588

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COMPARATIVE EVALUATION OF ISOLATED PELVIC FLOOR MUSCLE CONTRACTION OR ASSOCIATED WITH ABDOMINAL HYPOPRESSIVE TECHNIQUE THROUGH SURFACE ELECTROMYOGRAPHY

Hypothesis / aims of study

Caufriez[3] believe the abdominal muscles activation, specifically the transversus abdominis muscle, might contribute to a strong PFM contraction.
The purpose of the present study was to compare the effectiveness of isolated pelvic floor muscle (PFM) contraction and associated with abdominal hypopressive technique (AHT) analyzed by surface electromyography (sEMG).

Study design, materials and methods

Thirty three healthy women were invited to participate in the study throughout January, February and March 2010. Potential subjects were excluded if they had a history of diabetes, neurological conditions, autoimmune connective tissue disorders, menopausal period or pelvic floor dysfunction.
Abdominal and PFM activity were recorded using electromyography equipment (EMG Systems™). Each volunteer was left in the private laboratory area to insert intravaginally the single-use probe. With the probe in situ, three maneuvers in a ramdom order were performed: PFM contraction isolated, AHT and AHT associated with voluntary recruitment of pelvic floor muscle (PFM + AHT), while the sEMG data were acquired.
To the PFM contraction, patients were taught to breath normally, squeeze isolated their muscles as if they were trying to stop their urine stream. The protocol for instructing patients to perform AHT consisted of first asking the patient to do a slow diaphragmatic inspiration, followed to a total expiration followed by diaphragmatic aspiration (gradual contraction of the transversus abdominis and intercostal muscles with the rise of the hemidiaphragm) then maintaining apnea during 10 seconds.
Surface EMG data were acquired from the abdominal muscles using bipolar pairs of Meditrace™ electrodes. The electrode pairs were positioned along the line of action of the underlying muscle fibers on the left and right sides at the following locations: rectus abdominis (2 cm lateral and caudal to the umbilicus) and transversus abdominis (2 cm cephalad to the pubic bone just lateral to midline and parallel to the superior pubic ramus).
Data collection began once the subject could perform a proper PFM contraction and AHT. A proper PFM contraction was defined as one in which the EMG data rose at least five times higher than the baseline noise and when visible cephalic movement of the perineum was observed by the examiner. All data were recorded with the subject in supine, with a pillow under the head, and with the thighs slightly abducted. Subjects performed a serie of three repetitions of each technique aimed at maximally exerting each muscle studied, with at least 60 seconds of rest between each repetition.
After the selection of the best out of three contractions, were evaluated 5 seconds of that contraction using the software EMGLab, with subsequent analysis of Root-mean-square (RMS). For statistical analysis the SPSS (Statistical Package for Social Sciences) version 17® was used, and to analyse the possible differences in MVC between techniques the Wilcoxon test was used with a significance level of 5% (0.05).

Results

Thirty three women, with mean age of 28.1 (±6.0) years old, mean body mass index 23.7 (±3.3) Kg/m^2 were included.

On isolated PFM contraction, this muscle presented mean activation of 101.0 (±44.2) µV, rectus abdominis presented 7.4 (±9.1) µV and transversus abdominis 23.3 (±1.1) µV. On AHT, these values changes to 47 (±30) µV, 7.3 (±3.8) µV and 34.3 (±38.1) µV. Similar activation was observed when associated PFM and AHT, corresponding PFM of 104.8 (±49) µV, rectus abdominis 10.8 (±5.8) µV and transversus abdominis 57.6 (±47.3) µV.

Table 1.
Comparison of pelvic floor myoelectrical signal of three studied techniques:

Variable pairs (µV)	n	Mean	SD	Sig. (p)
AHT	33	47,0	31,0	< 0,001
PFM isolated	33	101,0	44,2	
AHT+PFM	33	104,7	50,6	0,5
PFM isolated	33	101,0	44,2	
AHT	33	47,0	31,0	< 0,001

AHT+PFM	33	104,7	50,6

Interpretation of results

According to a Cochrane review, pelvic floor muscle training should be recommended as first-line conservative management program for pelvic floor dysfunctions[1]. It is suggested that increasing the power and tone of the pelvic floor leads to permanent elevation of the levator plate to a higher resting position inside the pelvis, 'lifting' the pelvic viscera and restoring normal reflex activity and other protective continence mechanisms.
The AHT is an integrated model of procedure and has two aspects, postural development and acquisition of perineal automatism. This technique, by the decrease in abdominal pressure, stimulates and strengthens the transverse and oblique muscles of the abdomen, and PFM[2].
In this study we observed PFM activation during AHT but was more powerful when associated with voluntary contraction of PFM. Among three techniques observed, isolated PFM contraction is more effective than AHT, however, when associated AHT and PFM voluntary contraction, no significant differences were found.
These results agree with cientifics evidence that isolated PFM exercise is the gold standard in treatment of pelvic floor dysfunctions. However, learning AHT requires more time and one session of AHT training may be insufficient time to learn the technique and to achieve optimal activation of the involved muscles. This leads us to believe that maybe a more intensive AHT training associated with voluntary contraction of PFM could increase activation of that muscles and provide greater benefits for the patients. However, more studies are necessary to confirm these evidences.

Concluding message

Abdominal hypopressive technique (AHT) didn´t improve the PFM contraction. Maybe AHT can be one way to stimulate the PFM activation due reflex contraction of PFM in the beginning of treatment.

References

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