



MOBILE APPLICATION FOR TRACKING LOWER LIMB AMPUTEES FITNESS

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INTRODUCTION

The number of amputees living in the United States is projected to double to more than 3 million by 2050. As this population grows, healthcare professionals, including prosthetists, must consider the unique physiology of amputee patients when formulating treatment plans, setting goals, and creating wellness regimens. Due to their altered anatomy, amputees must consider weight control, muscle strength, joint health, and cardiovascular fitness as crucial parts of their overall wellness (Kahle & Highsmith, 2008).

Studies have demonstrated that energy expenditure during ambulation is significantly higher for amputees compared with non-amputee subjects (Schmalz, Blumentritt, and Jarasch, 2002, Waters & Mulroy, 1999). This is an important consideration for amputees as they work to safely maintain a healthy weight, particularly in light of the fact that amputees are more likely to have concurrent cardiovascular disease (Frugoli, Guion, Joyner, McMillan, 2000). In order to create fitness regimens that are safe for amputees with cardiovascular disease and other comorbidities, knowledge of caloric output is critical.

The amputee population is largely overlooked by the fitness industry. Despite the difference in caloric needs, there are currently no tools on the market for calculating and recording energy expenditure for amputees. There is a need for a user-friendly, accurate, and accessible tool for amputees to track their physical activities and caloric balance. The current project is to design a mobile application ("app" for cellular phones, tablets, etc) which would provide estimated caloric expenditure for transtibial and transfemoral amputees while walking or running.

METHOD

Subjects: No human subjects will be used in the study.

Apparatus: N/A

Procedures: The project will be based on results from an extensive literature review examining energy expenditure of transtibial and transfemoral amputees. The data from existing literature will be used to generate formulas for estimating caloric output of amputees while walking and running. These formulas will create the framework for a future mobile app to track amputee fitness.

Data Analysis: The results from existing studies will be assessed in order to establish average values. No new data will be collected or analyzed by the author.

RESULTS

The literature review will result in a collection of detailed formulas for estimating caloric output for lower limb amputees while walking and running. An informal program specification will be created in order to facilitate future development of a mobile app. Once the study is complete, the author will consult with app developers to discuss the feasibility of producing a serviceable app for public distribution.

DISCUSSION

It has been demonstrated that the energy needs of amputees differ from non-amputees, yet fitness tools which specifically cater to amputees do not exist. The proposed app would serve as a valuable resource for amputees pursuing a healthier lifestyle while filling a gap in the current technology. The current project is limited by the availability of experimental data comparing energy expenditure for amputees versus non-amputees. More research is needed in order to further refine the formulas and include more activities in the app. Future studies could also examine the possibility of using data collected by the app as an outcome measure.

CONCLUSION

Amputees would benefit from a fitness app designed to consider their unique energy requirements. Use of such an app would aid individuals seeking to improve or maintain physical fitness while providing prosthetists with quantitative data detailing their patients' progress.

CLINICAL APPLICATIONS

Encouraging physical fitness in an at-risk patient population could have positive consequences across numerous healthcare disciplines. Ultimately, any tool that serves to improve the overall health and fitness of amputee patients is a benefit to prosthetists. Furthermore, the proposed app would allow prosthetists to track rehabilitation progress, record changes in activity level, and provide evidence of patient motivation.

REFERENCES

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