ISRCTN13920928 https://doi.org/10.1186/ISRCTN13920928

# Buried versus exposed wires in hand and wrist fractures

**Submission date**
03/11/2025

**Recruitment status**
Recruiting

**Registration date**
11/11/2025

**Overall study status**
Ongoing

**Last Edited**
07/10/2026

**Condition category**
Musculoskeletal Diseases

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

## Plain English summary of protocol

Background and study aims
Fractures of the bones of the hand and wrist are the most common subtype of hand trauma, accounting for about 50% of all injuries. Although most do not need surgery, a proportion will be unstable and will require manipulation and fixation with metalwork to restore hand function. Recent UK studies indicate that over 50,000 hand and wrist fractures are operated on per year in the NHS. If a hand or wrist fracture requires fixation, then K-wires are usually employed to stabilise the bone following manipulation and reduction of the fracture.

Once a fracture has been fixed with K-wires, the wires are routinely removed when the bone has healed. When the wires are placed, the ends of the wires may be cut short and buried beneath the skin, or the end of the wires can be left exposed outside of the skin. There is currently no reliable data to inform practice, nor any health economic data to inform national guidelines. Based on our national clinician survey, the key rationale for burying the end of the wire is the perceived reduction in risk of infection. The interface between an exposed wire and the skin is a site of potential Surgical Site Infection (SSI), commonly referred to as a ‘pin site infection’. Pin site infections are superficial SSIs that usually require treatment with antibiotics, with or without removal of the wire. A major concern is deep SSI, where the bone and/or joint becomes infected due to bacterial transport along the wire and into the bone in which it is placed. For patients, the consequences of SSI following hand and wrist trauma surgery include worse and prolonged pain, continued antibiotic prescription, re-operation, hospital admission, delayed rehabilitation and in severe cases, amputation of all or part of the affected hand. Acquiring an SSI doubles the length of hospital stay and leads to substantial additional direct healthcare costs.

Who can participate?
Adult participants, aged 16 or over, with fractures of the hand or wrist which require fixation with k-wires.

What does the study involve?
The aim of this study is to conduct a randomised controlled trial to evaluate the clinical and cost effectiveness of burying K-wires compared to leaving them exposed following fixation of adult hand or wrist fractures in terms of reducing SSI. We will compare the risk of SSI by 90 days post-randomisation between treatment groups.

This study will be run in at least 22 hospitals around the UK, to make sure the results represent the whole country. Results from this study will help us decide how best to treat patients with broken hand and wrist bones that need surgery.

If an individual wishes to join the study, a researcher will discuss the study with them, answer any questions they may have, and ask them to fill in a consent form. They will then answer some questions about themselves, their health, and their quality of life. There will also be questions that ask how well they could do everyday tasks before they broke their hand or wrist, and how well they can do those now. Completing these questions will take about 15 minutes. Similar questions will be asked during their recovery at 3 and 6 months.

To compare the treatments, participants will be put into two groups:
Exposed K-wires: The broken bones in the hand or wrist will be held in place by wires where the end of the k-wires is left sticking OUT of the skin. The 'exposed' part is short (about 2–3cm/1 inch), they might get stitches, and the exposed k-wire will be covered with a sterile dressing and usually a cast. The dressing/cast might be replaced after a few weeks. After about 6 weeks, they will come back to hospital where the k-wires will be removed during their usual follow-up hospital appointment.

Buried K-wires: The broken bones in the hand or wrist will be held in place by k-wires with the ends buried UNDER the skin. At the end of the operation, they will usually get stitches and a plaster cast. After some weeks, this cast will then get replaced with a brace/splint. They might need to come to hospital to have their wound/stitches checked. After about 6 weeks, they will come back to hospital where the k-wires will be removed, usually in an operating room. They will receive a local anaesthetic, and a small cut will be made in the skin to remove the k-wires.

