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Protocol

Stabilometric examination of erect posture

Methods

Equipment:

Stabilometer, PC with Stabilometry software, two vibration stimulators, foam surface

Caution: It is absolutely necessary that the experimental subject not look at the monitor during recording and that he/she fully focus on correct performance of the task. The subject should not speak and should try to suppress any voluntary movement!!!

Stabilometry:

1. Start the acquisition programme by double-clicking on 1. the icon LIGHTSWAY. Maximize the window by clicking on the square symbol in the right upper corner.
2. Click on the third icon from the left (a green flash with the letter N). Fill in the name, sex, weight (kg) and height (cm) of the examined subject. As the saving time choose 20 seconds.
3. Fill in the first five comments: (1) normal conditions, (2) closed eyes, (3) closed eyes + foam surface. Leave the fourth comment blank. Confirm by clicking OK. Three buttons appear on the screen: START, RESULTS, and CENTER.
4. The examined person steps on the stabilometer without shoes, with the tips of the feet directed at the output cable, and the back of the subject is turned away from the PC monitor. If the signal is out of range in any axis, the subject's position on the stabilometer must be adjusted, so that the red point representing the COP position is at the cross point of the coordinates.
5. Tests will be performed while moments of supporting forces are recorded for 20 s in each test. During each test try to evaluate the subject's posture visually. Recording of each test will be started by clicking on the START button and will be terminated automatically. During each recording the START button disappears and occurs again after the test has been finished.
    a) **Normal conditions**: Subject's feet are 10 cm from each other, eyes open, and the head is straight ahead.
    b) **Eyes closed**: The subject closes his/her eyes and keeps the feet 10 cm away from each other and the head straight ahead.
    c) **Attenuation of tactile afferentation from feet:** The subject leaves the stabilometer. Lay a foam surface on the stabilometer plate. The subject steps on the foam surface, puts his/her feet together, and after a short adaptation closes his/her eyes. Having finished the test, the subject opens his/her eyes and leaves the stabilometer.
6. Press the button RESULTS to get a summary of results. Stabilometric parameters and statokinesigrams are displayed for each test. The red point on the statokinesigram curve represents the final position of COP achieved during recording. The blue point indicates the initial position.

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7. The data need not be saved or printed.

Romberg's test

The procedure is exactly the same but as examined postures Romberg's test will be used instead.

- **Romberg 1** – Subject's feet are 10 cm from each other, eyes open, and the head is straight ahead
- **Romberg 2** – Subject's feet are placed together, eyes open, and the head is straight ahead
- **Romberg 3** – Subject's feet are placed together, eyes closed, and the head is straight ahead
- **Romberg 4** – Subject's feet are placed together, eyes closed, and the head is tilted to right
- **Romberg 5** – Subject's feet are placed together, eyes closed, and the head is tilted to left

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Results

In a stabilometric test the motion of COP is recorded within the X and Y coordinates of the horizontal plane during a time period, producing a statokinesigram. The cross point of the coordinates is situated in the centre of the stabilometer plate, positive values representing deviations to the right and forward on the X and Y coordinates, respectively. The following parameters characterize the stabilometry examination:

1) Mean COP X, Y (mm) is the mean value of X coordinates and the mean value of Y coordinates of all points of the statokinesigram. It depends not only on the position of the subject on the stabilometer plate but also on the inclination of his/her body.
2) Mean distance from the centre (mm) is 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 defined with the movement trajectory.
3) Mean velocity (mm/s) represents the average speed achieved by moving COP. It characterizes the extent of muscular effort in maintaining the erect posture.
4) X, Y-axis movement (mm) is 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 and is directly proportional to the actual length of the trajectory.

All these parameters (with the exception of Mean COP X, Y) describe the overall stability. Increased values indicate decreased postural stability. In our practical the parameters enable us to assess the role of afferent systems in the process of postural control.

Draw all your records onto **one** graph. Use different colours to distinguish the examination conditions.

