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What Is A Good Night's Sleep?

"How did you sleep last night?" This is a common question asked by family members, friends or work colleagues. What would you call a 'good' sleep? Most likely you would say you slept well if you fell asleep quickly and didn't wake at all during the night. A very common misconception is that good sleep is one long deep valley of unconsciousness until the morning when you awake. Our own research found that almost everybody, when asked to draw a picture of the typical sleep of a good healthy young adult, drew a long deep curve with hours of uninterrupted deep sleep across the middle part of the night. As you will see shortly this concept of normal sleep is totally incorrect.

So it is not surprising that most people would say that their sleep was 'bad' if they had any awakenings during the night. Even our language reflects our strongly held concept of a good sleep when we refer to sleep with an awakening during the night as 'broken' as if sleep were damaged by the awakening.

Yet up until only the last couple of centuries, before recent industrialisation and artificial lighting, it was common to have a long wakeful period in the middle of the night between the 'first sleep' and 'second sleep'. This 1-3 hour wakeful period was often used for quiet meditation, recreation, or more productive activities. It wasn't considered an indication of poor sleep or an impediment to the following day's feelings or activities.

But what is a 'good' sleep? How often do we hear the phrase "You should get eight hours of solid sleep"? We might have heard it from our parents or doctor. We certainly hear it in the media. Therefore, it is easy to see how this relatively modern concept of 'good' sleep has arisen and repeatedly strengthened.

However, the technology to measure actual sleep has shown that sleep is not "solid" but more like a roller-coaster ride of several 'ups' and 'downs' across the night.

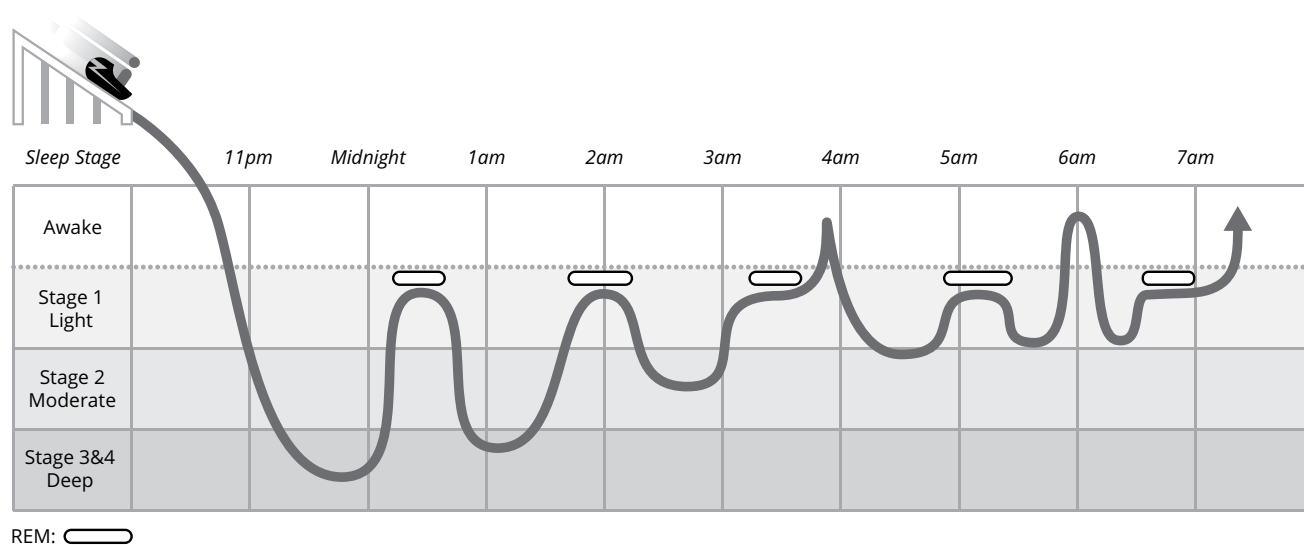
The 'Roller-coaster Ride' of Sleep

Sleep is like a roller-coaster ride not in the sense that it is an exciting event. It is like a roller coaster in that it consists of a series of valleys of deeper sleep alternating with peaks of light sleep and awakenings. The peaks are spaced about 90 minutes apart defining 90 minute sleep cycles.

