

# A clinical trial to develop new ways of measuring nerve healing after injury

**Submission date**  
25/03/2019

**Recruitment status**  
No longer recruiting

☐ Prospectively registered

☐ Protocol

**Registration date**  
21/05/2019

**Overall study status**  
Completed

☐ Statistical analysis plan

☒ Results

**Last Edited**  
18/09/2023

**Condition category**  
Injury, Occupational Diseases, Poisoning

☐ Individual participant data

## Plain English summary of protocol

### Background and study aims

Peripheral nerve injuries result in a loss of sensation to crucial areas of the hand. Alongside this, there is a loss of sweating and changes to the skin of the affected area. This study aims to assess whether it is possible to assess these skin changes in nerve-injured patients in order to examine if they can be used to monitor recovery of sensation in patients who have undergone treatment.

### Who can participate?

Patients over 18 years old who are attending Wythenshawe Hospital, Department of Plastic Surgery with a nerve injury in their forearm

### What does the study involve?

Skin changes are measured using OCT (Optical Coherence Tomography) imaging, a non-invasive device. The researchers also aim to investigate whether detailed three-dimensional ultrasound (similar to pregnancy scans) can be used to monitor nerve regeneration at the operation repair site. This imaging tool is non-invasive can be used to determine how fast the nerve is re-growing and also the volume of the re-growing nerve.

### What are the possible benefits and risks of participating?

There will be no effect on the patients' normal care pathway or surgery. There is no anticipated risk to patients. The imaging devices used are non-invasive and do not cause harm to patients.

### Where is the study run from?

Wythenshawe Hospital (UK)

### When is the study starting and how long is it expected to run for?

October 2018 to August 2022 (updated 06/08/2020, previously: July 2020)

### Who is funding the study?

1. British Association Of Plastic Reconstructive And Aesthetic Surgeons
2. Royal College of Surgeons of England

Who is the main contact?

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## Contact information

### Type(s)

Scientific

### Contact name

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**Additional identifiers****EudraCT/CTIS number**

Nil known

**IRAS number****ClinicalTrials.gov number**

Nil known

**Secondary identifying numbers**

40584

**Study information****Scientific Title**

Novel Outcome measures in Peripheral Nerve injury (OPEN study)

**Acronym**

OPEN

**Study objectives**

Will changes in: sweat gland density and epidermal thickness as measured by OCT and volume and growth of the regenerating nerve as measured by high-frequency 3D ultrasound, correspond to changes in current sensory outcome measures (two-point discrimination (2PD), locognosia, Weinstein Enhanced Sensory Test (WEST) monofilament and STI Test) and patient-reported outcome measures (DASH and i-Hand) following peripheral nerve repair.

## **Ethics approval required**

Old ethics approval format

## **Ethics approval(s)**

Approved 25/01/2019, East Midlands – Nottingham 1 Research Ethics Committee (The Old Chapel, Royal Standard Place, Nottingham, NG1 6FS, UK; Tel: +44 (0)207 104 8101; Email: NRESCCommittee.eastmidlands-nottingham1@nhs.net), ref: 18/EM/0426

## **Study design**

Non-randomized; Interventional; Design type: Screening, Device, Imaging, Active Monitoring

## **Primary study design**

Interventional

## **Secondary study design**

Non randomised study

## **Study setting(s)**

Hospital

## **Study type(s)**

Treatment

## **Participant information sheet**

Not available in web format, please use the contact details to request a patient information sheet

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

Peripheral nerve injury

## **Interventions**

There are no study 'interventions' as such, just additional imaging measurements. These are as follows:

Date of surgery (or within 7 days post-op): OCT scanning, high frequency 3D ultrasound scan (Hf, 3D,USS), sensory outcome measures and PROMs

Week 2: OCT scanning, high frequency 3D ultrasound scan (Hf,3D,USS), sensory outcome measures and PROMs

Week 6: OCT scanning, high frequency 3D ultrasound scan (Hf,3D,USS), sensory outcome measures and PROMs

