*O. Chenu, Y. Payan, P. Hlavackova, B. Diot, F. Cannard, J. Demongeot, N. Vuillerme. Preventing pressure sores in elderly persons using an embedded biofeedback system: A proof-of-concept study. Gerontechnology 2010;9(2):273;* doi:10.4017/gt.2010.09.02.142.00 **Purpose** Pressure ulcers represent one of the most common, disruptive, often disabling and life threatening conditions affecting older populations[1,2]. Whereas it can take only few hours for an ulcer to develop, complete healing can take many months. Accordingly, clinicians agree that it is far better to prevent bedsores than to treat them: "Preventing pressure ulcers is a 24/7/365 kind of job [...] and it takes tremendous consistency" (Jeff West, Qualis Health)[3]. This paper presents the architecture, the functioning principle and reports the results of a proof-of-concept study of the effectiveness of an embedded non-obstructive biofeedback system for pressure sore prevention in the elderly. This prototype was recently developed in TIMC-IMAG Laboratory in collaboration with IDS SA with the financial support of 'Bourse Innovation et Recherche Charles Foix of Pôle d'Allongement de la Vie'. **Method** Based on the concept of 'sensory substitution'[4], the general principle of the biofeedback system consists in supplying its user with supplementary sensory information regarding the detection and the localization of excessive (that is dangerous) seated buttock pressures. Indeed, contrary to young healthy adults, elderly people, known to exhibit somatosensory impairment, do not get the feedback arising from buttock area informing them of a localized excess of pressure at the skin/seat interface and the necessity to make adaptive postural correction to prevent pressure sores. This system (*Figure 1*) comprises three distinct components: (i) The sensory input unit, consisting in a computerized pressure mapping system put onto the chair, allows the real-time acquisition of the seated buttock pressure distributions; (ii) the processing unit allows the detection/localization of any excessive buttock pressure; (iii) the sensory output unit allows the user to be (a) alerted via wrist vibratory stimulation provided by a home-made watch and (b) informed of the localization of the excessive seated buttock pressure via a visual display. This biofeedback device has been tested in 4 elderly persons. Seated in front of a DVD movie, they were asked to reduce their buttock pressure while using the biofeedback system. By computing the differences between the pressure map recorded before and after the provision of the visuo-tactile stimulation, we determined whether or not the postural responses were adapted, yielding a decreased pressure distribution on the seat/skin interface. **Results & Discussion** Results showed that older adults were able to use the pressure sores prevention device to avoid long overpressures at their buttock while having other perceptual/attentional recreational activities. Even though these preliminary results need to be completed and validated in a larger elderly population, they evidence the effectiveness of a visuo-tactile embedded non-obstructive biofeedback system for pressure sore prevention in elderly that could have great impact on the well-being and quality of life of ageing people.

**References**

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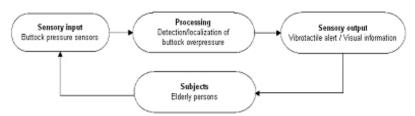
*Figure 1. Box diagram of the design of the biofeedback system*