Let's take a trip on this sleep 'roller coaster' ride that is mapped out in the diagram.

- ▶ When you first fall asleep at night you enter light sleep for a few minutes. This is named Stage 1 sleep and is considered light sleep because it is easy to wake the person. If you awake from Stage 1 sleep you will probably still feel alert and may doubt that you had been asleep. But you were. Have you ever denied your spouse's claim that you fell asleep while watching TV? Can you remember the content of the program? Were you aware that you were snoring? Even though you can quickly awake from Stage 1 sleep, you actually had lost contact with the external world - you were asleep. If sleep continues, you will then descend into intermediate Stage 2 sleep for about 20 to 30 minutes.
- ▶ Then about 40 minutes after falling asleep you descend further to the deep stages 3 and 4 of sleep - the deepest valley of the first sleep cycle. This is when your sleep is working most effectively to rejuvenate you for the next day. It is most rapidly, paying off your sleep debt accumulated during your 16-18 hours of being awake across the day. It is more difficult to awaken you from deep sleep than at other times during the night. But if awoken, you will feel confused and groggy and definitely know that you had been asleep. However, because deep sleep is protected from being disturbed, we rarely awaken from deep sleep to experience it directly. This is often true of people we treat for insomnia who claim they never have deep sleep. Yet they do have these deep sleep stages, they just don't awaken from it and have no direct experience of it.
- ▶ After a time in this deepest sleep, your brainwaves then start to show lighter sleep. You are on the "up-slope" to the first hill of the roller-coaster ride. Then a few minutes later, about 90 minutes after falling asleep, the brain waves change to an active pattern similar to someone who is awake with eyes darting about - this is Rapid Eye Movement (or REM) sleep. REM sleep is typically when dreaming events occur and for that reason is sometimes referred to as Dreaming sleep.
- ▶ You are now at the top of the first hill in the roller-coaster ride. This is the end of the first 90-minute sleep cycle. If you awaken now, you will feel alert - the body and brain are geared for action and emotion. It may take a while to get back to sleep because of these processes which are part of normal REM sleep.
- ▶ The first episode of REM sleep is usually brief, lasting only 5 to 10 minutes. It is then followed by another sleep cycle with the gradual descent into deeper sleep and then ascent into the second REM period after another 90 minutes - now about three hours after you first fell asleep. However, this second dip of the 'roller coaster' ride is usually not as deep as the first.
- ▶ Towards the end of the night the difference between dips and peaks decreases just as the thrill of a roller coaster ride tends to diminish with decreasing dips and peaks towards the end of the ride. Also, each dip of the roller coaster ride has progressively less deep sleep and each peak has progressively more REM sleep. After about five of these 90-minute sleep cycles, you

complete your usual night of sleep (end of the 'roller-coaster ride'). This usually adds up to a total of about seven to eight hours of sleep for an average young adult.



The typical sleep pattern of a normal, healthy adult.

Some interesting facts about REM sleep

- ▶ REM stands for Rapid Eye Movement. That is because during this stage of sleep, with your eyelids still closed both of your eyes flick from side to side or up and down, as they would if you were watching a movie – your dream.
- ▶ Some people say they never dream. This is probably not so – approximately 25% of our sleep is REM sleep. However, we don't become aware of our dreams or remember them unless we actually wake up out of REM sleep. It is more likely that people who can't recall dreams simply do not wake up from REM sleep. Also, unless we think about our dream immediately upon awakening, we usually forget the content by the morning.
- ▶ As our REM sleep episodes become longer and contain more rapid eye movements toward the end of the night, our dreams become more vivid and bizarre. Some people can get concerned about the weirdness of their dreams and worry about whether the dream has some unconscious meaning. What we do know is that these fantastic dreams are a normal part of REM sleep and that fantastic and bizarre dreams most commonly occur in psychologically healthy people.
- ▶ There are also other biological changes in REM sleep: there are increases in our heart rate, breathing rate, blood pressure, and blood flow to the brain. That is why you may sometimes wake up feeling alert. You may wake at 3 a.m. but feel so alert that you actually think it is time to get up. That is a result of waking out of REM sleep and not a sign that you have had enough sleep for the night.

