

# Stimulus Changing in Three-Dimensional Movement Due to Horse Gait Amplitude Variations and Its Effects on Hippotherapy Practitioners

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This research reports the stimulation provided by hippotherapy from the quantitative conceptions of human gait and its resemblance to horseback riding. The aim of this study is to compare the three-dimensional movement executed by the human being when walking with the stimulus received by the hippotherapy practitioner. I gathered the data through dynamical systems formalism and evaluated via Lyapunov exponent. I used a smartphone with accelerometer and proper software as measuring tool to record six variables concerning the three-dimensional movement acceleration ( $x$ ,  $y$ ,  $z$ ,  $R$ ,  $\varphi$ ,  $\theta$ ). I docked the smartphone in the chest region of the volunteers, allowing to record the acceleration on which they were subjected to. Initially the volunteers walked in three different speeds (slow, medium and fast), with three repetitions of each. Afterwards, with the volunteers sat on the horse, I cadenced the horse at three equivalent velocities (A, B and C). More data was obtained by placing only the smartphone above the animal. I divided the volunteers into three age groups (children, teenagers and adults). For each age group one model and two handicapped persons participated. At the end, the values I got from the volunteers on horseback were higher than those measured only with the smartphone above the horse, but smaller than on foot, indicating that the treatment stimulates smoother compared to human gait. With regard to the horse velocity, "A" was characterized by providing recurrent and rapid stimuli to the practitioners while "C" provides a less frequent and more lasting stimuli. Key-words: Horse. Stride Length. Health Treatment.