

Kinematic Analysis of Heel Height Effect on Knee Direction Correction in a Patient with Genu Recurvatum: A Case Study

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Abstract : The aim of this study was to evaluate the effect of heel height on the knee joint direction in Genu recurvatum patients compared to normal state. The test was performed on a patient with Genu recurvatum and a healthy person with similar and match biomechanical conditions. Subjects were tested under six different positions of shoes with heels 0, 1, 2, 3, 4 and 5 cm after marking during the gait. The results of the spatial temporal geometry obtained from Vicon Motion System (six-camera T10 model, Oxford Metrics Ltd., Oxford, UK), and were used to compute and analyze the kinematic results. In this study, we tried to determine the effect of shoe heel intervention on knee joint direction correction. The results indicate that the 1 cm heel has been optimized and significantly improved in knee joint flexion and flexion-extension angle so that the difference in knee flexion-extension angle between the patient and the healthy person at some stages of walking has reached zero (good posture). The 3 cm heel compared with the 0 cm heel has reduced the knee recurvatum index (KRI) by up to 21.74% in the patient (from 219.233 mm to 47.6714 mm). According to the findings of this study, it can be concluded that heel increase is effective in correcting knee joints in Genu recurvatum and the optimum heel height is 1 cm.

Keywords : joint alignment of knee, gait analysis, genu recurvatum, heel lift, kinematics, motion-analysis

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