

J. Merilahti, T. Petäkoski-Hult, M. Ermes, M. van Gils, H. Lahti, A. Ylinen, L. Autio, E. Hyvärinen, J. Hyttinen. *Evaluation of new concept for balance and gait analysis: patients with neurological disease, elderly people and young people. Gerontechnology 2008; 7(2):164.* Supporting elderly people to live longer at home has benefits for both the citizens and the health care system. In this study we focus on possible service concepts which utilize technologies to be used in accident prevention, rehabilitation and improving safety at home. The aim is to develop and establish a new kind of service platform where public and private services and organisations collaborate for the patients and people's benefit. Fall accidents are a significant problem in elderly, which could be decreased and possible help could be provided by new services. There are indications that balance and gait problems are the most significant independent factors to predict the probability of future fall accidents among elderly people<sup>1</sup>. We selected 3 different groups with 20 persons each (patients with neurological disease, elderly people, and young people) to participate in the study in which we performed a Berg Balance Scale test<sup>2</sup> and a short walk test to measure gait and balance of the person. After the tests we interviewed participants about different topics concerning new services for the fall accident problem. Our objective is to find suitable technological solutions for identifying possible personal fall risks by measuring a user's health status at home. **Methods** During the tests we collected activity data with two 3D accelerometers; one attached to the person's lower back and the other to some other location which the person him/herself preferred (e.g., arm, trouser pocket, or neck). By collecting the person's kinetic data (e.g. with accelerometers) we can determine several gait parameters<sup>3</sup>. Additionally, a normal pedometer (Omron Walking Style II) was used during the walk test and video was recorded for later analysis. The analysis of data will concern correlation, e.g., of the accelerometer parameters with the Berg index and comparisons of signal quality for different accelerometer locations. Interviews after the recordings were performed to discuss with the participants about their general technological knowledge, suitable qualities for possible new services utilizing technology, personal health behaviour, experiences with fall incidents, and personal opinions about financing of possible new services. **Preliminary results** We collected material from 9 patients (5 males/ 4 females, average age 54, average Berg 42/56) with neurological disease, 15 elderly people (1 male/14 females, average age 78, average Berg score 44/56) and 15 young subjects (7 males/8 females, average age 27, average Berg score 56/56). According to the interviews usability and reliability were seen as the most important properties and unobtrusiveness was said to concern people least. Fear of falling is quite common among the elderly people and the patients with neurological disease. Most of the elderly people and some patients have unpleasant memory of fall accidents. Economical issues were also considered important and were emphasized more in the comments of the elderly people.

## References

1. Ganz DA, Bao Y, Shekelle PG, Rubenstein LZ. *JAMA* 2007;297:77-86
2. Wood-Dauphinee S, Berg K, Bravo G, Williams JI. *Canadian Journal of Rehabilitation* 1997;10:35-50
3. Moe-Nilssen R. *Clinical Biomechanics* 1998;13:328-335

**Keywords:** concept evaluation, fall, gait, balance

**Address:** VTT, Finland; E: juho.merilahti@vtt.fi