

EXPERIENCES OF ROBOTICS AND DOMOTICS IN REHABILITATION

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Abstract

Introduction

The robotic technology and domotics (home automation systems) can be a great help to people with spinal injuries who have major limitations in the use of the arts, but there is necessary a specific protocol to provide to the patient a aids able to increase his quality of life.

Text

Robotics and domotics systems can really change the life to the people with spinal injuries; especially in the cases of major limitations in the use of the upper limbs; so generally the people think the use of technological aids should always applied but, our experience leads us to say that technology has always combined positive aspects and critical issues. In order to avoid wrong approach with the patient a preliminary work is carried out and it can be summarized in the identification of 'maximum tolerable level of technology by the user and his family'.

In order to provide an electronic device or system, with the purpose to increase the quality of life and opportunities for participation and inclusion, it is necessary that this process follows a well-established methodology and a multidisciplinary approach. Our procedure consists of 4 well-defined phases:

- 1) Analysis of user needs. At this stage we consider the type of disability, socio-familial, motivations, expectations, etc.
- 2) Finding aid. We consider the cost, flexibility in the use, the quality, the service and maintenance facilities near the patient's home.
- 3) Supply, application and customization of the device. This step necessarily involves installation and training at home.
- 4) Follow up of the process and corrective actions. In this phase we evaluate the whole process, we try to verify the real outcome on the patient and on the care givers; sometime we plan also new applications .

Will be presented two case studies. The first related on the application and customization of a robotic arm to a quadriplegic patient C3-C4, and the second related to the installation of a home automation system in a quadriplegic C5-C6 patient.

In the case of the robotic arm has been designed also the graphical interface for PC that allows the patient to move the various joints of the robot by mean a suited mouse or voice control.

In the case of home automation solution, we used a commercial system installed by a local technician; on the standard system we designed completely the user interface based on handheld. In this way the patient is able to use independently all the automations installed in his home.

Conclusion

Both cases presented have a high technological impact and a high implementations complexity that could lead to a failure of the project, but the proper planning of activities and specific work on the real needs of the patient has lead to a significant increase in independence and quality of life.