What the Tech: Stroke Recovery Technology

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American Heart Association.

American Heart Association. Get With The Guidelines. Stroke

DISCLAIMER

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Speaker Disclosures

Speaker: Joni Cook
Speaker: Morgan Davis

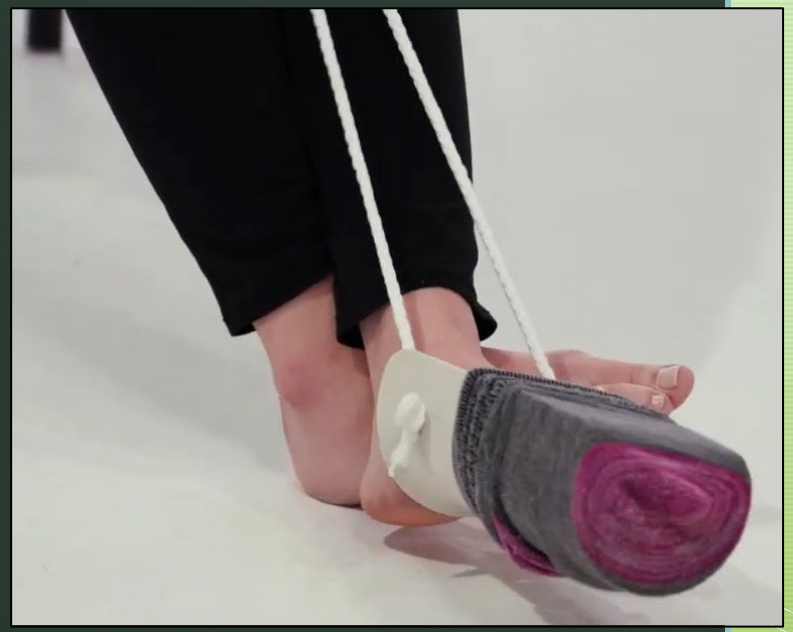
Title: What the Tech: Stroke Recovery Technology

No relevant financial relationships exist for Joni Cook or Morgan Davis.

Fun Fact:
Joni & Morgan 25 Years Ago

Daily Living & Mobility

- Hemi Techniques
- Learned helplessness vs Dependency
- Client-centered approach
- "Do less" approach for family members
- Stroke Impact Scale or QOL
- Modify the environment



Cromosini, A., Pham, L., Naujokaitis, V., & Karia, P. (2022)

Virtual Reality & Occupational Therapy

- Therapy using VR
- Outcome Measures
  - Primary:
    Canadian Occupational Performance Measure (COPM)
    Stroke Self-Efficacy Questionnaire
  - Secondary:
    Modified Barthel Index
    Fugl-Meyer Assessment – UE
    Functional Test for the Hemiplegic Upper Extremity

Long, Y., Ouyang, Rg. & Zhang, Jq. (2020)

What does VR look like?

- Non-immersive v Semi-immersive v Fully immersive
- Doctor Kinetic was used in this study.
  - Touch screen
  - Infrared sensor smart recognition camera
  - Human shaped model on the screen

Long, Y., Ouyang, Rg. & Zhang, Jq. (2020)

