



Sleep disturbance after
traumatic brain injury
a self-help guide



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Who is this guide for?

This guide is for people with brain injuries, their relatives, caregivers, and professionals working in this area. The guidance has been developed by psychological practitioners at Headwise and is based on best clinical practice guidelines and psychotherapeutic approaches to sleep disturbances. This guide should not be seen as a replacement for therapy. If you would like to discuss the appropriateness of psychological therapy, then please contact your GP or alternatively speak to one of the Headwise team.

What is sleep disturbance?

Sleep is a natural process, essential for the maintenance of our health, everyday functioning, and physical development. National guidelines suggest that, on average, adults should get around 6-9 hours of sleep per night.

Research suggests around 30-75% of individuals with traumatic brain injury (TBI) experience sleep disturbances. It is therefore one of the most commonly experienced symptoms following TBI. In fact, individuals with TBI are 3 times more likely to experience sleep disturbances than the general population.

Sleep disturbances can be categorised into 4 main types:

- Sleep onset deficit (i.e. trouble falling asleep)
- Sleep maintenance deficit (i.e. repeated waking during the night)
- Early waking (i.e. waking up much earlier than planned and not being able to get back to sleep)
- Hypersomnia (i.e. excessive sleeping)*

* This self-help guide focuses on the first 3 types of sleep disturbances rather than excessive sleepiness. For individuals who experience excessive sleepiness and fatigue, please refer to our 'Fatigue Management' self-help guide.

What is sleep disturbance?

Sleep disturbance can impact on almost all aspects of life:

- It leaves people feeling run down, fed up, irritable, and lacking energy.
- It increases our chances of developing mental health conditions such as depression and anxiety.
- It has a negative impact on our relationships with others and can lead to social isolation.
- It affects our thinking abilities, such as memory and concentration. It takes us longer to complete tasks and we are more prone to making careless mistakes.
- It impacts on our physical health, with sufferers more likely to develop heart disease, obesity, and diabetes.



“My sleep was so erratic. That was the thing that bothered me the most. Some nights it would be okay, but other nights I would hardly sleep at all. It got to the stage that I stopped making plans because I never knew how I was going to be. I became more distant with my friends and this had such an impact on my mood.”

“I’d lie there for hours trying to fall asleep. It became so frustrating just lying there, desperately hoping to fall asleep, knowing how exhausted I was going to feel the next day. I’d spend the entire day exhausted, unable to focus on work. But then when I got around to the next night it was like – BING – my mind would be active again and I’d be unable to sleep.”



What causes sleep disturbance?

The causes underlying sleep disturbance following TBI are still not fully understood but it is likely to be multifactorial (i.e. there are several factors contributing to the problem). Whilst we know that certain brain regions are essential for effective sleep, we also know that sleep difficulties develop in people who don't have damage to these regions. This suggests that other factors, such as a person's psychology (e.g. attitudes, thoughts, and feelings) and environment, might be contributing to their sleep difficulties.

When trying to understand the reasons why people with brain injury are more likely to experience sleep disturbances it is helpful to think about it using the **biopsychosocial** model ...

Bio – this refers to the physical/biological changes in the brain and body that contribute to sleep disturbances.

Psycho – this refers to the psychological changes (i.e. changes in how the person thinks about things) that contribute to sleep disturbances.

Social – the changes to a person's environment that contribute to sleep disturbances.

What causes sleep disturbance?

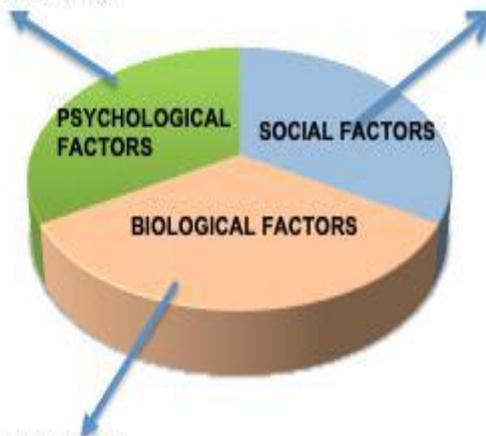
The following diagram shows some of the biological, psychological, and social changes that are often seen after brain injury that may be contributing to your difficulties with sleep.

