Presentation: Motion controlled arm support

L.A. VAN DER HEIDE, G.J. GELDERBLOM, D. VAN DER PIJL, L.P. DE WITTE. ***User experience guiding the development of a new robotic motion controlled arm support.*** *Gerontechnology 2012;11(2):372;* doi:10.4017/gt.2012.11.02.556.00 **Purpose** Decreased arm function in neuromuscular diseases (NMD) and progressive neurological disorders can lead to a limited ability to perform activities of daily living (ADL) and influences independence negatively. Arm supports are dynamic assistive devices supporting the users' arm against gravity and therefore enabling ADL-performance. Existing arm supports can offer improvement but still have shortcomings. The McARM-project will develop a motion-controlled robotic arm support, for those who cannot use currently available devices. To learn how current devices meet the needs and preferences of users, this first step in the development process aims to identify effects at the level of activity of currently available arm supports and their limitations. **Method** Seven arm support users were involved in a face-to-face semi-structured interview and observations on standardized task execution by an occupational therapist (OT). The interview consisted of the ADL part of the long version of the Life-Habits questionnaire (3.0)[1] , importance of the activity was added as an additional question on each ADL. The Brooke scale[2] was administered to measure arm function. The execution of six common ADLs was assessed by the OT. During both the interview and the observation subjects were encouraged to explain the nature and origin of occurring difficulties. This narrative was recorded, transcribed, and qualitatively analysed. A systematic review was performed in Pubmed, Cinahl, and the IEEE database on effects of arm supports on the ability to perform ADLs. **Results & Discussion** Of the seven interviewees three wheelchair-bound users made daily use of their arm support. The remaining four made limited to no use of their device. These participants either had too much arm function to benefit from an arm support (1) or were able to perform tasks by means of compensating movements of the trunk and shoulders (2) or had no opportunity to make use of the device due to being restricted to bed temporarily (1). In two cases, the device was fixed to a desk, which made use of the device at other locations impractical or impossible. Participants use the device in ADLs such as eating, drinking, using the computer, brushing teeth, or blowing their nose. Analysis of problematic life habits revealed that with the device, subjects experienced difficulties in reaching distant objects, picking up items, fixation of the wrist, or lifting weight with the hand. Practical limitations encountered were clashing of the arm support and in general that they take up too much space. Based on the interviews, it can be concluded that the studied arm supports can positively affect the ability to perform ADLs, but practical limitations have to be taken into account. A study performed on one of the arm supports (the WREX) endorsed use of the device as determined by the functional/benefit ratio[3]. There is little evidence from literature on the effects of arm supports on ability to perform ADLs. As a result of the in-depth interviews performed, the development of arm support may need to be revisited.

References

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Figure 1. Arm support in use