Paralysis and Exercise
Cutting Edge Fitness for Wheelchair Users

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Want to Ask a Question?

Type question here.
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Objectives

- Importance of Exercise
- Rehabilitation vs. Fitness
- Options for people with mobility impairments
- Technology integration
- Resource to learn more

Disclaimer page

- The information presented in this webinar is not meant to replace the advice from a medical professional. You should consult a healthcare professional familiar with your specific case, concerns and condition.

- Neurotech Network and its representatives do not endorse, rate, sell, distribute, prescribe, administer or recommend any products, procedures or services. We highly suggest for you to take information to a trained medical professional familiar with your case to discuss options that are best for you.
Helping people regain life thru neurotechnology

Focus on education of and advocacy to access neurotechnology devices, therapies and treatments for people living with impairments, their care-givers and medical professionals.

www.NeurotechNetwork.org

What is Neurotechnology?

The application of medical electronics and engineering to restore or improve the function of the human nervous system.

Potential Health and Economic Impact:
- Reduced long term care costs
- Increased independence
- Accelerate rehabilitation
- Improve quality of life
- More self-reliance
- Decreased health management costs

Impact varies depending on device, therapy or treatment and specific user circumstances.
Why is exercise important for people with paralysis?

- High incidences of:
  - Obesity
  - Cardiovascular disease
  - Diabetes
  - Low metabolic rates
  - Pulmonary disorders
  - Osteoporosis
  - Pressure Sores

Key Take Away:
Exercise same impact as able bodies.
Can't maintain gains if stop exercising

Rehabilitation vs Fitness

- Medical Definition:
  Rehabilitation is a treatment or treatments designed to facilitate the process of recovery from injury, illness, or disease to as normal a condition as possible.

- Focus is
  - Restoration/recovery
  - Compensation
  - Limitations/adjustment
  - Independence

- Medical Definition:
  Exercise is physical activity that is planned, structured, and repetitive for the purpose of conditioning any part of the body.

- Focus is
  - Improve health condition,
  - Maintain or improve fitness and
  - Prevention/performance
Pinwheel of Exercise

No Need for High Tech

- Theraband
- Weights
- Yoga
- Dance
- Ropes
- Resources
  - United Spinal Association Tech Guide
  - Fitness Zones
Resources gather more

- Wheelchair exercise and fitness
- Sit and Be Fit:
  [http://www.sitandbefit.org/chair_exercises_for_seniors](http://www.sitandbefit.org/chair_exercises_for_seniors)
Video Games/Virtual Reality
No Couch Potato

- Physical Benefits
  - Fine Motor Skills
  - Hand Eye Coordination
  - Endurance
  - Range of Motion
  - Bilateral Coordination
  - Balance
  - Physical Outlet
  - Increase Metabolic Rate

- Social/Psychological
  - Inclusion
  - Sense of ‘normal’
  - Equalizing
  - Peer Interaction
  - Improved Self-Esteem
  - Increased Leisure activity

Source: Katie Murphy, CTRS, Shepherd Center

Video Games/Virtual Reality

- Physical Activity Games
  - Tennis
  - Boxing
  - Dance

- Activity Adapted
  - Controllers

- Group/Team Play

- Adaptive Devices
  - Gloves
  - Head Gear
  - Asst. Tech

Source: Paralysis & Exercise
Cutting Edge Fitness for Wheelchair Users
Resources Adapted Gaming

- http://benheck.com
- http://quadcontrol.com
- http://www.robertflorio.com
- http://www.broadenedhorizons.com
- http://www.eDimensional.com
- http://www.gimpgear.us

Repetitive & Range of Motion

*Clinical Based*

Hocoma Upper Extremity Motion
http://www.hocoma.com/patients/upper-extremities/

InMotion Upper Extremity Interaction
http://interactive-motion.com/patients/
**Repetitive & Range of Motion**

*Home Based*

- Kinetic Muscles Hand Therapy
  - [http://www.kineticmuscles.com/](http://www.kineticmuscles.com/)

- Quadriciser Range of Motion

- Theracycle Movement Therapy

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**Movement systems**

- Cyberdyne

- Ekso Bionics

- REX Bionics

- Parker Hannifin
  - [http://indego.parker.com](http://indego.parker.com)
Electrical Stimulation for Exercise

- Prevent muscle atrophy
- Improve blood flow
- Cardiovascular
- Increase muscle bulk & strength
- Reversal of osteopenia
- Prevent joint ossification
- Decrease spasticity
- Increase venous returns
- Decrease risk of pressure sores
- Improve perceived 'appearance'

NeuroMuscular Electrical Stimulation

- Bio-medical Research
  http://www.neurotechgroup.com/
- Empi
  http://empi.com/
- RS Medical
  http://www.rsmedical.com/
Biofeedback
EMG with NMES

Biomove
http://www.biomove.com/

Care Rehab
http://www.carerehab.com/

Zynex Medical
http://www.zynexmed.com

Functional Electrical Stimulation

Axibionics/Wearable Therapies
www.wearabletherapy.com

Restorative Therapies
www.restorative-therapies.com

RECK Motomed & Hasomed
www.ri-llc.com

Therapeutic Alliances
www.musclepower.com
Considerations to Participating in any FES program

- Not all programs are appropriate for all populations
- Fitness Goals
- Variety of exercises, potential benefit of ‘mixing it up’
- Commitments of self, family/caregiver
  - Time
  - Out of pocket cost and/or reimbursement
- Medical Professional Monitoring
  - Peripheral nerve damage or skin damage
  - Over-stress or fatigue the stimulated muscles

Resources

- National Center on Health, Physical Activity and Disability: [http://ncpad.org/](http://ncpad.org/)
- Exercise for Older Adults with a Disability: [www.agerrtc.org](http://www.agerrtc.org), University of Washington
- Neurotech Network, Fact Sheet Exercise Weak or Paralyzed Muscles: [http://www.neurotechnetwork.org/educate_exercise.htm](http://www.neurotechnetwork.org/educate_exercise.htm)