

## Upper limb exoskeleton through pneumatic muscles

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**Background, Motivation and Objective.** Chondrosarcoma is a cartilaginous tumor of malignant origin, which occurs most often in adults. If this type of tumor does not respond to chemotherapy and radiotherapy, the solution existing nowadays to minimize the damage caused by disease is the surgical intervention with resection of the affected segment. Tikhoff-Linberg surgery is sometimes necessary, this technique consists of extra-articular removal [1]. There is an estimate of the growth of malignant neoplasm cases and requiring an increase of robotic devices to assist in the rehabilitation [2, 3]. The objective of this project is to develop a prototype exoskeleton of upper limb that performs movement in the elbow joint with the help of pneumatic muscles, from commands given by electromyography (EMG) signals.

**Methods.** It is understood in construction of a pneumatic muscle and program of the electronic control system and acquisition EMG. The pneumatic muscle components are latex, nylon and aluminum clips [4]. The EMG signal from the job authors themselves will activate the device [5]. This system will include amplifiers, electronic filters and digital processing.

**Results.** An initial prototype with iron structure was developed (Fig. 1). The device allowed extension and flexion control from the EMG signal of the brachial biceps.

**Figure 1.** Prototype of Upper limb exoskeleton through pneumatic muscles



**Discussion and Conclusions.** This project may assist in the rehabilitation of patients who have undergone degenerative upper limb movements or amputation surgery. It is hoped to collaborate with the independence of persons with reduced mobility of the upper limb.

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