Hypothesis / aims of study:

The musculoskeletal capsule is formed by abdominal pelvic, lumbar vertebrae, the deeper layers of muscle multifidus, respiratory diaphragm and transversus abdominis. The balance and maintenance of the stability of the spine and pelvis are due to co-activation of deep and superficial muscles that act across the trunk. Sapsford et al. (2001) (1), Neumann & Gill (2002) (2) and Bo (2004) (3) have demonstrated the recruitment of the transversus abdominis muscles / internal oblique (Tra / IO) during contractions of the pelvic floor muscles (MAP) in young individuals, states cannot be held an effective contraction of the pelvic floor during the relaxation of the deep abdominal muscles. This fact suggests that the abdominal muscles have strong influence on the performance of the pelvic floor. Thus, this study aims at evaluating, through surface electromyography, the female co-activation during abdominopelvic exercises of maximal voluntary contraction of Tra / IO and MAP in primigravid pregnant women compared to nulliparous women.

Study design, materials and methods:

Clinical, prospective, observational and controlled, comprising 45 women, mean age of 24.52 (± 4.6) years and mean body mass index of 24.62 (± 2.45). The volunteers were recruited in the Health Programs of the National Health System (SUS), the city of Poços de Caldas (Minas Gerais, Brazil) and divided into two homogeneous groups (Hartley test Hc = 3.47 for age and Hc = 2 , 14 for BMI): (G1) 20 nulliparous women without symptoms of dysfunction of the MAP (G2) 25 primigravid pregnant women with mean gestational age of 30.49 weeks. Not included were women who had: prior abdominal or pelvic surgery, pelvic organ prolapse, diabetes, hypertension, neurological abnormalities, myopathy, chronic lung diseases, presence of urinary tract infection; physically active, high imp...

Results:

The nulliparous group showed both co-activation of muscles Tra/IO to achieve maximal voluntary contraction of the MAP, the co-activation of muscles in the MAP, to achieve maximal voluntary contraction of muscles Tra/IO. However, groups of pregnant women showed no significant co-activation during muscle contractions and MAP Tra /IO compared with nulliparous women (Table I).

Table I - Electromyographic Behavior of the muscles Tra/IO and MAP during maximal voluntary contraction in pregnant primigravid and nulliparous women
**Exercises**

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<tr>
<td>Tra/IO response during maximal MAP</td>
<td>0.0007***</td>
</tr>
<tr>
<td>AP response during isometric exercise abdominal (Tra/IO)</td>
<td>0.00001***</td>
</tr>
</tbody>
</table>

*Teste de Contrastes Ortogonais.
***Valor significativo, considerando p≤0.001

**Interpretation of results:**
Several authors have reported the importance of co-activation between muscles Tra/IO and MAP under conditions fisiológicas (1; 2; 3). However, so far not found other studies that may clarify what is the behavior of these muscles in different conditions, such as in pregnancy, where these muscles undergo physiological effects of pregnancy, whether biochemical (hormonal) or biomechanical (physical).

In assessing the muscles Tra/IO and pelvic floor of nulliparous women, through surface electromyography, our study found significant simultaneous motor response, arising from the co-activation of these muscles during their maximal voluntary contractions. However, despite the women's group to show homogeneous, were not observed to co-activation between these muscles in the group of pregnant women. These findings allow us to infer that pregnancy per se influences the physiology of muscle, preventing the abdominopelvic synergy.

**Concluding message:**
Co-activation between the muscles transversus abdominis / internal oblique pelvic in nulliparous women without complaints of pelvic floor dysfunction. Or pregnancy did not show co-activation between the muscles transversus abdominis / internal oblique and pelvic floor.

**References**