



Use of Remote Monitoring Devices to Support Rehabilitation Goals

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Objectives

Participants will be able to:

- outline the possibilities and challenges associated with using remote monitoring systems to support rehab goals.
- discuss administrative issues associated with tele-rehabilitation and documentation
- generate appropriate situations for which remote monitoring is appropriate.

Tele-health Trends

Explosion of E-health strategies to address and manage health conditions

- Electronic medical record; patient portals
- Health Decision Support Systems (HMIS) – extends the capacity of health administrators, clinicians, policy makers, patients, and caregivers to make decisions that impact health and health care delivery
- Online and virtual instructional resources for health care providers
- Virtual implementation of health care (video conferencing, email)
- Development of mechanisms to ensure security of health information
- New technologies that can make health care more accessible but perhaps also more expensive

Tele-health Trends

Models of service delivery

- Business to business – communicating electronic health information from one site to another
- Business to consumer – Patient portals; health related websites
- Patient to provider (provider to patient) – heart monitors, electronic HEP applications
- Consumer to consumer – FitBit networking groups

Tan, 2005)

(Forducy, Kaur, Scheideman-Miller, &

Methods of Providing Tele-rehabilitation

Allure of new technologies

- Cool new gadgets to use! (new Saebo FES for shoulder subluxation)
- Continuity of care through improved compliance with HEP by using more engaging and motivating strategies
- Potential cost and time efficiencies (e.g., less travel time, reach broader population)

Primary modes of tele-rehabilitation

- Video conferencing
- Telephone
- Email
- Collection of information from a wearable device

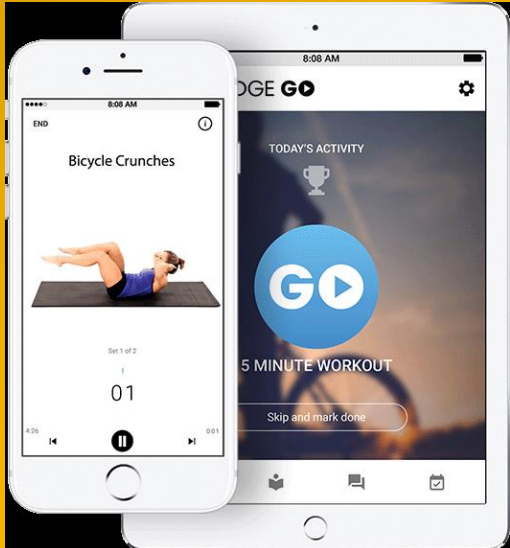
Remote Monitoring: Wearables and Mobile Technology

Remote Monitoring Programs or Systems – enables virtual access to data collected through a wearable or mobile device and an opportunity for therapists and clients to virtually track improvement toward desired goals

FitBit



Medbridge GO



Pros and Cons of Remote Monitoring Devices

Pros

- Allows a systematic collection of data of performance outcomes
- Supports compliance with HEP
- Fun and motivating
- Increases access to care to under-served populations

Cons

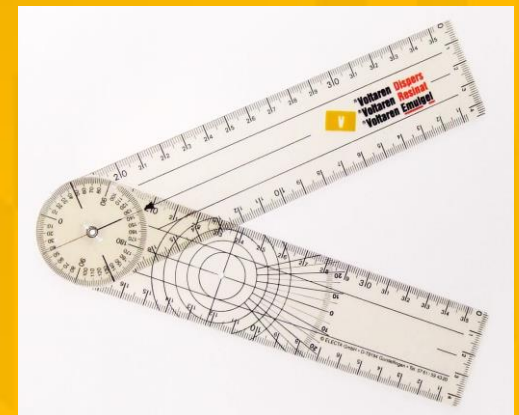
- Accuracy of data
- Interface issues may be difficult to manage
- Novelty wears off
- Internet access is limited
- Cost of obtaining devices

Remote Monitoring of HEP Following TKA

Msayib, Gaydecki, Callaghan, Dale, & Ismail (2017)

- Provided patients with sensors to attach to calf and thigh that would detect knee ROM and were prescribed a program of exercises to do at home
- Therapists could remotely track knee ROM progress
- Unpublished results at this time

- Question: How accurate is the ROM data?
- Question: What is the overall goal of the HEP?



Feedback Provided to Patient

Feedback provided to the patient plays a huge role in the effectiveness of a remote monitoring plan

- Audio feedback from the device or from a therapist's voice
- Visual feedback from the device or from a computer or website
- Vibration (haptic) feedback can be very useful

Feedback from devices only briefly sustains motivation to use the device (Schwartz & Baca, 2016)

- Other forms of feedback are needed for rehabilitation purposes

Peterson (2018) combined a phone app and video "boosters" in a LBP HEP. The app provided reminders for exercises and the periodic video conferencing booster allowed therapists to answer questions and ensure exercises were being performed correctly. Positive results!

Virtual Sharing of Information

The collection and sharing of personal health information is problematic and protection of this information is essential
HIPAA compliant servers are available



Virtual sharing can be motivating if a client likes to compete with others or just share experiences as they work towards similar goals.

Activity Analysis!!!

In small groups or with a partner, complete a quick activity analysis of a phone app you use to track certain information for your assigned diagnosis

- Right CVA – left neglect and left hemiplegia
- Left CVA – aphasia and right hemiplegia
- C6 SCI
- Parkinson's Disease – intention tremors
- 75 year old who just had a L1-4 laminectomy

Analyze the use of your app in the following areas:

- Cognitive requirements
- Sensory requirements
- Motor requirements
- Psychosocial/emotional requirements

Rehab Goals

Many therapists have worked with developers to create apps and remote monitoring systems to aid with the rehab process.

These are important features to consider in the design:

- Calibration options
- Feedback options
- Reporting and documentation options
- Monitoring issues – internet access
- Billing for services

ARMStrokes

This app was designed to assist stroke survivors in improving arm movement. (n=9)

- **Feedback:** audio, visual, and haptic provided but resulted in different outcomes between iOS and Android phones
- **Interface features:** dexterity needed to operate the controls, instructions provided
- **Data access:** provided through the phone app and secure website
- **Accuracy of data:** quality of wave pattern indicated better performance; limitations in actual ROM target movements
- **Security:** password protected website to view data by patient, caregiver, and/or therapist
- **Acceptability:** variances in motivation or willingness to use the app with most participants being positive

Demonstration of Version 2.0 ARMStrokes



Your feedback is very much appreciated!!

References

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Questions?

Thank you!

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