

## Chapter 68

# Focus on Patient in Virtual Reality–Assisted Rehabilitation

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### ABSTRACT

*Since several years scientists are carrying on research about innovative systems, based on robotics, mechatronics devices and IT tools – especially the graphical ones – to support patients in rehabilitation programs for rescuing from various brain damages due to adverse events as stroke. Training sessions with a combination of robot and virtual reality (VR) lead to better rehabilitation outcomes than using only a robot and evidence from the field proved the importance of the use of VR interfaces in rehabilitation. The main aim of such a kind of environments is to monitor, motivate and drive the patient during the rehabilitation sessions. These systems mainly provide motor guidance and multimedia communication channels also measuring patients' performance and other observable variables. The approach implemented is usually based on gaming, where the patient has the key role to perform certain tasks or movements for controlling the game in the correct way and exercise the injured part. According to daily experience from physiotherapists, different aspects related to the physical and self-perceived patients'*

*state revealed to have a fundamental role in influencing the rehabilitation session. Indeed, the treatment result depends not only on motor skills but also on patient's personal behavior and feelings that are not directly investigable, observable and measurable from outside. In other words this kind of elements can only be assessed by subjective measurements (as questions, interviews, narratives) revealing the point of view of the patient. Moreover, the emotional state has implications at different levels: on one hand, it is important to evaluate if the single rehabilitation session affects the emotional state of the patient, on the other, if the performance was influenced by this state. Some answers of a questionnaire administrated to post-stroke patients in a previous study underlined also the need for the patient to focus his/her attention on the trained body portion and the relevance of a visual feedback on movements to increase self-awareness on the action performed, avoiding any possible distraction derived from other kind of tasks and related visual/auditory stimuli. Patient-centered models of care are actually becoming increasingly common among rehabilitation clinical settings. They help to focus the therapy on improving the treatment of those deficiencies that most influence the quality of life of the patient. Another important aspect is represented by the relationship with the caregiver that in virtually assisted rehabilitation would not be direct anymore and will need to be mediated without completely losing natural interaction. According to this patient centered vision, and in order to reduce possible side effects related to semi-automatic rehabilitation systems, it has been studied and developed a system which has not the aim of merely entertain the patient but to focalize the rehabilitation on him/her as a proactive character aware of what is happening and of the quality of the work performed.*

## **INTRODUCTION: A PATIENT-CENTERED VISION**

Different sociologists and physicians have underlined the changing of patient's position in medicine from a leading role to a supporting one. According to Nicholas Jewson (sociologist in seventies of nine hundreds), eighteenth century English medicine was gradually moving away from a model in which the patient had considerable interaction with the physician – and, through this consultative relationship, had an equal influence on the physician's therapeutic approach. It was moving towards a paradigm in which the patient became the recipient of a more standardized form of intervention that was determined by the prevailing opinions of the medical profession of the day (Jewson, 1974). The concept of patient in eighteenth century was holistic and oriented to the single person (Chin-Yee, 2015). The nineteenth century represented a transition towards “object-orientated” medicine (Jewson, 1976; Foucault, 2012). The examinations and medical investigations were the objective of studies more than the patient and his/her story. Despite criticisms that Jewson's vision arose, his point of view is confirmed by some case studies by Mary Fissell, a professor in the Department of the History of Medicine at the Johns Hopkins University: study of illness narratives at the Bristol Infirmary during the eighteenth century reveals a diminishing role of the patient history in hospital medicine (Fissell, 2005).

Engel, (1977) and Armstrong, (1982) analysed medical/patient relation in nineties but more focus on clinical psychology and bio-psychosocial concepts of illness underlined the status of the patient history in medical practice during the twentieth century (Engel, 1977; Armstrong, 1982).

“It is hard to escape the implicit conviction that laboratory and technologic data are more objective, and therefore more scientific, than the subjective information gathered by listening to a patient tell his or her story” (Henderson, 2012). This is the conclusion of the history of the Evidence Based Approach

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