Electronic Device to Aid in the Correction of Foot Drop Syndrome

Goulart, Rebeca (School: Escola Tecnica Estadual Henrique Lage)
Padrone, Eloah (School: Escola Tecnica Estadual Henrique Lage)

Nowadays, rehabilitation engineering and biomedical engineering are always creating new techniques in order to improve people's quality of life. When talking about foot drop or steppage gait, it is, in most cases, a consequence of a peroneal nerve injury, in which the injured person is no longer able to make the dorsiflexion movement (a movement in which the tip of the foot is taken upwards) which ends up making it difficult to walk and causing constant falls. Although an orthosis has already been developed to help patients, even with its use, the user's foot has limited mobility, being ineffective. Considering that, a device was developed that performs the dorsiflexion movement on the user's foot at the right times during walking, giving more flexibility to the user's gait. The device contains sensors, a stepper motor and a microcontroller, so that when the angle sensor detects that the foot is at a foot drop angle, it sends a signal to the motor, through the microcontroller, for the motor to lift the foot and lock. As soon as the ultrasonic sensor detects that the heel has touched the ground, it sends a signal to the motor to unlock, allowing the foot to return to the ground. Firstly, for the tests, a prototype was assembled simulating a leg, where the system was installed and where the parameters that would be placed in the programming of the circuit, such as angle, time and speed of the step, were adjusted. However, after observing an insufficient torque (due to the size of the lever), a second, more improved prototype was developed, correcting this error, and to be attached directly to the user's leg. At the end of this process, it is desired, with the authorization of the ethics committee, to test it on a person with the syndrome without the risk of accidents.

Awards Won:
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