

Prep4Surg – An Interactive App to Improve Preoperative Fitness

Prof. Dr. Andreas Schnitzbauer (Goethe-Universität Frankfurt/Ruhr-Universität Bochum)

Medical need

Between 15 and 40 percent of patients who undergo major surgery develop postoperative complications. This leads to increased morbidity, mortality, length of hospital stays and healthcare costs. Frail, elderly and obese patients are particularly at risk and have limited physiological resources to fully recover from surgery. However, even apparently healthy individuals are susceptible to postoperative complications. There is growing evidence that prehabilitation through aerobic fitness training, nutritional optimization, and psychological counseling can improve patients' resilience to major surgery. Yet hospitals lack the staff, space, and funding to provide patients with appropriate prehabilitation. Typically, not much happens in the preoperative phase.

Suggested Solution

As a digital solution, the project team developed the Prep4Surg app, which allows patients to complete structured and interactive prehabilitation programs at home under the medical supervision of a remote physician. Based on an initial health assessment by the physician, the app provides a 3- to 6-week training program consisting of several interval training sessions per week. To ensure that the patient performs the program within the optimal heart rate range, the training is monitored via a smartwatch. Training data is continuously analyzed and feedback is provided by the clinician. While the prototype of this app is limited to fitness training, nutritional and psychological features will be added in the future.

Translational Gap (ForTra Funding)

A proof-of-concept pilot study was needed to move this project into the clinic. This study, called Protego Maxima, tested the usability of the app for patients and physicians, and its validity against an ergometer in measuring heart rate and distance, which are required for safe remote use, as well as correct alarms when heart rate thresholds are exceeded. ForTra funded this study. It was successfully completed in 2023. Follow-up funding is now being provided by the Hessian Digital Ministry.

Current Status/Perspective

Schnitzbauer and his partners have founded Capreolos GmbH to further develop and market their product. To test its efficacy, they will soon launch a randomized trial called Lumos, whose primary endpoint will be the complication rate 90 days after surgery in patients who use the Prep4Surg app versus those who don't. The C5 certificate from the Federal Office for Information Security is expected in November 2024, the CE certificate as a marketing authorization in late 2025.

Reference

Sliwinski S. et al. Predictive value of a novel digital risk calculator to determine early patient outcomes after major surgery: a proof-of-concept pilot study. Patient safety in Surgery 18: 13 (2024) <https://doi.org/10.1186/s13037-024-00395-y>

Link to further information

<https://www.prep4surg.com>