

ROOMMATE

IntegRated system of rObOts and Multimedia Monitors: technology for innovAtion and personalizaTion of rEhabilitation care

KEYWORDS

Neurorehabilitation, Assistive/rehabilitation robotics, Digital health, Continuum of care, People-centered care, Accessible care, Innovation adoption

DURATION

24 months

ABSTRACT

Rehabilitation of neurological disorders requires the development of an individual rehabilitation project and the definition of person-centered interdisciplinary care, provided across a continuum from inpatient to outpatient and home rehabilitation. There is an increasing pressure towards providing accessible care to the ever-increasing number of persons with neurological disability. Further, in the aftermath of the COVID-19 pandemic, a number of critical issues have emerged in the hospital setting including isolation, a reduced level of primary care, and limited hospital access. Thus, economic, technical and organizational hindrances to the integration of rehabilitation across all levels of the health system, require innovative and sustainable solutions. The crisis in traditional systems of care has accelerated the use of digital and robotic technologies, with important spillovers to the Health System, worldwide. However, some barriers still exist to the widespread adoption of this technological shift. As stated by the World Health Organization, the development of technological health solutions should be equitable and accessible to all end users. Thus, the involvement of patients, caregivers and health professionals in co-developing human-centered, accessible, user-friendly, effective, and reliable solutions is a crucial factor to the breaking down of such barriers. We aim to optimize current pathways in the rehabilitation of neurological conditions, by implementing bed-side intuitive technological rehabilitation stations that will vehiculate telemonitoring, educational and rehabilitation contents (e.g., videos for action observation, neuropsychological training), telerehabilitation with and without social robotic systems. The training and coaching into the use of technological solutions will facilitate their integration in the continuum of care. Indeed, personalized coaching in the use of technologies, provided by expert professionals is one of the key elements of ROOMMATE, to promote end users e-literacy and innovation adoption. The multimedia monitor apparatus that we will implement was originally developed to facilitate patients social interactions (e.g., video calls, messaging applications, virtual group meetings), promoting patient empowerment and quality of life, and to support health professionals in telemonitoring and planning inpatient care. The innovative integrated workstation that we will develop will enable patients to receive targeted educational contents, increase rehabilitation hours, diversify treatment, and promote self-management. Healthcare providers will be able to standardize and objectify functional assessment, by digitizing outcome measures (e.g., WHODAS 2.0) and validating sensor derived measures, and to provide therapy innovation and customization. The development of innovative technological rehabilitation solutions, based on the partners expertise, and on a co-creative approach involving patients and caregivers is the

other key element of ROOMMATE. We will follow an interdisciplinary co-creation process that will start with the collection of user needs (patients, caregivers and health care providers) and follow with the development, testing and implementation of technological solutions across the integrated rehabilitation pathway. Among targeted solutions, we will include: - a set of sensors to objectify movement analysis, - telepresence robots, - minimally actuated intuitive robotic solutions for upper limb rehabilitation already developed by the involved partners (TRL5-6), - immersive virtual reality environments using Head Mounted Displays (HMDs) that can adapt the level of complexity of the environment. Finally, the partnership will perform the clinical validation of the developed solutions in the clinical partners pilot sites, and will assess the organization, economic and management impact of integrating these innovative solutions in the continuum of rehabilitation care.

PARTNERS

PI	Organisation	Country
Doronzio	IRCCS Fondazione don Carlo Gnocchi ONLUS	Italy
Berteanu	Universitatea de Medicina si Farmacie Carol Davila	Romania
Cavallo	Dipartimento di Ingegneria Industriale, Università degli Studi di Firenze	Italy
Cecchi	IRCCS Fondazione don Carlo Gnocchi	Italy
Grünloh	Roessingh Research and Development B.V.	The Netherlands
Marchal-Crespo	Technische Universiteit Delft	The Netherlands
Randazzo	Emovo Care SA	Switzerland
Tamburini	MEDEA S.R.L.	Italy