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PELVIC FLOOR MUSCLE TRAINING ALONE OR IN COMBINATION WITH HYPOPRESSIVE EXERCISES: RANDOMIZED CONTROLLED TRIAL

Hypothesis / aims of study

The pelvic floor muscle training (PFMT) has been indicated for treatment of pelvic floor dysfunction, with A level of evidence for the urinary incontinence (1). Recently, the indirect training of pelvic floor muscles (PFM) by transversus abdominis (TrA) muscle contraction has been suggested as a new method for strengthening PFM (2), and the hypopressive exercises recommend the contraction of TrA muscles associated with diaphragmatic aspiration (3). Although widely used, there are no consistent evidences that TrA muscle contraction or hypopressive exercises can effectively strengthen the PFM. This study aimed to evaluate the impact of PFMT alone or in combination with hypopressive exercises in women with pelvic organ prolapse.

Study design, materials and methods

From January 2008 to September 2009, fifty eight women, with untreated pelvic organ prolapse was included in this randomized controlled trial. All subjects gave written informed consent to participate. Women with stage II of pelvic organ prolapse, graduated by a gynecologist according POP-Q, were included. The exclusion criteria were neuromuscular diseases and the use of hormonal therapy. Once enrolled, subjects were evaluated by an urogynecology physiotherapist (responsible for the study), which measured the pelvic floor muscle strength using 0-5 Oxford graduation, previously validated. Then, endurance was registered via PERFECT assessment scheme. Endurance was expressed as the length of time, up to 10 s, that a maximal voluntary contraction (MVC) could be sustained. Thus, the contraction was timed until the muscle started to fatigue the muscular endurance (maintenance time of contraction in seconds). At last, the MVC using surface electromyography (SEMG) was measured by a vaginal probe. Three maximum voluntary and successive contractions were required from the pelvic floor, registered in microvolts (μV). The evaluation parameter was the root mean square, and considered the arithmetic mean of the three contractions. Each evaluation was carried out with a 2-min interval.

Subsequently, an assistant researcher performed the randomization of volunteers by a computer-generated random number generator to receive: (a) individualized program of PFMT, (b) hypopressive exercises associated with PFM contraction and (c) control. The patients of treatment groups received information about PFM localization and function by a blind physiotherapist. Then, the women of PFMT group were taught about how to contract the PFM with normal breath, squeeze around the pelvic openings and cranial inward lift, in lying, sitting and standing positions. The hypopressive group was instructed about how to perform hypopressive exercises: a slow diaphragmatic inspiration, followed to a total expiration followed by gradual contraction of the TrA and intercostal muscles with the rise of the hemidiaphragm (diaphragmatic aspiration) (3). Thus, were taught about how to contract the PFM at the same time of diaphragmatic aspiration in lying and standing positions. The treatment groups also received lifestyle advices, as hold the PFM contracted during increases of intra-abdominal pressure, and increase fiber and water intake to prevent constipation.

This protocol was performed in three first appointments for each treatment group. Then, they performed the same amount of daily home exercises during three months (12 weeks), with fortnightly appointments. They also filled out exercises diaries. The control group underwent one appointment and received instructions to perform PFM contractions (without follow a protocol), and the same lifestyle advices of the treatment groups. The three groups are blind revaluated after 12 weeks by the same expert physiotherapist who performed the initial evaluation. For statistical analysis the SPSS (Statistical Package for Social Sciences) version 17® was used, and to analyze the possible differences in Oxford, endurance and MVC at baseline and final of the treatment, Wilcoxon test was used, as appropriate, with a significance level of 5% (0.05). To analyze the groups in pairs, Mann-Whitney test was used. Data analysis was performed by a specialized professional who was blinded to the group allocation.

Results

The PFMT and hypopressive groups obtained significantly increase of all analyzed variables, when comparing with control group (Table 1). No statistically difference were founded when comparing final mean values of Oxford and MVC from PFM and Hypopressive groups (p = 0.406 and p= 0.505 respectively), however, the endurance was statistically different in these both groups (p = 0.007).

Table 1 – Results of baseline and final evaluation of three analyzed groups

Group	Variable	Mean (±SD)	Sig p *
PFMT (n= 21)	Baseline Oxford	1.7 (± 0.7)	< 0,001
	Final Oxford	3.8 (± 0.8)	
	Baseline Endurance (s)	2.9 (± 1.1)	< 0,001
	Final Endurance (s)	6.2 (± 1.4)	
	Baseline MCV (μv)	10 (± 2)	< 0,001
	Final MCV (μv)	17 (± 4)	
Hypopressive (n = 21)	Baseline Oxford	2.4 (± 0.8)	< 0,001
	Final Oxford	3.6 (± 0.7)	
	Baseline Endurance (s)	3.1 (± 1.6)	< 0,001
	Final Endurance (s)	7.4 (± 1.8)	
	Baseline MCV (μv)	10.4 (± 3)	0,001

	Final MCV (µv)	15.4 (± 4.1)	
Control (n= 16)	Baseline Oxford	2 (± 0.8)	0,705
	Final Oxford	2.1 (± 0.8)	
	Baseline Endurance (s)	2.9 (± 1.1)	0,564
	Final Endurance (s)	3 (± 1.4)	
	Baseline MCV (µv)	10.7 (± 4.8)	0,352
	Final MCV (µv)	11 (± 4.3)	

* Wilcoxon test

Interpretation of results

According to Caufriez (1997), the hypopressive exercises relax the diaphragm, decreases the abdominal pressure and, via reflex, activates TrA and PFM. Furthermore, one of his statements is the strengthening pelvic floor muscles (3). To support this theory, some authors claim that there is a co-contraction of PFM when deep abdominal muscles are contracted (2). However, according Bo et al (2009) the contraction of PFM could not occur in women with pelvic floor dysfunctions, and the contraction of TrA can increase de abdominal pressure and harm the pelvic floor (1). In this study we observed that hypopressive exercises associated with a PFM voluntary contraction showed similar results for muscular strength and electrical activity when comparing to PFMT. Therefore, this technique could be an alternative to increase the awareness and improve pelvic floor muscle strength, but not replace the PFMT.

Concluding message

The hypopressive exercises, associated with voluntary pelvic floor muscle contraction, seem to cause similar increase of PFM strength and electrical activity when comparing to PFMT. However more studies are necessary to confirm these results.

References

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Is this study registered in a public clinical trials registry?	**No**
Is this a Randomised Controlled Trial (RCT)?	**Yes**
What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**Ethics Research Committee of Federal University of São Paulo**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**