**Title: OpenFO: An Open-Source Software Package for the Design of Foot Orthoses**

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**Introduction:** Custom foot orthoses (FOs) are prescribed for a range of musculoskeletal conditions affecting the lower limb and are a popular conservative intervention given their low cost and minimal risk of side effects. However, research on custom FO design and use is hindered by the variability in the processes used to design these devices, both within and between those producing them. The goal of this study is to develop and distribute an open-source software package to create custom FOs based on a patient’s foot scan. Systematic design of FOs using this software will enable more robust and reproducible orthotics research.

**Methods:** An open-source software package (OpenFO) was created in the FreeCAD platform using Python. The package allows input of a patient foot scan and directed design of the orthotic with several parameters. Using the OpenFO package, FOs were designed by multiple users who had been given the same foot scan and the similarity of the produced FOs were analyzed based on shape and size.

**Results:** OpenFO is able to design orthotics in a repeatable manner based on a scan of a patient’s foot. The program allows multiple design features to be added including orthotic thickness, medial or lateral posting, and heel raise with opportunity for expansion. With current parameters, the FOs produced were comparable between several users given the same foot scan.

**Conclusion:** OpenFO will be able to create reproducible and controlled customized FOs with little to no user difference, allowing improved standardization between clinical trials. Further work to analyze the quality of FOs produced by the software package to general orthotic designs currently produced for patient use is needed.