

Motor unit and Electromyogram (EMG)

Motor unit:

A single motoneuron and its axons supply not only a muscle fiber but several muscle fibers. The muscle fiber that is supplied by one motoneuron through its single axon along with branches are called a Motor Unit. Numbers of muscle fibers in motor unit varies. It has been observed in cat leg muscles that approximately 120, ~165 fibers are present in one motor unit.

EMG

A motor unit activity is recorded by inserting coaxial electrode in to the muscle that is to be studied. Then the electrode are connected to the electromyography. A recording is obtained during muscular activity. This recording called an electromyogram.

A hypodermic needle can be made in to a coaxial electrode introducing an insulated inner wire with in it. Potential differences is recorded from small volume of the muscles in immediate neighborhood of the needle tip. Thus, it is has been observed that most of electrical activity is from the active fibers near electrodes . Sometimes, surface electrodes is used in stead of coaxal deep muscle electrodes. In this recoring method, two surface electrode is placed on the skin overlying muscle, which is to be studied, at the reasonable distance

When the muscle is at rest there is no action potential recorded but as soon as the muscle become active, potentials are recorded. The potential recorded during Activity is as a result of the asynchronous discharge of motor units in the vicinity of the electrodes. During minimal voluntary activity, only a few number of motor units discharges, and as voluntary effort increases the more number of units is activated. This is called as recruitment of motor units Gradation of muscular activity is a part of the function of a number of motor units activated. Electromyographic studies have clinically importance in diagnosiz of motor unit disorders including peripheral nerve injuries, neuromuscular disorders such as myotonia and myasthenia gravis, so on and so forth.