

EMG Simulator Exercise

The EMG Simulator will assist you to better understand the properties of motor unit potentials (MUP) and the changes that occur in the MUP with alterations in properties of muscle fibers and motor units.

There are many parameters that may be altered in either

- a) Properties of an entire motor unit
- b) Properties of muscle fibers
- c) Firing rate or force
- d) Needle position
- e) Needle type

These questions will help you understand how different changes in the above properties affect the findings on needle EMG:

1. Add a single motor unit. Observe morphology and parameters (duration, amplitude, phases, rise time, firing rate)
 - a) Move needle approximately 1 mm in 3 or 4 different directions (left screen). You are recording the same motor unit. What properties change? Why?
 - b) Move the needle to the edge of the motor unit (center screen). Which parameters change the most?
 - c) Move the needle closer to the endplate (right screen). What happens to the MUP?
2. Add a second motor unit (to compare with the first).
 - a) Which parameter changes would most likely produce increase in MUP amplitude?
 - b) What changes occur in MUP with only increasing fiber diameter?
 - c) What changes occur in MUP with only decreasing fiber diameter? Increasing territory radius and number of fibers in a motor unit produces what changes in MUP? What pathophysiologic process does this reflect?
 - d) Which parameter change would be most responsible for producing increased polyphasicity in a MUP? What does increasing jitter do to a MUP? What disorders does this occur in? What happens to a MUP when you change to a bigger recording area (button on top taskbar)?
3. Add 3rd motor unit.
 - a) Increasing the force to 75% would mimic what finding?