Construction of an automated table standing

R E Neira, M D Barbero, E A Di Giulio, J F Folco and G F Jiménez

Universidad Tecnológica Nacional, Facultad Regional San Francisco, 501 University Avenue, (2400) San Francisco, Córdoba, Argentina

E-mail: rneira@arnet.com.ar

Abstract. In this paper, the construction of an upright stretcher designed for patients in rehabilitation. The standing back to patients' expectations of therapeutic improvement, allowing correct all the troubles of a passive long. It has been shown that this table favors not only physically but also has a psychological reach beyond the scope of physical therapy and strongly affects the recovery. At the same time, the use of an upright stretcher greatly decreases the biomechanical disorders of hospital staff in the process of recovery. Thus the problem of rehabilitation of trafficking in a comprehensive way which not only focuses on the patient's undivided attention but also includes medical and auxiliary personnel.

1. Introduction

The axis travel is finding a solution to a major health problem is the lack of proper equipment necessary in the treatment of patients suffering from immobility associated with neuromuscular disorders and/or cardiovascular diseases, which involve evolution disabling sequelae. This is why there is a need to regain standing in mechanically assisted as part of the successful outcome of such treatment [1].

Defined from the rehabilitation aspect, the standing engine is a major milestone, which returns the expectations patients therapeutic improvements, allowing correct any disorders passive supine posture long as they are not anti-gravity postures appropriate.

A neurophysiological level the human nervous system is programmed motor sequences of movements and postural coordination program, which are the settings in different muscle groups to facilitate implementation. These adjustments help in the planning and the intent of the movement [2,3].

Reaching the standing position by any means or method, allows treatment to begin rehabilitation in the patient a great stage, whose scope is beyond the scope of psychological and physical therapy impact on its position vigorously address the problems imposed by their position [4-8].

Empirically analyzing variables of an adult male patient population of an average weight of 82 kg, with involvement of cardiovascular disease and nursing staff (nursing, kinesiology, speech) of female majority, result: an immobilized patient beyond expected and nursing staff working conditions based on biomechanical disorders, such as diseases of backbone, arthritis of multiple joints, among others. These are health problems associated with highly relevant to the quality of institutions working with these patients.

Since the 60's to date there has been a major shift in approach to the problem of rehabilitation: the interest of nation states, provincial and municipal is no longer exclusively focused on patient care but is addressed a more integrated way, which includes medical and auxiliary personnel. They are making great economic efforts to address this problem more comprehensively.

This brings greater responsibility in the area of health, to provide rehabilitation services appropriate technological and human capacity for.
In return, to deal with this new technical necessity, shall be studied and relate new materials, conduct a thorough systematization of production, resulting in better products, more affordable and more competitive.

2. Materials and methods

By working with patients who need to recover the standing, we chose to work with an element commonly used in health institutions, such as the horizontal fixed table. These are used for the transfer and management of patients with many limitations. To assist affected staff, we designed a special table with a base in tubular welded metal and painted with epoxy material to meet the rigorous standards applied to these elements. This database is based on wheel slip and equipped with emergency brake. In addition, the base material has rolling environments that support health, even with spilled liquids. For stress analysis supported by the structure, we used a design and simulation software as SolidWork, to visualize the areas of greatest demand in the structure so we can strengthen them, taking into account the most unfavorable position of the table (vertically).

The bed is built on a tubular metal base secured by screws flat wooden structure with high density polyester material 100 mm thick and covered with a special leatherette fabric visible seamless for easy cleaning and replacement.

For lifting the stretcher from the horizontal position at the bottom of the base metal, placed an electronic actuator taking into account the minimum maintenance time. Other options were analyzed lift (air, water), which were ruled by the requiring special maintenance and high initial cost. The actuator selected was WB10-24-650-9-304, 8 provided by the Company for Mechanical Industries Welter, it has an operating voltage of 24 volts, a maximum load of 650 kg, a maximum load speed of 9 mm / sec and a piston stroke of 304.8 mm.

The union of the stretcher to the metal base was made using a non-skid device mounted on bushings that allow the rotation of the table in a horizontal position to vertical.

The stretcher has footrest, supports tape to prevent knee flexion and trunk inclination, and wheels that allow mobility within the hospital environment.

For the electronic control of standing, was added to the base keyboard commands an electronic board that contains the elements to store the instructions where medical personnel program the number of positions up the table (required angle) and the time spent at each station stop. This task can be performed by medical personnel without difficulty due to the simplicity of the commands sent to the electronic actuator and allows you to change your routine, your stop and back flat. This system provides protection against overload stress and emergency system to return to the horizontal position.

3. Results

Through a study of existing elements applied to improve the patient's condition in the process of standing, it appears that they are poor, inadequate and high cost, usually through outside sources. With the design and development of this automated table we can improve patient mobility and reduce substantially the problems of caregivers, reducing their working conditions and improving the quality of life of patients and medical personnel and support staff.
The design and development of this table, see Figure 1, is made entirely in the local, and industrial production will bring many benefits in this area, by leveraging the technical and intellectual capacity of their community, gaining recognition regionally and nationally.

The cost of building a prototype is estimated to amount close to $8,000 pesos, an amount that is substantially reduced if the production is done on a large scale.

4. Conclusions

No longer discusses the need to monitor the patient in all stages of rehabilitation, nor the work of the staff concerned, but we must approach this task so that the effort is directed to patient care and spend time at a routine process, mechanical and slavish times.

The physical consequences they would suffer serious medical and support staff negatively affects the provision of the service.

Regarding the automated table is noticeably better than others on the market because it allows the management of a person regardless of size or physical condition of the therapist. In addition to regular digital control allows programming of time standing, angles required and can be performed by medical personnel without difficulty due to the simplicity of the commands sent to the electronic actuator.

By treating the patient's rehabilitation process in a comprehensive way, the improvements obtained with the use of automated litter standing are designed not only the patient but also to medical and auxiliary personnel.

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