

Simple Muscle Twitch in Relation With Exam / Test Induced Stress.

Bai K¹, Qasmi R², Abbas A³.

Abstract:

Introduction: Single action potential causes a brief contraction followed by relaxation and is known as Simple Muscle Twitch. The twitch may be benign (having no underlying pathology) i.e., may be related to anxiety, stress, psychiatric illness, depression and traumatic events and also may be due to motor neuron disease.

Objective: To determine the simple muscle twitch in Exam / Test induced stress in first semester MBBS students on

Material & Methods: This study was carried out at physiology department LUMHS Jamshoro. In this comparative study, 30 students of first semester MBBS were included. The tool for collection of data was power lab T_125 by AD instruments (hardware) and the lab tutor (software) with stimulating bar electrode as transducer. The data collected before test and after test was analyzed on MS Excel.

Results: The result of this study showed that the voltage of current required for muscle twitch to develop in the- nar muscle and in fingers during test induced stress was on average 5.85 mA while the current required after test (free of stress) was 7.75 mA. The difference is statistically significant.

Conclusions: Less voltage was required to develop muscle twitch during mental stress.

Keywords: Stress, Muscle Twitch, Power Lab.

Introduction:

Single action potential causes a brief contraction followed by relaxation and is known as Simple Muscle Twitch. The muscle twitch starts about 2ms after the start of depolarization of membrane before repolarization is complete. The process by which depolarization of muscle fiber initiates contraction is called excitation-contraction coupling. The action potential runs via T system and causes release of calcium ions from sarcoplasmic reticulum. Calcium binds to troponin-C to initiate contraction by uncovering myosin head binding sites on actin. Formation of cross linkages between actin and myosin and sliding of thin on thick filaments produces shortening of muscle fibers. Pumping of calcium back to sarcoplasmic reticulum causes relaxation.¹ The energy required for contractile process to begin comes from ATP. Interaction of one myosin filament, two actin filaments and calcium ions in presence of ATP causes contraction.² Locally visible muscle twitch is called fasciculation. The fasciculation's may be benign (having no underlying pathology) i.e., may be related to anxiety, stress, psychiatric illness, depression and traumatic events and also may be due to motor neuron disease.³ There are two types of muscle fibers Type-I Slow Twitch Fibers and Type-II Fast Twitch Fibers.⁴ Time course of contractile response of slow twitch fibers is slower than fast twitch fibers as name implies. Part of difference in contractile speed between slow and

fast twitch is attributable to difference in myosin isoforms. Basic unit of activity in the two main muscle fiber types is the twitch, which is a brief contractile response caused due to single action potential on the surface membrane. Slow twitch fibers have many similarities with fast twitch fibers but also many differences. Slow twitch fibers are more resistant to fatigue because of large mitochondrial volume and higher activity of oxidative enzymes.⁵ Slow twitch fibers has good blood supply while fast twitch fibers has less blood supply.⁶

Material And Methods:

This study was conducted in department of Physiology at LUMHS Jamshoro in well operating Power lab AD instruments T_125 with stimulating bar electrode as transducer. The study was conducted on 30 students of first semester MBBS before test and after test. In the study first checked out that stimulator switch is off then stimulating bar electrode placed over the volunteers ulnar nerve at wrist along the axis of arm with red dot closest to elbow. In stimulator panel current settled to 5mA then icon start clicked and stimulator switched on. The stimulator status light flashed green indicated that the chosen current passed thru the skin of the volunteer and waited to observe twitch contraction in thumb and fingers and increased stimulating current simultaneously and slowly in stimulating current panel up to the twitch appeared in thumb and fingers and that current noted from stimulating current panel that caused twitch in thumb and fingers. Same procedure repeated after test when students were relax and free of exam induced stress. The data collected and analyzed on MS Excel.

1. Lecturer Muhammad Medical College Mirpurkhas.
2. Associate Professor Muhammad Medical College Mirpurkhas.
3. Assistant Professor Muhammad Medical College Mirpurkhas.

S.No.	Parameter	Average	ST DEV	P-Value
1	Current required before test to cause twitch	5.85mA	2.05548	0.0533 11
2	Current required after test to cause twitch	7.75mA	1.55009	

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Result:

The result of this study showed that the voltage of current required for muscle twitch to develop in thenar muscle and in fingers during test induced stress was average 5.85 mA while the current required after test (free of stress) was 7.75 mA. Statistically the difference is significant.

Discussion:

In the same students, less current was required to develop muscle twitch during test induced mental stress period as compared to after test i.e free of mental stress period. A study conducted in India on person suffering from benign fasciculation's, showed that these persons were suffering from anxiety, stress, psychiatric illness and irritable bowel syndrome.³ Benign fasciculation's may be a sign of difficulty coping with life stress and a form of somatization.

This study may help the psychiatrists and physicians to exclude the benign fasciculation's in mental stress condition from the patients suffering from fasciculation's due to organic disorder like amyotrophic lateral sclerosis, but still this needs further research and evaluation.

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