PSYCHOLOGICAL FACTORS

- Emotional difficulties like depression, anxiety and stress
- Personality traits, such as perfectionism
- Executive dysfunction: impulsivity, hyperactivity, distractibility, poor planning and problem solving

SOCIAL FACTORS

- Reduced activity levels
- Noisy environment
- Social isolation
- Lifestyle choices such as diet
- Reliance on others for bedtime routine



BIOLOGICAL FACTORS

- Damage to brain regions involved in sleep, such as the hypothalamus
- Chronic pain conditions
- Medications that affect sleep

How is sleep disturbance treated?

Before engaging in the strategies recommended in this booklet, you should consider consulting with your GP to ensure there are no medical issues causing your sleep difficulties. For example, head trauma may increase your risk of sleep apnoea - a disorder where sleep is disturbed by breathing difficulties. Damage to a region of the brain called the hypothalamus can also impact on sleep and your GP may recommend you see an Endocrinologist to explore this further. Finally, if your sleep is affected by pain then your GP may suggest trialling some pain medication.

Whilst there are a range of medications that can improve sleep, they often have side effects, can be addictive, and become less effective over time. They also fail to address the factors underlying your poor sleep. As such, most doctors will advise against their use other than as a short-term treatment.

Your doctor is much more likely to suggest you consider psychological strategies to improve your sleep. These are the most evidence-based treatments for sleep disturbance. They examine how our environment, thoughts, emotions, and behaviours impact on our sleep. This self-help leaflet will focus on these strategies.

Strategies for overcoming sleep disturbance

1. Record your sleep using a sleep diary

Keeping a sleep diary is important in establishing a baseline so that we can measure the effectiveness of our various interventions. Even more importantly, it also helps us identify *when* our sleep is affected and this can provide some insight into *why* we experience our difficulties. For example, you might find that your sleep disturbance occurs more after certain activities, after seeing certain people, after eating certain foods, etc. The best way to ascertain this information is to keep a sleep diary, making a record of your sleep everyday for at least a few weeks to get reliable data.

An example of a completed sleep diary can be found on the next page. What can we learn from this person's diary?

- They are regularly getting less than 6 hours sleep, which is a sign of a significant sleep problem.
- Their main difficulty is fragmented sleep, with lots of wakeups during the night.
- Their bedtime is erratic, changing markedly from one day to the next.
- There appears to be a rebound effect, with a poor night's sleep followed by a night of excessive sleep.
- They are spending a lot of wasted time in bed when they are not actually sleeping.

SLEEP DIARY

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Time you got into bed	11pm	9pm	11:30pm	9:30pm	12am	1am	10pm
Time you fell asleep	11:15pm	9:15pm	11:40pm	9:50pm	12:05am	1:10am	11pm
Number of awakenings during night	4	2	2	1	5	5	1
Duration of awakenings (cumulative)	2 hours	15 mins	2.5 hours	5 minutes	1 hour	45 mins	2 hours
Time you eventually woke up	6am	6:30am	7:30am	6am	7am	8:30am	6:45am
Time you got out of bed	6:45am	7am	8am	6:10am	9am	10am	6:45am
Total time asleep	4.75 hrs	9 hrs	5.33 hrs	8.25 hrs	5.93 hrs	6.57 hrs	5.75 hours

A blank version of this sleep diary can be found on page 23

Strategies for overcoming sleep disturbance

2. Lifestyle and environmental changes

One of the easiest ways to address our sleep difficulties is to look at lifestyle and environmental factors that may be affecting our sleep. This is often referred to as 'sleep hygiene' (although it has nothing to do with cleanliness!). It looks at certain habits we may have got into that have a negative impact on our sleep. Consider these strategies:

DO ...

- Go to bed at a regular time each night and get up at the same time in the morning, even if you have not had a good night's sleep.
- Take regular exercise, but not late in the evening.
- Drink a warm milky drink in the evening. It releases a substance called Tryptophan, which helps aid sleep.
- Make sure your bedroom is a dark, quiet, and comfortable environment.
- Use your bed only for sleeping.
- Try and keep a regular routine in the run up to bed. This helps prepare you mentally for sleep.

Strategies for overcoming sleep disturbance

DON'T ...

