Development of an assistive soft exoskeleton – a multistakeholder endeavour
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Aim
Development of a soft and modular exoskeleton to assist people with mobility impairments, which incorporates the needs and requirements of future users.

Methods

Patients (primary-users), n=8
- incomplete spinal cord injury
- hemiparesis post-stroke
- age-related weakness

Caregivers (secondary-users), n=8
- professional: physiotherapists, occupational therapists, nurses
- non-professional: relatives

Procedures
- formulation of basic requirements based on use-case derived from primary-user interviews
- testing of 4 prototypes
  - primary-users: function, usability
  - secondary-users: rating of videos using questionnaires and interviews

Results
Changes achieved throughout prototype development:
- Function
  - notable active support
  - ankle dorsiflexion & hip flexion assistance well received
  - suitable for limited users
  - too noisy

Design
- improved appearance
- donning/ doffing improved but still too slow and complex
- garment material potentially too warm
- backpack heavy and bulky

Conclusions
- Primary- and secondary users of a technology should be involved in the development from the very beginning.
- The choice of users and the level of involvement must be considered carefully and be adapted to the level of development.
- All stakeholders should acquire basic knowledge and perspectives of the other involved disciplines.
- Physiotherapists play a key role by bridging user-perspectives with that of engineers.

References

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