

Assessing functional recovery in burn patients: A retrospective study using digital activity monitoring

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BACKGROUND

- **Burn recovery tracking remains limited:** Follow-up relies on clinic visits and subjective assessments, often missing day-to-day variations. Missed appointments further fragment long-term monitoring (1-3).
- **Digital opportunity:** Smartphones can passively and objectively track physical activity (PA), offering continuous, scalable insight into recovery.
- **StepHome App:** Previously validated in reconstructive and orthopaedic surgery; its use in burns is novel and enables remote, real-time, personalised rehabilitation.
- **Unmet need:** Despite advances in acute burn care (4-7), recovery tracking remains inconsistent. Smartphone-based monitoring could bridge this gap and enhance outcomes.

HYPOTHESIS & AIMS

- Assess smartphone-based PA data for monitoring burn recovery
- Identify patient and injury factors affecting recovery
- Map recovery curves across burn types and treatments
- Compare smartphone data with therapist and patient-reported outcomes

Hypothesis: Smartphone PA data offers a valid, objective measure of burn recovery aligned with clinical outcomes

METHODS

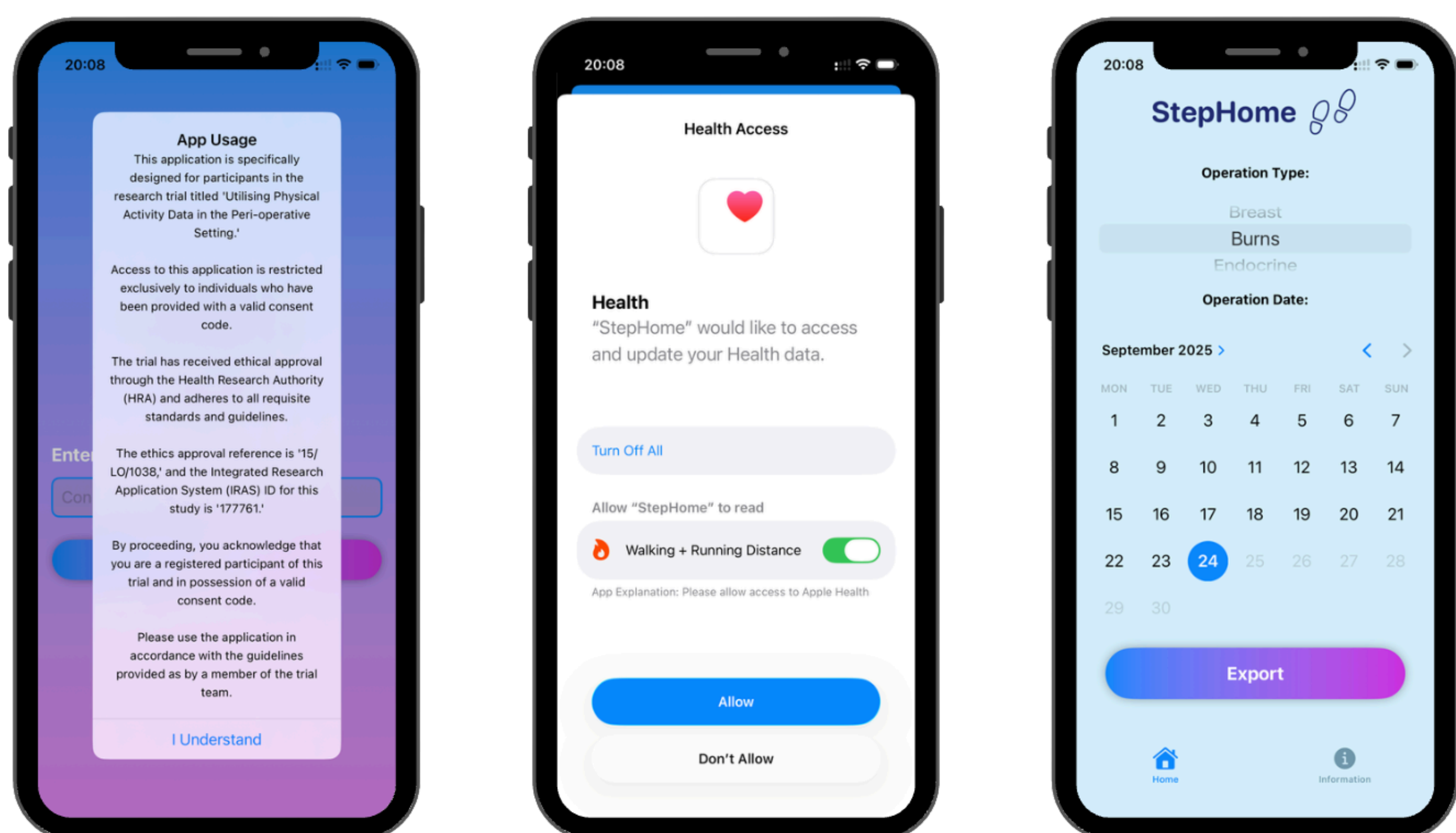


Figure 1: StepHome Trial App workflow for walking/running data export (App Store)

- **Design:** Multicentre retrospective cohort (Imperial, Chelsea & Westminster, Mersey sites; recruited between June - August 2025).
- **Participants:** Adults (≥ 18 yrs) with burns (2021+), iPhone users with ≥ 3 months pre-injury data.
- **Data Collected:** Smartphone walking distance (Apple Health), clinical variables, and recovery measures (QoL, therapy use, reoperations).
- **Analysis:** Correlation between smartphone activity and clinical/patient-reported outcomes.

