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XLIII. Electroencephalography
XLIV. Evoked potentials
XXXIII. Estimation of visual acuity

Physiology I – practice

Autumn, week 10-12

Electroencephalography (EEG)

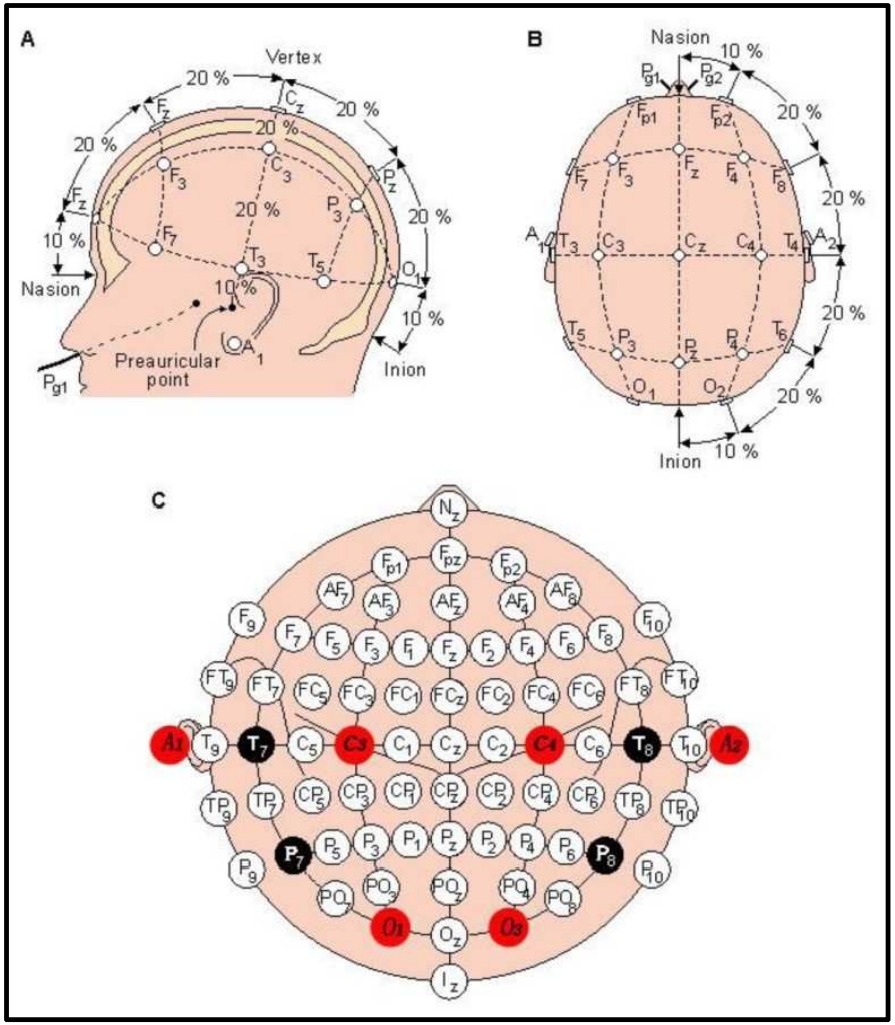
- Method used for the registration of electrical potentials of the brain
- Hans Berger (1929)

- Scalp EEG
- Electrocorticogram (ECoG)
- Stereoelectroencephalogram (SEEG)

