

POSTER

Health and Self-Esteem

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Purpose Falls are a terrible affliction to the elderly, and a major resource consuming and expensive issue for US healthcare and healthcare worldwide¹⁻⁶. It is the clinical experience of the physician author, as supported by recent literature⁷, that many falls of walker dependent older persons occur when the person is not using their walker. There is also evidence that an ambulation aid is protective from serious injury when falls do occur⁷. Therefore, a technology that provides real time reminding for use of the walker, as a person comes to stand, may be important for fall prevention. Collaboration between a physical medicine and rehabilitation (PM&R) physician and electrical and computer science engineers is developing the "Reminding Walker" (Figure 1) device from a basic prototype to a well-engineered device suitable for human studies with elderly walker dependent persons. **Method** The "Reminding Walker" is an embodiment of a device described by US Patent 9180063 systems and methods for assisted ambulation⁸. This poster will present the advanced prototyping of the "Reminding Walker" using the Arduino microprocessor, distance and motion sensors, and wireless data transmission and storage module. **Results & Discussion** We will present an experimental protocol used to test the accuracy with which sit-stand movements can be determined by the device in various geometric relationships between chair and walker. We will present data from multiple trials with experimental subjects showing the accuracy with which the device can determine sit to stand in real time under different conditions of relative position and orientation. The "Reminding Walker" is a device that fits squarely within the purview of Gerontechnology, particularly as it applies to the 4th age, frailty and dependence⁹. It is an electro-mechanical Technology at the intersection of Medicine / Rehabilitation and Mechatronics / Robotics. The application domain is mobility and ADL related mobility. It functions as a cognitive orthotic to compensate for cognitive decline (or normal human inadequacies), with the purpose of improving the consistency of walker use, so as to prevent falls. Therefore, the "Reminding Walker" technology has goals pertinent to 3 of the goals of intervention in Gerontechnology: (1) Prevention of accidents: falls; (2) Technology that compensates for losses in cognition: provides cuing for use of the walker as a person stands; and (3) Care support technology used by professional or volunteer caregivers with the provision of information about physiological functioning to a remote location: information about the mobility status of the walker user is valuable for itself, and is a proxy for the person's overall health status¹⁰.

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Figure 1. Walker electronics (version 1)

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