

Mission statement

We are making smart exercise machines integrated to renal units to solve sarcopenia and frailty in hemodialysis patients so that independence and strength can be regained.

Introduction of Unmet Clinical Need

- Sarcopenia and frailty are common disorders for patients with chronic kidney disease or on haemodialysis
- Long recurring bouts of inactivity lead to an increasingly sedentary lifestyle that contributes to sarcopenia and frailty
- Exercise has been shown to be an effective treatment and preventative measure [1].
- Issues arise with low patient adherence and a lack of access to quality intradialytic and interdialytic exercise programs in Australia
- Project aims to identify current implementations of exercise programs, problems with failed attempts, and feasibility in Australian renal units
- Solution discussed to encourage long term personalised intradialytic and interdialytic exercise routines
- Goal is for independence to be regained

Impact of Solution

- Potential benefits of an exercise program in reducing falls and conditions associated with a sedentary lifestyle may outweigh the procurement and maintenance costs
- In the year 2000, 1.5% of total healthcare expenditure in the US was attributed to sarcopenia [2].
- Frailty is associated with increased direct and indirect costs and higher costs compared to non-frail patients [2].
- Frailty may complicate kidney transplants and other invasive procedures, increasing recovery times and risk of mortality
- An exercise program may increase the likelihood of successful kidney transplants, improving quality of life

Solution

- “Retro-FIT” is a service which retrofits existing commercial exercise machines with modern electronics
- Interconnect exercise data from patients to clinicians
- Promote adherence through gamification
- Follow personalised exercise routines
- Exercise machines and trackers can be recommended to renal units
- Smartphone app or fitness tracker to send data to specialised fitness tracking software for clinicians to use
- Zero hardware manufacturing capacity required



Timeline

Feb 2023

Initial idea and planning: key features and functionalities, Resources and budget.

Mar 2023

Design and wireframe: Wireframes and mock-ups to visualise the layout and user flow of the app.

Apr 2023

Integration with smart fitness machine: Ensure hardware and software is working as expected

May 2023

Development: coding and building process of the app, including frontend and backend systems.

Oct 2023

Testing and QA: informally test the app internally, bugs are identified, and that all systems are ready.

Dec 2023

Pilot study: pilot study with patients, identifying problem areas, efficiency, adherence rate, etc

References

1. Wong L, Duque G, McMahon LP. Sarcopenia and frailty: Challenges in mainstream nephrology practice. *Kidney International Reports*. 2021;6(10):2554–64.
2. Yamamoto S, Matsuzawa R, Abe Y, Hoshi K, Yoneki K, Harada M, et al. Utility of regular management of physical activity and physical function in hemodialysis patients. *Kidney and Blood Pressure Research*. 2018;43(5):1505–15.