

## Reducing Painfulness and Labor Intensity and Increasing Accuracy of Tests in Needle Electromyography

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### ABSTRACT

Needle electromyography has a significant role in diagnostics of neuromuscular diseases. The drawback of this research is that it is a painful, lengthy, traumatic procedure for the patient and a difficult and laborious one for the doctor. Routine electromyography takes 0.5-1 h during which the electromyographer constantly moves the needle electrode to and forth in order to obtain optimal location against the motor unit fibers. As a result, the procedure causes persistent pain to the patient and is labor-intensive for the physician. This is particularly true for single fiber electromyography. This test requires proficiency of the electromyographer (manipulating with the electrodes within tenth of millimeters) and collaboration from the patient. Even an electromyographer highly experienced in this methodology needs from one to several hours to conduct the test. A new type of needle electrode has been developed by us - a telescopic electrode, acknowledged as an invention by the state. It represents a hollow needle with lengthwise groove in which the dielectric rod is located with a microelectrode affixed on it. During the test the hollow needle is immobile inside the muscle, only the dielectric rod is moved, thus sharply reducing the painfulness of the process. A needle electrode may be connected to a micro screw, micro electromotor and be equipped with relevant software, which significantly reduces labor-intensity of the routine needle electromyography and single fiber electromyography in particular. Accuracy of the test has greatly increased - measuring the transverse dimension of fibers of separate muscles has become possible. New parameters for assessment of functional state of neuromuscular system are proposed.

**Keywords:** Routine electromyography, Single fiber electromyography, Needle electrode, Motor unit, Telescopic needle electrode, Microelectrode

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