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MOTOR RESPONSE MODEL IN THE FUNCTION OF SELECTED ACOUSTIC PARAMETERS OF METRORHYTHMIC STIMULATION

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There are many types of movements in humans, including involuntary ones. One of the spontaneous movements that can be observed is rhythmic toe tapping or heel stomping during prolonged sitting. Such actions are also often associated with the perception of music, especially music with a powerful rhythmic element. Human susceptibility to acoustic stimulation is a complex but interesting phenomenon. In the literature, it is referred to as musical entrainment. It is often used as a motivational element during physical activity. Due to the multidimensionality of musical materials, researchers are still trying to identify which quantities mainly determine the suitability of a piece of music for music therapy applications. The starting point in many publications is to study how the sound of a metronome with specific characteristics affects human motor skills. Moderated parameters of this stimulation can be its tempo, type, or sound intensity. Among other things, the positive effects of metrorhythmic stimulation have been noted in improving gait symmetry, which is especially important for neurological patients.

While biomechanical gait analyses with an acoustic stimulus are performed quite frequently, studies of muscle tension during other forms of motion are found slightly rarer in the literature. In the future, a comprehensive approach to the topic of motor response to metrorhythmic stimulation will perhaps bring researchers closer to fully defining the characteristics of the mentioned stimuli in the context of applications aimed at improving the patient's condition on multiple levels. The article attempts to develop a method for studying the variability of the electromyographic signal from specific muscle parts depending on a given metrorhythmic stimulation. Sounds of varying values of acoustic quantities are responsible for the initiation of the subject's motility. The selection of specific muscles was based on grounds from the biomechanical, anatomical, and neuromotor sides. The analysis of the recorded signal results not only in the presented findings. It can also be an impetus for further research into the concept of auditory stimulation as a support in the progress of rehabilitation, the development of healthy habits and physical culture, and a factor positively influencing the emotional state of patients in therapy.