- Give in to the temptation to sleep during the day. If you do need to nap, limit this to 30 minutes and ensure you do not take a nap any later than 4pm.
- Consume caffeine, sugary drinks, or sweets after 6pm.
- Smoke in the 2 hours leading up to bed.
- Engage in stimulating activities (e.g. action movies, computer games) in the run up to bed. Instead, try to read or listen to relaxing music or radio.
- Drink alcohol in the evening. Whilst it may help you fall asleep, it results in poorer quality sleep and increases the chances of you waking up during the night.
- Go to bed hungry. Consider having a small, healthy snack before bed.
- Look at screens (e.g. phones and computers) in the run up to bed. The lights from these screens trick the brain into thinking it's daytime.
- Drink large amounts of liquid in the evening.

Strategies for overcoming sleep disturbance

3. Winding down before bed

Ensuring you give yourself plenty of time to switch off and wind down before bed is essential for encouraging a restful night's sleep. Often the things we do during the day, and the stresses that come along with it, creep into our minds as we try to sleep and this can disrupt our ability to drift off. Through engaging in relaxation or mindful exercises before bed time it is possible to empty our minds and calm our bodies, helping us to feel more relaxed and ready for bed. There are a wide range of tasks that can help us feel relaxed, such as:

- Reading a book
- Listening to relaxing music
- Mindful colouring
- Having a bath
- Meditation
- Yoga
- Listening to an audiobook

There are lots of relaxation and mindfulness techniques online, with videos and apps to support this. Some of these can be found on page 24.

Strategies for overcoming sleep disturbance

4. The 15 minute rule

Being unable to sleep is frustrating! We all know that experience of tossing and turning in bed, glancing at the clock to see how much time we have left until we need to get up. Paradoxically, the frustration we feel during such times results in physiological changes (e.g. release of stress hormones, increased heart rate, increased body temperature) that make it even less likely that we'll fall asleep. Instead it is recommended that if you have not fallen asleep within around 15 minutes of going to bed, or waking up in the night, then you should get out of bed and engage in low level activity (e.g. reading, relaxation exercises) until you feel sleepy. Only then should you return to bed.

Below is a space for you to write down ideas of things you could do if you can't sleep, that get you up and out of bed, but that equally aren't too demanding.

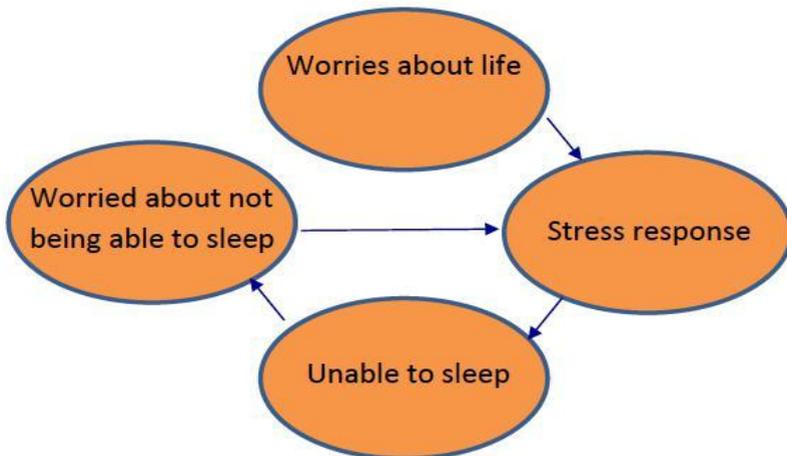
1.
2.
3.

Strategies for overcoming sleep disturbance

5. Understanding how negative thoughts can impact on sleep

The way that we think about things affects our emotions and our physiological responses. When we focus on thoughts that make us stressed or anxious our physiological response changes – our heart rate increases and our body temperature climbs – basically the opposite physiological response needed to sleep.

These unhelpful thought patterns are more common in people that have sleep difficulties. They may be worried about things that have happened during the day. They may be worried about the consequence of not sleeping. This begins a vicious cycle, as shown in the diagram below:



Strategies for overcoming sleep disturbance

Technique 1: Distraction

There are many different ways that we can deal with these troublesome thoughts. One way is to try and distract ourselves through thinking of something else that is less likely to arouse our physiological system. This is where the old adage comes that we should count sheep in order to fall asleep. In practice, it is useful to have a range of distractions on hand that you can turn to if your sleep is disturbed by racing or troublesome thoughts. Some people count backwards from 100. Others may imagine they are driving a familiar route or doing their weekly supermarket shop. There is no shortage of mundane things that we can focus on to try and reduce our physiological arousal. Try and list a few in the space below:

1.

2.

3.

4.

5.

