Utilizing Technology to Improve Patient Adherence and Professional Patient Monitoring for At-home Exercise Programs in Patients with Multiple Sclerosis:

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Treating MS is Not Easy!

- MS is unique to the individual, and the symptoms vary drastically.
- Patients experience many social, economic, and clinical difficulties in treating the disease.
  - Transportation to MS specialists
  - Insurance coverage
  - High treatment costs
  - Lack of effective treatment methods
- Even with the many difficulties, can we provide alternative treatments that are safe and easy for the patient ?

Exercise is Medicine

- Exercise & physical rehabilitation can have many positive effects in patients with MS[123]
  - Quality of life
  - Improvements in fatigue
  - Motor function
  - Overall patient well being
  - Psychological benefits?
  - Improved confidence in daily activities?

What is the Limiting Factor?

✓PATIENT ADHERENCE

- ✓ Can we improve adherence to maximize the effects of physical rehab and exercise??
- ✓ Can technology play a pivotal role??

Objectives:

- Propose an easy and effective at-home telerehab program for patients with Multiple Sclerosis utilizing the iPad, Facetime video calls, and Fitbit exercise tracker
  - Improve patient compliance
  - Improve patient-physician communication
  - Provide high-level patient care with decreased burden to the patient by eliminating transportation difficulties and expenses

Design:

- 8 patient single-center case series
- In-patient initial assessment
- Patients performed 12 week at-home rehabilitation program and wore Fitbit exercise tracker daily
- Follow-up patient visits occured via Facetime video call every 2-3 weeks to discuss progress and concerns.
- Following completion of the 12 week program, patients returned to clinic for inpatient follow-up exam

Equipment:

Participants:

Inclusion Criteria:

- >18 years old
- English speaking
- Diagnosed with MS
- No change in medication or disease modifying therapy for 30 days prior to initial assessment
- No relapses within 30 days prior to initial assessment
- Are comfortable and confident with mode of functional assistance
- EDSS 0-6.5

Exclusion Criteria:

- Refuse to sign informed consent and/or agree to be adherent with the exercise program and follow-up appointment schedule
- Do not have an internet connection

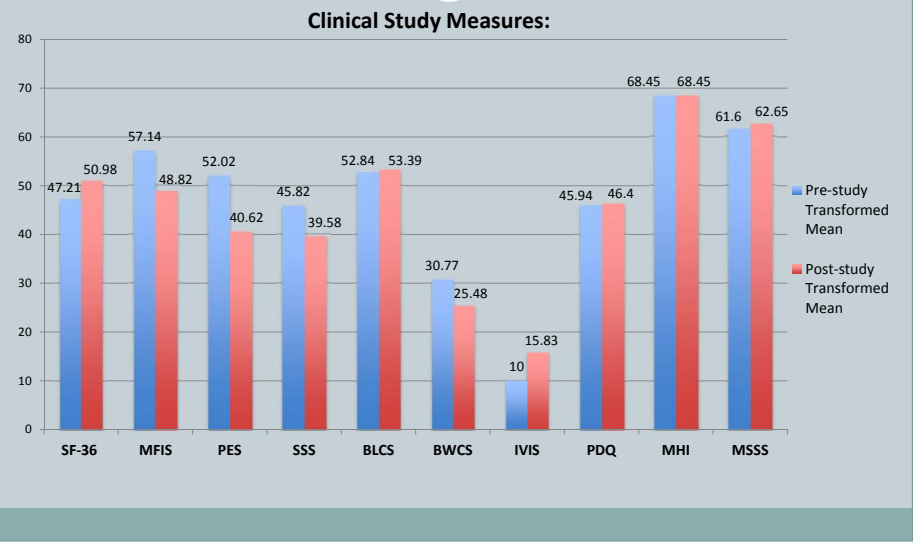
In-Clinic Initial Assessment:

- Clinical assessment surveys:
  - SF-36, MFIS, PES, SSS, BLCS, BWCS, IVIS, PDQ, MHI, MSSS
- History and physical performed by physical therapist
- Functional assessments:
  - Tinetti Balance, Tinetti Gait, Timed up and go, Timed 25 ft walk
- Technology tutorial:
  - iPad & Fitbit set up and tutorial
- Exercise program instruction:
  - Exercise programs designed based on the patient's individual needs and abilities
  - 6-8 low-moderate intensity exercises, approximately 20- 30 minutes, performed 5-7 days per week

