P155- NORMAL ANTICIPATORY ACTIVITY OF TRUNK MUSCLES DURING UNILATERAL LIMB MOVEMENT

Maroufi N.[1], Davarian S.[2], Ebrahimi E.[3], Parnianpour M.[4], Farahmand F[5]

1 Physical Therapy, School of Rehabilitation, Tehran University of Medical Sciences, Tehran, Iran; 2 Physical Therapy, Faculty of Rehabilitation Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran; 3 Physical Therapy, School of Rehabilitation, Tehran University of Medical Sciences, Tehran, Iran; 4 Information and Industrial Engineering, Hanyang University, Seoul, Korea; 5 Biomechanics, Department of Mechanical Engineering, Sharif University of Technology, Tehran, Iran.

Introduction

Previous studies demonstrated controversies regarding normal anticipatory activity of Transversus Abdominis. It will not be possible to prescribe an appropriate exercise for patients who suffer from chronic low back pain (CLBP) unless the normal activation pattern of the trunk muscles in healthy subjects becomes clear. There are, also, limited studies concerning bilateral activation of trunk muscles during a self-induced perturbation.

Purpose

The aim of this study was to evaluate bilateral anticipatory activity of trunk muscles during unilateral arm flexion.

Materials and Methods

18 healthy subjects (13 women and 5 men) participated in this study. They were asked to raise their right arm as fast as possible in response to a visual stimulus and 10 repetitions of rapid arm flexion were recorded. The electromyographic activity of the right Anterior Deltoid (AD) and bilateral trunk muscles including Transversus Abdominis/Obliquus Internus (TA/OI), Superficial Lumbar Multifidus (SLM) and Lumbar Erector Spinae (LES) was recorded. The onset latency of the recorded trunk muscles was calculated.

Results

The first muscle activated in anticipation of the right arm flexion was the left TA/OI. The right TA/OI activated significantly later than all other trunk muscles ($P<0.001$). The anticipatory activation of the SLM and LES muscle groups was observed during rapid arm flexion. There was no significant difference in onset latency among other trunk muscles ($P>0.05$).

Conclusions

Healthy subjects did not show bilateral co-activation of TA/OI in anticipation of unilateral arm elevation. The SLM and LES muscle groups did not show any bilateral differences in onset latency during rapid arm flexion. Further investigations are required to evaluate normal muscle activation pattern in other functional tasks in healthy subjects prior to prescribing bilateral activation training of Transversus Abdominis for patients with CLBP.

Key words: Anticipatory Postural Adjustments, Low Back, Self-induced Perturbation.