

## The Nerve and Muscle Practical Class

### B- The Muscle Practical Class

#### Objectives:

To study some of the contractile properties of Muscle. These include:

1. Single Muscle Twitches.
2. Summation
3. The recruitment of muscle units.
4. Tetanus and
5. Fatigue

#### Apparatus:

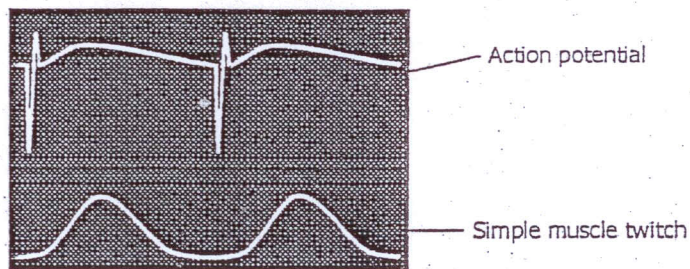
- Biopac students' lab
- The PRO lesson which describes hardware and software set up of the BSL PRO SYSTEM
- Biopac electrode lead set (SS2L)
- BIOPAC ACQUISITION UNIT (MP30)
- STIMULATOR
- FORCE TRANSDUCER

## 1. The Simple Muscle Twitch:

Arrange the stimulator to give a stimulus of adequate strength and observe the mechanical response i.e, SIMPLE MUSCLE TWITCH, which consists of Latent Period, A Contraction Phase and a Relaxation Phase.

### SIMPLE MUSCLE TWITCH

Relationship  
between electrical  
and mechanical  
events

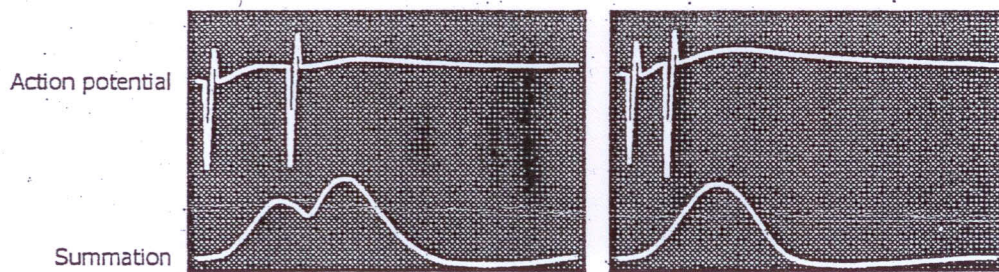


## 2. SUMMATION:

Arrange the stimulator to give stimuli of increasing frequencies.

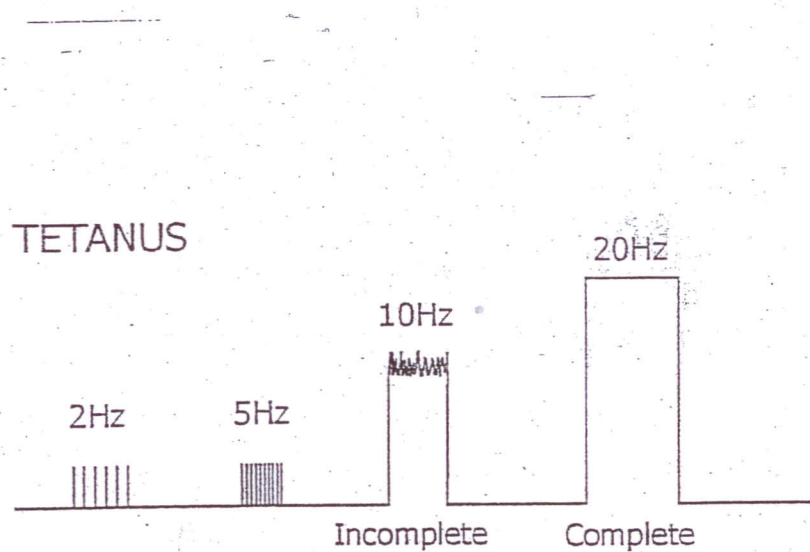
First stimulus is given and the second stimulus is applied before the completion of the Relaxation period of the first stimulus.

As a result there is summation of the contractile force.



### 3. Tetanus:

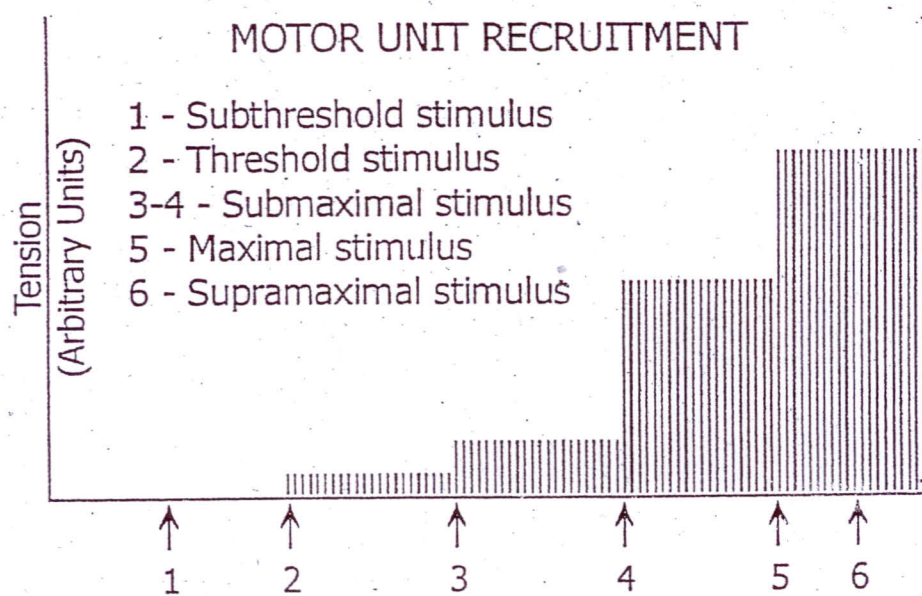
Arrange the stimulator to give repeated stimulation. We will observe that first there is incomplete Tetanus i.e, sustained contraction with partial relaxation. With increasing frequency we observe complete tetanus i.e, sustained contraction with no Relaxation i.e, straight line.



#### 4. Recruitment:

Stimulating more MOTOR UNITS (by increasing stimulus strength) creates a stronger contraction.

- (a) Subthreshold stimulus: The number of motor units responding is not sufficient to cause visible movement.
- (b) Threshold stimulus: The minimum stimulus that can evoke a response.
- (c) Recruitment: Stronger response than threshold because additional motor units join to generate an increase in tension.
- (d) Maximal Stimulus: When all Motor units are being recruited and more intense stimulus does not evoke greater tension.





### 5. Fatigue:

Continued rapid stimulation causes gradual inability of the muscle to respond to stimulation. We can't show fatigue in human.

#### FATIGUE

