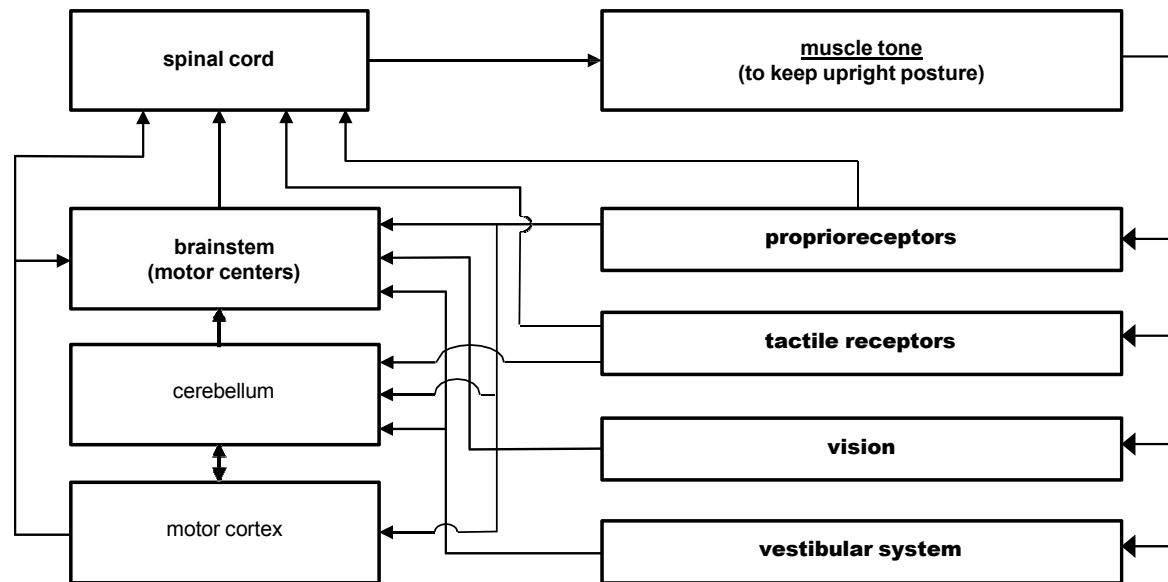


(XXIX.) Erect posture examination using stabilometry

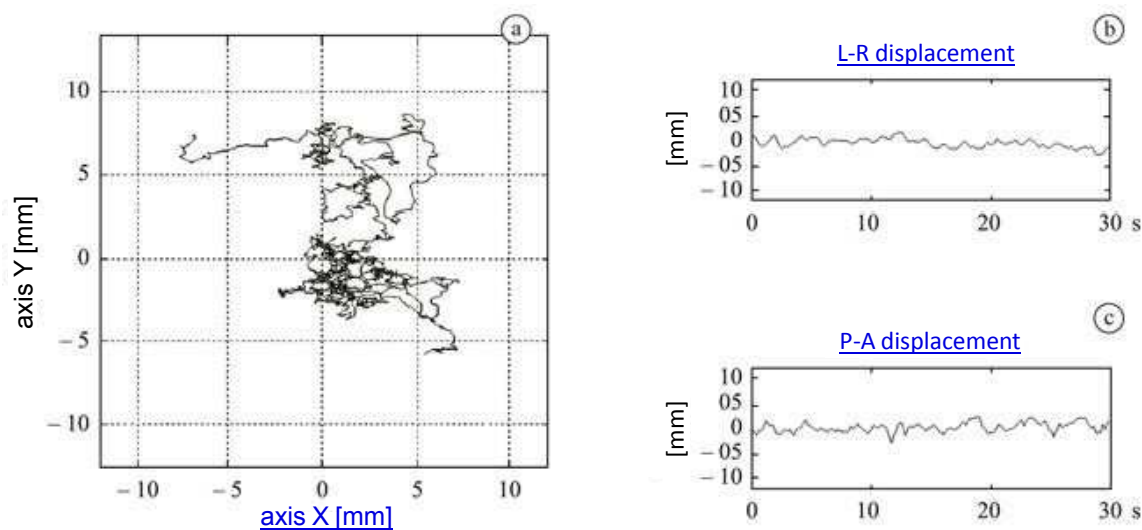
Physiology - practices

- Control of erect posture by the central nervous system is manifested by permanent corrections of deviations of the body from the vertical axis, which results in changes of gravity-opposing muscle tone.



Simplified scheme of regulation of stability

- Deviation of the body from the vertical axis and following changes in muscle tone are manifested by changes in the moments of supporting forces that are registered by the stabilometer.



COP displacement in the statokineziogram (a) and stabilogram (b, c)

- COP (centre of pressure) is an imaginary point on the ground, where the resultant ground reaction force (opposing the resultant gravity force) is located.

