Adaptive patterns of movement during stair climbing in patients with knee osteoarthritis.

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The purpose of this study was to determine if there is a distinctive characteristic in the pattern of movement (forward trunk lean to reduce demand on the quadriceps muscle) during stair climbing in patients with knee osteoarthritis (OA) that is associated with the severity of the disease. Twenty-three patients with radiographically diagnosed knee OA and 20 physically active adults performed stair ascending trials without support at their self-selected speed. Standard gait analysis was used to calculate three-dimensional lower extremity joint kinematics and kinetics. Forward trunk lean, or trunk flexion, was defined as the sagittal plane projection of the angle between a line connecting the midpoint of the trans-acromion line and the midpoint of the trans-iliac crest line and the global vertical axis. Patients with more severe knee OA (KL = 3) had greater forward trunk lean (+6.3 degrees , p = 0.045) and lower knee net quadriceps moments (-35.2%, p = 0.001) than controls. In more severe patients, the forward trunk lean was correlated with a reduction in the net quadriceps moment during stair climbing (R(2) = 0.590, p = 0.006). The results of this study identified a distinctive compensatory pattern of movement to reduce the quadriceps demand during stair climbing in patients with more severe knee OA by increasing forward trunk lean. Assessing forward trunk lean during stair climbing may be a useful functional marker for evaluating osteoarthritis status and quadriceps function that appears to be a more sensitive indicator of disease severity than perceived pain.

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