

CAN YOU BREATHE YOURSELF TO A BETTER PELVIC FLOOR? A SYSTEMATIC REVIEW

NIH Department of Sports Medicine
NORWEGIAN SCHOOL OF SPORT SCIENCES

Abstract
#648

Kari Bø, PT, Professor, PhD¹; Patricia Driusso, PT, Professor, PhD²; Cristine Homsí Jorge, PT, Associate Professor, PhD³

1. Norwegian School of Sport Sciences, Department of Sports Medicine, Oslo Norway, 2. Women's Health Research Laboratory, Physical Therapy Department, Universidade Federal de São Carlos, Brazil, 3. Ribeirão Preto Medical School, Department of Health Science, Graduation Program in Rehabilitation and Functional Performance, Ribeirão Preto, Brazil

Introduction

Pelvic floor muscle training (PFMT) has Level 1 evidence/ recommendation A to treat stress- and mixed urinary incontinence (UI) and pelvic organ prolapse (POP) in women, and there is international consensus that PFMT should be first-line treatment for these conditions (1). Due to its location at the lower part of the abdominal canister, it has been suggested that the PFM works in orchestra with abdominal muscles and the thoracic diaphragm. Some authors have hypothesized that pelvic floor function can be improved by performing diaphragmatic breathing exercises, indirectly via what they claimed to be a facial connection between the diaphragm and PFM, and that incontinence could be reduced.

Aim of study

The aim of the present review was to investigate whether there is evidence for deep breathing as an intervention alone or in addition to PFM contraction in the treatment of UI and POP. In addition to randomized controlled trials (RCTs), we also report results from short-term experimental studies on a possible effect of inspiration and expiration on PFM response and function



Materials and Methods

This systematic review included short-term experimental studies and RCTs indexed on PubMed, EMBASE and PEDro Database. The last search date was December 10th, 2022. A form was used to extract data that was analyzed qualitatively due to the heterogeneity in subjects involved, interventions and outcome measures of the included studies. Inclusion criteria were short-term experimental studies and RCTs with full-text publications available, with no language restriction, including only women, not pregnant or in the postpartum period and above 18 years old. The studies had to investigate the impact of breathing on the PFM and/or pelvic floor support and the effectiveness of any breathing technique alone or added to PFM contraction (PFMc)/training on PFM response, urinary incontinence and/or pelvic organ prolapse. Exclusion criteria were studies that included breathing exercises, among other exercises for other purposes than affecting the PFM in addition to PFMT, given in exercise classes.

The PEDro rating scale was used to grade the methodological quality of the RCTs. Total PEDro scores of 0-3 are considered 'poor', 4-5 'fair', 6-8 'good', and 9-10 'excellent'. For trials evaluating complex interventions (e.g., exercise), a total PEDro score of 8/10 is optimal as it is considered impossible to blind the therapist and the participants. The PEDro scale is a reliable and valid tool to evaluate the risk of bias in clinical trials (2).



This Photo by Unknown Author is licensed under CC BY-SA

Results

Eighteen full-text articles were included in the review. A total of 374 participants were included in the short-term experimental studies and 765 participants in the RCTs. The studies were published from 1990 to 2022. Nine were short-term experimental studies while nine were RCTs.

Short term experimental studies:

The studies had sample sizes ranging from 6 to 177 and used sEMG, manometer, ultrasound or magnetic resonance imaging (MRI) to assess response from the PFM during respiration. Most studies included healthy participants. Activation of the PFM during expiration was significantly less than during a PFM contraction. Three studies evaluated hypopressive technique (combination of excessive expiration and abdominal contraction). All of these showed that PFMc was significantly more effective in activating the PFM compared to the hypopressive technique measured with sEMG: PFMc :101.1 (SD 44.2) μ V, hypopressive: 22.9 (SD 11) μ V, $p < 0.001$, narrowing of LH area measured with ultrasonography: PFMc: 1.8 cm^2 , hypopressive: 0.5 cm^2 and activating the PFM measured with sEMG during PFMc: 40.25 (IQ 25-75: 30.42-61.07) and hypopressive: 7.57 (IQ 25-75: 4.52-12.77).

RCTs:

The PEDro score of the RCTs varied from 4 to 8. The RCTs showed that training the PFM was significantly more effective to improve PFM variables and UI and POP than breathing exercises, and that adding breathing exercises to PFMT does not have any additional effect to PFMT. Five RCTs evaluated the effect of hypopressive exercise (two reported from the same study) compared to PFMT. There was no additional effect of adding hypopressive exercise to PFMT, and PFMT was more effective than hypopressive exercise for UI, POP and PFM variables. Only two studies compared breathing exercise alone with either a control group with no breathing (sham) or PFMT. The sham study found no effect of breathing on OAB, but that breathing reduced perceived psychological stress (3). In the other study there was no differences between PFMT and breathing in the primary outcome.

Discussion

We found limited information about respiration and the PFM from short-term experimental and RCTs to support the theories that breathing can positively affect PFM variables, UI and POP. The studies included a plethora of outcome measures, exercise programs and breathing techniques, and meta-analyses could therefore not be conducted. Activation of the PFM during expiration was minor or non-existing and significantly less than during a PFM contraction. In general, the RCTs showed that PFMT was significantly more effective to improve PFM variables, UI and POP than breathing exercises, and that adding breathing exercises to PFMT had no additional effect. One argument for applying breathing exercise and especially expiration is that some women are not able to perform an effective PFM contraction. As the co-contraction of the PFM during breathing found in the published studies was minor or non-existent, further investigations are needed to investigate whether use of different muscle groups and expiration are effective methods to teach women to contract the PFM. There is a need for further high quality RCTs to compare deep abdominal breathing with equal time of sham or other relaxation techniques. This systematic review found only one such RCT, and interestingly, this study showed no effect of the primary outcome, OAB variables, but a significant reduction in psychological stress (3). The study finding no difference between breathing exercises and PFMT was hampered with only a 6 weeks training period and that the training was conducted at home. Supervision has shown to be one of the key components for effective PFMT (1).

Conclusions

The results of this systematic review indicate that the evidence for incorporating breathing exercise in clinical practice in addition to or instead of PFMT is scant or non-existing. This conclusion is based on the immediate effect assessed during short-term experimental studies and small RCTs. Clinical practice in applying PFMT to treat UI and POP should be based on protocols from published high quality RCTs showing convincing effect sizes (1).

References

1. Dumoulin C et al. Conservative management of UI and POP in adults including neurological patients. In: Cardozo L, Rovner E, Wagg A, Wein A, Abrams P. Incontinence 7th Ed 2023, page 795-1038
2. Macedo LG et al. There was evidence of convergent and construct validity of Physiotherapy Evidence Database quality scale for physiotherapy trials. J Clin Epidemiol. 2010; 63(8):920-5. <https://doi.org/10.1016/j.jclinepi.2009.10.005>
3. Huang AJ et al. A Randomized Controlled Trial of Device-Guided Slow-Paced Respiration In Women with Overactive Bladder Syndrome. J Urol. 2019 October ; 202(4): 787-794. doi:10.1097/ JU.0000000000000328