EXPERIMENT 11

COMPOSED CONTRACTION OF THE SKELETAL MUSCLE

GROUP NO: 3
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INTRODUCTION

Summation of contraction represents the contractile response of the skeletal muscle following the application of at least 2 stimuli before contraction period elicited by the first stimulus ended (15 – 20 msec).

Considering the possibility that we can apply two stimuli according to the announced thepry, the second stimulus can find the muscle in one of the 3 phases of the twitch. Indeed, there are 3 possibilities that we can observe, leading to 3 different myograms:

1. The second stimulus finds the muscle in the latent period: there is no result, the muscle is not excitable during this phase
2. The second stimulus finds the muscle in the contraction period: we observe a greater response, but the 2 twitches are incompletely fused
3. The second stimulus finds the muscle in the relaxation period: we observe a specific aspect of the myogram, the 2 twitches are partially fused (the relaxation period of the 1st twitch is interrupted by the intervention of the second the stimulus)

In conclusion, regarding the moment of appearance of the second stimulus, the composed contraction can follow one of the next 2 patterns:

a. Incomplete tetanus occurs when every second stimulus finds the muscle in the relaxation period.
b. Complete tetanus occurs when every second stimulus finds the muscle in the contraction period.

OBJECTIVES

Study the summation of contractions of the skeletal muscle and analyze the resulting myograms.

Principle

Apply a complex of stimuli with different frequencies on the skeletal muscle, recording the resulting myograms on a graphical surface.

METHODOLOGY

Session 1: Myogram of complete tetanus

1. Set the frequency of the stimuli at 20 stimuli/sec with the right buttons
2. Apply a complex of stimuli for 5-6 secs
3. Analyze the resulting myogram

Session 2: Myogram of incomplete tetanus

1. Set the frequency of stimuli at 10 per sec.
2. Apply a complex of stimuli for 5-6 sec
3. Analyze the resulting myogram
4. Repeat all steps at 6.5 and 5 stimuli/sec

OBSERVATIONS AND DISCUSSIONS

1. Describe the myogram at:
   a. 20 stimuli/sec

      I observed that at 20 stimuli/sec a complete tetanus occured. This happens when every second stimuli finds the muscle in the contraction period. And when the stimuli is continuous, it slowly causes the myogram to produce a linear line.

   b. 10 stimuli/sec

      At 10 stimuli/sec, i observed that the myogram shows an incomplete tetanus. This occurs when every second stimuli fonds the muscle in the relaxation period. the longer the stimuli is applied, the myogram slowly decreases thus resulting to a liner line.

   c. 6.5 stimuli/sec

      Upon applying 6.5 stimuli/sec, it causes the myogram to result in the fusion of two twitches meaning, that the relaxation period of the first twitch has been interrupted by the intervention of the second stimulus.

   d. 5 stimuli/sec

      In applying 5 stumuli/sec on the skeletal muscle, the myogram shows a result of two twitches but they are incompletely fused. It means that the second stimuli finds the muscle in the contraction period producing a greater response.

2. What differences did you observe in the myogram of the different stimulus frequency? What does these differences mean?

   The differences that i observed is when the second stimulus found the muscles under three different phases of muscle twitch. This means that the myogram changes when the stimulus would apply on the latent period (no result, muscle is unexcitable), contraction period (resulting to two twitch with greater response but doesn't fuse) and the relaxation period (there are two twitches that are partially fused).

3. What similarity did you observe on the different myograms? What does this mean?
   According to my observation, all the different myograms results have reached a fast incomplete tetanus though not all the second stimuli found the muscle on the relaxation period. And also there is the summation of contraction happened.