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Journal of Sleep Disorders & Therapy

Commentary

Stage of Slow Wave Sleep (SWS) and Electroencephalographic Characteristics

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DESCRIPTION

The stage of sleep when our body is most peaceful is known as Slow Wave Sleep (SWS), commonly referred to as deep sleep. The slowest brainwaves experience during Slow Wave Sleep (SWS) are synchronised when our EEG is being recorded. Our breathing and heart rates both considerably slow down during this time, and our muscles also relax. Even in the presence of loud noises, waking up from slow wave sleep can be challenging. When awakened during Slow Wave Sleep (SWS), we frequently feel sleepy and bewildered. Our body quickly moves from light sleep to slow wave sleep after sleep (then later to REM sleep). Typically, our first Slow Wave Sleep (SWS) session lasts 45 to 90 minutes. Slow Wave Sleep (SWS) episodes get shorter as the night wears. The subsequent sleep cycles include shorter episodes of Slow Wave Sleep (SWS) as the night wears on. Most adults normally have three to five complete sleep cycles per night.

Electroencephalographic characteristics

Electroencephalograms primarily consist of large 75-microvolt (0.5–2.0 Hz) delta waves (EEG). According to the most recent 2007 AASM recommendations, stage N3 is indicated by the presence of 20% delta waves in any given 30-second epoch of the EEG during sleep. Throughout the first half of the night, mainly during the first two sleep cycles, longer bouts of SWS occur (roughly three hours). The total SWS in a night will be higher in children and young adults than in older adults. Slow-wave sleep is a real occurrence that most likely results from the raphe system's serotonergic neurons being activated. The Thalamo Cortical (TC) neurons in the thalamus and cerebral cortex communicate to produce the slow-wave visible in the cortical EEG. This is produced by the "slow oscillation" in the TC neurons and is reliant on membrane potential bistability, a characteristic of these neurons brought on by an electrical feature known as the "I t window." The overlap between the activation and inactivation curves when displayed for T-type calcium channels is known as the "I t window" (inward current). Three equilibrium points are shown at 90, 70, and 60 mv, with 90 and 60 being stable and 70 unstable. These two curves can be multiplied, and a second line can be placed on the graph to illustrate a small Ik leak current (outward). Due to an oscillation between two stable locations, this characteristic enables the formation of slow waves. The mGluR on these neurons must be active in *in vitro* for a minor Ik leak to occur, as is the case in *in vivo*.

Functions

Our body repairs itself physiologically during slow wave sleep. At this stage of sleep, roughly 95% of human growth hormone is produced. People frequently believe that strengthening occurs while working out or at the gym; however this is a widespread mistake. Our muscles degenerate after exercise, and then they rebuild themselves during slow wave sleep. To get the most out of our training that day and optimise our potential gains, we must consume enough SWS.

The subsequent procedures also take place during slow wave sleep:

- Muscle blood flow is increased
- One can rejuvenate cells
- Bone and tissue are repaired
- The immune system is boosted
- The metabolism and blood sugar levels are in balance
- Detoxification of the brain

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Received: 28-Dec-2022, Manuscript No. JSDT-23-21867; **Editor assigned:** 30-Dec-2022, PreQC No. JSDT -23-21867 (PQ); **Reviewed:**13-Jan-2023, QC No. JSDT-23-21867;**Revised:** 20-Jan-2023, Manuscript No. JSDT-23-21867 (R); **Published:** 27-Jan-2023, DOI: 10.35248/2167-0277.23.12.400.

Citation: Giorgos KS (2023) Stage of Slow Wave Sleep (SWS) and Electroencephalographic Characteristics. J Sleep Disord Ther. 12:400.