SLEEPING SOUNDLY

Delving into the issue of what is sleep, Dr Lim Ing Ruen discusses sleep cycles, the different types of sleep disorders, diagnosis and treatment.

Sleep is a natural state of bodily rest characterised by unconsciousness. During sleep, we appear to be dormant and passive. In reality, the brain remains internally responsive though externally unresponsive. The sleeping brain goes through predictable cycling culminating in a reversal of external unresponsiveness. This makes sleep different from coma or hibernation.

SLEEP CYCLES

Sleep proceeds in cycles of REM (Rapid Eye Movement) and Non-REM (Non-Rapid Eye Movement). The American Academy of Sleep Medicine divides Non-REM sleep into 3 stages: N1, N2 and N3. A typical sleep cycle goes from N1 → N2 → N3 → N2 → REM. Each sleep cycle lasts about 90 to 110 minutes. We spend more time in N3 deep sleep in the early part of the night, and, more time in REM sleep in pre-morning hours.

REM sleep is when a person dreams. EEG shows cortical activation and desynchronisation of EEG waves. The eyes jerk, the limbs becomes paralysed briefly, the heart races, breathing becomes faster and shallower. If we are awakened during REM, we recall vivid dreams. Paralysis during REM prevent us from acting out our dreams. An infant spends 50% of sleeping time in REM dreamland, an adult 25%. The other 50% of adult sleep is spent in deep N2 sleep.

WHY DO WE NEED TO SLEEP?

Sleep gives overworked neurons time to repair and regenerate. Sleep deprivation leads to drowsiness and decreased daytime performance. Sleep is associated with secretion of growth hormones and anabolic factors needed for cell growth and beauty. Sleep allows unused neurons to be activated hence preventing degeneration from inactivity. During deep sleep, the brain re-enacts daytime neuronal patterns allowing us to encode memory and improve learning. REM stimulates the brain segments used in learning, hence, infants spend more sleep time in REM.
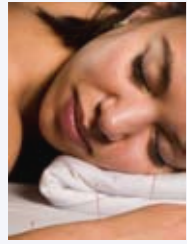
DIFFERENT TYPES OF SLEEP DISORDERS

International Classification of Diseases documents as many as 81 sleep disorders. These can be primary or secondary disorders.

Secondary sleep disorders have an identifiable trigger. These triggers include medical conditions of the heart, thyroid, respiratory or gastrointestinal system. Treatment of the underlying condition is the first step to resolution of secondary sleep disorders.

Primary sleep disorders arise from an endogenous disturbance in the sleep-wake cycle. They are again subdivided into parasomnias and dyssomnias.

Parasomnias are noted for deviant sleep-related behavior. Common parasomnias include sleep terrors, sleep walking, nightmares, REM sleep behavior disorder, and, restless leg syndrome.

Dyssomnias are characterized by abnormal sleep quality, including initiation, maintenance, duration, timing, and amount of sleep. Common dyssomnias include primary insomnia, hypersomnia, narcolepsy, sleep apnea, and, circadian rhythm sleep disorder.

2 MOST COMMON SLEEP DISORDERS

Insomnia means difficulty falling asleep, staying asleep, early awakening or fragmented sleep. 8 out of 10 insomniacs have secondary insomnia. Psychological triggers include anxiety, depression, stress and medications. Underlying medical conditions include gastric reflux, pain, thyroid or breathing disorders. Primary insomnia is not triggered by a major condition but may be associated with disruptions to sleep routine such as shift work or travel.

Sleep apnea or sleep-disordered breathing. Obstructive sleep apnea is the most common type. It is due to fat buildup or loss of muscle tone with age. OSA patients struggle in vain to breath during sleep. Each apnea is associated with microarousals, chest movements but simply no airflow into the nose. Apnea is defined as absence of breathing lasting more than 10 seconds. Apnea occurring more than 5 times an hour is abnormal. Imagine the effect of chronic sleep deprivation and lack of oxygen on the brain and the heart.

