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Lindland M[1], Bø K[1]
1. Norwegian University of Sport and Physical Education

DOES STRENUOUS GENERAL PHYSICAL ACTIVITY CAUSE PELVIC FLOOR MUSCLE FATIGUE?

Hypothesis / aims of study

A high prevalence of symptoms of stress urinary incontinence (SUI) has been found in elite athletes and participants of fitness activities (1). However, in the 2nd Consultation on incontinence it is stated that there is scant knowledge whether strenuous physical activity or stressors in the workplace can cause pelvic floor dysfunction causing SUI and pelvic organ prolapse (2). It is suggested that strenuous physical activity can provoke leakage in those who are pre-disposed for the condition. The aim of this study was to investigate whether strenuous general physical activity can produce pelvic floor muscle fatigue measured as voluntary maximum contraction, vaginal resting pressure or holding time in young nulliparous women with SUI symptoms.

Study design, materials and methods

Eleven nulliparous women with reported SUI during strenuous physical activity participated in this study. The study was approved by the Regional Medical Ethical Committee, and the participants gave written consent. Two women were excluded because they failed to perform a correct pelvic floor muscle contraction assessed by vaginal palpation. Mean age of the included women was 24 years (SD $\pm$ 2). Mean severity index score was 2 (SD $\pm$ 0.7) (3). The study had a randomized Crossover design, and a power calculation showed that 10 subjects were needed to detect a difference of 5 cm H_2O with a power of 80%, α 0.05. Subjects were randomized to start with either strenuous physical activity (a 90 minutes interval training program consisting of heavy strength training and high impact endurance activities) or rest in the sitting position (control period of 90 minutes). Vaginal resting pressure (cm H_2O), maximal voluntary contraction (cm H_2O) and holding time (seconds) were measured before and after intervention and rest, by a fiberoptic microtip transducer connected to a balloon catheter inserted into the vagina (Camtech AS, Sandvika, Norway). Data are reported as median with range and were analyzed with nonparametric statistics (Wilcoxons Signed Rank test). A significance level of 5 % was chosen.

Results

The difference in maximal voluntary contraction in the control period (median 1 cm H_2O, range -7 till 6) was significantly different (p=0.02) from the intervention period (median -7 cm H_2O, range -12 till 2). There were no significant differences in resting pressures in the control period (median 0 cm H_2O, range -2 till 6) compared with the intervention period (median 0 cm H_2O, range -11 till 4), p=0.16 or in holding time (control period: median 0 sec, range -1 till 1 and intervention period median 0 sec, range -2 till 3), p=0.33.

Interpretation of results

To our knowledge this is the first study investigating the influence of general strenuous physical activity on pelvic floor muscle fatigue. The difference in maximal voluntary contraction of the pelvic floor muscles was significantly different when comparing the control period with the intervention period. The difference may indicate that strenuous general physical activity can cause short term pelvic floor muscle fatigue in symptomatic nulliparous women. Strenuous general physical activity influenced neither vaginal resting pressure nor pelvic floor muscle holding time in this study. Caution should be taken due to a relative small study population. However, we did perform an a priori power calculation and also used an adequate and strong design to investigate the research question.

Concluding message

Reduction in maximal voluntary contraction after strenuous general physical exercise indicates development of short term pelvic floor muscle fatigue. Further studies are required to investigate whether strenuous exercise can cause long term pelvic floor muscle fatigue, stretch and weakening leading to permanent pelvic floor dysfunction.

References:

1. Urinary incontinence, pelvic floor dysfunction, exercise and sport. Sport Med 2004, 34 (7): 451-464.

2. Conservative treatment in women. In: Abrams et al: Incontinence, 2nd International Consultation on incontinence, 2nd Edition, 2002:571-624.
3. A severity index for epidemiological surveys of female urinary incontinence. Comparison with 48-hour pad tests. Neurourol Urodyn 2000, 19: 137-145.