THE EFFECT OF STRENGTH OR ENDURANCE TRAINING PROGRAMS ON STRENGTH AND ENDURANCE MEASURES OF THE SUPRASPINATUS AND INFRASPINATUS

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Background: Shoulder pain is the third most common cause of musculoskeletal pain, with the most common diagnosis being rotator cuff disease. One of the factors causing this pain is the loss of strength or endurance of the rotator cuff muscles. The muscles that are most affected include the supraspinatus and infraspinatus, which allow external rotation and abduction and help to provide dynamic stability. Due to the prevalence and subsequent high cost of treating shoulder dysfunction, it is imperative to determine the most effective and efficient rehabilitation program.

Purpose: The purpose of the present study was to compare the effect of either a strength or endurance training program on the rotator cuff muscles of the shoulder.

Study Design: Randomized Controlled Trial.

Methods: The participants were comprised of 60 healthy graduate students, with a total of 52 participants who completed the study. A 12-week training program randomly placed participants into either the control, endurance, or strength training group. Participants were then randomly assigned a treatment arm where they conducted 6 exercises that targeted mainly the posterior rotator cuff muscles. Pre-testing consisted of strength assessment via a handheld dynamometer for shoulder flexion, abduction (ABD), external rotation (ER), and internal rotation (IR), while endurance was assessed using a side-lying external rotation timed endurance test. While both training groups performed the same exercises, those placed in the strength program were instructed to complete a higher intensity (using the OMNI-RES scale) and lower volume, while the endurance program was instructed to complete a lower intensity (using OMNI-RES scale) and a higher volume. Three sets of each exercise were performed, and when unable to perform them with minimal fatigue and an OMNI-RES score below the target range, they advanced to the next level of increased resistance. Compliance was tracked through weekly log sheets. Posters demonstrated the 6 exercises targeted shoulder ER and abduction.

Results: The strength training group showed an increase in ABD, ER, and IR strength. ABD showed an average increase in 2.19 pounds and ER 2.25 pounds. Since the exercises in the training program emphasized strengthening of the supraspinatus and infraspinatus, increases in ABD and ER strength were expected. IR strength showed an average increase of 3.76 pounds and while this secondary increase in IR was welcomed, it was unexpected. Increases in IR strength may have been due to an overall increase in dynamic shoulder stability gained by the exercises performed. Flexion strength did not show a significant increase. This was expected as the exercises were not specific to those muscles.

The endurance training group demonstrated a significant increase in ER endurance with an average improvement of 27.16 seconds. The endurance group showed no significant difference for all four strength measurements of the treated and untreated arm. However, while insignificant, the endurance group did yield strength gains for all four strength measurements except IR for both the treated and untreated arm.

Discussion/Conclusion: The study results were as predicted regarding both the strength and endurance training groups. Each group demonstrated increases in their perspective training modes. Based on our results from this study, these specific training protocols may be beneficial for targeting posterior shoulder muscles. The conclusion of our research raises the question of which is the best protocol regarding strength or endurance training for those with rotator cuff pathology or pain. Clinicians would benefit from future research targeting patients with rotator cuff pathology and the training program’s ability to resolve and prevent injury in the long-term.

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