

# Sleep for Chiropractors 2012

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The author is Dr Robert J Troell, MD, FACS, a quadruple board certified physician, Stanford trained in both Otolaryngology/Head and Neck Surgery and Sleep Medicine. He was a clinical professor for seven years at the first sleep clinic in the United States, the Stanford Sleep Disorders Center. Additionally, he was the first surgeon board certified in Sleep Medicine in the US. His first medical and surgical practice was with colleagues Robert Riley, Nelson Powell and Kasey Li, considered the premier group in the world at the time for upper airway reconstructive surgery. Dr Troell currently practices in Las Vegas NV and Laguna Beach CA.

## Why does a Chiropractor need to know about sleep?

All animals require sleep. Sleep restores the body and the mind. Since the purpose of the art of chiropractic medicine is to heal the mind and the body, understanding sleep should be paramount to attaining this goal.

## Why do human beings sleep?

All metabolic processes require restoration of their function, which is achieved through sleep. As MacNish in 1834 stated: Sleep is the intermediate state between wakefulness and death; wakefulness being regarded as the active state of all the animal and intellectual functions, and death as that of their total suspension. Rodents die within about 21 days if completely sleep deprived and it is theorized that humans would die after about 180 days of sleep deprivation.

## What are the stages of sleep?

### Background

As Dr. William Dement, the first physician board certified in sleep and founder of the Stanford University Sleep Disorders Center, stated: the interest in sleep and dreams has existed since the dawn of history and perhaps only "love" and "human conflict"

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have received more attention from poets and writers. There are three distinct physiological states of the human body: awake, non-rapid eye movement (NREM) sleep and rapid eye movement (REM) sleep. The brain waves and the status of the neuromuscular system are different in each of these states. Alterations in the "normal" state of sleep has produced over 160 diagnosis of sleep pathology.

## Sleep Study

A polysomnogram or sleep study is the simultaneous recordings of multiple physiological variables related to sleep, which include: electroencephalogram (EEG), recording of eye movements or electro-oculogram (EOG), recording of muscle activity or electromyogram (EMG), cardiac rhythm or electrocardiogram (ECG), nasal and oral air flow, breathing effort measured by strain gauges known as plethysmography and oxygen saturation measured by pulse oximetry.

## Stages of Sleep Overview

The EEG and EOG assist in determining the stage of sleep of the patient. Non-REM sleep has four levels with different adult normal percentages of each: stage I (2-7%), stage II (45-55%), stage III and stage IV sleep. Stage III and IV are referred to "as slow wave" sleep, also known as delta sleep or deep sleep (10-12%), since the brain waves of each are similar. REM (20-25%) sleep is an active brain in a paralyzed body. The normal optimal sleep efficiency (amount time sleeping/ total time in bed) is 85%.

## Non-REM Sleep

The awake state has a predominance of alpha activity as well as low voltage, mixed frequency pattern. Stage I sleep is the transition from the awake state to stage II sleep, shown by diminished or disappearance of alpha activity and a relatively low voltage, mixed frequency EEG pattern, often in the presence of slow-rolling eye movements. Stage II sleep has K-complexes and sleep spindles with a mixed frequency background. Slow wave sleep reveals high amplitude (>75 microvolts) delta waves with a frequency of 0.5 to 2 Hertz,

that is between one-half to two seconds in duration. Delta sleep occurs more commonly in the first one third of the night and decreases with age.

## REM Sleep

REM sleep is scored having three criteria: 1) EEG returns to relatively low voltage, mixed frequency pattern with no K-complexes or sleep spindles. Some patients also reveal a "sawtooth" EEG pattern. 2) chin EMG decreases in amplitude to its lowest levels, and 3) EOG reveals rapid eye movements. REM is more prominent in the last third of the night.

Although one can dream in all stages of sleep, dreams in REM sleep are much more vivid and may have "phasic" body movements associated with them. This is commonly observed when one's dog is dreaming and chasing a feline friend with the extremities moving, the eyes fluttering and the dog barking or panting. REM sleep occurs 90-120 minutes after sleep onset and approximately every 90 minutes thereafter.

## Sleep Disorders

One needs to understand normal sleep before under taking diagnosing and treating sleep disorders. There are four sections in the classification of sleep disorders:

- Dysomnias- comprises disorders that cause a complaint of either insomnia or excessive sleepiness
- Parasomnias- comprises disorders that intrude into or occur during sleep
- Medical & Psychiatric disorders associated with sleep disturbance
- Proposed sleep disorders of new and rapid advances in sleep disorders, such as short and long sleepers and fragmentary myoclonus

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## Dyssomnias

These are either a) intrinsic sleep disorders, such as insomnia, narcolepsy, sleep apnea, periodic limb disorder or restless legs syndrome, b) extrinsic sleep disorders, such as inadequate sleep hygiene, insufficient sleep disorder, or drug or alcohol dependent sleep disorder, and c) circadian rhythm disorders, such as jet lag, shift work sleep disorder, delayed or advanced sleep phase syndrome.

