Horsensor: Quantitative Analysis of Movements Using Different Types of Riding Equipment in Hippotherapy

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Hippotherapy uses the movements of horses to treat people with disabilities. Each hippotherapy patient has different needs, highlighting the importance of researching to understand every aspect of the therapy. Particularly, the study of riding equipment is relevant because they transmit the movements from the horse to the rider. The goal of this project was to compare the acceleration produced when using different types of hippotherapy riding equipment. Experiments were performed on a 20-meter sand track with 12 healthy individuals riding a mare. Australian and classic saddles (with stirrups) and a hippotherapy saddle blanket (with and without stirrups) were evaluated, while other factors were standardized. This is the third year of a continuation project and the device developed in the first year was used to obtain data through two accelerometers attached to the volunteers and one to the riding equipment. With the data gathered, RMS value and Lyapunov exponent were calculated using GNU Octave. The results found allowed various comparisons of the stimuli transmitted by each equipment. Among those results, accelerometers in the riding equipment and in the volunteers' pelvis had higher RMS mean values using the Australian saddle, while the accelerometer on the volunteers' chest had a higher mean using the saddle blanket. Additionally, the saddle blanket transmitted movements to the rider more similar to those obtained on the riding equipment. The results can assist health professionals in formulating individualized programs with appropriate equipment for each case in hippotherapy, improving the treatment and opening the way for further studies.