

Chapter 26

Sensorized Garments Developed for Remote Postural and Motor Rehabilitation

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ABSTRACT

Every day, all around the world, millions of people request postural and/or motor rehabilitation. The rehabilitation process, also known as Tertiary Prevention, intends to be a sort of therapy to restore functionality and self-sufficiency of the patient, and regards not only millions of patients daily, but involves also a huge number of professionals in medical staffs, i.e. specialists, nurses, physiotherapists and therapists, social workers, psychologists, physiatrists. The care is given in hospitals, clinics, geriatric facilities, and with territorial home care. For the large number of patients as well as the medical staff and facilities necessary to support the appropriate postural and motor training, the monetary costs of rehabilitation is so large, it is difficult to estimate. So, every effort towards a simplification of the rehabilitation route is desirable and welcome, and this chapter covers this aspect.

INTRODUCTION

Nowadays in the world there are about 600 million of people with various types of disabilities (Fifty-Eighth World Health Assembly) with respect to a total world population of around 7 billion of persons. This number is rapidly increasing since the

population growth rate, the increasing average age, the malnutrition, the violence (especially domestic ones), the environmental degradation, the diseases (such as AIDS, malaria, Ebola,...), amputations, medical treatments, or finally because of injury reported in various type of accidents (work, road, sport, guns, etc.).

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From an analysis of available statistical data on disability, it results that each country has a different concept of “disabilities” and their cares. There are situations for which the disabled person is considered who doesn’t have a dignified life, and therefore live in extreme poverty. Other societies consider the disability the condition for which it is not possible to work continuously, and others that define people with disabilities just who needs government support to live. Finally, some countries consider disabled only those persons with a form of physical disability or who are suffering from physically debilitating diseases like multiple sclerosis can be.

Focusing only on people with physical impairments, the 80% of them live in poverty and therefore have no care taking, and it cannot be otherwise since in the world there are only just more than 300,000 accredited physiotherapists capable of giving support to physical deficit. The percentage of disability shows a great variability between countries from 0.2 to 20.9% with respect the population, especially regarding the degree of disabilities. The average prevalence is approximately 10%, half of which 5% is from moderate to severe conditions. In the year 2000, the 70% of disabled were living in developing countries and only 3% of them were appropriately treated (WCPT Quadriennial Report 2003-2007; Takahashi et al., 2003).

Rehabilitation care cannot reach all patients and this is a problem both for developing than developed countries. In fact only 50% of States are able to provide the necessary care and the disabled population that can be medical treated is about 20% of the total. All around the world there are Nations that haven’t the capability to do this at all. The distribution of physiotherapists around the world is indicative: in developing countries there is 1 physical therapist every 550,000 patients while in developed countries this ratio is only 1 every 1,400 patients (WCPT, October 2003). The point is also that a patient who claim rehabilitation need not only of therapists but also of many

other medical and non-medical staff figures, as Figure 1 summarizes.

The care can be given in hospitals, clinics, geriatric facilities and with territorial home care. So, we have to consider that not only the real treatments of the patients have their costs, but also costs which come from the necessary environmental structures. In Table 1 a brief summary of setting and purpose for the rehabilitation evaluation (Ganter et al., 2005).

Let’s consider some detailed examples of data regarding consistent part of the world of numerical values to be considered in rehabilitation course.

The percentage of disability in the United States of America is around the 12.1% with respect the overall population. There a disabled person is defined as who is deaf or has serious difficulty in hearing; who is blind or has serious difficulty seeing even when wearing glasses; who has serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition; who has serious difficulty walking or climbing stairs; who has difficulty dressing or bathing or has difficulty doing errands alone such as visiting a doctor’s office or shopping because of a physical, mental, or emotional condition (www.bls.gov). We can guess as the 1/3 of percentage of them regards people with motor deficit.

Table 2 shows the number of people with/without disabilities with respect the level of employment in the U.S.A., comparing the same months of the current and last year.

Reporting another example, we focus on the situation of disability in Europe, represented in the chart below (ANED, 2009), in terms of overall costs with respect to the percentage of Gross Domestic Product of each Country (see Figure 2). The overall costs are here be considered the mere rehabilitation ones and the social costs supported by the community too.

The decision to propose the situation in economic term is due to the fact that the European Union is composed of very different countries,

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