# 26 - C. Brain activity

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© SPMM Course  Reduced recall of dreams if awaken. (Sleep terror is an NREM disorder. When awake after sleep terror episodes, children appear confused and do not recall what terrified them). REM sleep o 25% of adult sleep is REM. Darting eye movements are noted in REM despite other muscles being paralysed. REM sleep is characterized by a high level of brain activity and physiological activity similar to those in wakefulness. o In REM sleep behavioural disorder, muscular paralysis does not occur resulting in violent movements coinciding with brain activity. o EEG shows low-voltage, mixed-frequency (theta and slow alpha) activity similar to an awake state. Sawtooth waves are also seen. o In a typical night, a person cycles through five episodes of non-REM/REM activity. The REM episodes increase in length as the night unfolds. o Features of REM sleep:  Increased sympathetic activity (increased heart rate, systolic blood pressure, respiratory rate, cerebral blood flow)  Autonomic functions are active with penile erection or increased vaginal blood flow  Increased protein synthesis  Maximal loss of muscle tone with occasional myoclonic jerks  Vivid recall of dream if awaken. (Nightmares occur in REM sleep – hence they are well recollected). C. Brain activity Apart from various oscillatory patterns, some specific patterns of electrical activity are also noted during sleep.  Sleep spindles  Waves with upper alpha or lower beta frequency, seen in many stages but especially in stage 2. The waveform resembles a spindle with an initial increase in amplitude that decreases slowly  Duration usually <1second.  They usually are symmetric and are most obvious in the parasagittal regions.  K complex:  K complex waves are large-amplitude delta frequency waves, sometimes with a sharp apex.  They can occur throughout the brain but more prominent in the bifrontal regions.  These may be mediated by thalamocortical circuitry.  Usually symmetric, they occur each time the patient is aroused partially from sleep.  Semiarousal often follows brief noises; with longer sounds, repeated K complexes can occur.  Runs of generalized rhythmic theta waves sometimes follow K-complexes; this pattern is termed an arousal burst.  V waves:  V waves are sharp waves that occur during sleep. They are largest and most evident at the vertex bilaterally and are usually symmetrical.  Multiple V waves tend to occur especially during stage 2 sleep.

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Revision #1
Created 2026-01-04 20:02:56 UTC by Omar Ayman
Updated 2026-01-04 20:02:56 UTC by Omar Ayman