What are the possible benefits and risks of participating?
There is no direct benefit in taking part in the study. The information we receive will help in improving care for patients in the future. We do not know whether there is a difference in recovery for patients who get buried or exposed k-wires. This is why we are doing this research. If you join in, it will help us make treatment better for future patients with similar injuries. This study will also help us find out if one treatment costs more than the other. This will allow the NHS to make a decision about how to best spend their funds.
The risks in this study are the same as standard care because both treatments are carried out in routine care. Although there is no additional risk in taking part, both treatments have disadvantages. For those patients where the k-wires are not buried under the skin, there might be a slightly higher risk of infection. On the contrary, patients with buried k-wires will have to return to hospital for a second operation to have the k-wires removed.

Where is the study run from?
The University of Oxford is sponsoring this study. This study will be overseen by Oxford Clinical Trials Research Unit (OCTRU) with the day to day running of the study being completed by Oxford Trauma and Emergency Care at the University of Oxford, led by Mr Justin Wormald, Chief Investigator and Clinical Lecturer.

When is the study starting and how long is it expected to run for?
The study enrolment is planned for January 2026, over approximately a 15 month period at least 22 UK hospitals.

Who is funding the study?
National Institute for Health and Care Research (NIHR) Research for Patient Benefit programme, UK.

Who is the main contact?
Mr Justin Wormald, HAWAII-DRIFT@ndorms.ox.ac.uk

# Contact information

### Type(s)
Scientific, Principal investigator

### Contact name
Mr Justin Wormald

### ORCID ID
https://orcid.org/0000-0001-6197-4093

### Contact details
Mr (NIHR Academic Clinical Lecturer in Plastic Surgery)
Oxford Trauma & Emergency Care, NDORM, University of Oxford, Kadoorie Centre, John Radcliffe Hospital
Oxford
United Kingdom
OX3 9DU
+44 01865 612709
HAWAII-DRIFT@ndorms.ox.ac.uk

# Additional identifiers

### Integrated Research Application System (IRAS)
342133

### Central Portfolio Management System (CPMS)
61682

### National Institute for Health and Care Research (NIHR)
207194

# Study information

### Scientific Title
Hand And Wrist: Antimicrobials and Infection – burieD vs. exposed K-wiRes In Fracture fixaTion

### Acronym
HAWAII DRIFT

### Study objectives
To compare the risk of Surgical Site Infection (SSI) by 90 days post-randomisation between buried and exposed Kirschner wires (K-wires) in patients treated for hand and wrist fractures

### Ethics approval required

Ethics approval required

## Ethics approval(s)
Approved 18/11/2025, South Central Oxford B Research Ethics Committee (2 Redman Place, Stratford, London, E20 1JQ, United Kingdom; +44 (0)207 104 8032, (0)207 104 8243; oxfordb.rec@hra.nhs.uk), ref: 25/SC/0365

## Primary study design
Interventional

## Study design
Randomized controlled trial

## Study type(s)
Treatment

## Health condition(s) or problem(s) studied
Musculoskeletal

## Interventions
This trial is a multi-centre, two-arm, parallel design, superiority, randomised controlled clinical study. Participants will be randomised to either buried K-wires or exposed K-wires for treatment of their hand or wrist fracture; the randomisation will be on a 1:1 basis, stratified by hand or wrist injury, research site and open or closed injury at presentation. A total of 470 participants will be recruited across a minimum of 22 research sites within the UK.

A member of the research team at each site will initially screen patients for eligibility upon their presentation to hand trauma clinics or fracture clinics. If eligibility is confirmed, a trained member of the research team will approach the patient to give them a participant information sheet (PIS) and to explain the study to them. If they wish to proceed with participation, they will provide informed consent.

Participants will then complete baseline questionnaires based on how they were feeling before their injury (answered retrospectively) and how they are feeling today on their presentation to the hand/fracture clinic.

When the participant returns to have their surgery, their eligibility for the study will be reassessed to check that they are still eligible (e.g. they haven't contracted a skin infection over the intended site of the wire placement). This could also mean that a patient who was previously ineligible for the study may become eligible at this point. For example, if a nonoperative approach was initially decided when the patient was first screened, but now they will be having surgery, they may be approached to take part in the study.

