May 15th, 10:00 AM - 2:00 PM

The Effect of a Five-Week Exercise Intervention Using EMG Biofeedback on Scapular Stabilizer Muscle Activation and Scapular Kinematics.

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Western Washington University

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THE EFFECTS OF A FIVE-WEEK EXERCISE INTERVENTION USING EMG BIOFEEDBACK ON SCAPULAR STABILIZER MUSCLE ACTIVATION AND SCAPULAR KINEMATICS

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Introduction

- Electromyography (EMG) biofeedback has not been investigated as a preventative tool for those at risk for developing shoulder pathologies.
- Observing muscle activation on the screen allows the subjects to obtain the correct movement for the exercises performed\(^1\).
- Desired scapular kinematics during scapular plane humeral elevation
  - Upward rotation
  - External rotation
  - Posterior tilt
- This study investigated changes in scapular kinematics, and muscle activation patterns as a result of EMG biofeedback.
- Hypotheses:
  - The scapula will increase in upward rotation, posterior tilting and external rotation.
  - There will be a decrease in upper trapezius activity, with an increase in serratus anterior and lower trapezius activity.

Methods - Protocol

- Subjects divided into 2 groups
  - Exercise w/ biofeedback
  - Exercise only
- Humeral elevation in scapular plane
  - Baseline, week 6 & 8
- Subjects performed a warm up of pendulum swings
- Scapular stabilization exercises performed
  - I, W, T, Y (Figure 2 A, B, C, & D)
  - 1 x 10
- Exercises performed for five weeks
  - 3 x week
- Biofeedback group:
  - 1 x week EMG biofeedback
  - Exercises on screen in % MVIC
- Exercise only group:
  - Exercises at home w/ video instruction

Results

- No significance found for scapular external rotation (p = 0.880), posterior tilt (p = 0.212), or upward rotation (p = 0.668) for either group
- No significance 3-way interaction of muscle activation (p = 0.249)
- Increased upward rotation and decreased UT activation - Although not significant

Discussion & Conclusion

- Exercise intervention not long enough
  - 6 weeks in line with current recommendations\(^3\)
- Healthy population
  - Could have already been within normal ranges for scapular kinematics
- Future studies should investigate a longer program with a pathological population

References


Introduction Table

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Methods - Instrumentation

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Results – Graphical Representation

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Discussion & Conclusion

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