

Technological advances in Stroke Rehabilitation

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Outline

- Why is stroke rehabilitation going high-tech?
- What technology exists?
- Introduction of two technologies currently in use

Why is Stroke Rehab going High-tech?

- Rehabilitation is based on the concept of neuroplasticity
- Brain re-wiring requires 1000's of repetitions of a task!
- 400-1000 reps per therapy session, which is impractical (for both stroke survivor and therapist!)

Why is Stroke Rehab going High-tech?

- Therapy provides insufficient stimulus for lasting neuronal change
- Rehab is time-limited- recovery can theoretically go on for years
- Stroke survivors are more tech-savvy and tech-focused than ever before
- The variety and game-style nature of activities improves motivation and compliance

What technologies Exist?

- Robotic Therapy
- Virtual rehab
- Telerehab
- Brain-machine Interfacing
- Gadgets

Robotic Therapy

- Robots assist with retraining of either upper limb or lower limb, gait
- Early robots were mostly used for assessments, now expanded use to improve recovery
- For example:
 - Locomat Gait Retrainer
 - Kinarm
 - Re-Joyce

Virtual Rehab

- Allows patients to safely practice real-world environments and scenarios/ activities
- Users can practice skills that are important to them and have meaning (studies have shown that this will ultimately lead to greater improvements in function)
- Wii, Kinect systems being used for therapy (not the original purpose, less precise)

Telerehab

- Telerehab allows stroke survivors to access rehab at home whether due to inability to access rehab in their community, or post rehab
- Involves communication with rehab professionals via visual communication tools
- More typically consultation model of care for PT, OT, better utility for SLP treatment
- Webcam videoconferencing, use of robotic technologies at home

Brain-Machine Interfacing

- Surface EEG Neurofeedback
- Neuroprostheses
- Prostheses/ exoskeletons (computer programmed or remote controlled)
- Non-Invasive Brain Stimulation (TMS, TDS)

Gadgets

- Tablets, smartphones
- Improves adherence to prescribed independent exercise
- Allows therapists to monitor, give general advice from distance

THANK YOU!
Questions?

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