- ▶ The biological effects of REM sleep mimic what is called the “Fight-or-flight” response. This is the body’s response to prepare it for action when we perceive some threat to our welfare. This may be a real danger as would be a car that swerves into a collision course with your own car. Or it could be a worry that you may not be able to complete a commitment you made to someone important and thereby damage your reputation or sense of self, or a worry that you have been awake for a long time and will suffer tomorrow for loss of sleep. It is paradoxical that we are still asleep and out of contact with the world despite this activated body physiology.
- ▶ If you wake up from REM sleep not only will you feel alert but you might feel agitated and perhaps worried. This is due to the body’s Fight-or-flight response which is a normal component of REM sleep. However, during this time you may be especially vulnerable to focusing on events in your life that could cause some worry. In other words the brain is searching for reasons that you feel worried even though the ‘worry’ is only part of the REM physiology and not really a response to your practical concerns. Have you had this experience but then looked back on it the next day to wonder why you were so worried in the middle of the night? This happens to most of us on occasion. It happens more frequently in those with insomnia. It can be helpful to comfort yourself that the feeling of worry was likely to be a by-product of normal REM sleep rather than an issue that justifies such a strong feeling of worry.
- ▶ Interestingly, during REM sleep your large body muscles are paralysed. The loss of muscle activity is a good thing because REM is the stage of sleep during which our most active dreams occur. This REM sleep paralysis effectively stops you from acting out your dream experiences. A common experience in dreams is feeling somewhat paralysed when trying to run from a threat or jump out of harm’s way. This is the REM sleep paralysis in action.
- ▶ So, isn’t sleep walking and talking related to dreaming? No, strangely enough, they actually occur in deeper non-REM sleep.
- ▶ In REM sleep our body’s temperature regulating mechanism temporarily stops working. If your bed is a bit too warm for you, the loss of temperature control means that your body temperature starts rising. Following a longer REM sleep period towards the end of the night our temperature regulating mechanism (sweating) starts working again to cool us down and we can wake up hot and sweaty. If this happens frequently, try reducing your total amount of bed cover.
- ▶ Studies in normal, healthy males and females show that sexual arousal occurs in REM sleep. Men may wake from REM sleep with an erection and for both men and women, REM sleep can be associated with sexual dreams.

The old saying “your best sleep is before midnight” is probably referring to the fact that our deepest sleep occurs during those first three hours or the first two 90-minute sleep cycles. But, there is nothing magical before midnight - no matter what time you go to bed, you will have deep sleep in the first few sleep cycles.

Have you ever experienced a jolt or big body twitch as you are falling asleep – as if you have been startled if you trip over something? This is called a hypnic jerk (or sleep start) and can occur sometimes during light stage 1 sleep, but is considered harmless. Its causes are unknown but insufficient sleep, caffeine and nicotine might increase them.

Awakenings during normal sleep?

- ▶ It is very important to be aware that awakenings are a normal part of the sleep cycle. Although good sleepers may feel that they have had a ‘solid’ sleep through the night, normal sleep usually contains several brief awakenings. Sometimes you are aware of these awakenings and other times you may just roll over or change your sleep position and not remember the awakenings in the morning.
- ▶ Awakenings usually occur out of lighter sleep (Stage 1, 2, and sometimes REM) – about every 90 minutes across the night. If the awakenings are brief (less than 2 to 3 minutes) and do not involve getting out of bed, they are usually forgotten. Awakenings are more frequent and generally longer towards the end of the night when sleep is lighter.
- ▶ Wouldn't it be better to stay asleep even though awakenings usually occur out of light sleep? It has been shown that light Stage 1 sleep produces little or no benefit in “paying off sleep debt” and how you feel the next day. Since most brief periods of wakefulness across the night mainly interrupt Stage 1 sleep, they are no loss to the sleep period. There is no difference between Stage 1 sleep and brief wakening in terms of how you feel the next day.
- ▶ If you're spending a longer time in bed than normal, you will be aware of more awakenings and more time awake. This will not necessarily affect you during daytime hours unless you spend that time worrying or feeling anxious, especially about being awake.

