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# ORIGINAL RESEARCH

## SUSTAINED ISOMETRIC SHOULDER CONTRACTION ON MUSCULAR STRENGTH AND ENDURANCE: A RANDOMIZED CLINICAL TRIAL

Natalie L. Myers, MS, ATC<sup>1</sup>  
Jenny L. Tbonstra, PhD, ATC<sup>2</sup>  
Jacob S. Smith, MS, ATC<sup>3</sup>  
Cooper A. Padgett, MS, ATC<sup>3</sup>  
Tim L. Uhl, PhD, ATC, PT, FNATA<sup>1</sup>

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### ABSTRACT

**Background:** The Advanced Throwers Ten Exercise Program incorporates sustained isometric contractions in conjunction with dynamic shoulder movements. It has been suggested that incorporating isometric holds may facilitate greater increases in muscular strength and endurance. However, no objective evidence currently exists to support this claim.

**Hypothesis/Purpose:** The purpose of this research was to compare the effects of a sustained muscle contraction resistive training program (Advanced Throwers Ten Program) to a more traditional exercise training protocol to determine if increases in shoulder muscular strength and endurance occur in an otherwise healthy population. It was hypothesized that utilizing a sustained isometric hold during a shoulder scaption exercise from the Advanced Throwers Ten would produce greater increases in shoulder strength and endurance as compared to a traditional training program incorporating a isotonic scapular plane abduction (scaption) exercise.

**Study Design:** Randomized Clinical Trial.

**Method:** Fifty healthy participants were enrolled in this study, of which 25 were randomized into the traditional training group (age:  $26 \pm 8$ , height:  $172 \pm 10$  cm, weight:  $73 \pm 13$  kg, Marx Activity Scale:  $11 \pm 4$ ) and 25 were randomized to the Advanced Throwers Ten group (age:  $28 \pm 9$ , height:  $169 \pm 23$  cm, weight:  $74 \pm 16$  kg, Marx Activity Scale:  $11 \pm 5$ ). No pre-intervention differences existed between the groups ( $P > 0.05$ ). Arm endurance and strength data were collected pre and post intervention using a portable load cell (BTE Evaluator, Hanover, MD). Both within and between group analyses were done in order to investigate average torque (strength) and angular impulse (endurance) changes.

**Results:** The traditional and Advanced Throwers Ten groups both significantly improved torque and angular impulse on both the dominant and non-dominant arms by 10–14%. There were no differences in strength or endurance following the interventions between the two training groups ( $p > 0.75$ ).

**Conclusions:** Both training approaches increased strength and endurance as the muscle loads were consistent between protocols indicating that either approach will have positive effects.

**Level of Evidence:** Level 2

**Keywords:** Angular Impulse, abduction strength, Thrower's 10 exercise program

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### CORRESPONDING AUTHOR

Natalie L. Myers  
210c Charles T. Wethington Buidling  
900 South Limestone  
Lexington, KY 40506-0200  
phone: 859-218-0578  
fax: 859-323-6003  
E-mail: nataile.myers@uky.edu

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<sup>1</sup> Department of Rehabilitation Sciences, University of Kentucky, Lexington, KY, USA

<sup>2</sup> Department of Health and Sport Sciences, Salisbury University, Salisbury, MD, USA

<sup>3</sup> Division of Athletic Training, University of Kentucky, Lexington, KY, USA

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