New Fitness App for Amputees

Gina Martinez, SPT
Sonterra Health Center, San Antonio TX

Introduction

There are nearly 2 million people with an amputated limb in the United States, with more than 500 people undergoing an amputation daily. Recent studies predict this number to increase to 3.6 million people by the year 2050.[1] This increase in prevalence is thought to be because the aging population and the high rates of vascular conditions among older adults. In fact, vascular disease is the main cause for lower extremity amputations with a percentage as high as 54%, followed by trauma at 45%, and cancer at less than 2%.[1]

Unfortunately, once a patient undergoes surgery to remove a limb their worry is far from over. Nearly half of the patients who have an amputation due to vascular disease will die within 5 years.[2] This is higher than the 5-year mortality rates for breast cancer, colon cancer, and prostate cancer. In addition, up to 55% of amputees will require amputation of either the same or opposite limbs within 2-3 years.[2] A retrospective study based out of San Antonio, TX found that ipsilateral limbs had a significantly higher reamputation rate than contralateral limbs, especially in the first 6 months after the initial amputation.[3] However, the reamputation rate of the contralateral limb was low in the first 6 months, but as the amputated site healed and the patient regained mobility, there was an increase in reamputation occurring in the contralateral limb.[3] The findings in this study were higher than anticipated because the subjects were mostly Hispanic.

So as the prevalence of lower amputations continue to rise, what can we as healthcare providers do to prepare and prevent reamputations from occurring?

About the App

The "Fitness for Amputees" app is a FREE APP that contains several easy to follow exercises specifically designed by professional therapists at Ottobock for patients with a unilateral leg amputation. The app offers a holistic training program comprised of three modules including: Stretch and Relax, Strength and Endurance, and Coordination and Balance.[4] There are three levels of difficulty for each module in order to better fit an amputee's physical condition. Amputees can also choose to use a preset training program or create one on their own. Lastly, the app has a statistics function that allows the amputee to keep track of their progress and includes an optional reminder so that an exercises session is never missed.

How Does This Relate to PT?

The VA Clinical Practice Guidelines for lower limb amputations recommends early mobility training that includes both open and closed chain exercises and progressive resistance to improve gait, mobility, strength, cardiovascular fitness and ADL's to maximize function.[5] These are all components that are included within this app!

The days immediately after an amputation can set the stage for eventual return to functional mobility, hobbies, and participation in family and social roles.[6] The employees at Sonterra Health Center strongly feel that it is crucial to hold the patient ultimately accountable for their care to address the rapidly rising risk of reamputation. Patient involvement and compliance are key to increased and sustainable mobility and independence.

This app serves as a supplement to the traditional therapeutic approach. It is a FREE, automated, and interactive form of engagement with visual aids and auditory feedback. The patient or caregiver can easily download this free app on their device or tablet. The PT together with the patient and family can then select appropriate stretches and exercises to increase mobility and strength for the optimal rehab outcome. Daily reminders and tracking can also be used to assist the PT in assuring that the patient is doing their HEP.

Overall, this app provides an easy accessible tool to enhance rehab outcomes, increase patient compliance, and encourages caregiver involvement in the rehab process. Although anecdotal, we have trialed this app on several amputees here at Sonterra and feedback has been positive thus far. The stretching in particular has shown the most benefits in increasing knee extension range from initial contracture of -20 degrees of extension to -8 degrees. Further use and assessment of this adjunctive approach appears very promising.

Future Clinical Studies

Step 1: Select Patient

- Look for more residents that have recently had a LE amputation that could benefit from skilled PT

Step 2: Therapy Evaluation

- Undergo normal PT evaluation
- Include these outcome measures:
  - Numeric Pain Rating Scale (NPRS)
  - Trinity Amputation and Prosthesis Experiences Scales
  - Houghton Scale
  - Patient Health Questionnaire
- Create HEP on Fitness for Amputee app using dosage suggested by Sullivan[7]
  - Perform 2-3 times a day
  - Stretches: hold 20-30 seconds, repeat 4-5 times
  - Strength Training: 3x10-15 reps

Step 3: Re-evaluate Patient

- Perform normal PT re-evaluation after 4 weeks including outcomes measures

References:

1. Ziegler-Graham K, MacKenzie E, Ephraim P, Travison T, Brookmeyer R. Original article: Estimating the Prevalence of Limb Loss in the United States: 2005 to 2050. Archives Of Physical Medicine And Rehabilitation [serial online]. January 1, 2008;89:422-429. Available from: ScienceDirect, Ipswich, MA. Accessed May 27, 2018.

2. Robbins JM, Strauss G, Aron D, Long J, Kuba J, Kaplan Y. Mortality Rates and Diabetic Foot Ulcers. Journal of the American Podiatric Medical Association2008 November 1, 2008;98(6):489-93.

3. Izumi Y, Satterfield K, Lee S, Harkless LB. Risk of Reamputation in Diabetic Patients Stratified by Limb and Level of Amputation. *Diabetes Care*. 2006;29(3):566 LP-570. http://care.diabetesjournals.org/content/29/3/566.abstract.

4. Fitness for Amputees App: Daily training made easy – Now with new module. Ottobock. https://www.ottobock.com/en/fitness-app.html. Published 2018. Accessed May 27, 2018.

5. VA/DoD clinical practice guideline for the management of stroke rehabilitation. Journal of Rehabilitation Research & Development [serial online]. December 2010;47(9):1-43. Available from: CINAHL Complete, Ipswich, MA. Accessed May 27, 2018

6. Narres M, Kvitkina T, Icks A, et al. Incidence of lower extremity amputations in the diabetic compared with the non-diabetic population: A systematic review. Plos ONE [serial online]. August 28, 2017;12(8):1-28. Available from: Academic Search Index, Ipswich, MA. Accessed May 27, 2018.

7. Sullivan MJL, Bishop SR, Pivik J. The Pain Catastrophizing Scale: Development and validation. *Psychol Assess*. 1995;7(4):524-532. doi:10.1037/1040-3590.7.4.524.