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# 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**
05/09/2025

**Condition category**
Musculoskeletal Diseases

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[X] Record updated in last year

## 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
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# Contact information

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Public, Scientific

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# Additional identifiers

### Clinical Trials Information System (CTIS)
Nil known

### 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

### Study design
Randomized prospective parallel group non-blinded trial

### Primary study design
Interventional

### Study type(s)
Treatment

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

### Interventions
Control Arm: Standard NHS care post breast and axillary surgery. This involves patients receiving an exercise leaflet and 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 up 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, 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 post operative 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
Adult

### Lower age limit
18 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
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## 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 analysed during current study will be available upon request from Ahmed Latif ahmed.latif@imperial.ac.uk

### IPD sharing plan summary
Available on request