

An overview of head support solutions for people with reduced or altered head mobility

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Introduction

This research is part of the TTW program Symbionics which aims at creating assistive devices which are able to adapt automatically to the user. Advancements in the design of wheelchairs will allow the user to adapt their posture more easily for a certain activity, social situation or comfort [1]. To ensure proper support of the head, it is of high importance to adapt the position of the head accordingly [2].

Aim of the project

- To create an overview of existing wheelchair mounted head supports;
- To develop prototypes of dynamically adaptive head supports, based on identified opportunities.

Prototype development

Several assistive devices exist that can support a person's head position. However, there is a lack of devices that are capable to support head movements in a natural and safe way. In this project, the focus is on developing user interface concepts which provide more intuitive adjustment of the head support. Subsequently, a prototype will be developed which can adapt automatically to posture changes.

Functionality is currently being tested on a system level. Future research will include testing the developed prototypes and user interface concepts with end users.

Results

Non-adaptable



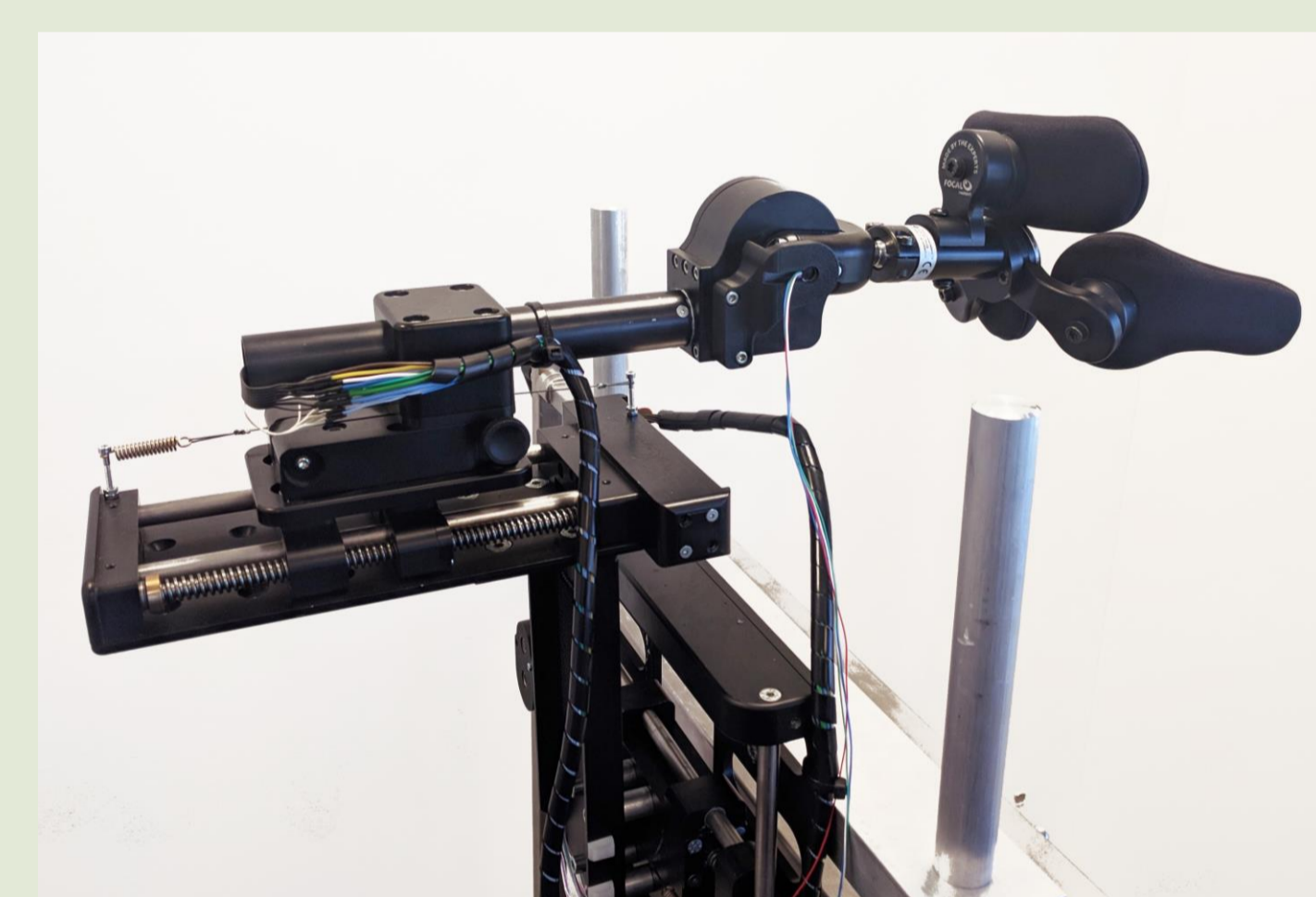
Adaptable by user



Adaptable by caregiver/expert



Adaptive to user (proof of principle)



Existing wheelchair mounted head supports

Head supports of varying complexity have been identified. Devices were categorized with respect to type of interface with the user, functionality and amount of adjustability in the system. Head supports which enable the user to adjust the head support position incrementally can be regarded as current state of the art.

Discussion/Conclusion

There is a need for assistive devices which are able to combine changes in position of the trunk and/or head with continuous stabilization of the head. To serve this need, new prototypes of head supports are being developed which will combine intuitive user interfacing with automatic adaptation to changes in posture.

References

- 1) Inskip, J. A. et al (2017). Dynamic wheelchair seating positions impact cardiovascular function after spinal cord injury. PLOS One, 12(6)
- 2) H. A. M., & Haaster, F. A. C. van. (1995). Het zitboek - Zithoudingsproblematiek in rolstoelen.
- 3) <http://www.aelseating.com/c-63-tri-pad-headrest-pads.aspx>
- 4) <http://www.dynaproducts.nl/nl/product/dynaparts/hoofdsteun-max>
- 5) <http://www.medifab.com.au/products/wheelchair-seating/savant-wheelchair-headrest-system>

Acknowledgements

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