Strategies for overcoming sleep disturbance

One particularly effective way of interfering with our processing of negative thoughts is to engage in a strategy called **mindfulness**. This technique encourages people to move away from worrying about future or past events by instead learning to focus on the here-and-now. Just like with physical exercise, mindfulness needs regular practice, but in time it helps people gain much more control over their thought processes. Once you become skilled in this technique you will be able to direct your attention away from distressing thoughts and onto less emotive things, thereby reducing your physiological response and making it easier to sleep. Page 24 contains links to a number of useful websites that provide mindfulness exercises.



Strategies for overcoming sleep disturbance

Technique 2: Thought challenging

Rather than try to distract ourselves from our troubling thoughts, another way to deal with them is to tackle our worries head on. This is referred to as ***thought challenging***. It involves identifying whatever it is that's bothering us and looking for counter-evidence to those thoughts. Challenging the accuracy of these negative thoughts can lead to us feeling more relaxed, thus helping the body ease into sleep. Below is an example of how this might work:

Initial thought: "If I don't sleep well tonight then my meeting tomorrow will be a disaster and everyone will think I'm an idiot"

Counter-evidence:

1. I have slept really well the last few nights, so I have some reserve in the tank to cope with a bad night's sleep.
2. Even if I don't sleep well I'm used to making do with little sleep.
3. Everyone that's attending the meeting has met me before and they're not going to judge me negatively based on one meeting.
4. Even if someone does judge me negatively, what does it matter?! If they're that judgemental, it reflects worse on them than it does on me.

New thought: "It would be better if I had a good night's sleep, but if I don't it's not the end of the world. I'll manage."

Strategies for overcoming sleep disturbance

When trying to challenge these negative thoughts it can be useful to prompt ourselves with the following questions:

1. Is the consequence of not sleeping as bad as I fear?
2. What advice would I give to a friend if they had the same worries?
3. Have I managed to deal with poor sleep before?
4. Do I have strategies that will help me get through the next day if I don't sleep well?
5. Am I setting myself unfairly high standards?

Another helpful strategy for dealing with negative thoughts is called ***putting the day to rest***. The idea here is that, in the run up to bed, you make a list of all the things that might be on your mind and then you draw up a plan of action for how you will address these problems. Usually if you have a plan of action for addressing your problems, you are less likely to worry about them in bed.

My Worries: I feel I'm not progressing with my rehab as quickly as I'd like. I worry I'll be like this forever.

My Solutions: Email my physio in the morning asking for a meeting to discuss my progress and goals for next 6 months.

A blank copy of this table is available on page 25.

Strategies for overcoming sleep disturbance

6. Sleep Efficiency Therapy

The final strategy we will discuss is called Sleep Efficiency Therapy, (also known as Sleep Restriction Therapy). It is one of the most effective strategies for combatting sleep disturbance, but also one of the most challenging.

Sleep Efficiency Therapy works by making changes to our sleep routine so that we maximise the quality of sleep we achieve whilst in bed. It does this by reducing the amount of time we spend in bed. This may seem counterintuitive. However, when we have sleep difficulties we actually spend a lot of wasted time lying in bed unable to sleep. This means that we begin to see our bed as a place of frustration and stress. Soon, even the sight of our bed can bring about physiological changes that make it harder for us to sleep. Sleep Efficiency Therapy aims to break this negative association.

There are a number of steps that we need to take to achieve this:

Step 1: We need to work out how efficient our current sleep routine is. We do this by working out how much time we spend asleep relative to the amount of time we are actually in bed. Consider the following example:

Strategies for overcoming sleep disturbance

- An individual goes to bed every night at 10pm - they get up at 7am
- That's 9 hours total spent in bed
- Usually they don't manage to fall asleep until 12am
- They often wake for short, but noticeable periods of time during the night. This adds up to around an hour.
- In total the individual only manages to get 6 hours sleep
- Sleep efficiency = (total time asleep ÷ total time in bed) multiplied by 100
- The individual has a sleep efficiency score of 67%

In the above example the person has a sleep efficiency score of 67%. This is very poor! The aim of sleep efficiency therapy is to improve your score to above 85%.

Step 2: We need to work out our new sleep schedule. We do this by setting a fixed wake up time. We then work out your new bedtime by subtracting your average sleep duration. So, based on the above example, if I set my wakeup time for 7am, and my average sleep duration is 6 hours, then my new bedtime is 1am.

