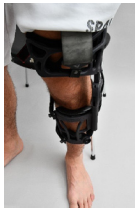
Empa
Materials Science and Technology

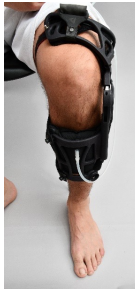
To support patients with movement impairments mobile robots or exoskeletons are used. Especially for patients with weak legs or stabilization problems, lightweight, unobtrusive robotic systems are beneficial. The involved electronics and motors produce heat and the mechanical parts need proper anchoring on the body parts.
As such systems are sometimes worn for several hours improvements for paddings and thermal comfort are essential.

Improvements for mobile robotic applications

Improvements for applications

Contact person
Martin Camenzind
Martin.camenzind@empa.ch
Biomimetic Membranes and textiles
Phone +41 58 765 73 42





Patients with movement impairments can use mobile robots or exoskeletons for support. The range of available systems includes rigid, motorized systems for textile integrated solutions, which either take over movement completely or just support wearer own movement. Especially for patients with weak legs or stabilization problems, lightweight, unobtrusive robotic systems are beneficial.

Improved padding

Inflation of airfilled structures can be used as padding adapting to the body and rigid surfaces. Such pads will reduce pressure points and enhance wearing comfort. By varying the amount of air, the mechanical properties can be adapted selectively. This is important for force anchoring points (higher air volume) and periods of rest (deflated). The air filled structures are produced by laser welding using water vapor permeable membranes.

Improved thermal comfort

Normal heat and moisture exchange is hindered in the back and hip area (belt) due to the added material and heat production of the motors and the electronics. A thin, flexible spacer fabric attached to vents was used to enhance wear comfort by active ventilation. The active ventilation unit is currently attached to the belt and backpack of the system and could be fully integrated in the future.

Both measures significantly increase wearing comfort and will allow the use of such a system over a longer period of time.