

# ABDOMINAL HOLLOWING AND LATERAL ABDOMINAL WALL MUSCLES' ACTIVITY IN BOTH HEALTHY MEN & WOMEN: AN ULTRASONIC ASSESSMENT IN SUPINE & STANDING POSITIONS

<sup>1</sup>Farideh Dehghan, <sup>2</sup>Mohamad Parnianpour, <sup>1</sup>Javad Sarraf Zadeh and <sup>3</sup>Anooshirvan Kazem Nejad

<sup>1</sup>Rehabilitation Faculty, Iran University of Medical Sciences & Health Services, Tehran, Iran, email: [farideh4351@gmail.com](mailto:farideh4351@gmail.com)

<sup>2</sup>Sharif University of Technology, Tehran, Iran

<sup>3</sup>Medical Sciences Faculty, Tarbiat Moddaress University, Tehran, Iran

## OBJECTIVE

The Transversus Abdominis Muscle (TrA), the deepest muscle in abdominal region is one of the Lumbo-pelvic stabilizers. Because of its interaction with pelvic floor muscles, TrA's dysfunction can be one of the etiologic factors for urinary incontinence. Abdominal Hollowing (AH) maneuver can activate TrA muscle and both palpation and Pressure Biofeedback (PBF) are clinical tools for monitoring its activity. This study was aimed to investigate the effects of AH on Lateral Abdominal Wall Muscles in both healthy men & women. Also ability of PBF to monitor TrA activity in standing position studied while controlled using Rehabilitative ultrasonic Imaging (RUSI) simultaneously.

## METHODS

A descriptive- analytical study was conducted on 43 volunteers (22 males and 21 females) aged 19-44(27.8±6.4) years. They had no history of doing regular exercise, low back pain or urinary incontinence. After completing a designed questionnaire regarding to demographic information, RUSI has done for measuring both rest and contraction thickness of all Anterior-Lateral Abdominal muscles in both supine and standing positions. At the same time, activation of the TrA after AH was controlled by using PBF. The ethical committee of the Iran Medical University approved the study. The spss/win15 statistical software and

Pearson and Repeated Measure ANOVA tests were used to compare mean values and P-value was considered significant at  $P < 0.05$ .

## RESULTS AND DISCUSSION

After AH, the thickness of TrA increased significantly in both supine & standing positions ( $P = 0.0001$ ). Also, thickness of the Internal Oblique (IO) muscle increased in both men and women groups after AH ( $P = 0.0001$ ). Generally, we saw that both IO & TrA thickness increased in standing comparing supine position ( $P = 0.003$ ,  $P = 0.0001$ ) but advance analysis showed that TrA had increased only in its rest thickness ( $P = 0.02$ ). There was no effect of AH or changing position on External Oblique muscle's thickness ( $P > 0.05$ ).

## CONCLUSIONS

Regarding to effects of AH and changing position on TrA thickness, it seems doing AH in standing position can be effective on TrA training. Although, the PBF has introduced as a clinical and available device for monitoring TrA activity, RUSI in this study showed that both TrA and IO muscles had activated after AH. We recommend performing further investigations by using electromyography and RUSI at the same time.