Step 3: We need to implement our new sleep routine. Most people find this quite anxiety provoking as they worry that if they spend less time in bed then they will be more tired in the morning.

Strategies for overcoming sleep disturbance

However, after a few days with their new sleep routine, most people find that they are so tired that they fall asleep much faster and are more likely to sleep all the way until their alarm goes off, which means that they achieve good quality sleep. It is essential that this new sleep routine is followed every night, regardless of whether it is the weekend or if we have had a really good or bad night's sleep. We need to follow this routine until our sleep efficiency over the week is at least 85%.

Step 4: Prepare yourself for the challenge. Sleep efficiency therapy is tough! There will be nights when you are desperate to go to bed early and mornings where you want to sleep in. However, for this treatment to be effective you have to keep to your sleep schedule. You may find it helpful to ask someone else to support you in the early stages when it is the hardest. Also you might want to set yourself a reward each week for keeping to your sleep schedule.

Step 5: Monitor your sleep efficiency and modify your sleep schedule accordingly. This should be done on a weekly basis. If your weekly sleep efficiency is above 85% then you should set your bedtime earlier so that you get an additional 15 minutes in bed. If it is falling below 80% then you may need to spend even less time in bed, so consider moving your bedtime 15 minutes later. Don't go below 5 hours in bed.

Summary

- Sleep difficulties are common after brain injury. Often there are psychological and environmental factors that cause our poor sleep. These factors can be modified.
- A sleep diary is a really useful way to better understand the nature of our sleep difficulties and the factors that impact on our sleep.
- Sleep hygiene looks at environmental and lifestyle factors that may be having a negative impact on our sleep.
- It is important that we wind down at the end of the day before bed. Relaxation and mindfulness exercises can help with this.
- Negative thoughts affect our physiological system in a way that stops us falling asleep. Often these thoughts focus on stresses from our day or worry about the consequences of not sleeping.
- Distracting ourselves from these negative thoughts can help us fall asleep. Otherwise it can be helpful to challenge the accuracy of our thoughts.
- Restricting the amount of time we are in bed can actually make it more likely that we'll have a restful night's sleep.

SLEEP DIARY

	Monday Date: _____	Tuesday Date: _____	Wednesday Date: _____	Thursday Date: _____	Friday Date: _____	Saturday Date: _____	Sunday Date: _____
Time you got into bed							
Time you fell asleep							
Number of awakenings during night							
Duration of awakenings (cumulative)							
Final wake up time							
Time you got out of bed							
Total time asleep							
Sleep efficiency (%)							

Relaxation and mindfulness exercises

The following websites contain a host of useful exercises and resources that can help us feel more relaxed in the run up to bed:

www.calm.com

www.headspace.com

www.cntw.nhs.uk/resource-library/relaxation-techniques/

www.oxfordmindfulness.org/learn-mindfulness/resources/

www.audible.co.uk

www.radioart.com

www.magenta-sky.com/what-is-mindful-drawing/

www.openculture.com/freeaudiobooks

www.sleepfoundation.org/insomnia/treatment/relaxation-exercise

www.sleepfoundation.org/articles/relaxation-exercises-falling-asleep

Putting the day to rest

My Worries:

My Solutions:

Further information

Headwise Limited

www.headwise.org.uk / 0121 222 5432

Headwise provides therapy services for people with brain injury.



MIND

www.mind.org.uk / 020 8519 2122

MIND provides information and support for people with mental health difficulties.



Headway

www.headway.org.uk / 0808 800 2244

Headway provides information and support for people with brain injury.



The British Psychological Society

www.bps.org.uk / 0116 254 9568

The BPS provides a directory of psychological therapists in your area.



The Sleep Council

<https://sleepcouncil.org.uk/> 01756 791089

The Sleep Council provides advice and raises awareness around the importance of sleep.



This information leaflet was developed by psychological practitioners at Headwise. It should not be reproduced or altered in any way. This guide is designed to inform people about psychotherapeutic approaches to sleep disturbance after brain injury; it is not designed to act as a replacement to therapy.

Headwise is a leading national independent provider of specialist services to adults, children and families. We deliver rehabilitation and assessments to individuals with cognitive, physical, emotional and neurobehavioural impairments resulting from brain injury and other neurological conditions. If you would like to learn more about our services or if you wish to make a referral then please contact the Headwise team at the following address:

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