

Western University

Scholarship@Western

Inspiring Minds – A Digital Collection of
Western's Graduate Research, Scholarship and
Creative Activity

Inspiring Minds

November 2022

Multi-segment foot model for gait analysis: testing on bowed-legged patients with knee osteoarthritis pre-/post-surgery

Songlin Zhu

Western University, szhu86@uwo.ca

Follow this and additional works at: <https://ir.lib.uwo.ca/inspiringminds>

Citation of this paper:

Zhu, Songlin, "Multi-segment foot model for gait analysis: testing on bowed-legged patients with knee osteoarthritis pre-/post-surgery" (2022). *Inspiring Minds – A Digital Collection of Western's Graduate Research, Scholarship and Creative Activity*. 340.

<https://ir.lib.uwo.ca/inspiringminds/340>

Multi-segment foot model for gait analysis: testing on bowed-legged patients with knee osteoarthritis pre-/post-surgery

Gait analysis using auto-reflective markers attached to the skin assesses how our body moves and functions, and it is important to detecting abnormalities in movements. The foot has been traditionally treated as a single, rigid segment in the history of human gait analysis, leaving motions and loads within the foot unmeasured. This substantially hinders assessment and diagnosis of primary and secondary foot/ankle pathologies. To solve this problem, my study developed a reliable, sensitive multi-segment foot model that divides the foot into four functional segments (hindfoot, midfoot, forefoot, toes). Relative motions and joint loads between foot segments are measured and calculated using motion analysis software. This model's clinical feasibility has also been supported in bowed-legged patients with knee osteoarthritis and undergoing a corrective knee alignment surgery called high tibial osteotomy (HTO). This clinically friendly foot model can help us better understand foot/ankle pathologies and potentially inform treatments like exercise and orthoses.

