Sleep

What is sleep, and why is it important?

Most of us view sleep as something we do when it is dark to pass the time, or when we feel tired or under the weather. We get into bed, close our eyes and hope to drift off into a peaceful slumber. We don't put much thought into what happens next, unless thinking about the dreams we have had. What actually happens next though, is a structured recharging of our brains and our bodies.

Everyone knows how much worse they can feel after even just one bad night's sleep. This just shows how important sleep is to our wellbeing. Sleep has been described as *the golden chain that ties health and our bodies together*. It is important in maintaining our mental health (mood, memory and ability to think) and our physical health (your risk of cardiovascular disease, diabetes and losing weight).

What does normal sleep look like?

The circadian rhythm

Circa means 'about' and dia means 'day'. The circadian rhythm therefore translates as 'the about-a-day rhythm'. Roughly every 24 hours the body cycles between a period of wakefulness and a period of sleep. This is called the circadian rhythm. Most people have a circadian rhythm slightly longer than 24 hours, but sunlight, food and temperature help keep this clock on track. This is why getting outside into natural light every single day is very important for good sleep, even if it is cloudy.

Light and melatonin

When light is recognised by our eyes, it stops our brain from producing a substance called melatonin. When there is no light, melatonin levels increase. Melatonin gently calms down activity, preparing the brain for sleep. If your bedroom is too light, this can prevent you from sleeping as your brain does not produce enough melatonin to help you sleep. Blackout curtains or blinds are important. This is also why tired people fall asleep in the cinema – in a low light environment, our brains release melatonin and prepare us for sleep.

The ultradian rhythm

Within the circadian rhythm there is an ultradian rhythm. If sleep was the sea, the circadian rhythm would be the tide coming in and out, and the ultradian rhythm would be the waves crashing on the beach. The ultradian rhythm cycles once roughly every 90 minutes. In this 90

minute cycle, we switch between different stages of sleep. All are important for different reasons, and just like having a balanced diet, the brain has a hunger for each of them at different points throughout the night.

Brainwave activity

When we are awake, brainwave activity is busy. The waves have a high frequency, but low range. Imagine a football match before it kicks off. The people in the crowd are the nerves in the brain. Before kick-off, the people in the crowd are all busy chatting to the other people around them, transferring high quality information, but not very far. When we are awake, the brain does the same thing, communicating very well between areas of the brain close together. This allows us to do all the things we need to do to during the day: talk, listen, write, eat, drive a car and put things into our short term memory.

When the football match kicks off, this local chatter stops, and chants start to emerge. Chants are lower quality communication than local chat, but travel over a much longer distance, sometimes all the way around the stadium. When we sleep, the same thing happens in our brains – local chat stops, but longer transmission begins. This is important for transferring information between our short and long term memory.

Stages of sleep

When it comes to sleep, there are five main stages: awake, REM sleep (Rapid Eye Movement), and Non-REM sleep. Rapid Eye Movement sleep is just what the name suggests. You are asleep but your eyes move rapidly behind closed eyelids. If you observe someone in this stage of sleep you can actually see their eyes moving behind their eyelids. Non-REM is sleep in which there isn't rapid eye movement, and this is split into 3 stages (N1, N2 and N3).

As we move from being awake to N1, N2 and N3, our local brainwave activity works across the brain, at a lower frequency and is more synchronised.

Non-REM stage 1 (N1)
Imagine now that you are sat on the sofa, watching the latest TV soap. You're tired but feel relaxed, and your eyelids begin to get heavier. You can't quite point to exactly when, but at some point your eyes closed, and a little later although you can still hear what is being said on the TV, it isn't really making a whole lot of sense and your thoughts have gradually become much more abstract. You are now in N1 sleep. If you were woken up at this point, you would probably argue that you weren't sleeping, you were just resting your eyes.

Non-REM stage 2 (N2)
If you weren't woken up during N1, you would begin to drift into N2 sleep as your brainwaves slowed further. In this stage, the brain starts moving information from the short term memory to the long-term memory. If you stay in this stage for long enough, you will move into N3 sleep. At this point your brain does something slightly different.

Non-REM stage 3 (N3)
Every day, for every hour you are awake, a chemical called adenosine builds up in your brain. It is a normal chemical, and the by-product of being awake. Just as a household fills the bins during a day of cooking, cleaning and general activities, the brain builds up adenosine. When the brain sleeps in this N3 stage, it empties these 'bins' and gets rid of the adenosine. Adenosine gives you

the urge to sleep. This is why you get more and more tired for every hour you are awake.

Effect of caffeine

Caffeine blocks the effect of adenosine in the brain. Caffeine is no substitute for sleep because when the caffeine wears off the adenosine still remains, making you crash and feel more tired than before.

REM Sleep
As we approach 90 minutes of sleep, the brain moves back from N3 to N2 and then N1 sleep. Around the 90 minute mark, a very interesting thing happens in the brain. Whilst the body remains asleep, the brain flips into a wake-like state. Brainwave activity has sped up again to a similar level to when we are awake. Our eyes begin to move back and forth behind our eyelids. We have entered Rapid Eye Movement (REM) sleep. In this stage, dreaming is most common.

