

Walk test with smartphone sensor can classify fall risk in amputees

August 19 2022



In lower-limb amputees, automated foot strikes from a six-minute walk

test (6MWT) can be used to calculate step-based features for fall risk classification, according to a study published online Aug. 18 in *PLOS Digital Health*.

Pascale Juneau, from Ottawa Hospital Research Institute in Ontario, Canada, and colleagues evaluated fall risk classification using the random forest model with a recently developed automated foot strike detection approach. A total of 80 lower-limb amputees (27 fallers and 53 nonfallers) performed a 6MWT with a [smartphone](#) at the posterior pelvis. A novel Long Short-Term Memory approach was used to complete automated foot strike detection. Using manually labeled or automated foot strikes, step-based features were calculated.

The researchers found that for 64 of 80 participants, manually labeled foot strikes correctly classified fall risk (accuracy, 80 percent; sensitivity, 55.6 percent; specificity, 92.5 percent). Fifty-eight of 80 participants were correctly classified by automated foot strikes (accuracy, 72.5 percent; sensitivity, 55.6 percent; specificity, 81.1 percent). Equivalent fall classification results were seen with both approaches, but six more false positives were seen with automated foot strikes.

"This study demonstrated that automatically detected foot strikes from a single smartphone sensor location on the body can be used to calculate step-based features for lower limb amputees after completing a 6MWT, leading to preliminary fall risk classification," the authors write.

More information: [Abstract/Full Text](#)

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Citation: Walk test with smartphone sensor can classify fall risk in amputees (2022, August 19)

retrieved 3 May 2024 from

<https://medicalxpress.com/news/2022-08-smartphone-sensor-fall-amputees.html>

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