

IS THERE ANY DIFFERENCE IN THE PELVIC FLOOR MUSCLE BEHAVIOR BETWEEN CONTINENT AND INCONTINENT WOMEN SUBMITTED TO FATIGUE TRAINING?

Hypothesis / aims of study

Pelvic floor muscle training (PFMT) has been recommended as first line therapy for stress urinary incontinence (SUI) (1,2). However, an inadequate exercise-training program may decrease results and adherence, as well as a low intense program may not reach adequate results (3). On the other hand, a very intense program may not be followed due to patient muscular inability to complete it. To obtain the best possible results with PFMT there are some important questions that have to be adequately addressed, such as: Do pelvic floor muscles (PFM) get fatigued? How much training is necessary to promote muscle improvement without generating fatigue? Are women with SUI more likely to develop fatigue of these muscles? In order to answer some of these questions we evaluated the PFM behavior during an exhausting workout in women with and without SUI.

Study design, materials and methods

From August 2010 to November 2011, we evaluated PFM ability of continent and SUI women. All SUI women had urodynamic demonstrated genuine SUI. Women without complaints of SUI were recruited from the community. Exclusion criteria were pregnancy, neurological and/or cognitive disorders, previous genitourinary surgery, overactive bladder symptoms, pelvic organ prolapse, age < 35 and > 70, women who could not understand how to adequately perform the PFM contractions.

All women performed fatigue training: they were instructed to contract/relax PFM on intervals of 1 second attempting to reach the maximum voluntary contraction amplitude, guided by electromyography (EMG) biofeedback. During these strenuous training women were asked every minute to score effort using Borg Scale (0-10, where 0 = no effort, 5 = tiredness and 10 = maximal effort). Training was stopped when they reached 10, which means that they were really exhausted and could not contract anymore. Training duration (time to reach fatigue), EMG variables and heart rate (HR) before and after fatigue were evaluated.

Results

We evaluated 26 continent and 30 SUI women (Demographics are presented in table 1). SUI women reached fatigue 36.7% faster than their counterparts (mean time = 9.17±/ 4.79 and 14.19 ±/ 8.32 minutes respectively, p= 0.006) - Table 2. Baseline heart rate (HR) and HR behavior during exercise were similar in both groups (p=0.824), with significant increase in both groups during the test (p<0.001), as seen in figure 1. The EMG evaluation showed a decrease in rest amplitude for both groups, demonstrating that continent and incontinent had reached exhaustion. However, SUI women showed a greater decrease in the 10 seconds sustained contraction Median Frequency, which means a greater tendency to fatigue - Table 3.

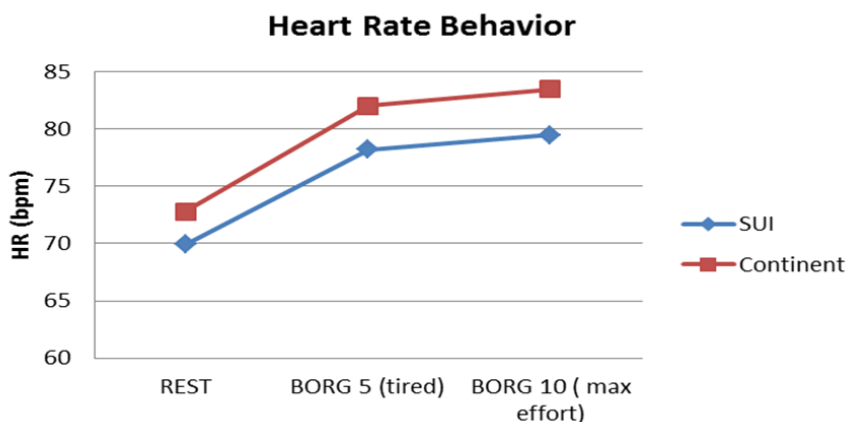
Table 1. Demographics

	Continents (n=26)	SUI (n=30)	p
Age (mean ± Sd)	50.73 ± 8.94	53.63 ± 11.3	0.296
BMI (kg/cm ²)	24.8 ± 4.88	27.95 ± 4.57	0.019
Pregnancies (mean ± Sd)	2.42 ± 1.03	3.47 ± 3.43	0.468

Table 2. Differences in the time to reach tiredness (Borg 5) and fatigue/exhaustion (Borg 10) between Continents and SUI women

Perception of Effort (Borg SR10)	SUI	Continent	p
Tired -Borg 5 (min/SD)	4.6 ± 3.40	6.54 ± 2.79	<0.005
Maximal Effort -Borg 10 (min/SD)	9.17 ± 4.79	14.19 ± 8.32	0.006

(Mann-Whitney test)



(Analysis of variance with repeated measures)

Figure 1. Heart rate behavior during PFM intensive exercising.

Table 3. Comparison between pre and post Fatigue EMG variables in continent and SUI women.

EMG variable	MOMENT	SUI	p	CONTINENT	p
Endurance Amplitude (μV / SD)	Pre fatigue	8.28 \pm 4.7	0.225	11.28 \pm 6.75	0.233
	Post fatigue	7.91 \pm 4.77		11.17 \pm 8.14	
Rest Amplitude (μV /SD)	Pre fatigue	3.66 \pm 2.64	0.003	4.11 \pm 2.86	0.006
	Post fatigue	2.91 \pm 2.44		3.37 \pm 2.37	
10 seconds of sustained contraction median frequency (Hz/ SD)	Pre fatigue	111.56 \pm 27.50	0.034	110.64 \pm 16.24	0.341
	Post fatigue	111.17 \pm 30.28		110.25 \pm 16.93	

(Non-parametrical Wilcoxon Test)

Interpretation of results

SUI women showed less resistance to an intense and long lasting PFM workout than their counterparts, suggesting that SUI women may present less effective and resistant PFM. Furthermore, there is an important variance in time to reach fatigue/exhaustion in both groups. It suggests a difference in women PFM performance, independently of the continence status, which should be evaluated before determine a PFMT program.

Concluding message

SUI women have a worse muscular resistance and develop PFM fatigue faster than age matched continent women. There is a great variability in time to reach fatigue in continent and incontinent women, demonstrating an individual variability in PFM. PFMT should be individualized respecting the principles of training, i.e., providing sufficient overload to cause muscle responses without exceeding individual limits.

References

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Disclosures

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