Why is sleep like a roller coaster ride? This sleep pattern is experienced by all humans, mammals, birds, and most other species. We can only speculate about this question but some have suggested the awakenings serve to “check out” the environment for any possible dangers. But aren't we vulnerable during the deep sleep periods of the night and in danger then? Yes, but throughout most of human existence our ancestors typically slept at night in family groups. Individual bedrooms are a modern creation. In sleeping family groups, particularly those with older adults as you will see later, it would almost be automatically guaranteed that someone would be awake or in light sleep. This would automatically provide an inbuilt sentry system to protect the family from possible dangers during the night. If this is the reason that awakenings were built into the sleep period, then we should think more kindly towards those awakenings. If our ancestors did not have them for protection, they may not have survived and we, personally, may not have existed. Think about it.

Mental activity (“thinking”) during sleep

Have you ever had a night full of thinking? In the morning you recall that your mind seemed to be active a lot, although you cannot remember very much. Most people would say that was not a good night of sleep. Some would even say they didn't sleep at all. How does this occur and does it mean you had a bad sleep?

It appears from research studies that mental activity is occurring most of the time you are asleep. When people are awoken from sleep they usually recall mental activity that had been taking place just before being awoken. It is usually only a few seconds worth of ‘thinking’. Therefore, it appears that mental activity is present almost all the time, it lasts for only a few seconds and then fades out of memory. So if you do not awake, there is no experience of this mental activity and no memory of it having occurred.

The nature of the mental activity depends on the stage of sleep and how long you have been asleep. Only in the deepest sleep stages early in the sleep period do awakenings fail to get reports of much mental activity. However, awakening out of intermediate stage 2 or lighter stage 1 sleep will almost always reveal mental activity. It may be a simple visual scene, a snippet of other sensory effect, or experience of a simple incident in your life. Awakening out of REM sleep will usually recall a more vivid, bizarre, story-like experience we call a dream.

Since awakenings across the night usually occur out of the lighter stages of sleep containing this mental activity, several brief awakenings across the night can give the impression of a night full of mental activity. This impression is heightened by the fact that sleep is a period of no memory

of this mental activity. Thus you would be comparing many snippets of memories in contrast with the nothingness of sleep making it likely that the impression of wakefulness was much more prominent than your sleep. Sleep leaves no impression.

How is this relevant to the development of insomnia?

If you have a few brief awakenings across the night maybe accounting for only 15 minutes of total wake time, this is a common example of normal, satisfactory sleep. However, your estimate of the amount of wake time is likely to be much longer than 15 minutes given the contrast of the memory of this mental activity with nothing from the actual sleep time. Thus your estimate of time awake is likely to be much more than 15 minutes, perhaps 30 minutes to an hour. You have underestimated how much sleep you got. This might lead to concern or worry about your estimated 6 hours of sleep in the context of being told you should get 7-8 hours of sleep per night. If these experiences occur frequently, the worry can intensify, the awakenings become longer, and insomnia may develop.

The underestimation of sleep length is magnified by another process related to awakenings during the night. Our research has shown that awakenings from sleep are often mistaken as continuous wakefulness, not an awakening from sleep. This might be due to mistaking that sleep mental activity for being awake. In good sleepers this happens about 30% of the time, but very often (70%) in people suffering chronic insomnia. Then if a person has a couple of brief awakenings (say an hour apart), if the second awakening is not seen as an awakening out of sleep but instead as a continuation of the first awake period, they would miss that intervening sleep and underestimate their sleep by an hour.

People with chronic insomnia typically underestimate their sleep by 1-2 hours and guess their total sleep to be 4-5 hours whereas it may actually have been 6-7 hours, closer to the normal amount. The reason for this honest mis-judgement is likely to come from perceiving an awakening from sleep as simply continuous wakefulness from the previous wake period.

Now with this new information about the nature of sleep mental activity, you may be able to re-assess what is happening to you across the night.

🔗 Questions?

We invite you to contact us with any questions relating to the content of this book:

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