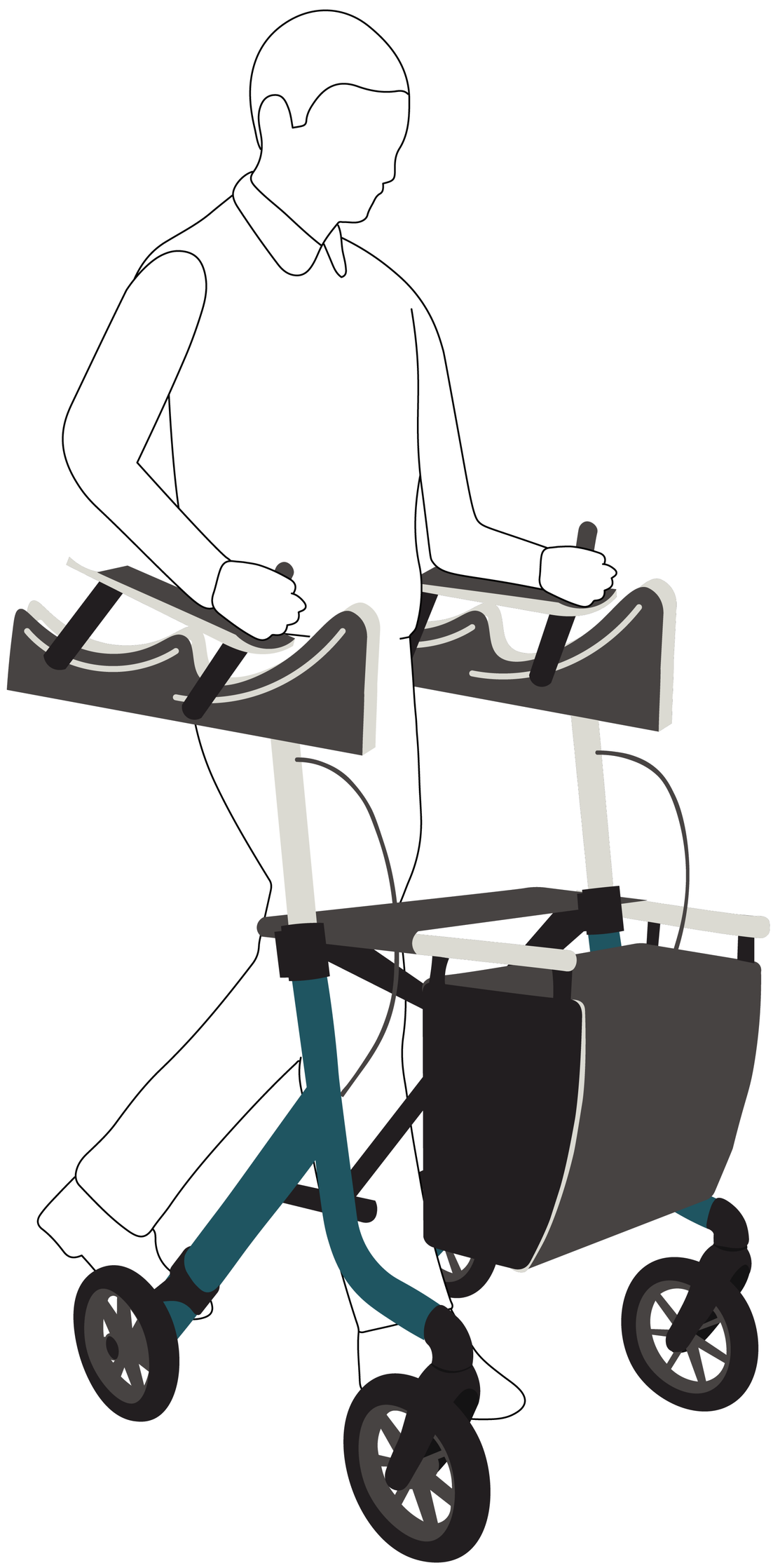
The aim of this project was to improve traditional rollator designs by addressing limitations in safety and ergonomics.

Current rollators often restrict arm movement, which is a key component of natural gait. Research suggests that natural arm swing improves walking stability, especially for elderly users. This inspired the creation of a rollator that allows users to swing their arms freely, mimicking the motion of natural walking.

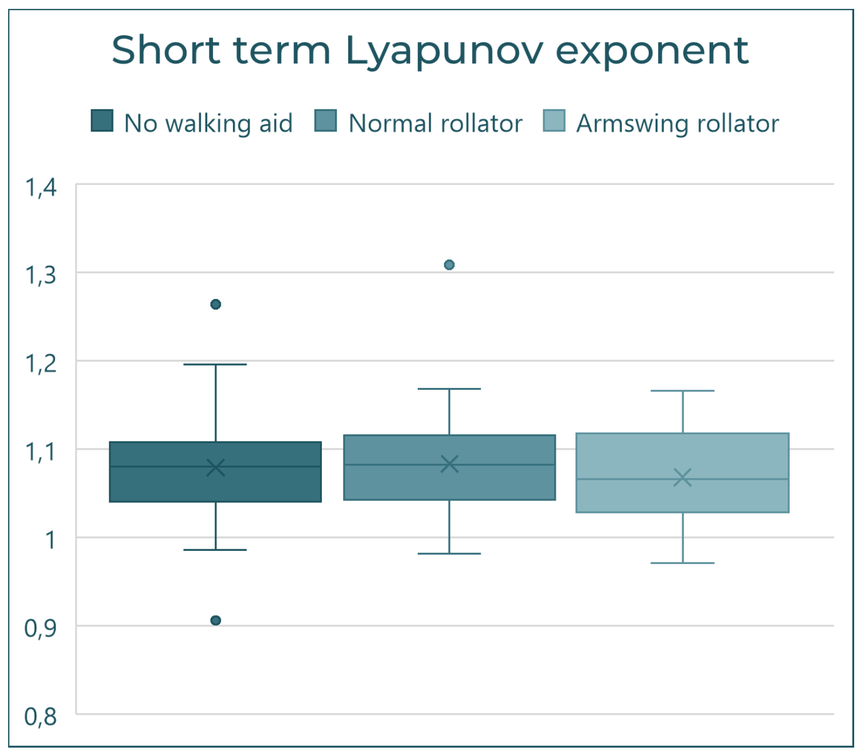
The arm swing rollator

An experimental redesign of the rollator for improved safety and ergonomics



The design incorporates a unique arm swing mechanism positioned beneath the shoulders, with raised underarm supports that enhance posture and facilitate smooth steering. The rollator's adjustable width accommodates users of various sizes. By enabling natural arm movements, the rollator aims to improve gait stability and provide safer walking experiences.

To evaluate the design, tests were conducted using ten student participants who simulated reduced stability with balance distortion platforms. Stability was defined by the Lyapunov exponent, which is calculatuted using the tracked mediolateral body movements.



The Lyapunov exponent defines the walking stability. The lower the score the more stable the gait.

Surprisingly, results showed no significant stability improvements with the arm swing rollator or the traditional rollator compared to walking unaided. However, participants reported feeling more supported and experiencing better posture with the arm swing rollator.

Future research should refine the prototype by reducing mechanical friction. Testing should involve elderly participants who more closely align with the target demographic. Employing advanced tracking technologies, such as IMUs, could enhance the precision of stability measurements.

Although this project did not yield conclusive evidence of improved stability, it highlights the importance of rethinking rollator design.

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The arm swing rollator: An experimental redesign of the rollator for improved safety and ergonomics
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