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Gait - pathology or physiology?

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Introduction: Gait is a kind of visiting card of any person which says a lot about the individual. It can testify both health status and possible pathology. The gait of a person is the harmonious interaction of muscles, bones, eyes and the inner ear under the control of the central nervous system. Despite clinical significance and widespread prevalence, gait disturbances have not been the subject of special studies until recently. This has determined the subject of our preliminary communication.

Purpose: The purpose is to study some mechanisms of human gait.

Materials & Methods: The studies were performed in 4 patients with Parkinson's disease, 5 patients suffering from ischemic stroke, 4 patients with peroneal nerve neuropathy, and 2 patients with myopathy. The comparison group involved 7 healthy volunteers. All patients and the study group underwent clinical examination, electromyography and biomechanical studies.

Results: We have seen obvious differences in patients during electromyography: high-frequency, high-amplitude curves during muscle contraction in healthy volunteers were recorded; the amplitude of the potentials increased and subsequently decreased in patients with Parkinson, spindle shapes were also recorded and; patients with peroneal nerve neuropathy showed singular irregular potentials in amplitude and frequency. The nature of the EMG changes indicated the different anatomical level of injury of the particular anatomical structure involved in the act of walking. So, EMG studies allowed us to objectivize changes in the process of neuromuscular transmission in various diseases. Within the biomechanical parameters, we measured PI (inclination of the pelvis) - the angle between the line joining the middle of the upper surface of the sacrum with the center of the femoral head and perpendicular to the upper surface of the sacrum, restored at the point 0. This measure also varied in patients with different pathologies. PI (50.1°) - patients with peroneal nerve neuropathy and volunteers; PI (less than 35°) - patients with stroke and; PI (between 35° and 50.1°) patients with myopathy and Parkinson's disease. In the vertical position, the spino-pelvic balance is regulated by the neuromuscular system. Therefore, it is logical to assume that alterations in neuromuscular transmission also change the parameters of the spino-pelvic balance.

Conclusions: The person's gait being individual and absolutely unique testifies both to a healthy status and even reflects the presence of a possible pathology. The type of pathological gait depends on which of the links of the locomotor chain has suffered: corticospinal tract, extrapyramidal system, musculoskeletal system, etc. In setting the correct diagnosis in the presence of a pathological gait, the clinical examination is of utmost importance along with electromyography and biomechanical examinations. We will be presenting our overall study details and results with case examples.

Biography

Vakhtang Fedotov completed his 1st year of Medicine in Kharkiv National Medical University during September 2016-June 2017. During 2005-2016, he studied in private school "Ochag Gymnasium" and has finished it with excellent marks and a gold medal. He is a winner of regional chemical competition. Since 2015, he is a member of the minor Academy of Sciences. He took part in Biology and Anatomy conferences previously.

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