Once eligibility is confirmed, the participant will be randomised in the operating theatre, and subsequently followed up at 90 days and 6 months post-randomisation. Web-based randomisation will be used, provided by the OCTRU using a REDCap platform. Stratification will be used with random
permuted blocks within each stratum with an allocation ratio of 1:1. Allocation will be stratified to ensure balance for site, open/closed injury and anatomical location (hand/wrist).

Data will be collected via the clinical trial IT system REDCap, hosted by the University of Oxford, UK. Baseline demographic data will be entered directly by the site staff during the initial visit, and all baseline questionnaire data will be entered directly by the participant. Participants will then be contacted for follow-up using email and/or SMS text message prompts and invited to complete questionnaires through an online link. Telephone and postal follow-up will be conducted for those who require it. Follow-up will be conducted centrally by the trial team.

### Intervention Type
Procedure/Surgery

### Primary outcome(s)
The risk of surgical site infection (SSI) will be measured using patient- and site-reported prescription of antibiotics for the presence of an SSI using data collected from REDCap by 90 days post-randomisation

### Key secondary outcome(s)
1. Upper extremity function and pain measured using PROMIS Upper Extremity at Baseline (pre- and post-injury), 90 days and 6 months
2. Health-Related Quality of Life will be measured using the EQ-5D-5L at Baseline (pre- and post-injury), 90 days and 6 months
3. Risk of complications will be measured using the site-reported complications at treatment and medical records check at 6 months
4. Assess costs and comparative cost-effectiveness will be measured using a bespoke participant resource use questionnaire at 90 days and 6 months

### Completion date
28/02/2028

## Eligibility

### Key inclusion criteria
1. Age 16 years and above
2. Open or closed hand/wrist fracture(s) which, in the opinion of the treating clinician, require manipulation under anaesthetic and fixation with K-wires

### Participant type(s)
Patient

### Healthy volunteers allowed
No

### Age group
Mixed

### Lower age limit
16 Years

### Upper age limit
100 Years

### Sex
All

### Total final enrolment
0

### Key exclusion criteria
Current exclusion criteria as of 12/05/2026:
1. Insufficient soft tissue cover to bury the wire
2. Presence of overlying or adjacent skin infection/disorder
3. Injury is more than 2 weeks old at time of screening
4. Inability of participants to adhere to the trial procedures and/or follow-up procedures

Previous exclusion criteria:
1. Insufficient soft tissue cover to bury the wire
2. Presence of overlying or adjacent skin infection/disorder
3. Injury is more than 2 weeks old
4. Inability of participants to adhere to the trial procedures and/or follow-up procedures

### Date of first enrolment
26/01/2026

### Date of final enrolment
28/02/2027

## Locations

### Countries of recruitment
United Kingdom

England

Scotland

### Study participating centre
**Royal United Hospital**
Combe Park
Bath
England
BA1 3NG

### Study participating centre
**Queen Elizabeth Hospital**
Mindelsohn Way
Edgbaston

Birmingham
England
B15 2GW

**Study participating centre**
**Stoke Mandeville Hospital**
Mandeville Road
Aylesbury
England
HP21 8AL

**Study participating centre**
**St Thomas' Hospital**
Westminster Bridge Road
London
England
SE1 7EH

**Study participating centre**
**Basingstoke and North Hampshire Hospital**
Aldermaston Road
Basingstoke
England
RG24 9NA

**Study participating centre**
**St Mary's Hospital**
Praed Street
London
England
W2 1NY

**Study participating centre**
**St James' S University Hospital**
Beckett Street
Leeds
England
LS9 7TF

**Study participating centre**
**Musgrove Park Hospital**
Musgrove Park Hospital
Taunton
England
TA1 5DA

**Study participating centre**
**Queens Medical Centre**
Nottingham University Hospital
Derby Road
Nottingham
England
NG7 2UH

