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## Plan Overview

*A Data Management Plan created using DMPonline*

**Title:** Assessment of hand function while wearing three different flexor tendon repair hand splints in healthy volunteers

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**Affiliation:** University of Nottingham

**Template:** University of Nottingham generic Data Management Plan

### Project abstract:

Flexor tendon injury surgical repair requires extensive rehabilitation that can cause many inconveniences during daily life. A large variety of splints and rehabilitation protocols are described and used in clinical practise. These vary considerably in size. Traditional splints covered the fingertips down to the base of the forearm (Long splint). Less restrictive splints, known as the Manchester Short Splint have subsequently entered clinical practise which leaves the wrist free (Short splint). Recently relative motion flexion splints which just protect the affected finger have become popular (Mini splint). It is expected that the smaller splints will allow more hand function but this has never been tested.

Patients have to wear these splints continuously for 5-6 weeks to protect the surgical repair. This significantly impacts hand function, may require time off work and increases dependence on others for activities of self care. Most studies focus more on the biomechanical function for flexor tendon repair orthosis instead of functional activities.

Previous studies with other hand orthoses concerning hand function have been published to prove that it can be beneficial to gain functional movements, however, there is a lack of valid research for examining the hand function while wearing flexor tendon repair splinting, especially to investigate differences between each orthosis. Previous hand function measures do not include the use of devices such as mobile phones, computer mouses and keyboards which are now an essential part of daily life for most people. This study will use the recently describe modified Jebson hand function test which incorporates use of electronic devices to provide useful, up to date information to patients and clinicians regarding function carrying out daily tasks of modern life.

**ID:** 113378

**Start date:** 01-02-2023

**End date:** 26-09-2023

**Last modified:** 03-09-2023

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# Assessment of hand function while wearing three different flexor tendon repair hand splints in healthy volunteers

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## Data description

### What data will you create?

We will collect the quantitative data in our study, which will be the time (seconds) taken by each participant in the modified Jebsen hand function test (JHFT). The time will be recorded by a stopwatch, firstly recorded by Microsoft Excel spreadsheet on the clinic's computers then calculated by data analysis software.

The volume of the data will be approximately 1140 sets for inviting 20 participants.

## Data collection / generation

### What are your methodologies for data collection / generation? How will you ensure data quality? What data standards will you use?

Data will be collected as the time spent for every participant to complete 11 hand function subtests within the modified Jebsen Hand Function Test (JHFT) while wearing three splints and no splint.

The time for the previous seven original subtests is recorded and calculated. The mean time taken for four technological additional tasks is calculated by 20 participants in three attempts while wearing three different flexor tendon splints and no splint.

The one-way repeated measure ANOVA test and a paired t-test will be applied to the total time and individual time spent on subtests and a statistically significant level of  $p < 0.05$  will be set.

Data of each individual will be recognised as an ID number to ensure the anonymous, and once completed the assessment, we will use Excel spreadsheets to first keep those data and calculate the mean time through data analysis software for each subtest with every splint and no splint. Those data will be stored in the University of Nottingham OneDrive database.

## Data storage and security

### Where and how will data will be stored, backed-up, transferred, and secured during the active phase (short to medium term) of research?

Data created from the experiment will first be stored on the university workspace computer, then be transferred to the UoN OneDrive system, to further organise and classify the data.

#### *OneDrive*

We will use UoN-provided storage for our working data. UoN licenses Microsoft OneDrive, an ISO 27001 information security management compliant service that allows secure and controlled sharing of data amongst the research team. University of Nottingham OneDrive encrypts data both in transit and at rest and is approved against the University's Handling Restricted Data Policy. The service provides continual failover support. This service provides up to 5TB free-at-point-of-use, and as we do not anticipate generating more than 5TB we will not require any additional costs for use of this service.

## Data management, documentation, and curation

### What are your principles, systems, and major standards for data management and creation? What metadata and documentation will you keep?

#### Data creation

Originally, metadata in the format of a Microsoft Excel spreadsheet will be used, with descriptions of the analysis performed and references to the file names/version numbers, to record and simply organise the data while doing the experiment.