Month 3: OCT scanning, high frequency 3D ultrasound scan (Hf,3D,USS), sensory outcome measures and PROMs

Month 6: OCT scanning, high frequency 3D ultrasound scan (Hf,3D,USS), sensory outcome measures and PROMs

Month 12: OCT scanning, high frequency 3D ultrasound scan (Hf,3D,USS), sensory outcome measures and PROMs

## **Intervention Type**

Other

## **Primary outcome measure**

Measured at date of surgery (or within 7 days post-op), weeks 2 and 6, and months 3, 6 and 12:

1. Sweat gland density and epidermal thickness measured by Optical Coherence Tomography
2. Regenerative rate and volume of the regenerating nerve measured by high-frequency, three-dimensional ultrasound

## **Secondary outcome measures**

Sensory outcome measures:

1. Tactile spatial discrimination measured using 2 Point Discrimination Test at week 1/baseline, week 2/baseline, week 6, months 3, 6 and 12
2. Pressure detection threshold measured using Weinstein Enhanced Sensory Test (WEST) monofilament at week 1/baseline, week 2/baseline, week 6, months 3, 6 and 12
3. Tactile spatial discrimination measured using locognosia at week 1/baseline, week 2/baseline, week 6, months 3, 6 and 12
4. Stereogenesis measured using Shape/Texture Identification Test at months 6 and 12

Motor outcome measures:

1. Individual muscle strength measured using manual muscle testing (MRC Grading) at week 1/baseline, week 2/baseline, week 6, months 3, 6 and 12
2. Grip strength measured using Jamar Dynamometer at week 1/baseline, week 2/baseline, week 6, months 3, 6 and 12

Patient-Reported Outcome Measures (PROMs):

1. Functional disability and pain caused by nerve injury measured using DASH and i-HAND at week 1/baseline, week 2/baseline, week 6, months 3, 6 and 12

## **Overall study start date**

01/10/2018

## **Completion date**

04/08/2022

# **Eligibility**

## **Key inclusion criteria**

1. 18 – 80 years old
2. Peripheral nerve injury of ulnar or median nerve (or both) distal to the elbow
3. Having direct, epineural surgical repair within 1 week after injury
4. Capacity to consent

## **Participant type(s)**

Patient

## **Age group**

Adult

## **Lower age limit**

18 Years

## **Upper age limit**

80 Years

**Sex**

Both

**Target number of participants**

Planned Sample Size: 15; UK Sample Size: 15

**Total final enrolment**

5

**Key exclusion criteria**

1. Outside of stated age range
2. Outside stated location of injury
3. Nerve gap requiring alternative surgical management
4. Lacks capacity to consent

**Date of first enrolment**

01/05/2019

**Date of final enrolment**

03/08/2021

**Locations****Countries of recruitment**

England

United Kingdom

**Study participating centre****Wythenshawe Hospital**

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**Sponsor information****Organisation**

The University of Manchester

**Sponsor details**

c/o Ms Lynne Macrae

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**Sponsor type**

University/education

**ROR**

<https://ror.org/027m9bs27>

## **Funder(s)**

**Funder type**

Charity

**Funder Name**

British Association Of Plastic Reconstructive And Aesthetic Surgeons (BAPRAS)

**Funder Name**

Royal College of Surgeons of England

**Alternative Name(s)**

RCS

**Funding Body Type**

Private sector organisation

**Funding Body Subtype**

Associations and societies (private and public)

**Location**

United Kingdom

## **Results and Publications**

**Publication and dissemination plan**

The main study results will be published in the name of the study, in a peer-reviewed journal, on behalf of all collaborators.

## Intention to publish date

04/08/2023

## Individual participant data (IPD) sharing plan

The datasets generated and/or analysed during the current study will be published as a supplement to the results publication

## IPD sharing plan summary

Published as a supplement to the results publication

## Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">HRA research summary</a>			28/06/2023	No	No
<a href="#">Results article</a>		13/09/2023	15/09/2023	Yes	No