INTRODUCTION

- Clinical tools for assessing the scapula are limited in their ability to isolate the behavior of a specific muscle.
- Methodology for assessing lower trapezius (LT) thickness using ultrasound imaging (UI) has been established but not for the serratus anterior (SA).
- The sensitivity of UI to detect changes in thickness of the LT and SA has never been investigated.

OBJECTIVES

Establish within and between day reliability for measuring LT and SA muscle thickness.

Determine if increased torque on the shoulder results in increased absolute thickness of the LT and SA in healthy subjects.

METHODS

- Subjects
  - 14 subjects (7 males)
  - Age=27 ± 4 years
  - BMI=23.21 ± 3.20 kg/m²
- Procedures
  - Subjects were seated with the arm on a support at 90° of flexion and 45° horizontal adduction.
  - MVCs were tested with a hand held dynamometer.
  - Computerized UI (General Electric LOGIQ e 2008) was used to produce a cross sectional image of the LT and SA at rest and during 8 different lifting conditions (In lbs: 0,1,2,3,4, 50%MVIC, 66% MVIC, 75% MVIC).
  - Each condition was performed twice and the entire procedure was replicated 1 week later.

- Data Reduction
  - Shoulder torque was calculated as follows:
    Torque (Nm) = Force (N) * Arm length (m)
    Force (N) = 4.48(Weight of Lift + Arm)
  - A repeated measures analysis of variance (ANOVA) was run to determine differences in torque across all 9 conditions.
  - Based on the results, rest, 2lbs, and 66% MVIC were used to assess absolute muscle thickness.

RESULTS

- LT mean thickness ranged from .41(±11)cm to .58(±20)cm. The SA ranged from .61(±22)cm to .83(±28)cm.
- Good to excellent reliability for the LT and SA (Within day ICCs > .92 / Between day ICCs > .84).
- Mean 2lb and 66% MVIC muscle thickness was significantly greater than rest for both the LT/SA. The differences also exceeded the MDC scores (Tables 1&2).

CONCLUSION

Absolute SA and LT thickness can be reliably measured within and between days using ultrasound imaging.

Our hypothesis was partially supported, demonstrating that absolute muscle thickness for the LT/SA significantly increased between rest and a loaded position. As such, our methods can be used to determine the difference between a relaxed and contracted LT/SA in healthy individuals.

REFERENCES