Recommendations for clinical practice based on systematic review about environmental control systems and smart home technology on activity and participation, quality of life, and user satisfaction.

Based on publication by Åse Brandt, Kersti Samuelsson, Outi Töytäri, Anna-Liisa Salminen:

The review aimed to examine activity and participation, quality of life, and user satisfaction outcomes of environmental control systems (ECS) and smart home technology (SHT) interventions for persons with impairments. The review covered the period January 1993 – June 2009 and identified 1739 studies, of which five effect studies and six descriptive studies were included. One study was on SHT and the remainder on ECS; functionalities were overlapping.

The studies varied in most aspects, and no synthesis could be drawn. In addition the level of evidence was regarded as low, mainly due to small study sizes, lacking confounder control, and a majority of descriptive studies. However, ECS/SHT tended to increase study participants’ independence, IADL, socializing, and quality of life.

The technologies especially enabled IADL and social activities [Boman 2007; Rigby 2005; Ripat 2006, Sundar 2006, Tomita 2007] and to a lesser degree basic ADL [Boman 2007, Rigby 2005]. Furthermore, the interventions tended to enable persons with impairment to continue living in a private home as shown by the RCT [Sundar 2006, Tomita 2007], supported by two descriptive studies, which demonstrated that the users’ independence had increased [Ripat et al 2004] and the need for care had decreased [Stickel 2002].

One study showed that users with cognitive impairment experienced an increased quality of life [Boman 2007] and four studies showed that the interventions had a positive impact on the psychosocial function of users with physical impairment [Jutai 2001, Rigby 2005, Ripat 2006, Ripat & Strock 2004]. This indicates that ECS and SHT interventions have the potential to increase the quality of life for persons with impairment. In these four studies on the psychosocial impact of ECS and SHT interventions, the impact was higher than in findings in studies on other kinds of technological interventions, e.g., spectacles.

It is important to follow ECS and SHT intervention over time in the users’ homes since continuous adaptation and technological support often seem to be required [Stickel et al 2002].

In conclusion, there is some, but weak evidence that ECS and SHT interventions improve the user’s independence, IADL, socializing, and quality of life, why these technologies should be considered when relevant, but also carefully.

References:
Tomita MR, Mann WC, Stanton K, Tomita AD, Sundar V. Use of currently available smart home technology by frail elders: process and outcomes. Topics in Geriatric Rehabilitation 207; 23:24-34.
A systematic review was performed aiming to summarize and evaluate the knowledge about the effectiveness of lower limb prostheses for adults, primarily in terms of activity, participation and quality of life in real life contexts. Controlled studies and non-controlled follow-up studies including both baseline and follow-up data and published from 1998 until June 2009, were included. Out of initially 818 publications, eight studies met the inclusion criteria. It was not possible to draw any general conclusions or make suggestions for clinical guidelines based on the results of the review. However, individual studies showed significant improvements in one or more of the above-mentioned outcomes. Two of the studies had high scores on the internal validity evaluation (Hagberg and Gertzeli).

Four studies reported on the effectiveness of a microprocessor-controlled knee (MP-knee) compared to a non microprocessor- controlled knee (NMP-knee). Results were inconsistent except for quality of life, where three studies reported an improvement with the MP-knee compared to the NMP-knee (Kahle 2008; Hafner 2007; Gerzeli 2009). According to Kahle (2008) and Hafner (2007) user satisfaction was higher with the MP –knee, and according to Kahle (2008) the MP-knee decreases stumbles and falls. In addition, one study (Hafner 2007) showed that MP-knee improves patient’s ability to descend stairs and hills. Consequently it can be concluded that there is some, but weak evidence that the MP-knee is preferable to the NMP-knee.

The remaining four studies concerned a diversity of prosthetic interventions. Donovan-Hall (2002) compared a silicon cover to no silicon cover prosthesis. Using prosthesis with silicone cover showed an increase in engagement in activities, but no change in self-esteem, anxiety, and depression. Hagberg (2008) compared osseo-integrated (OI) prosthesis to non-osseo integrated prosthesis. Mobility, quality of life and use improved with OI-prosthesis. Selles (2005) compared total surface-bearing socket versus a traditional socket and could not find difference in mobility-related activities nor user satisfaction. Finally, Coleman (2004) compared elastometric suspension liner with distal locking pin versus a liner with neoprene suspension sleeve. Time spent on activities/day increased with neoprene suspension sleeve, but there was no difference in satisfaction.

Limited recommendations for clinical practice about effects of lower limb prosthesis on activity, participation, and quality of life.

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