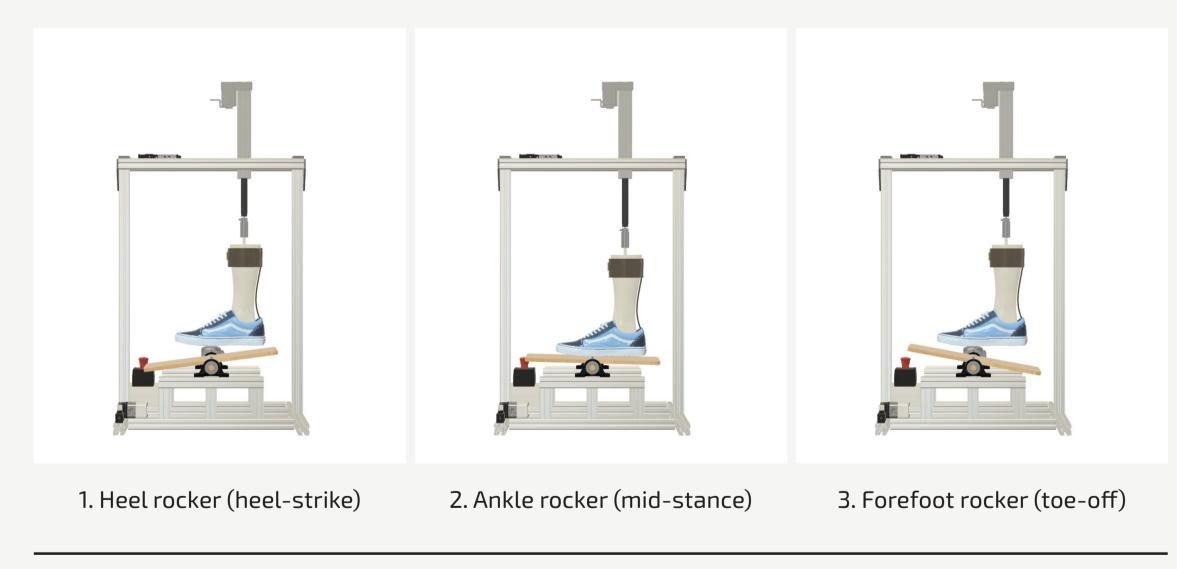
Developing a Load Cycle Test Setup to Evaluate the Durability of Ankle-Foot Orthoses

Problem Definition

This graduation project is for an organisation specialised in personalised braces on the basis of 3D-scans. They are looking into developing personalized ankle-foot orthoses (AFOs), with the use of 3D-printing. However, it is unknown if 3D-printed AFOs can provide 2 years of care without breaking or significantly losing performance.

Solution

To address this question a load cycle test setup was designed to simulate 2 million steps with an AFO. The design consists of a dummy lower leg, on which the AFO is strapped, attached on the end of a linear actuator. This dummy leg lands on a rotating platform. The combined action recreates the realistic loading on the AFO due to the 3 rocking motions of a step.



The three rocking motions of a step recreated in the test setup.

Linear pneumatic actuator Applies the load 5/2 way valve Pneumatic valve for the linear actuator Dummy leg Fixating the AFO Servo motor Rotary actuator for the platform **Dynamic** Ground Surface (DGS) Rotating platform **E-Pressure regulator Control unit** Controlling the load magnitude Electronics controlling the setup 5. Frame 40x40 profiles for modularity

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Integrated Product Design (IPD)

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Confidential

