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The Relationship Between Muscle Girth And Strength Gain: A Study On The Supraspinatus

The supraspinatus, or rotary cuff muscle of the shoulder, is a commonly injured muscle amongst many athletes. In 2003, approximately 13.7 million people went to the doctor to seek help for their shoulder problems. A large percentage of these problems were affiliated with an injured supraspinatus, or commonly called rotator cuff. Injuries of the supraspinatus are often caused by sudden, forceful movements of the muscle that result in tearing or rupturing of the muscle. There are a number of methods suggested for the strengthening of this muscle; however, these methods have not been thoroughly been tested on their effectiveness. This experiment will analyze these treatments and their effect on the growth of this muscle. Popularly used treatments for injuries of the supraspinatus include a variety of external strength exercises. This study will focus on a strengthening method of the supraspinatus using an external rotation exercise throughout a period of 4 weeks. The exercise will be used in an 8 set increment, with 30 seconds per set. The exercises performed during experimentation hypothesize a growth in strength and size of the supraspinatus from the duration of the first examination to the second examination. Prior to experimentation the supraspinatus of each test subject will be quantitatively analyzed under three variables: muscle thickness and width, and two strength positions. An ultrasound will be used to analyze the muscle and calculate its width and thickness, while a hand dynamometer and a Cybex ER will be used to test the force output. These test values will be recorded prior to experimentation, and then they will be recalculated after experimentation.

- 1.) Force output External Rotation using Hand Dynamometer
 - a.) Warm-up with moving arm in a circular motion
 - b.) Stretch
 - c.) Set back against wall and use perform external rotation in a 2-6-2 count.
 - d.) Perform abduction in a 2-6-2 count.
- 2.) Cybex Dynamometer
 - a.) Warm-up with moving arm in a circular motion
 - b.) Stretch
 - c.) With the dynamometer at 75 degrees, perform five repetitions using maximum ft lbs.
- 3.) Cross section diagram using diagnostic ultrasound
 - a.) Place ultrasound over supraspinatus muscle. On screen, measure distance between both sides of the muscle.
 - b.) In order to achieve optimal results, perform this step after steps one and two.