Parameters of stabilometric test

- **Mean COP X, Y (mm):** the mean value of X coordinates and mean value of Y coordinates of all points of statokinesigram. It depends not only on the position of the subject on the stabilometer plate but also on the inclination of his/her body.
- **Mean distance from the centre (mm):** the average deviation of COP position from the mean COP X, Y in left-right (X) and front-back (Y) directions. It is proportional to the size of the area determined by COP trajectory.
- **Mean velocity (mm/s):** represents the average speed achieved by moving COP. It characterizes the extent of muscular effort in maintaining erect posture.
- **X, Y-axis movement (mm):** the total length of the path that the COP followed in the left-right (X) and front-back (Y) directions. It provides information about the prevailing direction of the movement.

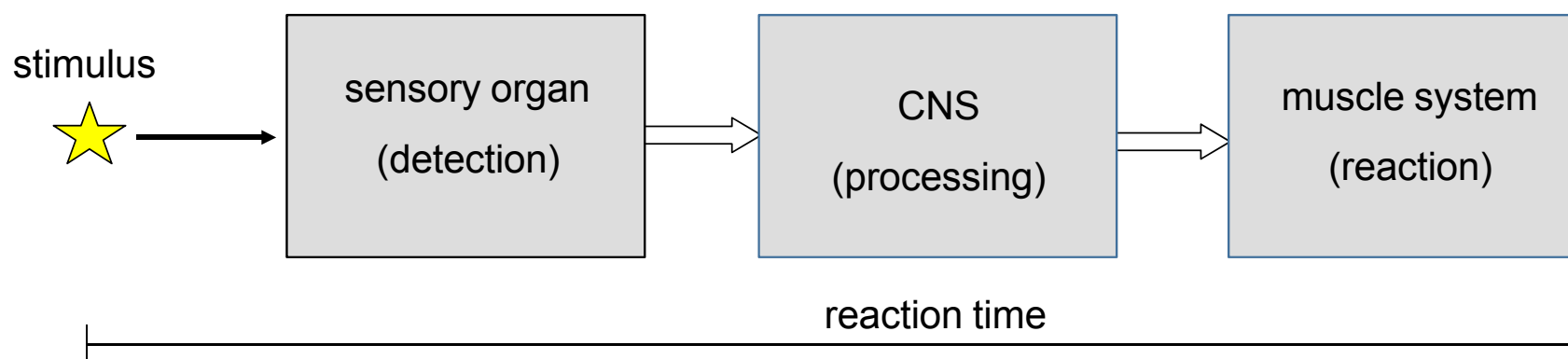
Stabilometric tests

- **Romberg's test I:** Subject's feet are 10 cm from each other, eyes open, and the head is straight ahead.
- **Romberg's test II:** The experimental subject puts his/her feet together, keeps his/her eyes open and his/her head straight ahead.
- **Romberg's test III:** The subject closes his/her eyes and keeps his/her feet together and his/her head straight ahead.
- **Stimulation of the Achilles tendons with vibrators:** The examined subject keeps his/her eyes closed, feet together and his/her head straight ahead. The vibrators are switched on during the examination.
- **Attenuation of tactile afferentation from feet:** The subject steps on the stabilometer equipped with a soft pad, puts his/her feet together, and after a short adaptation closes his/her eyes.

(XLI.) Estimation of Reaction Time Using Computer

Physiology II - practices

- **Reaction time** is the time between the application of a stimulus (light, acoustic, tactile, etc.) and the moment of appropriate reaction by the experimental subject.



- Reaction time depends on:
 - modality and intensity of the stimulus,
 - the complexity of the task (different reactions to different stimuli),
 - motivation, attention, fatigue and experience of the subject.

Reaction time testing

- **Visual and acoustic stimuli:** The test consists of a repeated random presentation of visual (asterisk in the centre of the screen) and acoustic (simple sound of 1 kHz) stimuli. The examined person responds to every stimulus by pressing ENTER on the keyboard.
- **Visual stimuli:** The reaction to the repeated random presentation of visual stimuli.
- **Acoustic stimuli:** The reaction to the repeated random presentation of acoustic stimuli.

Reaction time testing

- **Go/NoGo centre:** The test consists of repeated random presentation of two different visual stimuli (asterisk and symbol of dollar). Every stimulus is presented in the centre of the screen. The examined person responds to every asterisk by pressing ENTER on the keyboard. The symbol of dollar should be ignored.
- **Go/NoGo periphery:** The test consists of repeated random presentation of two different visual stimuli (asterisk and symbol of dollar). Each stimulus is presented anywhere on the screen. The examined person responds to every asterisk by pressing ENTER on the keyboard. The symbol of dollar should be ignored.

Reaction time testing in practicals

in this form write your results in the protocol

– Fill the results to the table:

Test		Arithmetic mean value	Standard deviation value	Number of mistakes
Visual and acoustic stimuli	Visual			
	Acoustic			
Visual stimuli				
Acoustic stimuli				
Go/NoGo centre				
Go/NoGo periphery				

Reaction time – discussion

write the answers to these considerations in the protocol as a conclusion

- Notice and explain the difference between reaction time values in the case of visual and acoustic stimuli.
- Discuss the diverse reaction time values and number of mistakes in different parts of the testing.
- What other factors influence reaction time values in humans?
What can cause faster or slower reaction time?

Source of figures

- Slide 2 – Physiology and neuroscience practicals, Masaryk University 2011