Waking in the night
When the brain switches between REM and Non-REM sleep (every 90 minutes), the sleeper is most likely to wake. Lots of us will wake every night in sleep, but fall back asleep without realising this. Where this becomes a problem is when the sleeper wakes at a natural wake point in their night's sleep, but recognises this and then starts thinking about being awake. It is best to think positive thoughts about completing a sleep cycle instead of becoming annoyed that you have woken and it will help you get back to sleep.

Protecting your sleep

Sleep requires effort on the part of the brain. There are lots of things we can do to give our brains the best chance of enjoying the best night's sleep possible. These involve:

- **avoid caffeine** one can of pop contains the same amount of caffeine as an espresso shot Drinking 5 or more cups of coffee a day means over a 24 hour period your blood always has a constant level of caffeine in, meaning it is very difficult for your brain to get to sleep. Decaffeinated drinks have about 20% of the caffeine that their caffeinated equivalents do
- **quit smoking** nicotine is a stimulant and constant smoking will stop your brain from getting to sleep
- **avoid alcohol** alcohol reduces the amount of REM sleep you get and causes frequent awakenings in the night
- **introduce a wind-down period before bed** avoid screens, turn down bright lights, build a comfy area you associate with sleep, consider **meditation,** a warm bath, breathing exercises or progressive muscle relaxation
- **keep the bedroom temperature comfortably cool**, between 60 and 75°F and the room well ventilated
- **exercise** at least three hours before you go to bed
- **set a regular wake up time** waking up at the same time each day helps to 'anchor' your circadian rhythm and helps keep a regular sleep cycle
- **only get into bed** when you are sleepy and get up after 15 mins if you are awake; being in bed when not tired or able to fall asleep makes your brain associate the bed with being awake, making it harder still to get some rest
- **try to make sure you are only in bed when you are ready to fall asleep; s**imilarly, you should only use the bedroom for sleep, sex and getting dressed

- **healthy eating and drinking**

Types of sleep problems

Insomnia

At least 1 in 3 people will experience symptoms of **insomnia** in their lifetime. Insomnia occurs when people have difficulty getting to sleep or staying asleep to the point that their daytime functioning is negatively affected.

What should you do if you can't sleep?

- get out of bed and do a low-energy relaxing activity (reading, tidying or folding clothes) or eat a small carbohydrate snack or drink a warm, caffeine free drink, such as milk
- be positive about being awake and use the time
- if you find worries keep you from sleeping, write these down so you can put them out of your mind and come back to them in the morning
- reduce drug usage, alcohol and nicotine
- undertake relaxation techniques, such has mindfulness and meditation if you are stressed or **anxious**
- ask your pharmacist if medication could be affecting your sleep
- wind down before sleep

Other types of sleep problems:

- **circadian rhythm disorders** having a circadian rhythm consistently out of sync with the light/dark cycle
- **Narcolepsy** excessive sleepiness during the day, experiencing 'sleep attacks'
- **parasomnias** means sleep walking and related disorders
- **REM Sleep Behaviour Disorder** means you act out dreams and should see a sleep specialist.
- **sleep paralysis** means you may feel awake but unable to move, as if a weight is pressing down on their chest. You should see a sleep specialist

Psychological strategies are also available to help with insomnia. These are just as effective in the short term as sleeping tablets, and more effective in the long term. **Sleepstation** may be useful as it is based on Cognitive Behavioural Therapy for Insominia (CBTi). Sleeping tablets can be used to help people sleep, but they should not be a regular prescription. Like a sticking plaster, they only cover the symptoms and don't treat the underlying cause. They also become less and less effective over time and have lots of side effects associated with them.

Other helpful advice

More information is available through the following links:

- **BBC human body & mind**
- **CNTW self help guides**
- **InformationNOW mental health information**
- **counselling and cognitive behaviour therapy (CBT):** a type of talking therapy that allows a person to talk about their problems and feelings in a confidential environment and encourages you to take positive steps
- **Smartersleep CNTW resource for staff and public**
- **Newcastle United Foundation** offer free sleep and stress workshops
- **Woman's Hour Sleeping problems**

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Useful Organisations

Sleepstation

Email: info@sleepstation.org.uk

Website: https://www.sleepstation.org.uk/

Telephone: 0333 800 9404

The Sleep Council

Email: info@sleepcouncil.org.uk

Website: https://sleepcouncil.org.uk/

Address: High Corn Mill, BD23 1NL

Patient Information Centre – Cumbria, Northumberland, Tyne and Wear NHS Foundation Trust (CNTW)

Website: www.cntw.nhs.uk

Telephone: 0191 246 7288

Address: St Nicholas Hospital, NE3 3XT

Newcastle United Foundation

Email: nucastle@nufc.co.uk

Website: http://www.nufoundation.org.uk/

Telephone: 0844 372 1892

Address: NUCASTLE, NE4 6BQ

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