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Bent Knee Adaptor for Experimental Testing of Prostheses

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Abstract

Novel prosthetic devices must undergo testing as part of their development. Testing with amputees is problematic at the development stage due to safety and administrative burdens. A bent-knee adaptor allows able-bodied individuals to wear a prosthesis and facilitate prototype testing.

An existing bent-knee adaptor was used as a basis to design an improved device. The existing adaptor did not preserve alignment between thigh and prosthesis, resulting in unnatural walking. 3D scanning and printing technologies were used to design the new adaptor.

Solid modeling was used to verify that the new design would withstand the loads associated with walking. The device was 3D-printed and attached to a prosthesis, and a preliminary walking test was conducted. Improvements will be required in terms of a better fit between the user's thigh and the adaptor. A systematic procedure will be followed to tune the prosthesis control system. For this, the subject will wear a safety harness and walk over a treadmill. The user will undergo a natural learning process to improve walking.