

Advances in Technology for Home Therapy after Stroke

Daniel Zondervan, PhD
Vice President, Flint Rehab LLC



Outline



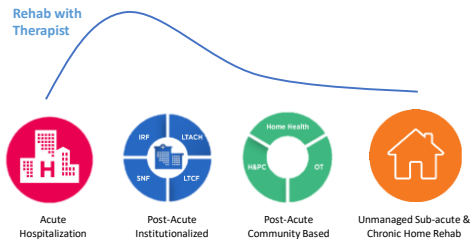
Why is Home Therapy Important?

Is Home Therapy Important?

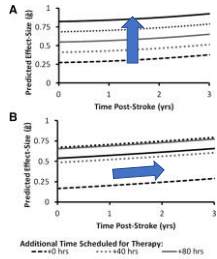


1 in 6 will have a stroke in their lifetime

Management of Stroke

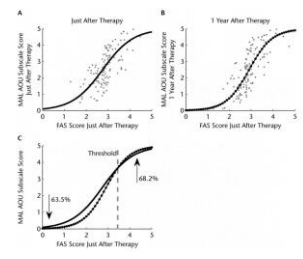


1. More Therapy => Better Outcomes



Lohse KR, Lang CE, Boyd LA. Is more better? Using meta-data to explore dose-response relationships in stroke rehabilitation. *Stroke*. 2014; 45:3053-8.

2. Better Outcomes => More "Real-world" Use

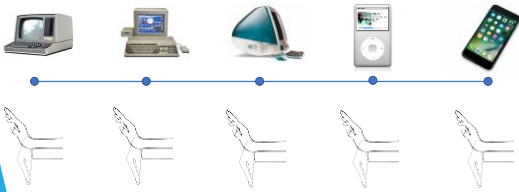
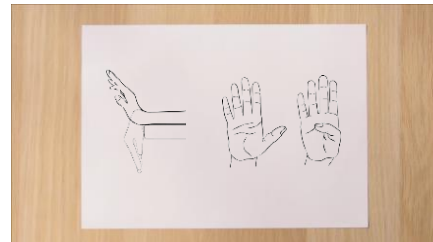


Schweighefer N, Han CE, Wolf SL, Arbib MA, Winstein GJ. A functional threshold for long-term use of hand and arm function can be determined: predictions from a computational model and supporting data from the Extremity Constraint-Induced Therapy Evaluation (ECITE) Trial. *Phys Ther*. 2009;89:1527-36.

3. More Use => Better Quality of Life



Conventional Home Therapy

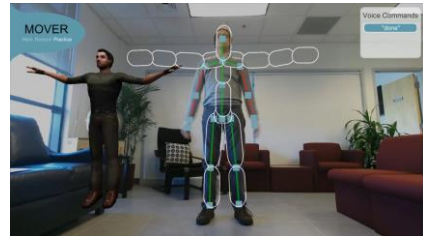


New Options are Becoming Available

“High-end” Technology



Computer Vision



Telerehabilitation



Custom Therapy Games



AbleX

MusicGlove

But Paper Exercises are Still the Standard of Care



Affordable



Easy to Use

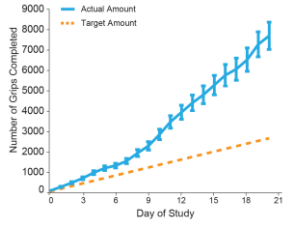


Flexible

Lessons learned from MusicGlove:

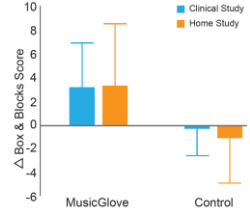
- **92** individuals admitted to a community hospital met all other inclusion criteria to participate in a MusicGlove RCT
- **Only 12%** had moderate hand impairment appropriate for the wearable sensing technology
- As Flint began selling the MusicGlove, in the first two years over 8000 people contacted the company but only about 10% had enough hand movement ability to use the MusicGlove

Lessons learned from MusicGlove:



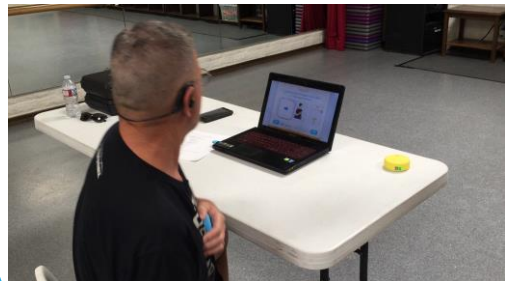
Zandbergen DK, Friedman N, Cheng E, Zhao X, Augburger R, Reinkenmeyer D, et al. Home-based hand rehabilitation after chronic stroke: Randomized, controlled single-blind trial comparing the MusicGlove with a conventional exercise program. *J. Rehabil. Res. Dev.* 2016;53:457-72.

