

Examination of the balance system

In addition to the vestibule, proprioception (cerebellum) and vision are also involved in balance - that's why balance disorders are difficult to assess.

Spontaneous and provoked vestibular phenomena

They are objective.

Nystagmus

Nystagmus are rhythmic movements of the bulbs in a certain plane and direction with a fast and slow component:

- **the slow component** is **the response to vestibular stimulation**,
- **the fast component** is **compensation from the CNS**,
- **direction of nystagmus** - given **according to the fast component** - rightward, leftward, up, down,
- **planes of nystagmus** - horizontal, vertical, rotatory and diagonal.
- **Intensity of nystagmus** - 3 degrees:
 - **Grade I** - nystagmus occurs when looking to one side, to which it then points,
 - **II. degree** - it can also be observed when viewed directly,
 - **III. degree** - it can also be observed when looking at the opposite side to the direction of the nystagmus.
- we further **evaluate** - frequency, amplitude and angular velocity,
- **positional nystagmus** - can be provoked by slowly moving the head into a certain position,
- **positioning nystagmus** - provoked by rapid change of position, onset with latency,
- vertical, diagonal, rotary or multidirectional is always central.

Standing according to Romberg

- lie down, eyes closed.
- head first straight, then with a turn to both sides.
- the affected person leans or falls in the direction of the slow component of the nystagmus (behind the diseased ear).
- we can scan optically and evaluate with posturography.

Deviations of the arms according to Hautant

- forearm, close eyes, watch for half a minute,
- in a peripheral disorder, both hands deviate in the direction of the slow component of the nystagmus.

Experimental examination of the vestibular system

- in experiments **we imitate** the irritation or attenuation of the apparatus,
- we mainly monitor nystagmus, but we can also monitor Romberg and Hautant.

Caloric examination

- the patient is lying down, the head is tilted forward by 30° (verticalize the lateral semicircular canal),
- through the glasses we watch the eyes,
- we use water at 30 °C and 44 °C (ie ± 7 °C from body temperature),
- first we examine both ears gradually (first one, then the other) with cold and then both with warm water,
- on the stopwatch, we measure the latency to the onset of nystagmus,
- cold water into the ear canal dampens (heat strengthens) the response of the lateral semicircular canal,
- we induce 2 nystagmus - one in the contralateral direction (extinction) and the other in the homolateral direction (irritation),
- nystagmus occurs in this way even in a healthy person.

Evaluation of results

- **bilateral hyporeflexia** - the duration of nystagmus is below the physical value.
- **bilateral hyperreflexia** - the duration of nystagmus is above the physical value.
- **lateral difference in excitability** - difference in times, pathological reduction in excitability of one side.
- **directional dominance** - the difference in the size of the deviation, the sum of the values in one direction is noticeably higher than in the other.
- **vestibular areflexia** - does not cause nystagmus.

▪

Investigation of rotations

- **we stimulate both labyrinths** at the same time, on a swivel chair, head tilted forward 30°, eyes closed,
- we rotate 1 revolution in 6 s, stop suddenly and read the nystagmus,
- physiologically, nystagmus lasts 25–60s, against the direction of rotation.

Examination of the fistula symptom

- in the presence of a labyrinthine fistula (it is most often in the semicircular canal),
- blow the balloon into the ear, increase the pressure and **if there is a whistle, nystagmus will occur.**

Links

Related Articles

- Vestibular apparatus
- Dizziness
- Vestibular syndrome

- Differential diagnosis of vertigo and tinnitus/PGS (VPL)
- Vertigo/PGS (VPL)

Source

- BENEŠ, Jiří. *Studijní materiály* [online]. ©2007. [cit. 2009]. <http://jirben2.chytrak.cz/materialy/orl_jb.doc>.