## Parasomnias

These are further divided into a) arousal disorders, such as sleepwalking and sleep terrors, b) sleep-wake transition disorders, such as sleep starts or sleep talking, c) parasomnias usually associated with REM sleep, such as nightmares, sleep paralysis and, d) other parasomnias, such as sleep bruxism, primary snoring, and sudden infant death syndrome.

## Most Common Sleep Disorders

### Insomnia

Insomnia is the most common sleep disorder with almost everyone having at least one episode in any given year. It is either initiating insomnia (while attempting to go to sleep with a duration greater than 20 minutes) or maintenance insomnia (awaking after sleep onset and having difficulty returning to sleep).

### Obstructive Sleep Apnea

Obstructive sleep apnea occurs in 24% of adult men and 9% in adult woman. The pathology is the upper airway collapsing during sleep. This syndrome usually causes excessive daytime sleepiness and there are numerous associated symptoms and risks, including socially disruptive snoring, depression, decreased cognitive functioning, personality changes, gastroesophageal reflux, hypertension, diabetes, with an increased risk of stroke and heart attacks. Almost 70% of these sleep apnea patients are over their ideal body weight, however, 30% are at or below their ideal

body weight, however, are usually associated with a deficient facial bony structure or larger soft palate.

### Insufficient Sleep Disorder

When one receives less sleep than genetically determined to require, it produces a state of sleep deprivation, which usually causes excessive daytime sleepiness. This can be due to voluntary schedule changes, sleep disruption of any cause including pain.

Sleep concerns related to a Chiropractic Physicians practice? Human beings sleep lying down. The apparatus or bed where the body resides can have a profound impact on the quality of sleep and the musculoskeletal system. When musculoskeletal pain exists or when the bed is uncomfortable, there are many changes that occur: delayed sleep onset (insomnia), more superficial non-REM sleep, reduced delta sleep and less REM sleep, increased arousals with sleep fragmentation and overall lowered sleep efficiency. These sleep changes from normal result in excessive daytime sleepiness, decreased cognitive function and a reduced state of well being, which lowers work efficiency and increases the risks of automobile and work related accidents.

## How a Chiropractic Manipulation can improve Sleep

As has been reviewed, sleep is a complex interaction between intrinsic and extrinsic influences. A number of sleep disorders are treatable and avoidable with proper and frequent chiropractic evaluations and treatments. Musculoskeletal pain, specifically neck and back discomfort, is one of the most common causes of insomnia and insufficient sleep.

Since most people have or have had a sleep disorder, educating your patient's regarding the association of there sleep problem with your area of expertise will improve

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the patient's well being and your practices bottom line. This may be facilitated by a chiropractor working in synergy with a psychiatrist, sleep specialist, pain specialist, and even a masseuse.

## Musculoskeletal Issues of Sleep

Stress and pain are the two most common causes of both initiating and maintenance insomnia. However, pain can also produce numerous other alterations in sleep, as noted above. In conclusion, pain reduces sleep efficiency. In order to diminish pain during sleep one can perform activities before and during sleep.

Before going to bed and daily activities that can improve one's severity of pain are the following:

1. non-steroidal anti-inflammatory medications. If muscle spasm is observed, muscle relaxants, such as diazepam or other muscle relaxants may be of benefit
2. daily exercise, stretching and range of motion exercises, however, this activity should be performed at least five hours before going to sleep to prevent delaying sleep onset
3. chiropractic manipulations and massage
4. soaking in a warm bath, which often improves sleep onset

## Improving the sleep environment:

- A quiet sleep room, this can be attained through double pane glass windows. Some patients prefer background noise, such as the sound of running water or soft music
- A dark sleep room, this can be facilitated by special draperies blocking outside light. Avoid the use of a television in the bedroom.
- A mattress with adequate head and body support is probably the most important physical variable during sleep.

The author completed a randomized, crossover study over a 6 month period evaluating the sleep architecture and sleep efficiency using a memory foam mattress, known as Tempurpedic, an air mattress, known as Select Comfort, the same as Sleep Number brand and a special gel substance, known as IntelliBEd. The results revealed that the study subjects had the best sleep efficiency using the gel mattress. The substance has been shown to provide a better support to the body and alleviates pressure points.

## Summary:

Sleep is a state of being that encompasses one third of our life's time and is essential for restoring both our mind and body. Understanding normal sleep, sleep disorders and the benefits of chiropractic care on sleep, may shape another chapter to your medical practice.

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