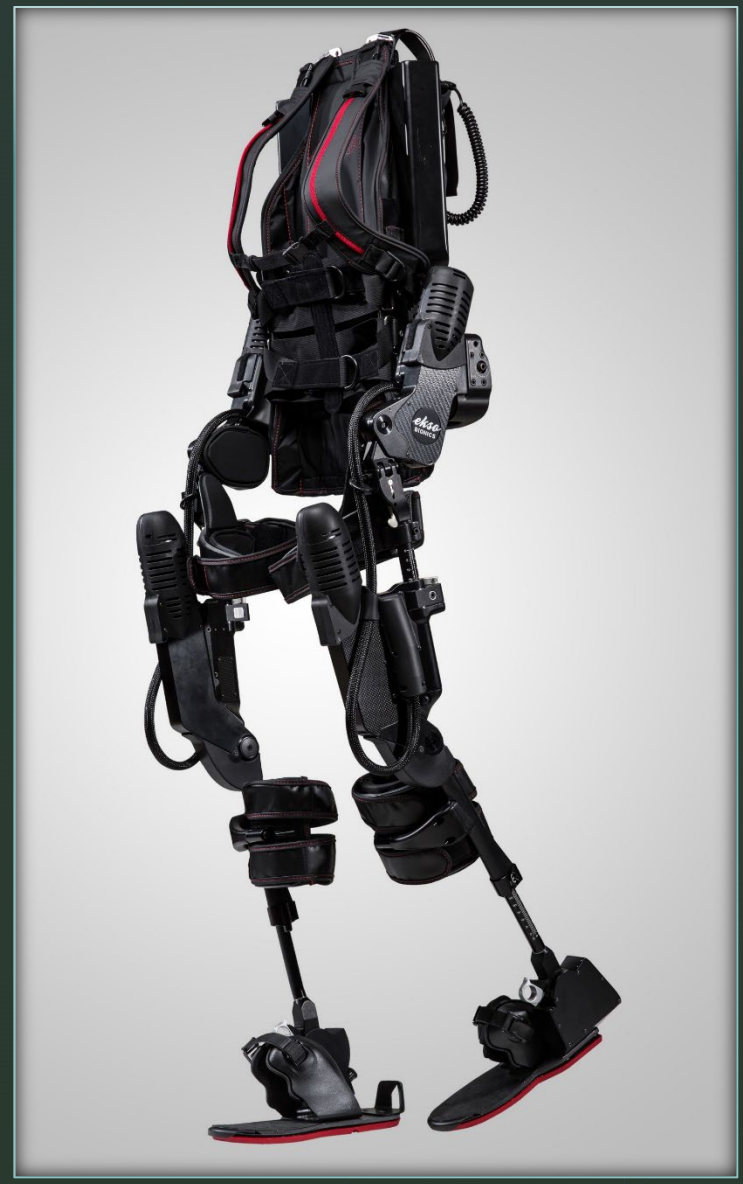
Virtual Reality and Robotics

- Microsoft Kinect
  - Traditional gaming technology
  - Rapid Movement Technology
  - Balance
- Combination therapy
  - ARMin robot for UE
  - Lokomat for LE

Clark, W. E., Sivan, M., & O'Connor, R. J. (2019).
Junata, M., Cheng, K. C. C., Man, H. S., Lai, C. W. K., Soo, Y. O. Y., & Tong, R. K. Y. (2021).

EXOSKELETONS

- FDA approved Exoskeletons
  - EksoNR
  - ReWalk
  - Indego
  - Hybrid Assistive Limb (HAL)
  - Honda Walking Assistive Device (WAD)
- Each of these are different in their own way



Hohl, K., Giffhorn, M., Jackson, S. *et al.* (2022).

Other OT Technology

https://medical.barrett.com

Home - Bioness (bionessrehab.com)

Other PT Technology

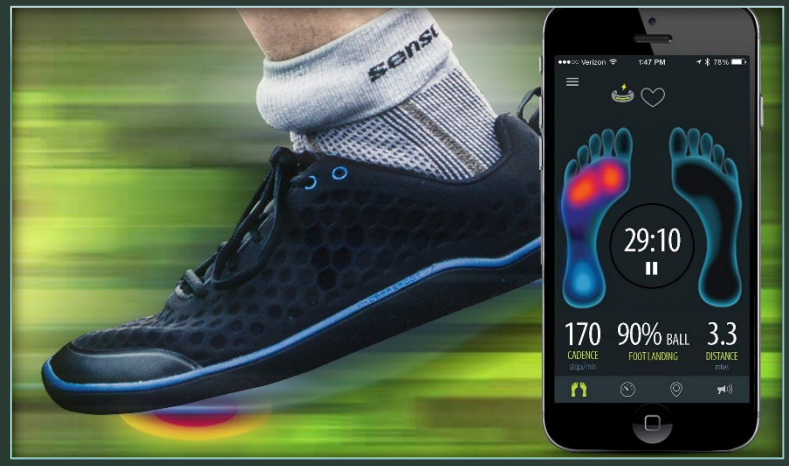
- Balance Exercise Assist Robot (BEAR)
- Body Weight Supported Training
  - Treadmill
  - Overground
- Robot-Assisted Gait Training
- Bioness L300 Plus

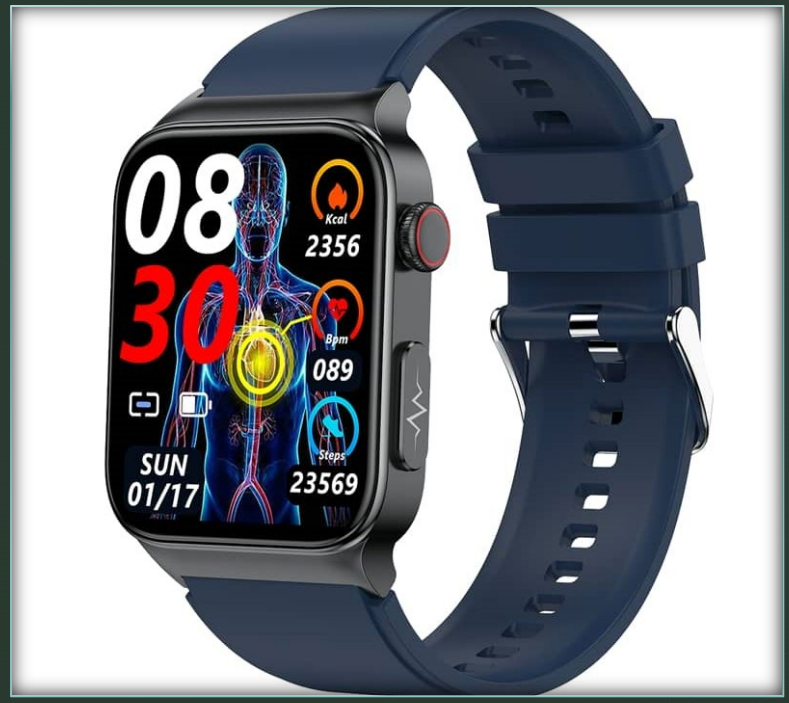
Inoue, S. et al (2022)

