Understanding My Sleep Study Results

To help you better understand the results of your sleep study, we are including this page which has the meanings of different words that are used in your report.

During a monitored, attended, in-lab polysomnographic study (sleep study), the following information from a patient’s body is monitored, recorded, classified, and reviewed by a licensed sleep technologists and a board certified sleep specialist:

1. Left, right, front, middle, and back brain wave activity also known as EEG (electroencephalogram) which will pick up different brain waveforms that indicate the different stages of sleep as well as wakefulness. EEG also picks up arousals, seizure activity, changes in brain activity due to medications, and other information.
2. Right and left eye muscle movements or EOG (electroocculogram) which will pick up eye flutter movements, blinks, rapid eye movement sleep, slow rolling eye movements, awakenings, and other variables.
3. Right, left, and lower chin muscle movements or EMG (electromyogram) which will pick up grinding of teeth, snoring, jaw movements from talking, and other movements.
4. Airflow from the nose and mouth with both a pressure transducer and a thermistor which records airflow as a result of temperature changes between air that is inhaled and air that is exhaled from the nose and mouth. This tells the doctor and technologist if a patient is breathing, how fast or slow the patient is breathing, and if the patient is having pauses in their breathing.
5. Chest belts to monitor the effort that a patient’s chest muscles are making to try to breathe. This helps the doctor to classify the type of sleep apnea that a patient may be having.
6. Stomach or abdominal belts that monitor the effort that a patient’s lower abdominal muscles are making to try to breathe. This helps the doctor to classify the type of sleep apnea that a patient may be having.
7. Leg muscle movements or EMG (electromyogram) will pick up leg kicks and jerks.
8. Oxygen levels (SPO2= saturation of peripheral oxygen) in the blood with a pulse oximeter on a patient’s finger, toe, earlobe, or other area used to get accurate recordings.
9. Pulse rate through the pulse oximeter.
10. Heart rate and rhythm or ECG (Electrocardiogram) using right, left, and neutral gel leads on the chest in the area of the heart. Heart rate is the speed at which the heart is
beating. Heart rhythm is the shape of the wave form that is produced from each beat of the heart.

11. Body position sensor which will show if the patient is on their stomach (prone position), right side, left side, or back (supine position).

12. Snore microphone which will pick up the volume of the snoring.

13. Visual monitoring and recording of the patient by the technologist so the technologist can describe activity that the patient may be doing in their sleep to the doctor such as kicking legs, moving arms, body rocking, shaking, sucking a pacifier, body position, and other movements.

14. Audio or sound monitoring and recording of the patient by the technologists so the technologist can describe the volume and frequency of any noises that a patient is making in their sleep such as sleep talking, snoring, snorting, blowing, humming, teeth grinding, screaming, moaning, and other sounds.

**Stages of Sleep** - Sleep follows a pattern of alternating NREM (non-rapid eye movement) and REM (rapid eye movement) sleep each night. This cycle repeats itself about every 90 minutes each night for usually a total of 3-4 cycles/night. There are four stages of sleep, Stage 1, Stage 2, Stage 3 and REM sleep. All stages of sleep are necessary for normal growth, development and general health. In patients with sleep disorders, many of the stages of sleep may be absent or significantly reduced.

**Stage 1 sleep** - usually the first stage of sleep that a patient enters into after wakefulness. It is a very light stage of sleep and it usually only lasts a few minutes.

**Stage 2 sleep** – usually follows stage 1 sleep and the second stage of sleep that a person enters into at the beginning of the first sleep cycle. A person becomes more unaware of their surroundings in this deeper stage of sleep. Breathing and heart rate are usually regular in a patient without a sleeping disorder or other medical conditions, and the body temperature drops a little. People spend the majority of their sleep in this stage.

**Stage 3 sleep** – Usually follows stage 2 sleep. This is the deepest and most restorative sleep stage. Blood pressure drops, breathing becomes slower, muscles are relaxed, blood supply to muscles increases, tissue growth and repair occurs, and energy is restored to the whole body during this stage of sleep. Also, growth hormones are released during this stage. The largest amount of stage 3 sleep usually occurs during the first cycle of sleep and gets shorter in amount with each following cycle.

**Stage REM Sleep** - First occurs about 90 minutes after falling asleep and recurs about every 90 minutes, getting longer later in the night. REM sleep provides energy to the brain and body. In this stage, the brain is active and dreams occur while the body is paralyzed or unable to move because muscles are turned off to keep a person from acting out dreams in their sleep state.
Apnea (Apneic Event) – a period of at least 10 seconds in length where a person does not breathe any air into their nose or mouth while they are sleeping even though their body is trying to breathe in air. This is often associated with loud snoring. A bed partner may describe apnea like this: they hear snoring from their bed partner, then there is a pause in their snoring, then they take a big breath, gasp or snort, and start snoring/breathing again. Apnea events can cause small arousals and even full awakenings during sleep. Apnea events can cause oxygen levels in the blood to drop below normal levels. Apnea events can contribute to irregular heart beats (rhythms), high blood pressure (hypertension), problems with controlling blood sugar levels (diabetes), strokes, heart attacks, severe daytime sleepiness and many other health problems.

Hypopnea (Hypopneic Event) – a period of at least 10 seconds in length where a person is breathing in only a little bit of air into their nose and/or mouth while they are sleeping. The amount of air going into their body is not a normal/regular amount. Hypopnea events can cause small arousals and even full awakenings during sleep. Hypopnea events can contribute to irregular heart beats (rhythms), high blood pressure (hypertension), problems with controlling blood sugar levels (diabetes), strokes, heart attacks, severe daytime sleepiness and many other health problems.

Apnea/Hypopnea Index (AHI) = This means the amount of apnea + hypopnea events that a person is having every hour of sleep. If a person has an AHI = 34.3 events/hour, then the person quits breathing 34.3 times every hour of sleep.

Oxygen Desaturation (SpO2) – A drop in the level of oxygen present in the blood over a few seconds of time as a result of an apnea event or hypopnea event. People who do not have sleep apnea or any other breathing problems usually have oxygen levels that stay between 93-98% in their blood. Oxygen levels are considered abnormal when they fall below 88%. Patients with apneas and hypopneas will often experience oxygen desaturations consistently throughout their sleep period time. These changes in oxygen levels can contribute to frequent morning headaches, swelling in ankles and feet (edema), tiredness, shortness of breath, irregular heart beats (rhythms), high blood pressure, lightheadedness, dizziness, skin and nail beds may turn bluish in color (cyanosis), confusion, memory loss, higher red blood cell count in blood (polycythemia).

Arousals – any tiny awakening lasting at least 3 seconds. An arousal can also be a change from a deep stage of sleep to a lighter stage of sleep. A person having small, 3 second arousals often does not even know that they are awake or that they are having these arousals. A lot of arousals during sleep can cause a person to feel very sleepy during the day which is called excessive daytime sleepiness.
**Periodic Limb Movements or Myoclonus** - Kicking, moving, or twitching one or both legs, arms or feet while sleeping. These can also cause 3 second arousals or full awakenings immediately after they occur.

Thank you for allowing the Sleep Disorders Center at Methodist Healthcare to participate in your care. Please call our facility at 901-683-0044, option#3 if you want to discuss your results with a licensed sleep technologist. Visit our website at [http://www.methodisthealth.org/healthcare-services/sleep-disorders/](http://www.methodisthealth.org/healthcare-services/sleep-disorders/) to learn more about sleep disorders and treatment options. Other websites that may be helpful are the National Sleep Foundation Website at [http://sleepfoundation.org/](http://sleepfoundation.org/).