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Robotic equipment in upper limb amputations

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Abstract

Clavicle fracture account for 2.6% of all fractures. >75% of these are midshaft fracture. Overlapping in multiple fragment fracture result in shortening of the shoulder girdle at the fracture site which leads to poor cosmetic and functional result. Classification of Clavicle Fractures: Group I: Middle third- Most common (80% of clavicle fractures), Group II: Distal third- 10-15% of clavicle injuries, Group III: Medial third-Least common (approx. 5%). Rockwood & Green's Fractures in Adults- As anyone who has treated this injury is aware, discussion of universal healing rates after clavicular fracture is overly optimistic. Recently, investigators have discovered that union after midshaft clavicle fracture is not as universal as once thought. Moreover, certain types of clavicular fractures have declared themselves to be problematic. Finally, there has been newfound interest in the treatment of problem fractures and nonunion. Recent data based on detailed classification suggests that incidence of nonunion in displaced clavicle fractures is between 10-15% Brinker MR, Edwards TB, an The human hand is a very important member in our daily life, it is necessary in any activity. However, loss as a result of trauma, accident or other cause can have a detrimental effect on the individual's personal, social, psychological and economic life.

Keywords: Fracture; TB; Orthopedics

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Introduction

Therefore, the establishment of a robotic device to restore the important functions in the simulation of the functions of a biological standard is of interest. We have the honor to present a robotic device, which served to the patients, who lost upper limb, to have a bionic hand under the vocal or myo-electrical command, and which can reproduce the movement's elementals of a biological hand. During the design and manufacture of the equipment, we tried to respect the biomechanical rules of the physiological principle. We will present the different stages of realization and manufacture of this robotic device, as well as a demonstration. The manufacture of the equipment passes through the main stages: 1. 3D modeling: it is the geometric design of all the pieces on a computer, but also to export these pieces in the form of a file accessible at any time. 2. 3D printing: it consists of converting a virtual computer file into a real object, via a 3D printer. All the printed parts are brought together to form all the equipment. Motorization and implementation of the electronic circuit: we installed servo-engines (one responsible for the pronation / supination of the forearm and 5 for the mobilization of the fingers). These servo motors are connected to an electronic card with a programmable microprocessor. Amputation is a big problem; this bionic hand is an ultimate solution for these patients and allows them to recover their hand functions.

In today's culture, about one million limbs are amputated each year due to accidents, war casualties, cardiovascular illness, cancers, or congenital defects. Robotic prosthetic limb is a well-established research area that combines advanced mechatronics, intelligent sensing, and control to achieve higher order missing sensorimotor functions while preserving the physical appearance of an amputated limb. Robotic prosthetic limbs are projected to replace an amputee's missing limbs, restoring lost capabilities and offering an appealing look. The main benefits include improved social contact, a more comfortable amputee living, and a more productive amputee in society.

Significant contributions have been made in this field during the previous few decades as sensor technology has advanced. Much of the work is still in the research phase, and further research and development work is expected in the next years, with the ultimate goal of producing a device capable of producing human-like motions.

Proposes a multi-degree-of-freedom hybrid driven transradial robotic prosthesis Individual and decoupled joint control, as well as electric or body-power actuation, are used in the majority of hybrid prostheses. The authors of this study have contributed to the development of a robotic prosthesis known as HyPro. It employs a hybrid powering idea to restore grasp functions comparable to those of a biological hand. HyPro is a 15-degree-of-freedom underactuated robot that can perform five grasping patterns: power grip, tip grasp, lateral grasp, hook grasp, and index point. The underactuated mechanism uses electric power in the pregrasp stage to produce the requisite hand preshaping for a certain grasping pattern, and body power in the grasp stage to complete the final clutching movement.

It is critical for foot prosthesis to have adaptive skills in order to do the essential actions of lower-limb amputees that the natural foot can. The authors of one article used the PRISMA approach to conduct a systematic review to better understand the design concepts of adaptive foot prostheses. They also explored the requirements and design constraints of adaptable foot prosthetics. Adaptive foot prosthesis have also been classed and compared. The authors predict that future adaptive prostheses will use energy regenerating methods and will be more user-friendly.

Articles emphasised both the promise and the obstacles that the development of robotic prosthetic limbs faces. Their studies also highlighted the crucial need for greater research in the design and control of robotic prosthetic limbs. In conclusion, this special issue presents an overview of the current state of transradial and transtibial robotic prosthetic limbs., which restricts our findings.

The time spent in a sling and the initial treatment may have influenced early healing throughout the first six weeks, but we are unable to comment further on this based on our data. In terms of returning to training and competition, the population studied may not be directly similar to professional athletes. Although the evidentiary base for this is limited, acute plate fixation is regarded to be preferable in such instances.

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