, Multiple Sclerosis (MS), cerebral palsy (CP), and stroke patients to have leg-cycling motion using functional electrical stimulation.

In the ParaCycle system, sequences of current pulses excite the intact lower motor neurons, which in turn contract paralyzed muscles. Activation of the lower motor neurons is achieved using electrodes placed on or near the innervating nerve fibers. By changing the parameters of the stimulation signal, the level of contraction can be altered to perform a specific task. To provide leg-cycling motion of the paralyzed limbs, an appropriate electrical stimulation pattern should be delivered to a set of muscles. In the ParaCycle system, an efficient control strategy generates the appropriate stimulation signals which are delivered to the paralyzed muscle via surface electrodes.

The ParaCycle provides on-line monitoring of functional operation of the system and electrode lead connection, and appropriate visual and audible alarm indicate the fault condition.

Clinical Benefits Using ParaCycle

- Improved cardiovascular health
- Increased muscle bulk in the muscles of the legs
  Prevent Atrophy/Build Muscle/Increase Strength
- Build Endurance
- Increase/Maintain Range of Motion
- Increased bone density in the lower limbs
- Reduction of spasticity
- Lowered risk of pressure sores.
- Cosmetic benefits
- Improve Self-Image
- Improve Quality of life
- Improve Blood Circulation

PUBLICATIONS

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11. A. Ajoudani and A. Erfanian, "A neuro-sliding mode control with adaptive modeling of uncertainty for control of movement in paralyzed limbs using functional electrical stimulation," *IEEE Trans. Biomed. Eng.* vol. 56, no. 7, pp. 1771-1780, July 2009.
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ParaCycling
ParaCycling®
ENTER
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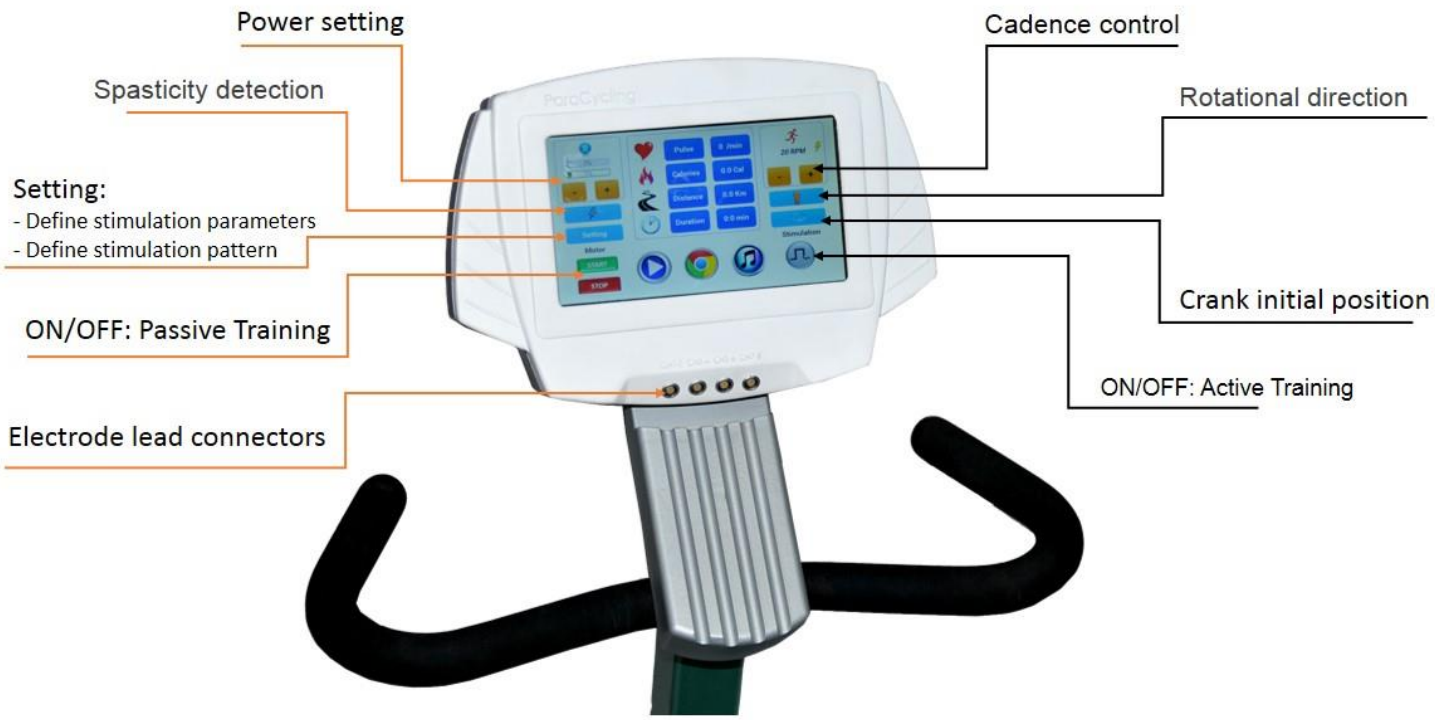
Power setting
Spasticity detection
Setting:
- Define stimulation parameters
- Define stimulation pattern
ON/OFF: Passive Training
Electrode lead connectors
Cadence control
Rotational direction
Crank initial position
ON/OFF: Active Training

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