Kim et al (2019)

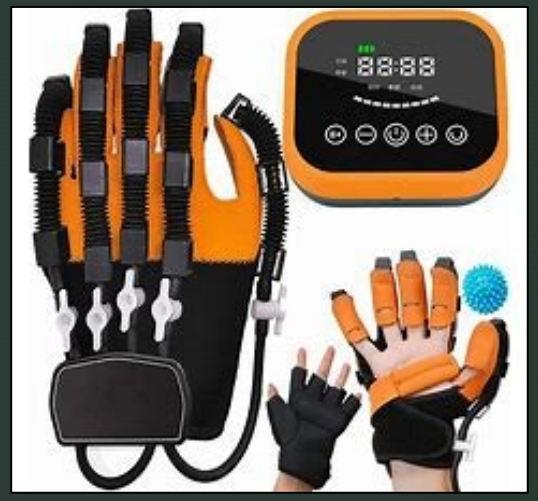
Wearable technology

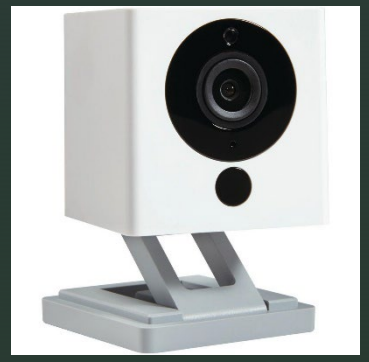
- Robotic Ankle-Foot-Orthosis
- Activity Monitors (Smart watches)
  - Blood pressure
  - Body temperature
  - Blood glucose
  - Oxygen/HR
- Wearable Motion Sensors
  - Smart socks
  - GPS
  - Gait sensors





Thalman, C., Hertzell, T., Debeurre, M., & Lee, H. (2022).
Kwon, et al. (2019). Peters DM, et al (2021).





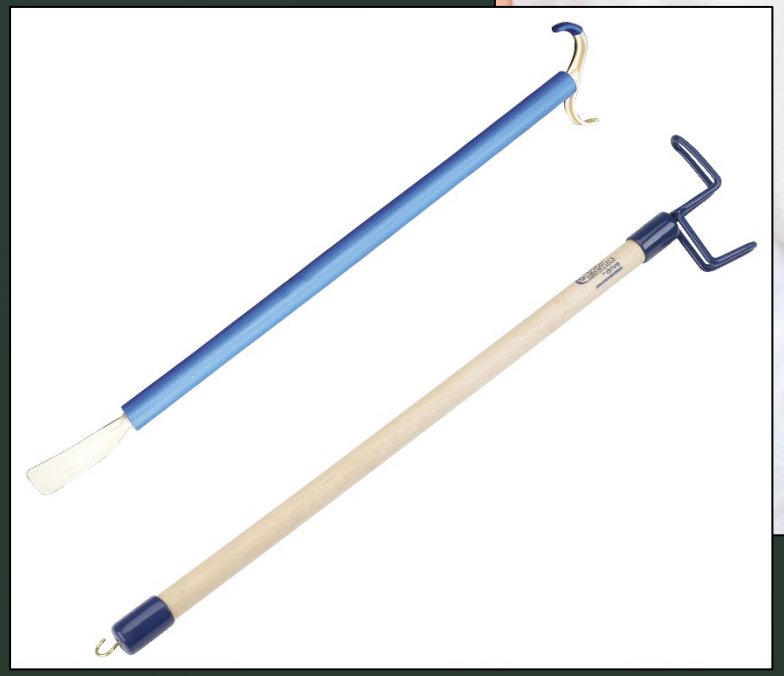
Technology for Home

- Medication Management
- Self-feeding
  Meet Obi – The Robotic Dining Companion – YouTube
- Amazon.com: KCYXSMAX Rehabilitation Robot Gloves Flexion & Finger Exerciser Gloves Hand Strengthener Physical Therapy Equipment for Stroke Hemiplegia Hand Dysfunction Patient 9 Intensity Gears 3 Training Modes : Health & Household

What does the research tell us?

Long, Y., Ouyang, Rg. & Zhang, Jq. (2020)
Proffitt, R., & Anderson, Sarah. (2020)
Ping, T. L. and Ju, K. (2023)

High Tech vs Low Tech



Ping, T. L. and Ju, K. (2023)
Elena, M-S, *et al.* (2021)

Resources

American Stroke Association

Technology and Life Post Stroke | American Stroke Association

Shirley Ryan Ability Lab Rehabilitation Measures Database: Stroke

https://www.sralab.org/rehabilitation-measures/database?population=4636

NeuroRehab Directory

Neurorehabdirectory.com

Questions

True/False: Neuroplasticity is the ability of the nervous system to change its activity in response to intrinsic or extrinsic stimuli by reorganizing its structure, functions, or connections.

True/False: There is no evidence to support the use of virtual reality (VR) in stroke recovery.

True/False: Meaningful recovery is possible more than six months after stroke.

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Thank you!

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