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## A gait analysis toolkit for the foot in rheumatoid arthritis: A case study

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Rheumatoid Arthritis (RA) is a symmetrical, small joint polyarthritis that typically affects the feet. Functional foot orthoses control abnormal mechanics of the foot thus providing a stable base for more efficient propulsion. The aim of this research study is to investigate the quantitative kinematic parameters of gait and dynamic plantar foot pressure distribution and thus to determine whether foot orthoses improves the studied gait parameters. Kinematic gait parameters were obtained using a three-dimensional (3D) motion analysis system (VICON 612, Oxford metrics, Oxford, England). Plantar pressure data were obtained using the Tekscan high resolution walkway and in-shoe measuring system. The hallux forefoot angle had an increased plantarflexion movement at toe-off of 40° with orthoses as compared to barefoot resulting in more efficient propulsion. The hindfoot floor angle also saw improvement in frontal plane movement with the total range of movement with the orthoses being 55° compared to the 30° when barefoot. With the Tekscan walkway, peak plantar pressure in the rearfoot was 179 Kilo Pascal's (KPka) in the left and 176 KPka in the right foot. In-shoe plantar pressure in the rearfoot in both feet was reduced with orthoses use with a difference of 139 KPka in the left and 161 KPka in the right foot.

### Biography

Vicki Cameron is a Consultant Podiatrist. Her PhD used computerised 3D gait analysis to quantify the effectiveness of foot orthoses in arthritis. She has published this research, and was awarded the esteemed Arthritis Research UK Silver Medal in 2011. She founded her company StEPS Podiatry® in 2011. She won the Lloyds TSB Best Start Up award for Scotland in 2012, and won the Glasgow Business awards 2013 in the category of Young Business Person of the Year. She consults for the Scottish Football Association, Celtic FC, Scottish Athletics Association, and the R&A.

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