

M. ITURBURU, E. ALDAZ, J. YANGUAS, C. ALDERETE, M. ALVAREZ DE ARCAJA. **User driven design of a smart rollator for rehabilitation after hip fracture.** *Gerontechnology* 2016;15(suppl):

127s; doi:10.4017/gt.2016.15.s.737.00 **Purpose** A first prototype of a four wheeled smart rollator (ANG-med1) has been designed and developed by INRIA (France) responding to the early user requirements¹ collected through a focus group held with care professionals at the rehabilitation floor of the Hospital Bermingham of the Matia Foundation in San Sebastian (Spain) and 20 interviews to patients operated on hip fracture at the same hospital within the RAPP Project². *Table 1* shows the functionalities developed and use cases implemented in the instrumented rollator to give response to the early user requirements. In the present study, ANG-med1 was tested at lab environment in Matia's facilities by researchers and caregivers to suggest improvements for the second prototype ANG-med2, which eventually at the end of the project will be used in real environment and tested by patients, caregivers and family members. The objectives of the this study are: (i) to test usability and accessibility of the first prototype of ANG-med1, designed to support the rehabilitation process after hip fracture, and (ii) to collect final user requirements for the design of the second prototype ANG-med2.

Method The prototype ANG-med1 was tested at lab environment by researchers of the Matia Institute (n=6; aged 35.3±12.5 years, 4 females and 2 males) and care professionals (n=11; aged 34.8±9.4 years, 10 females and 1 male) including gerontologists, physiotherapists and care assistants of the Hospital Bermingham. Afterwards, they answered an ad hoc questionnaire including questions on usability, handleability of the rollator, usefulness of the provided information on the screen and by the colour indicators, clarity of the users' guide and others.

Results & Discussion Results have been grouped in two topics, the former being related to the overall handling of the rollator and the latter regarding the performance of the defined exercises. Most participants indicated that the overall handling of the rollator was easy, as well as performing exercises with ANG-med1 (16 out of 17), but they recommended some improvements for ANG-med2 resulting in the final user requirements for the second prototype: (i) simplify the interfaces as much as possible to be more user friendly, (ii) provide multimodal information taking into account visual and or hearing impairment, (iii) the braking system and the speed of the rollator should be under control at all times to guarantee the safety of the older person, (iv) accessibility of the user identification device, the RFID tag reader should be improved, (v) accuracy and reliability of the measurements during the exercises should be improved, and (vi) communication language should be Spanish instead of English. After the testing of the first prototype ANG-med1, we can say that currently, the development of the rollator is in good track and that RAPP solutions meet most of the early user requirements defined, being mostly implemented. The ANG-med2 prototype resulted of the suggested improvements will be tested during the last 6 months of the RAPP project in real environments at hospital by patients, health professionals and family members.

References

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Table 1. Use cases and functionalities for ANG-med1²

User identification
Calibration procedures for the correct position and handles pressure
Correct position towards the rollator
Pressure on the handles
Dynamic exercises: Dynamic walk, Medical 10m walk, Timed Up and Go
Static exercises: Hip extension, Hip flexion, Hip abduction, Plantar flexion
Reports and indicators