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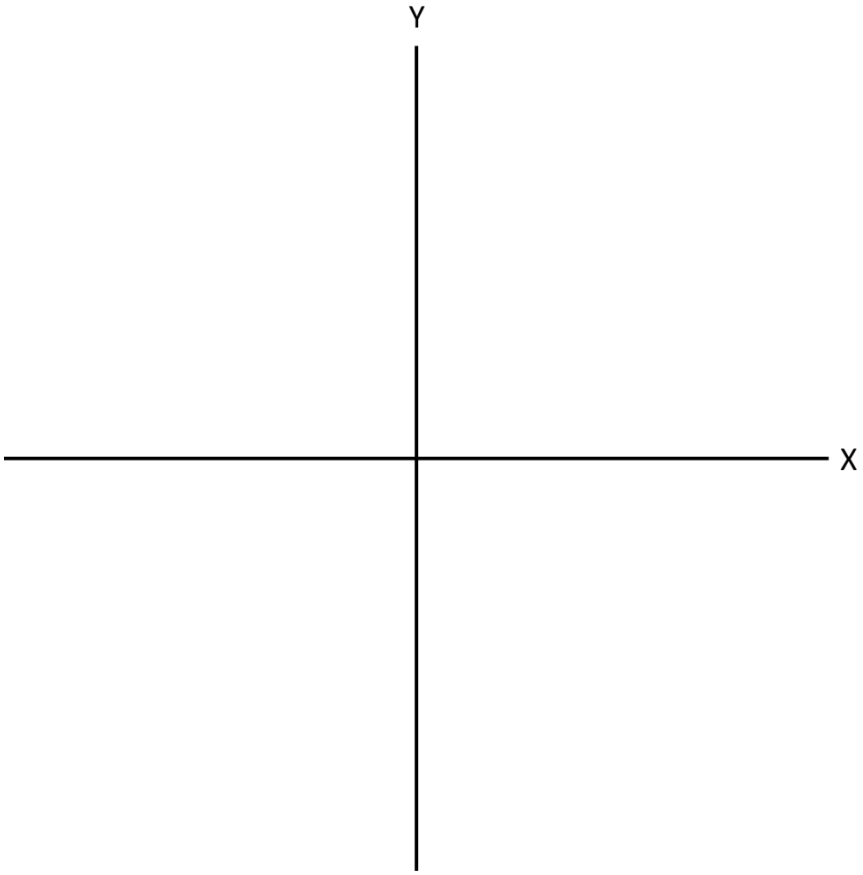
Stabilometry:



	mean velocity	movement in X	movement in Y
Romberg I			
Romberg II			
Romberg III			

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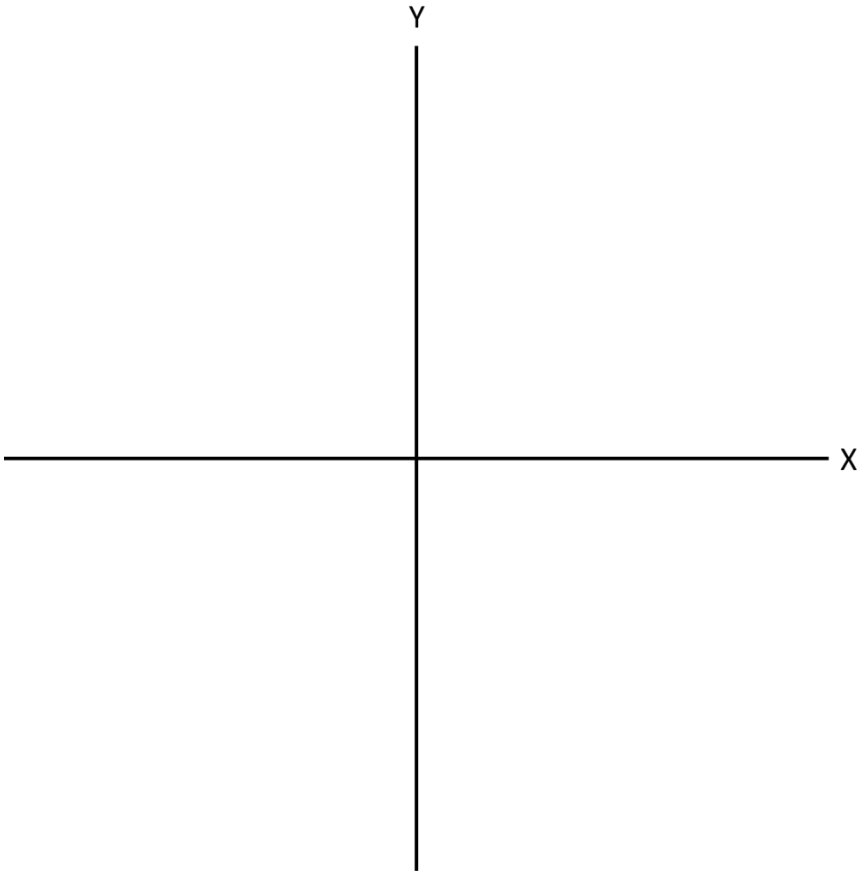
Romberg's test:



	mean velocity	movement in X	movement in Y
Foam surface			
Vibrators			

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Conclusion

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