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Asymptomatic Genu Recurvatum reshapes lower limb sagittal joint and elevation angles during gait at different speeds
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Abstract
Background: Kinematic characteristics of walking with an asymptomatic genu recurvatum are currently unknown. The objective of this study is to characterize the lower limb sagittal joint and elevation angles during walking in participants with asymptomatic genu recurvatum and compare it with control participants without knee deformation at different speeds. Methods: The spatio-temporal parameters and kinematics of the lower limb were recorded using an optoelectronic motion capture system in 26 participants (n = 13 with genu recurvatum and n = 13 controls). The participants walked on an instrumented treadmill during five minutes at three different speeds: slow, medium and fast. Results: Participants with genu recurvatum showed several significant differences with controls: a narrower step width, a greater maximum hip joint extension angle, a greater knee joint extension angle at mid stance, a lower maximum knee joint flexion angle during the swing phase, and a greater ankle joint extension angle at the end of the gait cycle. Participants with genu recurvatum had a greater minimum thigh elevation angle, a greater maximum foot elevation angle, and a change in the orientation of the covariance plane. Walking speed had a significant effect on nearly all lower limb joint and elevation angles, and covariance plane parameters. Conclusion: Our findings show that genu recurvatum reshapes lower limb sagittal joint and elevation angles during walking at different speeds but preserves the covariation of elevation angles along a plane during both stance and swing phases and the rotation of this plane with increasing speed. © 2021 Elsevier B.V.

Author Keywords
Inter-segmental coordination; Kinematics; Knee hyperextension; Planar covariation

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