HOW DO WE DIAGNOSE SLEEP DISORDERS

- Detailed medical evaluation for underlying secondary triggers.
- Imaging studies such as CT or has limited value.
- Sleep diary. Meticulous record of the sleep history over 2 weeks will differentiate between dyssomnias and parasomnias, and, primary and secondary disorders. It will identify triggers.
- Sleep scoring systems eg Epworth scores estimate the likelihood of falling asleep.
- Sleep studies. Polysomnography is the gold standard. It is an overnight study done under medical supervision, measuring EEG (brain waves), EMG (chest and chin muscle activity during breathing, limb jerks during restless leg syndrome), EOG (eye movement in REM sleep), ECG (heart), oximetry (oxygen levels in blood), nasal airflow and snoring. Partial sleep studies can be done at home without medical supervision and are more convenient. Partial studies include the Embletta and the WatchPat.

COMMON TREATMENTS

- Bright Light Therapy is used to reset the internal clock which malfunctions in jet lag and advanced sleep phase.
- Cognitive Behavioural Therapy (CBT) teaches proper sleep hygiene measures that promote healthy patterns in sleep.
- Continuous Positive Airway Pressure (CPAP) provides a steady stream of air via a mask to stent the airway open in patients with obstructive sleep apnea.
- Medications.
- Melatonin is a nutritional supplement useful in disorders of circadian rhythm, such as, jet lag, shift work and delayed sleep phase.
- Oral Appliances are devices similar to sports mouth guards that keep the airway open in obstructive sleep apnea and snoring, and prevents bruxism or teeth grinding.
- Various forms of sleep surgery are available for opening the airway in obstructive sleep apnea.

SLEEP HYGIENE

- Maintain a regular sleep routine. Stick to regular sleeping and waking hours to have a synchronized body clock.
- Do not nap. Napping decreases "sleep debt". Too much napping causes sleep fragmentation and insomnia.
- Don't stay in bed if you can't sleep after 20 minutes. If you can't force yourself to sleep. Get up, move out of bedroom and do something boring. Then you will only associate your bed with sleeping.
- Do use your bed only for sleeping and bedtime activities. No TV or reading or knitting or phoning in bed.
- Do not smoke. Do not drink coffee, tea or coke. Nicotine and caffeine are stimulants.
- Do not use alcohol to fall asleep. Alcohol causes fragmented sleep, sleep apnea, snoring and frequent trips to the toilet.
- Do not use medications inappropriately. Sleeping pills are a temporary fix, they will cause rebound insomnia when you stop them.
- Do have a comfortable bed, restful bedroom and soothing pre-bedtime routine such as warm bath and quiet time to ease you into sleep. No bright light or distractions such as TV, computer or pets.
- Do not have stimulating activities just before bedtime. Avoid competitive sports or exciting activities.
- Do exercise. Exercising in the morning or before dinner increases endorphins and regulates sleep.

Dr Lim Ing Ruen is an ENT surgeon at the Singapore Medical Specialists Centre. She graduated with basic medical qualifications from Singapore. She obtained her specialist degree in Otolaryngology from the Royal College of Physicians and Surgeons of Glasgow, before subspecialising in Rhinology and Sinus Surgery at the University of Pennsylvania.

She was also lecturer in the Department of Otolaryngology, Head & Neck Surgery at the Hospital of University of Pennsylvania, USA. Dr Lim trained in the latest management techniques for head and neck problems including sinus problems, snoring, sleep related problems, voice problems, hearing difficulties, ear problems and thyroid diseases.

Dr Lim is a member of the American Rhinologic Society and a fellow of the American Academy of Otolaryngology – Head and Neck Surgery.

EPWORTH SCORE (ARE YOU SLEEPY ?)

Situation	Chance of dozing			
Sitting and reading	0	1	2	3
Watching TV	0	1	2	3
Sitting, inactive in a public place (e.g., a theater or meeting)	0	1	2	3
As a passenger in a car for an hour without a break	0	1	2	3
Lying down to rest in the afternoon when circumstances permit	0	1	2	3
Sitting and talking to someone	0	1	2	3
Sitting quietly after lunch, without alcohol	0	1	2	3
In a car, while stopped for a few minutes in traffic	0	1	2	3

Score > 10 means that you are sleepy.
Score > 18 means that you are very sleepy and will benefit from seeing a doctor (ENT or Sleep physician)

0 = would never doze
1 = slight chance of dozing
2 = moderate chance of dozing
3 = high chance of dozing