

CO-ACTIVATION OF THE ABDOMINAL AND PELVIC FLOOR MUSCLES IN WOMEN WITH AND WITHOUT STRESS URINARY INCONTINENCE USING ULTRASOUND IMAGING

Hypothesis / aims of study

Synergistic co-activation of the abdominal muscles and pelvic floor muscles (PFM) has been shown in recent studies. Electromyographic (EMG) studies indicate that a physiological synergistic relationship exists between the PFM and abdominal muscles to contribute to the generation of intra-vaginal pressure in continent women and to allow maintaining of urinary continence in situations of increased intra-abdominal pressure (1-3). To our knowledge, no study has evaluated the co-activation of PFM and abdominal muscle in continent and stress incontinent women using ultrasound. The purpose of this study was to compare the changes in the thickness of the abdominal muscles during PFM contraction in women with and without stress urinary incontinence (SUI)

Study design, materials and methods

A two-way mixed-design was used and 20 non-pregnant female participated in the study. Subjects were categorized into two groups: continent females (N=10) and females with SUI (N =10). The change in the thickness of the right transverse abdominis (TrA) and internal oblique (IO) muscles was measured with ultrasound imaging during PFM contraction in both groups. A two-way mixed-design ANOVA was used to test the ultrasound measurement of the changes in thickness of each abdominal muscle in women with SUI and those without SUI.

Results

Change in the thickness of TrA and IO was found during PFM contraction both in women with and without SUI (Table 1). The result of two-way mixed-design ANOVA showed no significant health status by muscle interaction effect for changes in thickness of abdominal muscle during PFM contraction ($p=0.71$). The health status had no significant effect on thickness changes in the abdominal muscles ($p=0.42$). The main effect of muscle for change in thickness was not statistically significant ($p=0.24$). No significant difference was found in the change in thickness of TrA ($p=0.43$) and IO ($p=0.72$) in response to PFM contraction between women with and without SUI (Table 1).

Interpretation of results

The results of this study in agreement with EMG studies indicate a synergistic relationship between the pelvic floor and abdominal muscles. However, the change in thickness of abdominal muscles during PFM contraction, although not statistically significant, was greater in women with SUI compared to those without SUI. It seems that because the incontinent women can not perform a correct PFM contraction using a localized muscle strategy, they use muscles substitution strategies and activate all the muscles of the abdomino-pelvic cavity.

Concluding message

In conclusion, the findings suggest that pelvic floor and abdominal muscles co-activation exists in continent and stress incontinent women.

Table 1. The (Mean \pm SD) for change in thickness of abdominal muscles during PFM contraction for continent and incontinent women

Muscle	Group		P-value
	Continent (N=10)	Incontinent (N=10)	
TrA	0.21 \pm 0.20	0.25 \pm 0.19	0.43
IO	0.27 \pm 0.22	0.37 \pm 0.23	0.72
P-value	0.65	0.13	

References

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What were the subjects in the study?	HUMAN
Was this study approved by an ethics committee?	Yes
Specify Name of Ethics Committee	This research was reviewed and was approved by the Human Subject Committee at University of Social Welfare and Rehabilitation Sciences.
Was the Declaration of Helsinki followed?	Yes

Was informed consent obtained from the patients?

Yes
