

**Publication****Kinematic changes in severe hip osteoarthritis measured at matched gait speeds****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 4604280**Author(s)** Ismailidis, Petros; Kaufmann, Mara; Clauss, Martin; Pagenstert, Geert; Eckardt, Anke; Ilchmann, Thomas; Mündermann, Annegret; Nüesch, Corina**Author(s) at UniBasel** [Ismailidis, Petros](#) ; [Kaufmann, Mara](#) ; [Clauss, Martin](#) ; [Pagenstert, Geert](#) ; [Ilchmann, Thomas](#) ; [Nüesch, Corina](#) ; [Mündermann, Annegret](#) ;**Year** 2021**Title** Kinematic changes in severe hip osteoarthritis measured at matched gait speeds**Journal** Journal of orthopaedic research**Volume** 39**Number** 6**Pages / Article-Number** 1253-1261**Keywords** Kinematics; gait analysis; hip osteoarthritis; inertial sensors; matched speeds

Kinematic differences between patients with osteoarthritis (OA) and control participants have been reported to be influenced by gait speed. The purpose of this study was to experimentally detect the effect of walking speed on differences in spatiotemporal parameters and kinematic trajectories between patients with hip OA and age matched asymptomatic participants using wearable sensors and statistical parametric mapping (SPM). Twenty-four patients with severe unilateral hip OA and 48 control participants were included in this study. Patients walked at a self-selected normal speed and control participants at self-selected normal and slow speeds. Spatiotemporal parameters and kinematic trajectories were measured with the inertial sensor system RehaGait<sup>®</sup>. Gait parameters were compared between patients with hip OA and control participants for normal and matched speed using SPM with independent sample t tests. At self-selected normal speed, the patient group walked slower (-0.20 m/s,  $P<0.001$ ) and at lower cadence (-5.0 steps/minute,  $P<0.001$ ) as well as with smaller hip flexion (-7.4°,  $P<0.001$ ) and extension (-4.1°,  $P=0.001$ ), higher knee flexion during terminal stance (+8.0°,  $P<0.001$ ) and higher ankle dorsiflexion and plantarflexion (+7.1°,  $P<0.001$ ). While differences in spatiotemporal parameters and the ankle trajectory disappeared at matched speed, some clinically relevant and statistically significant differences in hip and knee trajectories remained. Most differences in sagittal plane gait kinematics between patients with hip OA and control participants were present for matched speed, and therefore appear to be associated with disease rather than gait speed. Nevertheless, studies investigating hip kinematics in patients with hip OA should involve trials at matched speeds.

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