

Dear Sir,

the correlation between pelvic floor muscles and abdominal muscles is increasingly considered in the research of uro-gynecological rehabilitation. The aim of Martinho and Coll. study in the December 2017 issue of *Pelvipereineology*¹, is to demonstrate the mutual and synergic influences between the transverse abdominal and the pelvic floor muscles. They have evaluated the changes in bladder neck position, genital hiatus and puborectalis thickness during the voluntary contraction of the transverse abdominal muscles in 31 selected patients with stress urinary incontinence. The results were compared with the parameters obtained during the maximal contraction of the only pelvic floor muscles through Kegel's exercises in the same patients. The research concludes that during a maximal contraction of the transverse abdominal muscles, only puborectalis muscle thickness was found increased, while pelvic floor maximal contraction changes all parameters.

An important starting point has been stated with this research to determine whether the goals of pelvic floor rehabilitation can be reached by abdominal muscles strengthening. An increasing number of physiotherapists, in fact, suggest low pressure abdominal exercises as a rehabilitation path in pelvic floor disorders like stress urinary incontinence and mild grade prolapse. Abdominal tone is one of the goals to be achieved in this type of pathology, but the way the therapist choose to train abdominal muscles becomes of the utmost importance: intra-abdominal pressure is greatly increased during classical abdominal exercises (flexion of the trunk on the lower limbs in supine position) and this pressure can damage the connective tissue of the pelvic floor. It is demonstrated that the most frequent pelvic floor disorders are related to changes in connective tissue. A new rehabilitative approach has been developed by Caufriz² to manage intra-abdominal pressures through global postural exercises targeted to tone up abdominal muscles.

These studies actually open new points of view in the research to avoid that wrong rehabilitation protocols become harmful to the patient: pelvic floor, vertebral column, thoracic diaphragm and abdomen must be considered as one functional unit³. We are working with this aim and results seem to be promising.

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Response to comment on

"THE EFFECTS OF PELVIC FLOOR AND TRANSVERSE ABDOMINAL MUSCLES' MAXIMAL VOLUNTARY CONTRACTIONS ON PELVIC FLOOR ULTRASOUND BIOMETRIC PARAMETERS IN WOMEN WITH STRESS URINARY INCONTINENCE: PRELIMINARY RESULTS"

We read with interest the comments by Elena Frighetto on our article, which investigated the effects of pelvic floor and transverse abdominal muscles' maximal voluntary contractions on pelvic floor ultrasound biometric parameters in women with stress urinary incontinence¹. Our findings reinforce the Sapsford's theory², that suggests that the transverse abdominal muscle (TrA) correlates with pelvic floor muscles (PFM), since TrA contraction increases puborectalis muscle thickness, assessed by 3D/4D translabial ultrasound. However, our results also demonstrated that TrA contraction does not seem to be as effective as direct PFM contraction, since it did not have a significant effect on genital hiatus measurements as well as on bladder neck position.

Imaging studies have shown that bladder neck funneling and descend during Valsalva maneuver, as well as urethral hypermobility and low closure pressure appear to be the main predictors of stress urinary incontinence (SUI)³⁻⁷. So, PFM functional rehabilitation in women with SUI should be based on PFM training, in such a way that PFM voluntary contraction can help to stabilize the bladder neck and to increase the urethral closure pressure during stressful activities that promotes involuntary loss of urine⁸⁻¹⁰. Therefore, TrA contraction seems not to be the best mechanism to reach these objectives.

Despite this, we share the same idea that abdominopelvic muscles act as a single functional unit and, in this way, a global training must be carried out during rehabilitation. However, in order to avoid inappropriate interventions in clinical practice, we must be careful about the results obtained and we have to keep researching in order to elucidate the functional relationship between these muscles, favoring an evidence-based clinical practice. Soon, the complete results of our research will be published and, thus, we hope to contribute expanding the scientific knowledge in our area.

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