

## Publication

Side to side kinematic gait differences within patients and spatiotemporal and kinematic gait differences between patients with severe knee osteoarthritis and controls measured with inertial sensors

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Kinematic changes associated with knee osteoarthritis (OA) have been traditionally measured with camera-based gait analysis. Lately, inertial sensors have become popular for gait analysis with the advantage of being less time consuming and not requiring a dedicated laboratory.; Do spatiotemporal and discrete kinematic gait parameters measured with the inertial sensor system RehaGait<sup>®</sup> differ between the affected and unaffected side in patients with unilateral knee OA and between patients with severe knee OA and asymptomatic control subjects? Do these differences have a similar magnitude as those reported in the literature?; Twenty-two patients with unilateral knee OA scheduled for total knee replacement and 46 age matched control subjects were included in this study. Spatiotemporal parameters and sagittal kinematics at the hip, knee, and ankle joint were measured using the RehaGait<sup>®</sup> system while walking at a self-selected speed for a distance of 20 m and compared between groups.; Patients with knee OA had slower walking speed, longer stride duration, shorter stride length and lower cadence ( $P < 0.001$ ). Peak knee flexion during stance and swing was lower in the affected than the unaffected leg ( $-4.8^\circ$  and  $-6.1^\circ$ ;  $P < 0.01$ ). Peak knee flexion during stance and swing ( $-5.2^\circ$  and  $-8.8^\circ$ ;  $P < 0.01$ ) and knee range of motion during loading response and swing ( $-3.6^\circ$  and  $-4.4^\circ$ ;  $P < 0.01$ ) were lower than in the control group.; These side to side differences within patients and differences between patients with knee OA and control subjects agree with known gait alterations measured with camera-based systems. The RehaGait<sup>®</sup> inertial sensor system can detect gait alterations in patients with knee OA and is suitable for gait analysis in a clinical environment.

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