**Title:** A Customizable Program to Design Ankle Foot Orthoses for Children with Over-Pronation

**Background:** Over-pronation in children is caused by ankle weakness, and results in lower leg roll. An Ankle Foot Orthosis (AFO) may be used to support a child to stand or walk. Existing AFOs are expensive and are often unsuitable for prolonged use due to inaccurate fit, cumbersome design and poor ventilation.

**Aim:** To develop a computer program to enable the custom design of a breathable AFO to suit a range of children’s foot dimensions.

**Methods:** The feet of a child with over-pronation were measured and a range of possible feet dimensions were established. A 3D parametrized model of an AFO was generated using Autodesk Inventor Professional. Two sizes of Footlogics® orthotic insoles were selected for use in the AFOs, and were scanned and imported into the 3D modelling environment. A combination of rules and forms were created to generate a program to customise the dimensions of the AFO to suit major specifications of the feet and ankle. Minor dimensions of the 3D model were programmed to support the change in nominated major parameters by using ratios or rules relevant for the behaviour of the area.

**Findings:** The program can rapidly generate customizable designs for AFOs compatible with available orthotic insoles. The files can be saved in several formats and taken for rapid manufacturing.

**Conclusion:** A program was created using Autodesk Inventor Professional that allows the user to generate a customized, breathable, 3D printable AFO for any child with over-pronation.