RESULTS

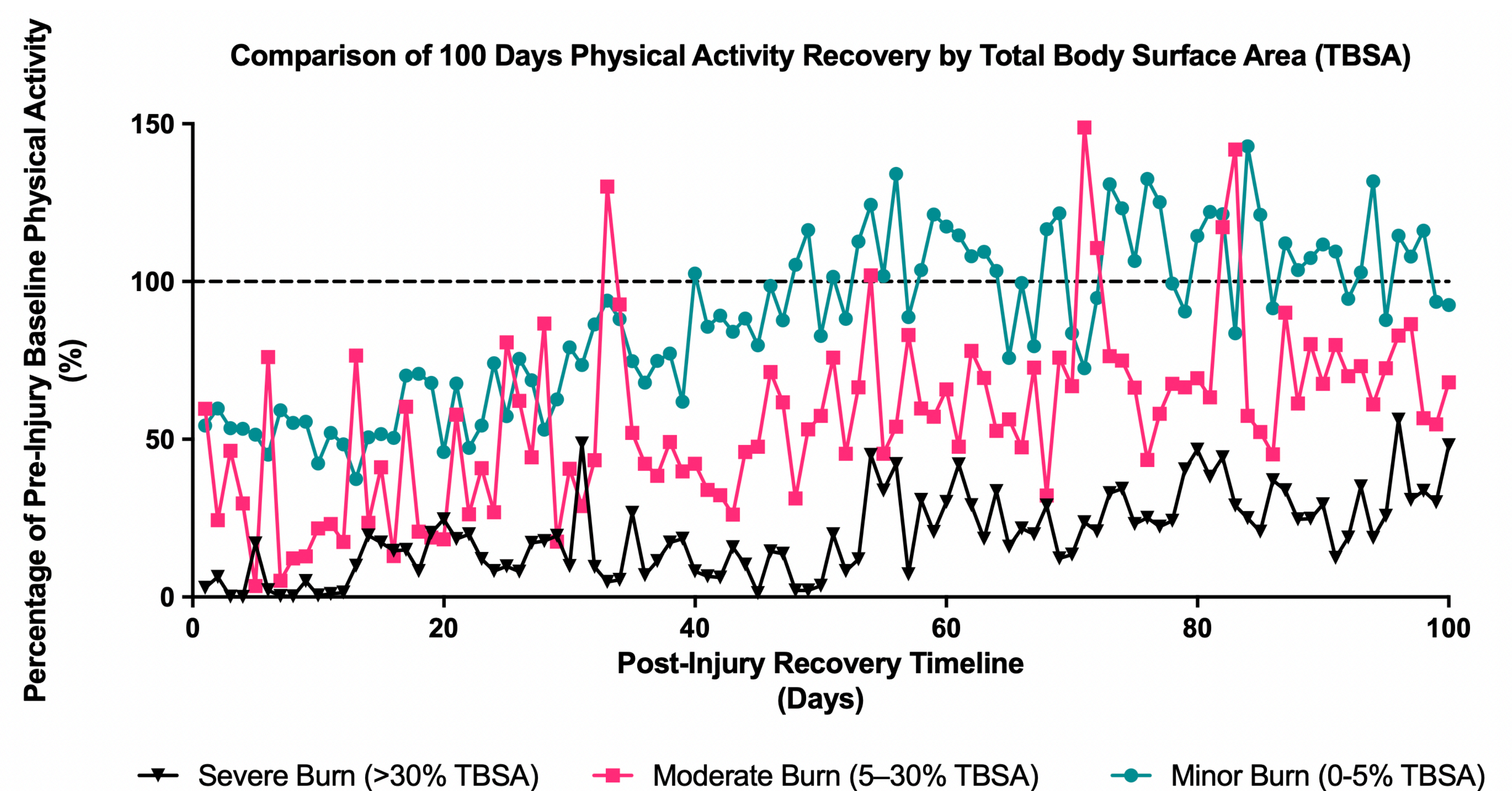


Figure 2: Physical activity recovery over 100 days post-burn injury by severity

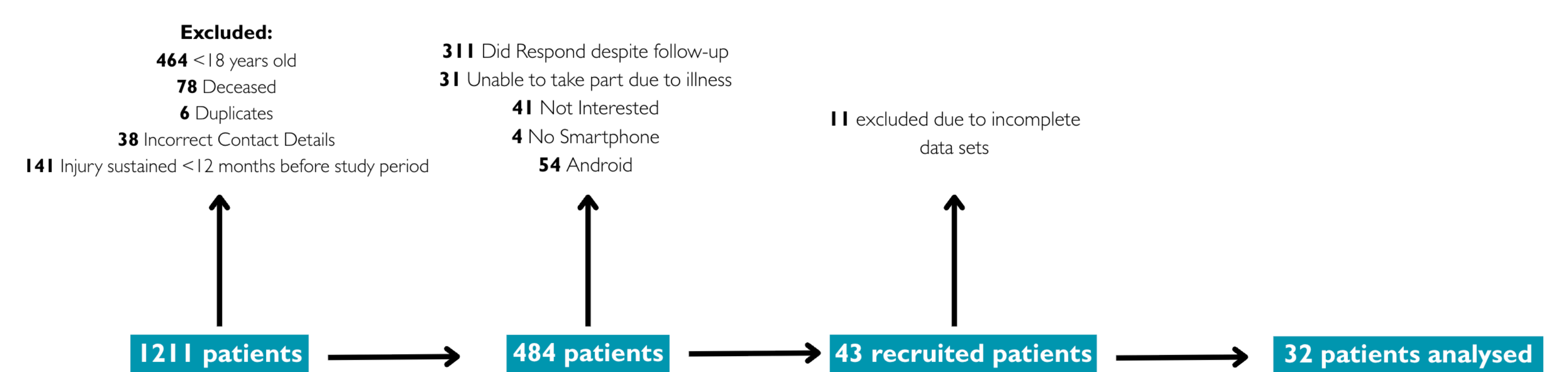


Figure 3: Flowchart of patient recruitment, screening, and exclusion process

DISCUSSION

Physical activity recovery showed a **clear inverse relationship** with **burn severity**

- Minor burns (0–5% TBSA): full recovery, often exceeding baseline activity.
- Moderate (5–30%) and Severe (>30%) burns: slower, incomplete, and more variable recovery.

Trends align with clinical expectations, supporting **StepHome** as a **reliable, objective tool for tracking long-term recovery**.

- Greater variability in moderate and severe groups may reflect injury site, depth, complications, and rehabilitation intensity.
- **Regression analysis** is needed to determine how these **factors contribute to outcomes**.
- **TBSA** can serve as a **predictive indicator of functional recovery**, forming the **basis for a burn-specific digital recovery model** that standardises and personalises long-term monitoring.

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