Abstract Samples from TechnoPalooza – CSM 2012

Sample 1
Abstract #11
TechnoPalooza 2012: An Interactive Experience at
Combined Sections Meeting
February 8-11, 2012, Chicago, IL

Indicate preferred format(s): √ Presentation   √ Demonstration

Indicate preferred topic area: √ Clinic

Title of Submission:  The Effect of Nintendo Wii Fit Balance Training on Balance and Walking in Elderly Residents of Assisted Living Facilities

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Description and Innovation:  Since the introduction of the Nintendo Wii™ (Wii) to the consumer market reports of PT utilization of the Wii for training balance in patients in orthopedic, rehabilitation, and pediatric populations have been noted in the mainstream and professional press.  Several single case reports and small sample studies utilizing Wii technology with a variety of patient diagnoses have been reported.  Additionally Wii is often utilized in assisted living facilities typically for seated activities.  This project investigated the effects of standing balance training utilizing the Nintendo Wii Fit Balance Platform™ on balance and walking abilities of older adults residing in an assisted living facility (ALF).  Subjects participated in 15 minutes of training twice weekly over 8 weeks.  This is the typical time frame for participation in physical therapy (PT).

Summary of Use:  Forty-one participants, 6 males, 35 females, mean age 86.7 years (range 67-97, ± 5.9) from 2 ALFs entered the study.  All participants ambulated independently with 75.6% (n=31) reporting the use of an assisted device.  Subjects trained under the direction and
supervision of 1st year physical therapy students. Training consisted of 15 minutes of active dynamic balance activities while standing on the Wii Fit balance platform conducted twice weekly for 8 weeks. Balance was assessed with the Berg Balance Scale (BBS) and walking speed was evaluated with the 10 Meter Walk Test (10 MWT) both at a self-selected pace and a fast pace.

**Evidence:** Prior to training the subjects’ mean BBS score measured 38.05 points ± 8.72. Following 8 training sessions or 2-hours of training, 29 of the original participants remained in the study and the BBS score increased to 40.59 ± 9.15. After 16 Wii training sessions, with 21 participants remaining in the study, the mean BBS score measured 42.55 points ± 8.74. Time to complete the 10 MWT at a self-selected pace improved on average 6 % (p > 0.05) and at a fast face improved 12% (p < 0.05).

**Importance to Members:** The Wii system is desirable due to is its ability to detect changes in balance in participants and its provision of immediate visual and auditory feedback to the individual training on the system. These factors combined with the affordability of the system, approximately $300 excluding the TV monitor, make it attractive to PT providers and Assisted Living Facility (ALF) managers. Specialty pieces of equipment for balance retraining are available but they generally cost several thousands of dollars and are often outside the range of affordability of physical therapy practices. Additionally based on this trial, recommendations for appropriate Wii balance training activities can be made in light of the naivety of many elderly individuals to interactive computer technologies as well as the physical and cognitive impairments that may contribute to balance deficits in this population.

**Indicate if this item commercially available:** Yes

**Indicate if you are a vendor at CSM 2012:** No
Preferred format(s): Presentation, Demonstration

Preferred topic area: Home

Title of Submission:
PAMSys: Long-term Physical Activity Monitoring with Single Wearable Motion Sensor

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Description and Innovation:
In this demonstration, we present PAMSys™ (physical activity monitoring system), a single body sensor solution for long-term and continuous monitoring of a person’s daily activities. PAMSys™ requires only a single light-weight sensor unit that can be integrated unobtrusively into a comfortable shirt (or directly to a subject's shirt) without hindering daily-living activities. The use of large flash storage and low power sensor technologies allows a maximal system lifetime of 8 days on a single charge, minimizing the management burden of the users of the system. PAMWare™, the data analysis software for PAMSys™, performs advanced biomechanical analyses on the tri-axial accelerometer signals recorded by the sensor unit and generates a detailed report on the subject’s postural information throughout the entire measurement period. The system can be used for monitoring the state of health in the elderly, as well as the effect of different medical and surgical procedures in enhancing a patients’ quality of life. As an example, long-term physical
activity data can be applied to assess the risk of fall for elderly people by monitoring durations of sit-to-stand posture transitions.

