

นพ.รังสรรค์ ชัยเสวิกุล



Normal EEG in adult



Definition

- A wide "variety" of normal EEG patterns seen
 - between persons of the same age
 - greater among different age groups
 - more in waking than in sleep record

Normal EEG in adult

Normal variants

Definition

- There are only a few definitely abnormal EEG components in any age group
 - Spikes, sharp waves
 - abnormal slow waves
 - abnormal amplitude changes

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Normal EEG in adult

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Definition

- Normal EEG not guarantee the absence of brain pathology
 - Not all brain pathology / dysfunction produce EEG abnormalities
- Abnormal EEG not always indicate cerebral abnormality
 - Few specific mild EEG abnormalities seen in some instances in normal persons

Normal EEG in adult

Descriptors of EEG activity

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Wave form

- Transient wave
 - Single wave or complex waves
 - Clearly standing out against background
 - Regarding "not definitely abnormal"
- Sharp transient
 - Sharply contoured waveform
 - Not abnormal epileptiform waveform <a>o

Normal EEG in adult







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Normal EEG in adult

Normal EEG in adult









Persistence

To describe how often activity occurs

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- Occasionally
- Sporadic: irregular and infrequent
- Intermittently
- Periodic
- Throughout
- Persistent
- May be calculated as "index"





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Normal EEG of wakeful resting adults (20-60 years)

Composed of various types of activity alone or in combination

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- Alpha rhythm
- Beta rhythms
- Mu rhythm
- Lambda waves
- Vertex sharp transient
- Kappa rhythm
- Intermittent posterior theta rhythms
- Low voltage activity

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Alpha rhythm

defined by frequency, distribution and reactivity

- Frequency : alpha activity, 8-13 Hz
 - Fairly constant
 - Equal in both sides
- Distribution : posterior part
 - Greatest amplitude and most persistent in occipital and parietal areas
 - Seen in temporal and central in the young
- Reactivity : blocked by eye opening, sudden alerting, attention and mental concentration

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Alpha rhythm

- Wave form : regular, often sinusoidal
- Phase relation : may vary over different parts
- Timing : simultateous on both sides
- Persistence :
 - Vary among normal subject
 - Prominent, waxes and wanes, rare occurrence, complete absence
 - Decrease with age
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Beta rhythms

- Defined by only frequency: over 13 Hz
- Distribution
 - Frontal beta rhythms
 - Widespread beta rhythm
 - Posterior beta rhythm or fast alpha variant
- Reactivity: disappear in drowsiness/sleep

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Beta rhythms

- Amplitude :
 - Usually lower than alpha activity
 - Symmetry, different less than 35% in amplitude
- Persistence : increase with age

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Normal sleep EEG of adults (over 20 yr)

Normal EEG in adult

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posterior slow wave of youth, frontal beta activity)

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- Beta activity
- Often more prominence
- Sporadic generalized slow wave

Normal EEG in adult

Slightly more common

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wakefulness

Activation procedures

Activation procedures

- To induce, enhance or better define abnormal EEG patterns
- However, they may induce normal patterns that are not seen in spontaneous EEG.

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Activation procedures

- Hyperventilation
- Photic stimulation
- Sleep recordings
- Other stimuli, e.g. patterned light, startling noise, musical sounds, reading, tactile stimuli, etc.

EXAMPLE OF EEG

Normal EEG in adult 51 Normal EEG in adult 52



Normal EEG in adult



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Normal EEG in adult





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Alpha frequency band

Beta frequency band e

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Normal EEG in adult







EEG in drowsiness : A. Slow lateral eye movement and B. Waxing and waning of posterior alpha rhythm • A B A B A B A B A B A B B Waxing and waning of posterior alpha rhythm •

Sleep stage 1: sleep vertex sharp wave .



Sleep stage II .

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