- Macro EEG
- Micro EEG

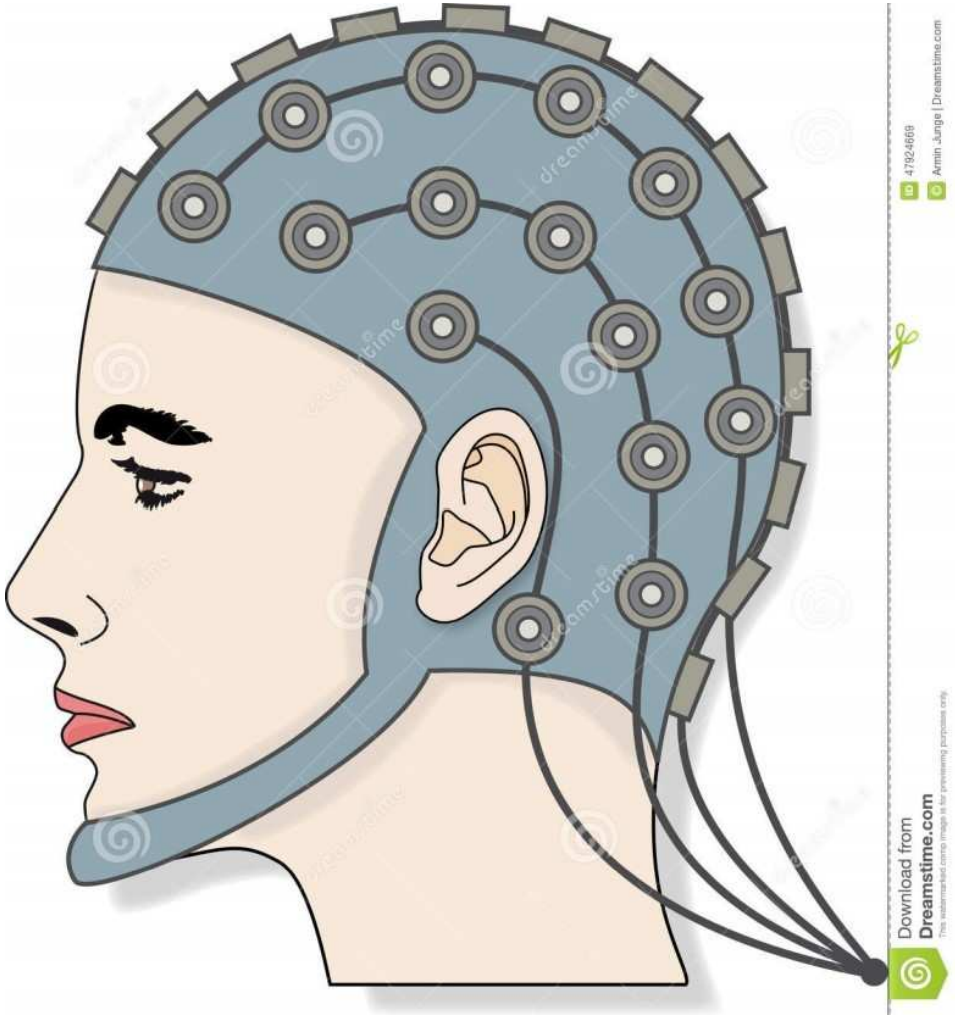
Electroencephalography

– Placement of electrodes: system 10-20



Electroencephalography

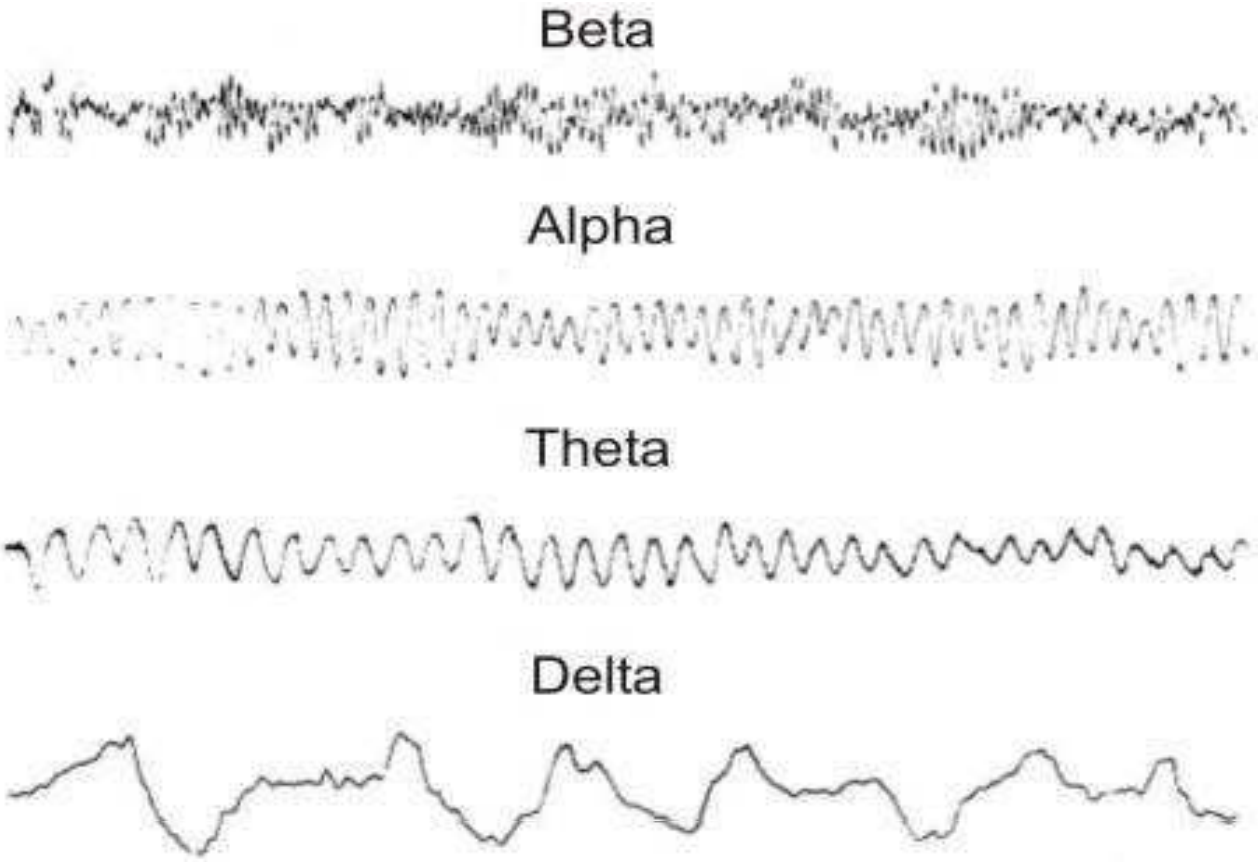
– Attachment of electrodes during scalp EEG