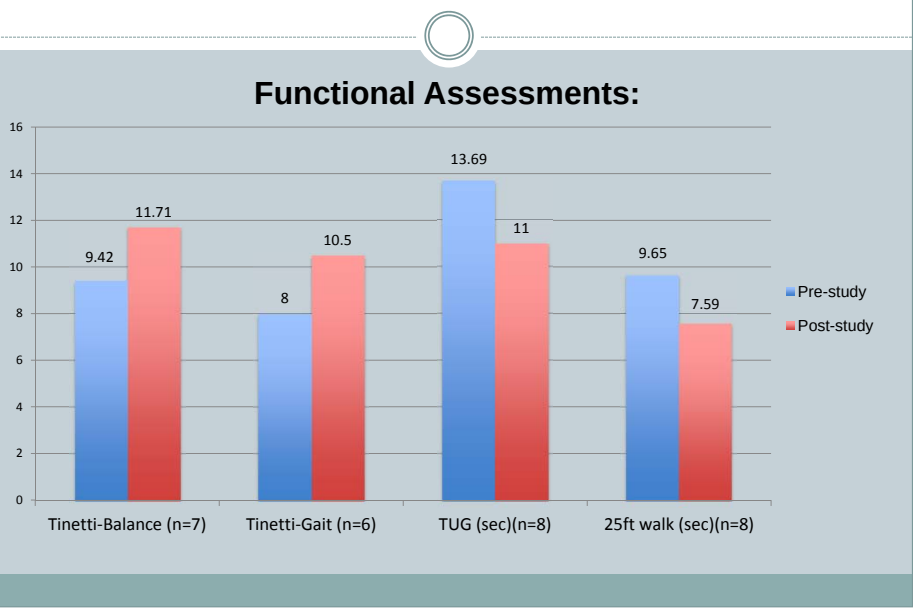
Clinical Assessment Surveys

SF-36	Health Status Questionnaire
MFIS	Modified Fatigue Impact Scale
PES	Pain Effects Scale
SSS	Sexual Satisfaction Scale
BLCS	Bladder Control Scale
BWCS	Bowel Control Scale
IVIS	Impact of Visual Impairment Scale
PDQ	Perceived Deficits Questionnaire
MHI	Mental Health Inventory
MSSS	Modified Social Support Survey

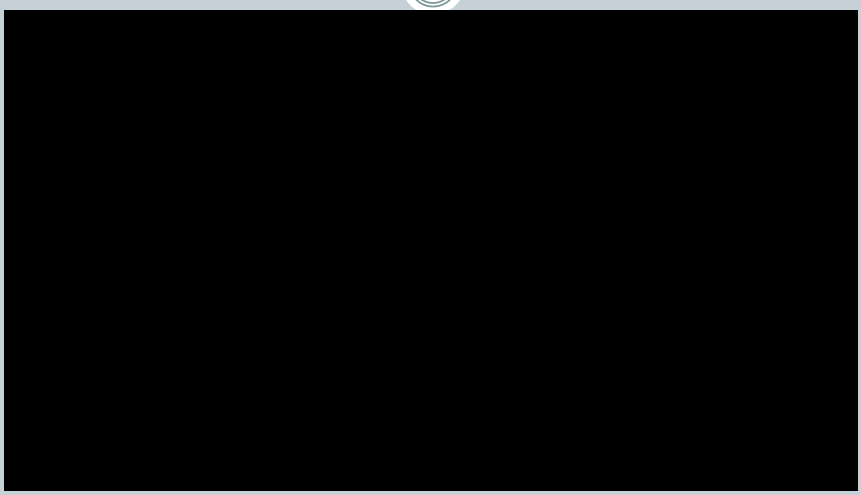
Results:



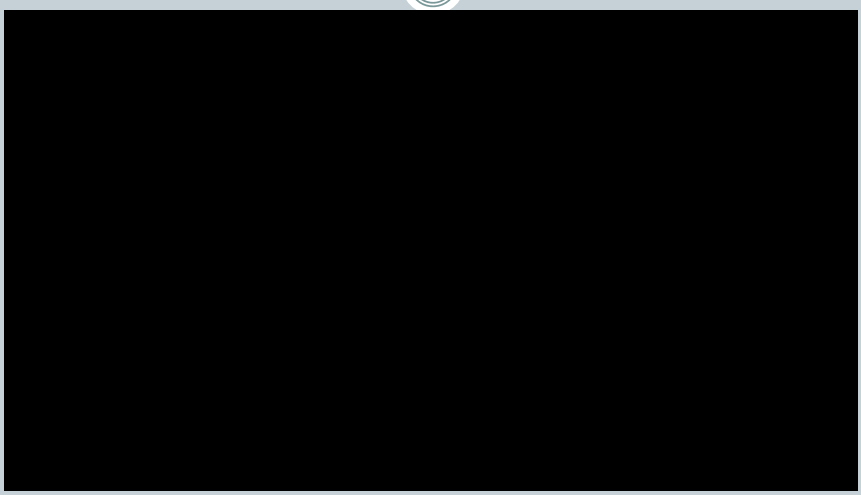
Results:



Pre/Post Exercise Results: Patient 1



Pre/Post Exercise Results : Patient 2



Patient Satisfaction

- Mean patient satisfaction = 8.85/10 (n=7)
- All patients would be willing to participate in another study

Patient Comments

- *"The supervision keeps you motivated…"*
- *"It was a huge help and really got me moving"*
- *"The study helped me to get more active and set goals"*
- *"The ipad made it simple"*

What did we learn?

- The Fitbit is a great motivator!
  - The bracelet would most likely be a more effective method of securing the device.
- Patients felt the ipad was easy to use, and had very few technical problems
- Videoing the patient's exercises on their ipad was helpful
  - Great way for patients to remember exercises and watch their progress

Areas of Difficulty:

- Unreliable Internet Connection
- Lost Fitbits
- Missed/late appointments

Ideas for Expansion?

- 3g/4g Connectivity
  - Allow for easier communication with poor internet connection
- Longer Duration
  - Study should be extended to 6 months to maximize the benefits of rehabilitation program and behavior modification
- Creating a Telehealth Team!
  - Can we provide multiple services via the same remote monitored protocol?
- Adding Specialties
  - Psychology
  - Nutrition

Citations:

- 1. Saxton JM, Carter A, Daley AJ, et al. Pragmatic exercise intervention for people with multiple sclerosis (ExIMS trial): study protocol for a randomised controlled trial. *Contemp Clin Trials*. 2013;34(2):205-211. doi:10.1016/j.cct.2012.10.011.
- 2. Collett J, Dawes H, Meaney A, et al. Exercise for multiple sclerosis: a single-blind randomized trial comparing three exercise intensities. *Mult Scler*. 2011;17(5):594-603. doi:10.1177/1352458510391836.
- 3. Andreasen AK, Stenager E, Dalgas U. The effect of exercise therapy on fatigue in multiple sclerosis. *Mult Scler*. 2011;17(9):1041-1054. doi:10.1177/1352458511401120.

Questions?