



## Design and manufacture of an elbow-rehabilitation device for patients with tennis elbow syndrome

Poster Presentation

DOI: 10.22089/SSRC-13TH.2022.3946

Paper ID : 1750-SSRC-13TH

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### Abstract

**Background:** Tennis elbow is one of the most common upper extremity complications. This disease affects 1-3% of the total population. Pain in the external epicondyle of the elbow is a complication of this disease. Resistance to wrist extensions and strength hand movements exacerbates pain during daily activities, especially during exercise.

**Purpose:** The aim of this study was to design and manufacture an elbow-rehabilitation device for patients with tennis elbow syndrome.

**Methodology:** This device was designed in accordance with the advantages and disadvantages of existing devices to strengthen the elbow. At first, the initial plan was designed in Catia software. The main body of the device was made of iron. The device has two pieces that are placed on the forearm and arm segments and are connected by two rods. Compression and tensile springs with different stiffness coefficients are placed between two iron bars.

**Results:** The elbow-rehabilitation device is a new device in the field of muscle rehabilitation that works on the elbow joints. This device allows flexion and extension movements of the elbow to be performed forcefully. In this study, using springs with three different stiffness coefficients, the amount of force in flexion and extension movements can be increased up to about 30N (3 kg). By making springs with higher stiffness coefficients, the amount of force can be increased according to the individual's ability. Weak resistive forces (100, 150 g) are used in the design of mechanical devices because they facilitate joint range of motion and improve strength to a small extent.

**Conclusions:** The ability of this device is that the force can be controlled from a very small amount. Improves muscle mobility and strength with minimal inflammation. It is recommended to use the elbow-rehabilitation device for people with elbow pain to improve joint strength and mobility.

### Keywords

design; Manufacture; Elbow-rehabilitation device; Tennis elbow syndrome

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