**Study participating centre**
**John Radcliffe Hospital**
Headley Way
Headington
Oxford
England
OX3 9DU

**Study participating centre**
**Royal Cornwall Hospital**
Treliske
Truro
England
TR1 3LJ

**Study participating centre**
**Salford Royal Hospital**
Stott Lane
Salford, Greater Manchester
England
M6 8HD

**Study participating centre**
**St George's Hospital**
Blackshaw Road
Tooting

London
England
SW17 0QT

**Study participating centre**
**Wexham Park Hospital**
Wexham Street
Wexham
Slough
England
SL2 4HL

**Study participating centre**
**Whiston Hospital**
St. Helens & Knowsley Hospital
Warrington Road
Prescot
England
L35 5DR

**Study participating centre**
**Blackpool Teaching Hospitals NHS Foundation Trust**
Victoria Hospital
Whinney Heys Road
Blackpool
England
FY3 8NR

**Study participating centre**
**Northumbria Healthcare NHS Foundation Trust**
North Tyneside General Hospital
Rake Lane
North Shields
England
NE29 8NH

**Study participating centre**
**University Hospitals Sussex NHS Foundation Trust**
Princess Royal Hospital
Lewes Road
Haywards Heath

England
RH16 4EX

**Study participating centre**
**University Hospitals Plymouth NHS Trust**
Derriford Hospital
Derriford Road
Derriford
Plymouth
England
PL6 8DH

**Study participating centre**
**University Hospitals of Derby and Burton NHS Foundation Trust**
Royal Derby Hospital
Uttoxeter Road
Derby
England
DE22 3NE

**Study participating centre**
**Royal Free London NHS Foundation Trust**
Royal Free Hospital
Pond Street
London
England
NW3 2QG

**Study participating centre**
**North Bristol NHS Trust**
Southmead Hospital
Southmead Road
Westbury-on-trym
Bristol
England
BS10 5NB

**Study participating centre**
**Mid and South Essex NHS Foundation Trust**
Broomfield Hospital
Court Rd

Broomfield
Chelmsford
England
CM1 7ET

**Study participating centre**
**Mid Yorkshire Teaching NHS Trust**
Pinderfields Hospital
Aberford Road
Wakefield
England
WF1 4DG

**Study participating centre**
**Barts Health NHS Trust**
The Royal London Hospital
80 Newark Street
London
England
E1 2ES

**Study participating centre**
**NHS Greater Glasgow and Clyde**
Glasgow Royal Infirmary
84 Castle St
Glasgow
Scotland
G4 0SF

**Study participating centre**
**NHS Grampian**
Aberdeen Royal Infirmary
Foresterhill Rd
Aberdeen
Scotland
AB25 2ZN

**Study participating centre**
**Northampton General Hospital**
Cliftonville
Northampton

England
NN1 5BD

**Study participating centre**
**Chelsea and Westminster Hospital NHS Foundation Trust**
Chelsea & Westminster Hospital
369 Fulham Road
London
England
SW10 9NH

**Study participating centre**
**Stepping Hill Hospital**
Stockport NHS Foundation Trust
Stepping Hill Hospital
Poplar Grove
Stockport
England
SK2 7JE

# Sponsor information

**Organisation**
University of Oxford

**ROR**
https://ror.org/052gg0110

# Funder(s)

**Funder type**
Government

**Funder Name**
National Institute for Health and Care Research

**Alternative Name(s)**
National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

### Funding Body Type
Government organisation

### Funding Body Subtype
National government

### Location
United Kingdom

# Results and Publications

## Individual participant data (IPD) sharing plan

### IPD sharing plan summary
Data sharing statement to be made available at a later date

### Study outputs

| Output type | Details | Date created | Date added | Peer reviewed? | Patient-facing? |
|---|---|---|---|---|---|
| Protocol file | version 2.0 | 11/03/2026 | 12/05/2026 | No | No |
| Protocol file | version 3.0 | 26/08/2026 | 07/10/2026 | No | No |