

DESIGN OF A RUBBER SPRING FOR ARM-LIFTING DEVICES FOR DUCHENNE PATIENTS



Healthcare is driven by increasing the comfort and the independency of patients. This implies that they need tools helping them to master their daily life. These can be grippers or spring-arrangements to reduce or replace the force necessary to lift things with their hands and arms. For the arm-lifting devices, the key parts are springs, which need to be made from elastomers as they have a very high energy density and elasticity.

Objective

Duchenne patients are losing successively their muscular strength. In order to be able to lift things with their hands and arms, they need to be supported by an arm-lifting device (see Fig. 1). As the muscular forces are reduced with progress of the illness, an adjustable spring system would make this arm-lifting device more flexible and enable to always delivering the forces the patient needs.



Fig. 1 : A Duchenne boy using an arm-lifting device with elastomer springs i.e. the blue strip.

Assignment

In the existing arm lifting devices, a rubber band is used (see the blue band in Fig. 1). A first version of the material for this band was developed in a recent MSc assignment. However, a single rubber band as in Fig. 1 is not adjustable and would have to be retailed and replaced with time, when the patient slowly but steadily loses more of this muscular force. In order to overcome this problem, a new rubber spring design needs to be developed, which can be easily adjusted to the capabilities of the patients. Besides, influencing factors such as the friction properties need to be considered as well.

The practical work will be performed in the laboratories of ETE at the UT.

Report

The graduation report should contain the development of the new design, a first experimental setup of the new design and the experiences with it.

Partners

This project will be technically supported by Yumen Bionics. They develop arm-lifting devices for Duchenne patients. Yumen Bionics will give technical advice, and can do measurements with the new spring design for this application.

Start:

Earliest: September 1, 2020

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