Electroencephalography

- Alpha rhythm
  - Frequency **8-13 Hz**, noticeable with eyes closed, in the awake, healthy and mature brain, especially in parietooccipital lobes
- Beta rhythm
  - Frequency **14-30 Hz**, noticeable with open eyes, sometimes constantly over the frontal area. The phenomenon of suppression of the alpha rhythm by opening eyes – alpha attenuation reaction (AAR).
- Theta rhythm
  - Frequency **4-7 Hz**, noticeable in children, in healthy adults only during shallow sleep stages
- Delta rhythm
  - Frequency **1-3 Hz**, in neonates and infants, in healthy adults only during deep non-REM sleep

EEG waves



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EEG record - example

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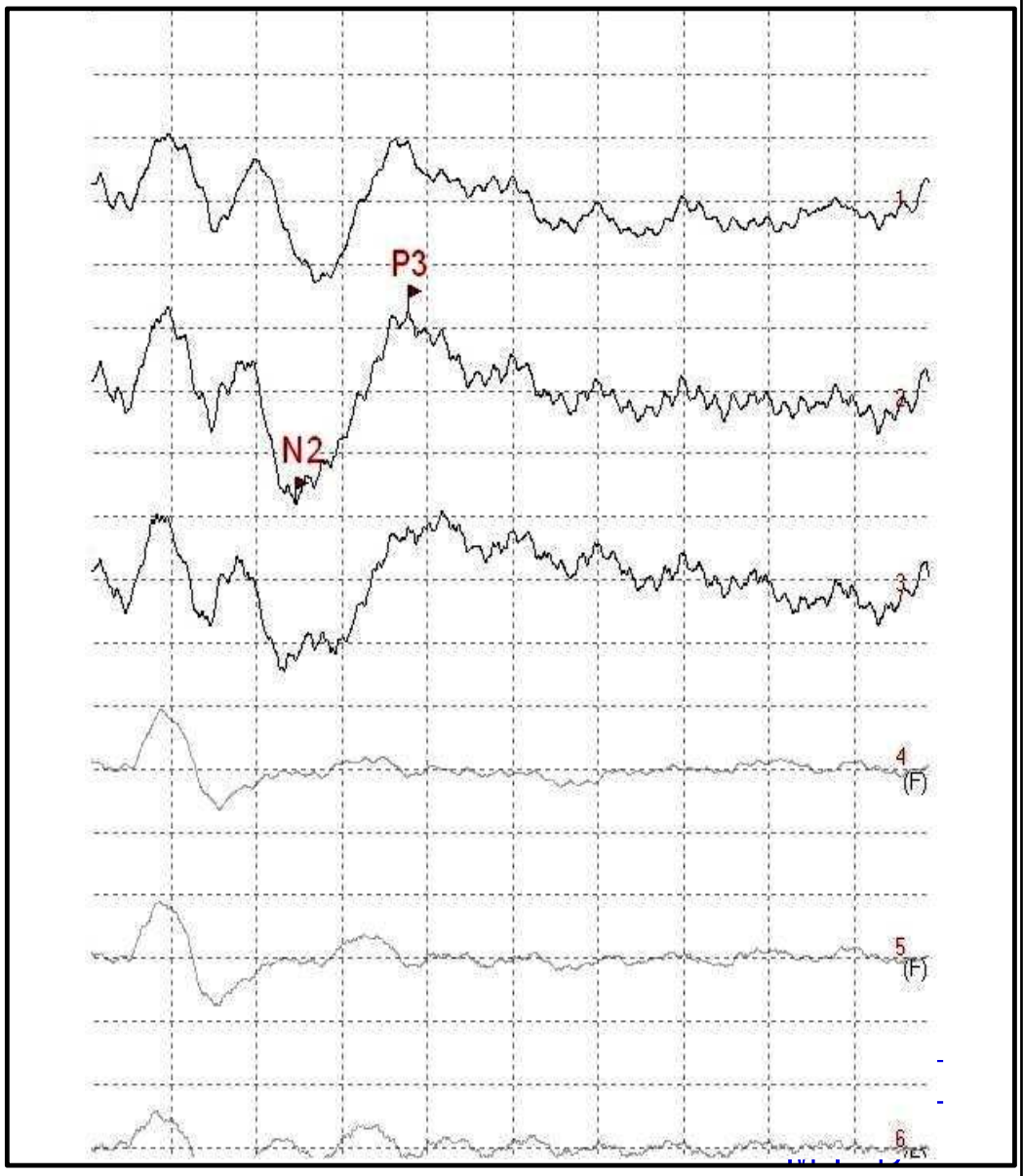
Evoked potentials (EP)