**Summary of Use:**

The PAMSys™ is designed to be easy-to-use. The only requirement for the subject is to place a single PAMSys™ sensor inside a comfortable undershirt, which he/she wears during the monitoring period. The sensor weighs only 15 grams and is unobtrusive. With its firmware highly optimized for low power consumption, the battery life of the sensor lasts for 200 hours or more on a single charge, reducing the device management burden of the users. In addition, the in-sensor storage capacity can hold up to 80 days of activity data.

After the monitoring period, caregivers or researchers can download the data from the sensor and analyze it using a software program PAMWare™. PAMWare™ is a software that performs biomechanical analysis algorithms for classifying body postures from accelerometer signals. As shown in Figure 1, PAMWare™ provides a visualization of the analysis results. A caregiver can quickly gauge the level of physical activity by reviewing the summary pie chart and postural time series. In addition, events of interest (e.g.

**Figure 1.** PAMSys™ and PAMWare™ record and presents detailed postural information using a single wearable sensor.
transitions from lying to sitting during nighttime hours) are easily identified by visual or algorithmic inspection. Detailed statistics of walking episodes and lying positions are available to researchers conducting long-term studies.

Evidence:

PAMSys has been validated in a few scientific studies [1,2]. In particular, a study by Najafi et al. [1] has discovered that standing period should be considered in assessing the risk of developing foot ulcer in dia

References:

Importance to Members:

Long-term physical activity information can help health care practitioners gain insight on the cause and effect of medical conditions on a person’s quality of life. PAMSys is a new tool to allow members of this community to evaluate the effectiveness of specific therapy procedures. Often, there are multiple ways to treat a medical condition and the effectiveness of any given approach depends varies across subjects. By investigating changes in physical activity patterns, clinicians can quantitatively track and evaluate the effects of a particular prescribed medications or rehabilitation procedures on a subject’s recovery progress. For example, an indicator could be based on whether the subject has recovered to be able to again resume normal amounts of walking and standing time during his/her daily activities.

Indicate if this item commercially available: Y

Indicate if you are a vendor at CSM 2012: Y
CSM Technopalooza 2012: Force Therapeutics Abstract

Preferred format: Demonstration

Preferred topic area: Clinic

Title: FORCE TherEx

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Description and Innovation:
FORCE TherEx is a breakthrough web and mobile application that extends physical therapy patient care beyond the office visit. The application provides physical therapists a clinically tested solution that manages patients, tracks compliance and effortlessly assigns video exercises. For patients, FORCE TherEx offers a robust online home exercise platform, an easy way to buy equipment, track progress and securely communicate with their physical therapist.

Summary of Use:
FORCE TherEx is the perfect home exercise prescription tool for the therapist who wants to elevate their level of service. Therapists can assign an exercise from our existing library of 300+ video clips or add their own. Patients automatically receive an email with login and password details so they can access their individualized, secure patient portal from any computer or mobile device. The therapist's portal shows a patient’s compliance with their home program and allows PTs to send messages in a HIPPA compliant environment. Electronic reminders are automatically generated to alert patients to a change in their program ("Your therapist added a new exercise"). Therapists can assign rehab equipment from our online store, enabling patients one click to purchase their recommended gear.

Features of FORCE TherEx

- Assign exercises from online video library
- Add custom exercises to a clinic's proprietary library
- Save exercise protocols
- Set up and manage multiple clinics within a multi-clinic organization
- Create admin assistants and assign responsibilities
- Enable electronic patient alerts
- View patients' compliance summaries
- Communicate with patients securely
- Assign rehab equipment from online store
- HIPPA compliant patient portal

**Evidence:**
FORCE TherEx has been in beta testing for 18 months in 65 clinics. Physical therapists have reported higher levels of patient satisfaction rates and improved outcomes as a result of using FORCE TherEx. FORCE Therapeutics has researched and published 19 articles and 3 podcasts within the digital health space over the past year. (Please see attached for a comprehensive list).

**Importance to members:**
As digital healthcare continues to invade all aspects of patient care and provider-patient interaction, CSM attendees will have the opportunity to see how FORCE TherEx can make rehab easier for the patient and therapist.

**Commercially available:** Yes

**Vendor at CSM 2012:** Undecided