ISRCTN24248527 https://doi.org/10.1186/ISRCTN24248527

Wearable technology in post breast surgery upper limb rehabilitation

Submission date
27/03/2025

Recruitment status
No longer recruiting

Registration date
12/04/2025

Overall study status
Completed

Last Edited
07/08/2026

Condition category
Musculoskeletal Diseases

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[X] Results
[ ] Individual participant data

Plain English summary of protocol

Background and study aims
Breast cancer is the most common cancer worldwide, with over 55,000 patients diagnosed in the UK each year. Axillary surgery, which includes procedures like Sentinel Lymph Node Biopsy (SNLB) and Axillary Node Dissection (AND), is crucial for staging breast cancer but can lead to shoulder problems such as pain, reduced movement, lymphoedema, and decreased quality of life. This study aims to explore the benefits of a digital rehabilitation system called OnTrack, which uses a smartwatch and smartphone to help breast cancer patients recover arm function after surgery.

Who can participate?
Adults aged 18 and older who are scheduled for sentinel node biopsy or axillary node clearance as part of their breast cancer treatment can participate. Participants must be able to provide informed consent.

What does the study involve?
Participants will use the OnTrack system, which provides real-time activity feedback and remote physiotherapy support through a smartwatch and smartphone. This system is designed to help manage arm rehabilitation effectively.

What are the possible benefits and risks of participating?
Benefits include reduced pain and lymphoedema, improved shoulder mobility, and enhanced quality of life. The study also aims to generate cost savings for patients. Risks may include mild discomfort from using the wearable devices, but these are expected to be minimal.

Where is the study run from?
Imperial College London (UK)

When is the study starting and how long is it expected to run for?
November 2024 to August 2025

Who is funding the study?
Imperial MedTechOne (UK)
Wellcome Trust (UK)

Who is the main contact?
Ahmed Latif, ahmed.latif@imperial.ac.uk
Daniel Leff, d.leff@imperial.ac.uk

Contact information

Type(s)
Public, Scientific

Contact name
Mr Ahmed Latif

ORCID ID
https://orcid.org/0009-0001-9066-813X

Contact details
10th Floor QEQM Building
St Mary's Hospital
London
United Kingdom
W2 1NY
+44 7903292540
ahmed.latif@imperial.ac.uk

Type(s)
Principal investigator

Contact name
Mr Daniel Leff

Contact details
Breast Surgery Unit, Charing Cross Hospital
London
United Kingdom
W6 8RF
+44 7340102203
d.leff@imperial.ac.uk

Additional identifiers

Integrated Research Application System (IRAS)
327556

Protocol serial number
23CX8516

Study information

Scientific Title
A study to investigate the use of wearable technology in upper limb rehabilitation post breast and axillary surgery

Study objectives
Wearable technology can facilitate remote shoulder rehabilitation post breast and axillary surgery.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 29/02/2024, London - Surrey Research Ethics Committee (2 Redman Place, Stratford, London, E20 1JQ, United Kingdom; +44 207 104 8131; surrey.rec@hra.nhs.uk), ref: 24/PR/0049

Primary study design
Interventional

Study design
Randomized prospective parallel group non-blinded trial

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Shoulder dysfunction post breast and axillary surgery

Interventions
Control arm: Standard NHS care post breast and axillary surgery. This involves patients receiving an exercise leaflet and being asked to perform exercises at home. Some patients will have an inactivated activity monitor on the arm to track their arm movement and some will have no monitor at all. Patients will be followed up for a minimum of 1 month post-surgery.

Intervention arm: Patients will be asked to wear a wearable rehabilitation platform (OnTrack App on Apple Watch) for a period of 1 month post-surgery in addition to the standard NHS care. The app tracks their movement and gives real-time feedback on activity along with push notifications to encourage movement, allowing remote rehabilitation and remote clinician input. They will also be followed up for 1 month.

Randomisation will be using block randomisation via the Sealed Envelope online platform.

Intervention Type
Device

Phase
Not Applicable

Drug/device/biological/vaccine name(s)

OnTrack Rehab

Primary outcome(s)
1. Patient perceptions, satisfaction and acceptability regarding the use of OnTrack measured using semi-structured interviews and a System Usability Scale at the end of the study period
2. The effect of OnTrack on post-operative upper limb pain measured using validated pain analogue scale at baseline and 1 month after surgery
3. The effect of OnTrack on post-operative upper-limb movement in the affected limb measured using patient-reported outcome measures (DASH questionnaire) along with range of movement, using a goniometer and upper-limb strength using a dynamometer, at baseline and 1 month after surgery
4. The effect of OnTrack on patient's postoperative health-related quality of life measured using EQ5D5L QoL questionnaire at baseline and 1 month post surgery

Key secondary outcome(s)
1. Healthcare professionals' (surgeons, nurse specialists and physiotherapists) perceptions and acceptability regarding the use of OnTrack measured using semi-structured interviews at the end of the study period
2. Impact on the workload of healthcare professionals measured using semi-structured interviews at the end of the study period

Completion date
04/08/2025

Eligibility

Key inclusion criteria
1. Age ≥18 years
2. Planned for sentinel node biopsy or axillary node clearance as part of their breast cancer management
3. Participants must be able to provide informed consent

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 Years

Upper age limit
100 Years

Sex
All

Total final enrolment
70

Key exclusion criteria
1. Unstable medical condition
2. Pre-existing pre-operative shoulder disability affecting shoulder movement
3. Patients unable to provide informed consent

Date of first enrolment
30/03/2025

Date of final enrolment
30/06/2025

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Charing Cross Hospital
Fulham Palace Road
London
England
W6 8RF

Sponsor information

Organisation
Imperial College London

ROR
https://ror.org/041kmwe10

Funder(s)

Funder type
University/education

Funder Name

Imperial MedTechOne

Funder Name
Wellcome Trust

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated and/or analyzed during current study will be available upon request from Ahmed Latif (ahmed.latif@imperial.ac.uk)

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Basic results		07/08/2026	07/08/2026	No	No