A main folder "**2023 Hand Splint Project**" will be created, the folder contains related documents of the project. A "**Data**" folder will be created and will contain the Excel file for each participant (i.e. P01). In the Excel files, each participant with code will have their own Excel spreadsheet to record all the time spent in the hand function test. There will be 20 spreadsheets and an example template in total.

#### **OneDrive (organise data)**

##### **1. Main folder: 2023 Hand Splint Project**

A main data folder "2023 Hand Splint Project" will be created first to store all the data into it and then saved onto the UoN-provided storage.

##### **2. Data collection folders**

Among the main folder, there will be a data folder, containing two documents to collect all the data from participants including time spent in each subtest and splinting order along with time appointment. Each spreadsheet for individuals will be titled with the participant ID, showing as a number (i.e. P001 to P020).

The process of data management will ensure that research data can be used by others outside of the project team. The researcher will document the procedures, objectives, and methodology of the research, and explicitly describe the meanings of variables and codes used. This information will be saved to a file within the main data folder. Any derivations, transformations, pseudonymisation or data cleaning will be described and saved in password-protected files where relevant.

## **Ethics & Privacy**

### **Are there any ethical or privacy related issues associated with your data?**

This project has considered the ethical and legal implications in terms of data handling, storage as well as the security. All the data collected from participants will be anonymous, and ordered by number. Research will follow standard ethical procedures of the Faculty.

## **Data preservation**

### **How will you ensure the long term storage and preservation of data?**

All anonymised research data created by the project will be deposited in the UoN research data archive (<https://rdmc.nottingham.ac.uk>). UoN will retain and preserve research data in line with UoN for a minimum of 7 years, but data will be retained for longer periods of time where it is of continual value to users.

## **Data sharing and access**

### **How will the data generated be shared and published?**

All data for which consent to share has been obtained will be shared via the University of Nottingham data archive under a CC-BY license. Any data which is deemed to be personally or commercially sensitive will be assessed on a case-by-case basis to determine whether it can be shared. There will be no need to update the data past the project period. All published outputs will contain a Data Availability Statement including the datacite DOI that directs to the relevant data set. Data will be released at the same time as any published outputs underpinned by the data or by one year from the end of the project.

## **Roles & responsibilities**

### **Who will be responsible for managing data, data security, data quality, and data security both during the award and post-award?**

The principal investigator (PI) of our study, **Mr. Nick Johnson**, will be responsible for the storage and management of the data collected during this study. The data will mainly be organised and processed by the student, **Ms. Chih-Hsin Tseng**.

The overall responsibility for data security is held by the University of Nottingham Chief information security officer. Whilst the data is being analysed it will be accessible to any member of the study team, the use of UoN One Drive will facilitate this and allow for team members based at different locations to still have access to the data set. All project members are required to follow the DMP. All project members are responsible for their own use and management of data.

## Relevant policies

### What are the relevant institutional, departmental or study policies on data sharing and data security?

We will ensure that our research aligns with the requirements of the University's Research Data Management Policy, Information Security Policy, Code of Research Conduct and Research Ethics.

## IPR

### Who will own the copyright and IPR of any data that you will collect or create? Will you create a licence(s) for its use and reuse? If you are planning to use existing data as part of your research, do any copyright or other restrictions determine its use?

Copyright & IPR for all project research data is owned by University of Nottingham.

## Budgeting

### What are the costs or funding required for capturing, processing, storing, and archiving your data?

No costs will add on this issue, the data will be preserved and kept through the database of the University of Nottingham.

## Further Help

### Would you like your plan to be reviewed by specialists in Libraries?

Saving this plan after checking the "Yes" box will immediately notify Libraries DMP review service, please only do this when you are ready for review.

- Yes

### Would you like a reminder and further guidance on depositing your data? If so, indicate when would be most useful.

Guidance is sent out twice a year, but you can contact [library-researchsupport@nottingham.ac.uk](mailto:library-researchsupport@nottingham.ac.uk) at any time for further support.

- Jan 2023