Recording of simple muscle twitch with electrical stimulation through PowerPoint presentation.

PRINCIPLE

- When a single adequate stimulus is applied to a skeletal muscle through its motor nerve it responds by a brisk contraction followed by a quick relaxation. This response is called **simple muscle twitch (SMT).**
- Muscles and nerve are excitable tissues.
- Therefore, they respond to different stimuli.
- Any change in the environment to which the tissue responds is called a **stimulus.**

- The reactivity of the nerve and muscle to different stimuli depends on the type, strength and duration of stimulation.

Different types of stimuli are:-

- **Electrical** - Galvanic or direct current, faradic or induced current
- **Mechanical** - Tapping, pinching, cutting.
- **Chemical** - Acid / alkali or other chemicals
- **Thermal** - Cooling / warming.

An electrical stimulus is preferred because –

- Its site, intensity, frequency, duration & timing can be exactly known & can be easily controlled.
- It causes least damage to the tissue.
- Tissue recovers immediately after stimulation.
- Phenomenon of excitation & conduction of impulse in the excitable tissue is **'electrical' in nature.**

PHASES OF SIMPLE TWITCH

- The duration of simple muscle twitch is about **100 Msec.**
- It is divided in to
  - **LATENT PERIOD (LP)**
  - **CONTRACTION PERIOD (CP)**
  - **RELAXATION PERIOD (RP)**

- **LATENT PERIOD (LP) -** Time interval from point of stimulation to the beginning of Contraction- it is about 10 ms.

Intrinsic Cause

- Time taken for depolarization of the nerve.
- Time taken for the passage of nerve impulse throughout the length of the nerve.
- Time taken for impulse to cross the neuromuscular junction.
- Time taken for the excitation-contraction coupling.
- To overcome the viscous resistance of the muscle.

CONTRACTION PERIOD (CP)

- Time interval from beginning of contraction to the peak of contraction. It is about 40 ms.

FACTORS INFLUENCING THE HEIGHT OF CONTRACTION OF A TWITCH

- Type, Character and condition of muscle.
- Strength of stimulus.
- Temperature.
- Load.
- Inertia of recording instrument.
- Repetition of stimuli at certain interval.

CHANGES IN MUSCLE PROPERTIES DURING CONTRACTION PERIOD

- Muscle becomes hard.
- Muscle develops tension and resists stretching.
- Muscle can shorten.
- Muscle lifts a weight.

RELAXATION PERIOD (RP)

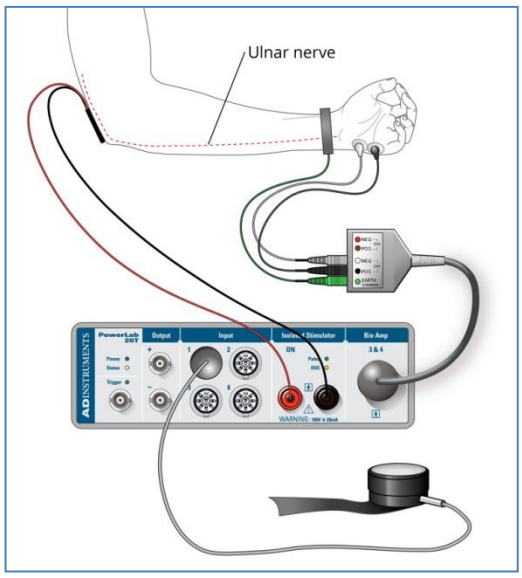
- Time interval from beginning of relaxation to end of relaxation it is about 50 ms.

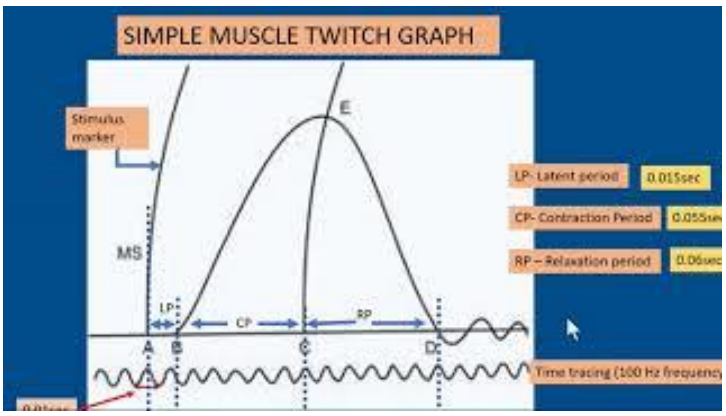
REACTIONS IN THE RELAXATION PERIOD

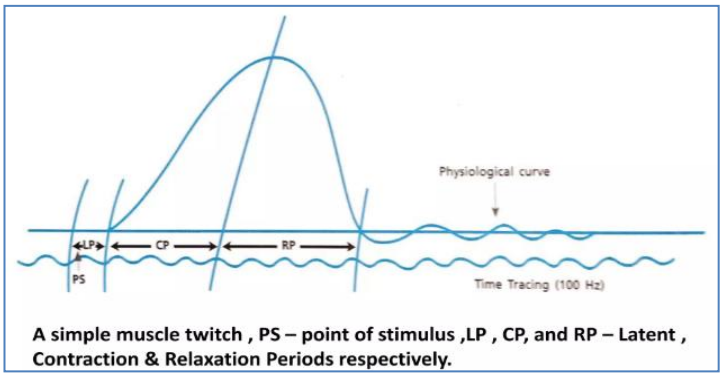
- Heat production.
- Resynthesis of glycogen from lactic acid.
- Resynthesis of creatine Phosphate and ATP.

FACTORS CAUSING PROLONGATION OF RELAXATION PERIOD

- Muscle dehydration.
- Cold temperature.
- Fatigue of muscle.







A simple muscle twitch , PS – point of stimulus ,LP , CP, and RP – Latent , Contraction & Relaxation Periods respectively.