Lessons learned from MusicGlove:



Friedman N, Chan Y, Reinkenmeyer AK, Benoussim A, Zamboni GJ, Bachman M, et al. Retraining and assessing hand movement after stroke using the MusicGlove: comparison with conventional hand therapy and isometric grip training. *J. Neuroeng. Rehabil.* 2014;11:76.

How can we combine these benefits with the advantages of paper exercises?





CUSTOMIZE YOUR WORKOUT

1. Select Body Part

- Arm
- Core
- Hand
- Legs

Total Level: 4

Total Reps: 0

Exercise Time: 0:00

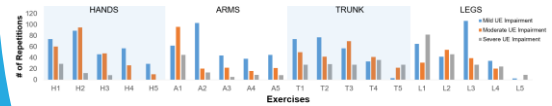
2. Select Duration

- 30 min
- 25 min
- 20 min
- 15 min
- 10 min
- 5 min

1. Select Your Body Part BEGIN



Advantages: Flexible



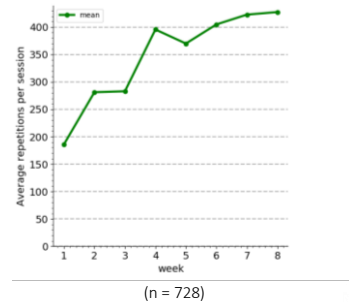
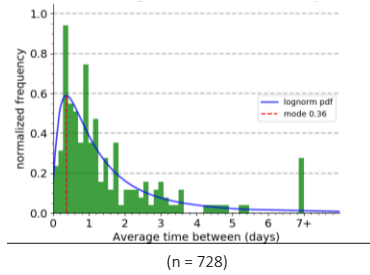
Advantages: Enjoyable

"I am not one to play video games but this is engaging and fun and gets my hands arms and feet moving in a positive way and gives me a fun way to get some extra rehab without leaving my home (or my desk lol)."

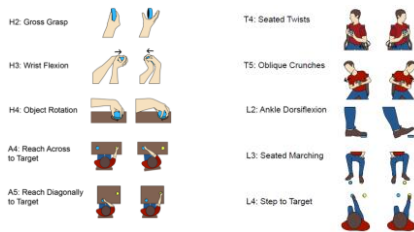


- Great Tool** - Edgare
- Best therapeutic tool to date** - Jeremy Kohn
- Makes therapy enjoyable** - Tina Lamb
- Great tool...** - Mary Urbanak
- A good health investment** - Drew & Randi S
- Fun and motivating rehab exercise** - Samuel Young
- Hope renewed** - Karen Galaway
- Introduces me** - Lynn
- A real godsend** - Kate & Bobby
- I can live my life with both hands thanks** - [User]
- Best part of view** - Johnny Smith

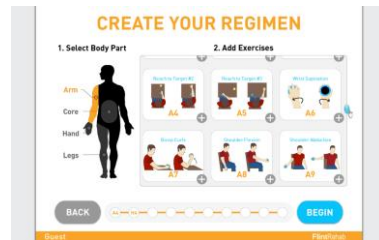
Advantages: Motivating



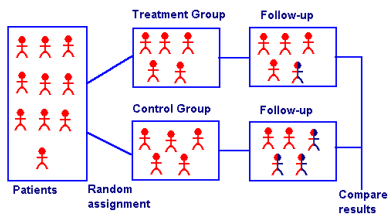
Next Steps: Improve Exercise Library



Next Steps: Improve Exercise Selection

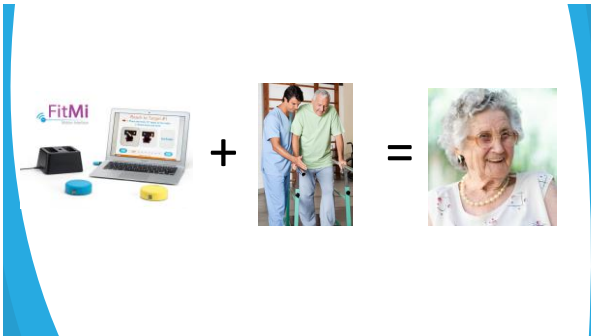
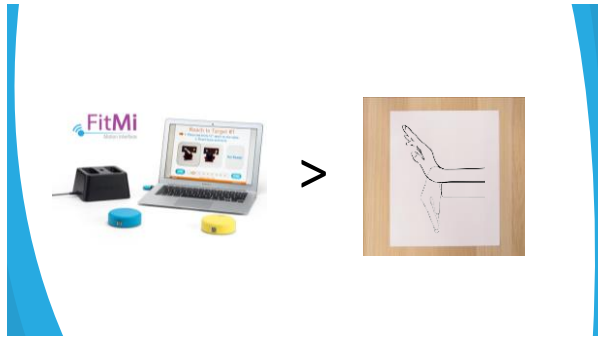


Next Steps: Complete RCT



Open Questions for Home Therapy

- How much freedom/agency should we give patients?
- What is the goal of home therapy?
- How do we integrate home therapy with a comprehensive rehabilitation plan?



Questions?