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Design and Evaluation of a low Cost Electrical Muscle Stimulator (EMS) with Biopac

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The present paper is aimed towards designing a low-cost electrical muscle stimulation device and evaluating the muscle activity using high performance electromyography device, BIOPAC. The electrical muscle stimulator is essentially an electronic device which has the ability to contract the muscles via electrical current sent to the electrodes. The power of the device is provided by a 9 V battery, which ensures the portability of the device. The electrical muscle stimulation is provided mainly by two timers that are designed to carry electrical impulses and count them, a transformer, a LED that monitors the transmission of the impulse and three potentiometers which are used to change the length, the duration and the amplitude of the impulse that will be sent to the muscle via electrodes. This type of electronic device addresses patients with cervical spine pain, to increase muscle strength, warming and relaxation. By using this EMS device in certain pathologies of the neck, the patients are able to relieve neck pain without using medication. Biopac is used for evaluating and monitoring differences between a natural and an electrical stimulated contraction.