

Sleep and Rehabilitation after Brain Injury

Study Report

Why did we do this research?



Sleep is important for learning new skills. A good night's sleep after learning a skill can boost your performance when you next attempt it. This is because, while sleeping, **the brain organises the memories** associated with that skill so that you become more efficient at it once you wake up.

After stroke or brain injury, people often have difficulty with their movement. Relearning this movement is one skill that many people with brain injury attempt to acquire through rehabilitation. Therefore, good sleep quality is likely to be important in **giving the best chance of regaining this movement**.



Sleep problems are often reported by people after brain injury. If people receiving physical or occupational therapy after brain injury are **not sleeping well at night**, this could reduce the total benefit gained, as the **brain is not able to organise these skill memories** as efficiently.

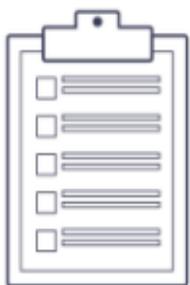
What did we aim to find out?

In our study, we aimed to look at whether there is a **relationship between sleep quality and recovery of movement** in people receiving rehabilitation in hospital after brain injury.

Who did we include in the study?

59 people with brain injury, who were staying in a rehabilitation unit, took part in the study as well as a control group of **55 people who had not had a brain injury** and were at home.

How did we measure sleep quality?



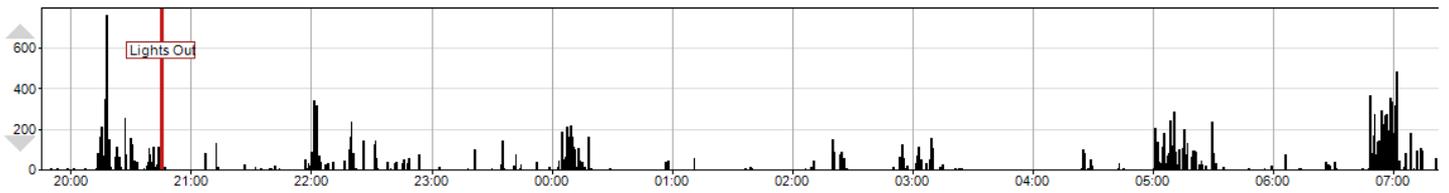
We assessed the brain injury group at 3 time points - beginning, middle and end of their stay in the rehabilitation unit. We assessed the control group once only.

The **Sleep Condition Indicator (SCI)** questionnaire was used to ask people about their average sleep quality over the past month.

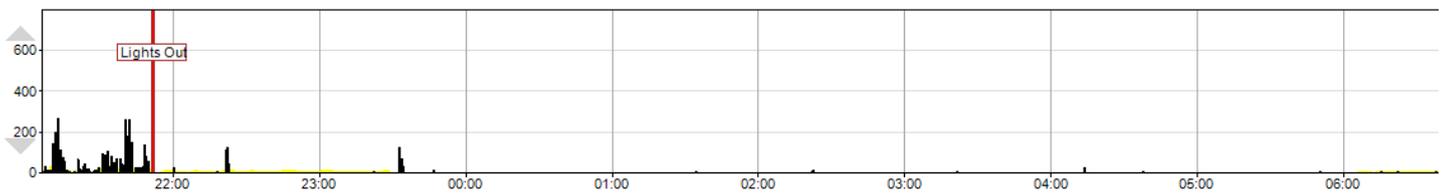
An **activity monitor** was worn on the wrist for one week per time point, to record sleep disruption by looking at movement



This is an example of someone with poor sleep quality, lots of movement - shown as black bars:



This shows someone with good sleep quality, very little movement:



How did we measure recovery?

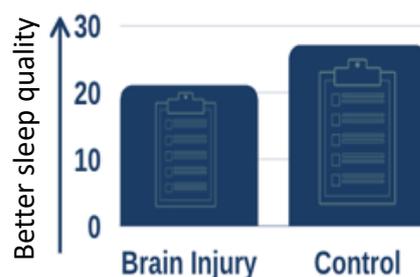
For the people with brain injury, we assessed how well they could move their arms and legs with two different tests.

1. The **Action Research Arm Test** was used to see how well people could pick up and move different objects with their affected arm.
2. The **Fugl-Meyer Assessment** measured how well people could make different movements of their arms and legs.
3. The **Rivermead Mobility Index** measured how well people could move around the room, such as sitting up, standing and walking.
4. The **Functional Independence Measure** was used to measure people's overall ability to engage with activities of daily life.

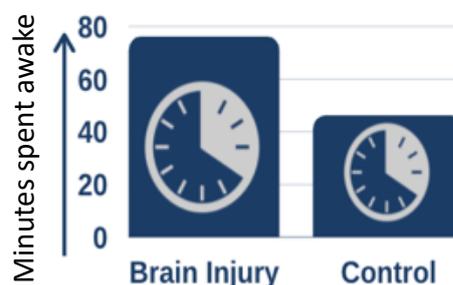


What did we find out?

Responses to the SCI sleep questionnaire showed that people who had experienced brain injury **rated their sleep quality as lower** than the control group.



Furthermore, the sleep monitoring wrist watches showed that, on average, **people with brain injury had more disrupted sleep and spent more time awake overnight.**



When looking at the **relationship between sleep quality and movement ability** when discharged from the rehabilitation unit, people with brain injury who had **better sleep**:

1. Scored **higher on the test of arm/hand function**
2. Showed **less overall movement impairment** in their affected arm and legs
3. Were **more mobile**.

When looking at **recovery of functional independence** over the time spent in the rehabilitation unit, people with brain injury who had more consistent, **less disrupted sleep recovered more quickly** than those who had more disrupted sleep.

What does this mean?

As we expected, people in hospital following **brain injury showed poorer sleep quality** compared to the control group and **people who sleep better have better outcomes after rehabilitation**.

In the future we are hoping to investigate ways of **improving people's sleep quality** while they are in the hospital to see whether this can help recovery.

We are starting to do this by first looking at whether an **online sleep improvement programme** can help to improve sleep quality in people who are further along the recovery process after stroke.



Email Melanie or Tom on sleep@fmrib.ox.ac.uk



01865 611461

Thank you to everyone who took part or helped us with this study.

Thank you to the Wellcome Trust for funding this research.