Scapular stabilizer Muscles exercises: Muscle activity using surface EMG during push-up plus exercise on a stable support or swiss ball

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Introduction

Push up exercise is one of the most effective and popular exercise. One is push up on stable support such as floor or wall, the other one is push up on mobile condition, Swiss ball. However little is known which one is better for strengthening of scapular stabilizer, push up exercise on stable support or push up on Swiss ball. The purpose of this study is to measure the differences of two types of exercises in terms of force output and muscle activities using surface EMG to suggest effective rehabilitation program.

Materials and Methods

Ten healthy males volunteers recruited for this study. The mean age of the study group was 25±1 age. Any volunteers who had history of shoulder surgery or recent shoulder pain were excluded from this study.

To get constant results, all volunteers finished three sets of push up plus exercise before EMG study. Surface EMG was recorded in the five important scapular stabilizers in both sides simultaneously; 1) Upper Trapezius 2) Mid Trapezius 3) Lower Trapezius 4) Serratus Anterior 5) Latissimus Dorsi.

Result

The Upper Trapezius showed greater mean electric activation amplitude at scapular retraction posture, and Serratus Anterior showed greater mean electric activation amplitude on scapular protraction posture.

The RMS(root mean squares) normalized values of the all scapular stabilizer muscles demonstrated increased value at an exercise on a Swiss ball compared to those performed on a stable base of support.

Conclusion

This study shows that Upper Trapezius and Serratus Anterior are two major muscles activated during push up exercises both on a stable or unstable support. Push up exercise on a unstable support requires more scapular stabilizer muscle activation than stable support especially on Upper Trapezius and Serratus Anterior.