

INTRODUCTION

Recently, a theoretical model involving training of the deep abdominal muscles, in particular the transversus abdominis (Tra), to increase tonic pelvic floor muscle (PFM) activity has been suggested. Its necessary to better understand the factors that influence the co-activation between Tra and PFM in order to better target and increase the effectiveness of the PFM training. Therefore the aim of this study was to assess the PFMs muscle response during maximum voluntary contraction of Tra/OI, and evaluate the relationship of co-activation of those muscles with the variables: age, body mass index (BMI), pregnancy, postpartum, physical activity, number of pregnancies, presence and severity of urinary incontinence assessed by ICIQ-UI SF and the presence of symptoms of overactive bladder (OAB) assessed by ICIQ - OAB.

METHODS

This is a clinical, controlled, prospective study that consisted of 92 women who had body mass index ≤ 25 kg / m² and the average age of 28.52 years (SD \pm 10.55). Regarding physical activity, 56.52% were sedentary, while 23.91% of the women performed low-impact physical activity (23.91%).

All patients were evaluated with digital palpation prior to the inclusion. Only patients who were able to contract the PFM were included in the study. Exclusion criteria included women with pelvic organ prolapse, diabetes, hypertension, neurological abnormalities, myopathy, chronic lung diseases, presence of urinary tract infection, body mass index (BMI) equal or greater than 25kg/m², and/or previous abdominal muscles training.

Pelvic Floor and Transversus Abdominis/Internal Oblique Electromyography: The rest and PFM and Tra/IO contractility was registered using a surface electromyography equipment (EMG System do Brasil, 400C model). To test for the correct Tra/IO contraction, electrical activity generated with contraction was evaluated using surface sensors (disposable, 3M). The contraction of the PFM has been previously taught to the volunteer, requesting her to press the probe in cranial direction and observing its contraction on the computer screen. Pelvic floor EMG was recorded using a vaginal probe (Physio-Med Services), which has two opposing metal sensors. PFM and Tra/IO evaluation was performed by supinely positioning the subjects with, flexed lower limbs with the feet on the stretcher.

EMG evaluation protocol: The protocol consisted of the three, maximal, voluntary Tra/IO contractions. The volunteer was then instructed to perform an isometric contraction of the lower abdomen, during expiration. PFM and Tra/IO electrical activities were simultaneously registered. Each contraction was recorded for 5 sec, in microvolt and analyzed by root-mean-square (RMS). The arithmetic mean of three RMS was considered per analysis.

RESULTS

According to the data analyzed, the variables that influence the abdominopelvic co-activation are shown in the table below:

VARIABLES	p values
Pregnancy	p=0.01*
Physical activity	p=0.03*
ICIQ UI-SF	p=0.005*
Age	p=0.60
BMI	p=0.50
Postpartum	p=0.17
Number of pregnancies	p=0.10
ICIQ-OAB	p=0.16

*Significant values
**Statistical Analysis: ANOVA Models for repeated measures with the response variables transformed into posts
The level of significance was set at 5%.

CONCLUSION

Pregnancy, physical activity, and presence/severity of urinary incontinence assessed by ICIQ-SF are factors that exert influence on co-activation between the Tra/OI and PFM. These results support the importance of evaluating the abdominal-pelvic muscle activity and consider them before defining training exercises for the pelvic floor muscles.

REFERENCES

- 1-) Pereira LC et al. **Are Transversus Abdominis/Oblique Internal and Pelvic Floor Muscles Coactivated During Pregnancy and Postpartum?** *Neurourology and Urodynamics* 32:416-419 (2013).
- 2-) Bo K, et al. **Evidence for Benefit of transversus abdominis training alone or in combination with pelvic floor muscle training to treat female urinary incontinence: A systematic review.** *Neurorol Urodyn*;28:368-73 (2009).
- 3-) Sapsford R et al. **Co-activation of the abdominal and pelvic floor muscles during voluntary exercises.** *Neurorol Urodyn*; 20(1):31-42 (2001).