

P. RUMEAU, V. PASQUI, N. VIGOUROU. **A generic method for the assessment of smart walkers.** *Gerontechnology* 2012;11(2):345; doi:10.4017/gt.2012.11.02.480.00 **Purpose** This paper presents a generic method to assess the usability of smart-walkers. With an increasing number of assistive robots available, it is important to make sure they work before making a choice. Mechatronic systems propose more functions that are of interest to the ageing frail or handicapped population than conventional walking frames. For example: helping the user to get up or to sit down, avoiding obstacles, finding directions, driving, etc. These systems are all research prototypes, except PAM-AID which was marketed under GUIDO™. Most of them were tested in order to validate their features either with healthy young subjects¹, or with elderly people². However, only PAM-AID was tried for its usability³. In that study the PAM-AID was compared to the AMD (Assistive Mobility Device developed by Atlanta VAMC which is totally passive and without sensors) and the user's usual walking aid. The test used in the evaluation protocol is a 36.6m course, without obstacles, with each of the three different technical devices. The time to complete the test and a questionnaire were included in the analysis. Our reports suggest that a generic method is needed to evaluate smart-walkers whatever their robotics features. **Method** The usability of smart-walkers was assessed with a normalized test used in geriatric medicine to diagnose frailty and walking difficulties: the 4-meter walking test. If the volunteer failed to complete the 4 meters, the protocol specified the test would stop at that stage. Failure of the 4-meter test was defined as taking over ten times more time to complete the test with a device than it would take volunteer walking usually (i.e. without aid or a different aid such as a cane). During the test, the volunteer was first trained to complete the test, then to complete it with first the regular walking frame and then again with the robuWalker. Training lasted as long as the volunteer wanted to feel sufficiently confident. Each test was run immediately after training with a new device (usual way of walking; walking frame; robuWalker). The method adds to the time of completion a gait analysis including the feet motion extracted from videos. **Results & Discussion** In a previous article we analyzed the completion time. However time is hardly sufficient to describe the required speed of an active smart walker, extra information such as trajectory, instant speed, distance to the marking, duration of double limb, etc. are also required. We applied to the 4m-test a gait analysis including feet motion analysis from the videos of our two groups of four healthy elderly volunteers and four impaired volunteers (with both motor and cognitive impairments) and three test conditions.

References

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Figure 1. Explanations of the use of robuWALKER to an older person before the tests