To Determine the Relationship between Anxiety and Core Muscle Stability in Rifle Shooters Performance

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ABSTRACT: Target shooting is a sport of fine muscle control and endurance. Although target shooting does not involve the heart and lungs as does running, the muscles used by a shooter can become as starved for O2 as the muscles of a runner, therefore it is vital for the shooter to be physically fit in all perspectives. The medical definition of anxiety describes it is a state consisting of psychological & physical symptoms brought about by a sense of apprehension of perceived threat. The core refers to trunk region which includes abdominal and back extensors. A cross sectional study on 60 rifle shooters was done to check for anxiety, core muscle strength and to correlate it with their performance score and it was found that there is no correlation between anxiety & core muscle stability in rifle shooter's performance. The present study concludes that there is no correlation between anxiety and core stability among rifle shooter's performance.

Key Words: Anxiety, Core Muscle Stability, Rifle Shooters Performance

INTRODUCTION
In the sports world shooting has acquired an important place among all the athletic events and in India particularly this event has achieved a dominant role in the sports arena. Target shooting is a sport of fine muscle control and endurance. Although target shooting does not involve the heart and lungs as does running, the muscles used by a shooter can become as starved for O2 as the muscles of a runner, therefore it is vital for the shooter to be physically fit in all perspectives. The shooting sport demands precise and well-coordinated movements, a good sense of balance and flexibility of the body and limbs. Shooting is a sport based on absolute concentration, but like all other sports, physical fitness will help any shooter perform better. Ten general physical skill areas contribute to the fitness that will support shooting-cardio-vascular, respiratory endurance, stamina, strength, flexibility, power, coordination, agility, balance and accuracy. When considering competitive shooting as any other athletic effort, the shooter must be trained and conditioned physically. While shooting is a skill sport, fully trained athletes require strength, strength endurance, an efficient cardio-vascular system and flexible joints. Thus, if shooters are adequately conditioned and if they maintain good muscle tone, they will be maximizing their physical capabilities to hold the rifle motionless. Therefore, in order to maintain a good performance and ranking, the level of physical fitness of a shooter along with anthropometric parameters is considered essential. This aspect is important in determining one’s athletic capability. Very few studies have been carried out on the effects of conditioning programmes on specific fitness of rifle shooters in different parts of the world. But no such study has so far been conducted in India especially on shooters of West Bengal and this prompted the author to initiate a research design on the problem and solution related to shooters[7]. Anxiety and core stability are factors which can affect shooters performance. The medical definition of anxiety describes it is a state consisting of psychological & physical symptoms brought about by a sense of apprehension of perceived threat. Anxiety affects sport performance in physiological, cognitive & behavioral ways. Listed below are the ways in which anxiety can affect sport performance: fear, unable to concentrate, sweating, racing heart rate, shortness of breath, dizziness and shaking. Many shooters attempt to fire at a target between heart beats, when the body is at its most stable. The more fit the shooter generally lower the heart rate and the lower heart rate will provide shooter with greater window within which to deliver the shot. The core refers to trunk region which includes abdominal and back extensors. These muscles provide a stable base in correct position and maintain for optimal stability. A strong core is critical for stability. The stronger the core better the hold will be so more stable the body will be and so less movement of the body and so more the perfect the shot will be[3]. So it is important for shooter with strong core for good performance.
METHODOLOGY
For the study 60 subjects were randomly selected between age group of 15-30 years who have been playing for more than one year at state or national level. Informed consent was obtain from coach of club and verbal explanation of study given to coach as well as shooters. A written consent was taken from shooters recruited in the study. After selecting, subjects were checked for level of anxiety by using Sports competitive anxiety scale. Then shooters core muscles strength were checked using: Dynamic abdominal endurance test and Dynamic extensor endurance test

Dynamic abdominal endurance test
This test checks the endurance of the abdominals. The patient is in supine with the hips at 45° and knees at 90° and hands at sides. The patient tucks in the chin and curls the trunk towards the foot and repeats as many curls as possible using cadence of 25 repetitions per minute.

Dynamic Extensor endurance test
The test is designed to test the strength of iliocostalis lumborum and multifidus. The test may is done with subject prone lying and extending the spine if the preceding test. In this case the patient can start with hands by the side, moving the hands on back and finally moving hands behind head for increasing difficulty. The cadence is 25 repetitions per minute.

Competitive State anxiety inventory-2 scale
This scale is called the Competitive State Anxiety Inventory-2 (CSAI-2), a sport specific state anxiety scale developed by Martens, Vealey, and Burton (1990). The scale divides anxiety into three components: cognitive anxiety, somatic anxiety, and a related component-self-confidence. Self-confidence tends to be the opposite of cognitive anxiety and is another important factor in managing stress. To score the CSAI-2, take all the scores for each item at face value with the exception of item 14, where you "reverse" the score. For example, if you circled 3, count that as 2 points (1 = 4; 2 = 3; 3 = 2; 4 = 1). Total your scores in the following manner: Cognitive state anxiety: Sum items 1, 4, 7, 10, 13, 16, 19, 22, and 25. __ Somatic state anxiety: Sum items 2, 5, 8, 11, 14, 17, 20, 23, 26. __ Self-confidence: Sum items 3, 6, 9, 12, 15, 18, 21, 24, and 27. Your scores for each will range from 9 to 36, with 9 indicating low anxiety (confidence) and 36 indicating high anxiety confidence.

STATISTICAL ANALYSIS

As per statistical analysis, using Pearson correlation test, graph shows R2 value with 0.033 which signifies poor correlation between anxiety and performance level.
This graph correlates between match score and abdominal repetition. So as per statistical analysis, using Pearson correlation, $R^2$ value is 0.0003 which is suggestive of poor correlation match score and abdominal repetition.

**DISCUSSION**

The sport of rifle shooting is popular competitive sport played throughout world. An important research in anxiety among successful and unsuccessful competitors who differ in competitive anxiety was carried out by Martens and Gill (1976), which concluded that the individuals who maintained low levels of A-state throughout the competition were highly successful. This supports the research carried out by Martens
(1990) and Parfitt and Hardy (1991) with the Inverted-U shaped relationship between anxiety and performance. The greater the level of physical fitness possessed by a competitive shooter, the more likely they are to achieve competitive success. Many shooters attempt to fire at a target between heartbeats, when the body is at its most stable. The more fit the shooter, generally, the lower the heart rate. A lower heart rate will provide the shooter with a greater window within which to deliver the shot. The breathing exercises that are often performed by shooters during competition to relax the body have a more pronounced effect on a body that has both a fit cardiovascular and cardiorespiratory system. Sandra Uptagrafft, the 2007 Pan American Games gold medalist in Women's Sport Pistol, can attest to the importance of having a strong core in order to maximize stability in her shooting. "A strong core is critical for stability, so under ideal training conditions I would work on core strengthening exercises at least three times a week," said Uptagrafft. "I combine low weight and high repetition core strength and balance exercises for general stability and endurance, with pistol holding exercises to work more specific muscles." A cross sectional study on 60 rifle shooters was done to check for anxiety, core muscle strength and to correlate it with their performance score and it was found that there is no correlation between anxiety & core muscle stability in rifle shooter's performance.

CONCLUSION
The present study concludes that there is no correlation between anxiety and core stability among rifle shooter's performance.

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