Motor unit's relation with Electromyogram (EMG)

A single motoneuron and its axon innervates supply not only a muscle fiber, but also several muscle fibers through its axon. All the group of muscle fibers that is innervated by one motor neuron through its single axon and axonal branches are called a motor unit. The number of variety of numbers of muscle fibers in a motor unit varies are present. It is has been observed in cat leg muscles that approximately 120–165 fibers are present in one motor unit.

Electromyogram (EMG)

Motor unit activity is measured through placing recorded by inserting a coaxial electrode in-to the muscle that is to be studied. Next, the electrodes are connected to the electromyography (EMG). A recording, called an electromyogram, is obtained during muscular activity. This recording is called an electromyogram (EMG).

A hollow hypodermic needle can be made converted in-to a coaxial electrode by introducing an insulated inner wire with-in it. Possible changes in the muscle fibers in the immediate neighborhood of the tip of the needle are recorded. Thus, it has been observed that most of the electrical activity is from the active fibers near the electrodes.

Sometimes, surface electrodes are used instead of coaxial deep muscle electrodes. In this recording method, two surface electrodes are placed on the skin overlying the muscle under study over the to be studied muscle’s at a reasonable distance from each other.

Action potential is recorded when the muscle becomes active but not when the muscle is at rest. no action potential is recorded; however, as soon as the muscle becomes active, potentials are recorded. The potential recorded during activity is attributed as a result of the asynchronous discharge of motoneurons in the vicinity of the electrodes. During minimal voluntary activity, only a few the number of motor units discharged is less, and as the voluntary effort increases, the number of units that are activated is more. This is called known as recruitment of motor units recruitment.
Gradation of muscular activity is a part of the function of a number of motor units activated.

Electromyographic studies have clinically important in diagnosing of motor unit disorders including peripheral nerve injuries, and neuromuscular disorders such as myotonia and myasthenia gravis, so on and so forth.