- Electrical manifestation of brain activity triggered by external sensory stimulus
- Evaluation of the functional state of the nerve pathway
- Types of EP:
  - VEP (visual)
  - AEP (auditory)
  - SEP (somatosensoric)
  - MEP (motoric)
  - SSEP (stable)
  - ERP (cognitive)

Evoked potentials

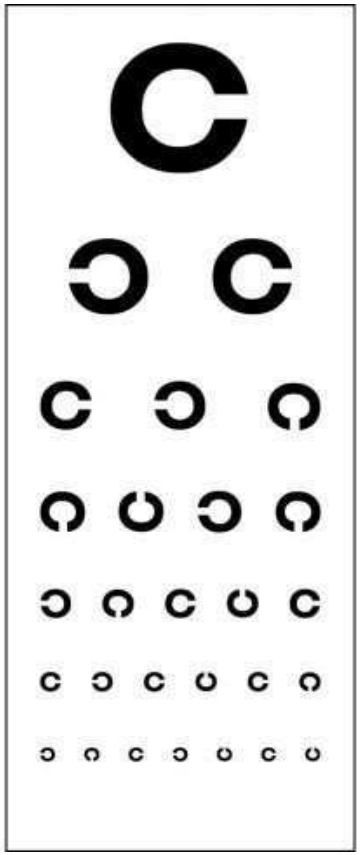
– Wave p300 (mean latency 300 ms)



Visual acuity examination – optotypes

Snellen

Landolt



Pflüger

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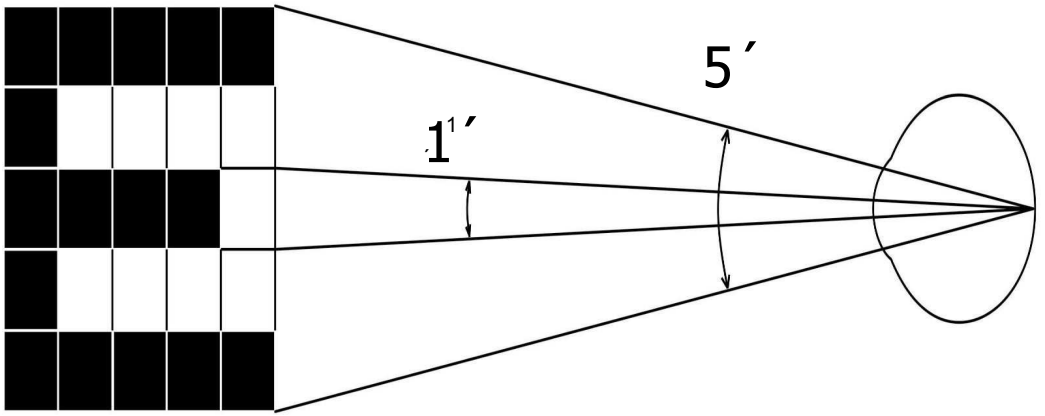
Visual acuity examination – optotypes

- Physiological background:
  - the eye can distinguish 2 points as 2 points when the light rays from these two points fall on the retina at an angle of 1 arc minute



- Examination:
  - Each row of optotypes has a number on the side that expresses the distance from which the rays from 2 points (for their differentiation and correct reading of the sign) fall on the retina at an angle of 1 arc minute
  - The most frequently used distance is 5 m
- The result of the examination:
  - Visus – we write it as a fraction: the numerator is the distance from which we are examining, the denominator is the number of the line read without error

    for the right eye ….V_{OD} = 5/5 …….. healthy eye, good visual acuity

    for the left eye…… V_{OS} = 5/10 …. an eye with impaired visual acuity

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