Background: Aerobic capacity is an indicator of overall health.

**Aim/Primary Aim:** To evaluate the relationship between aerobic capacity and PFM function in adult women without UI or other urinary tract dysfunctions and without conditions affecting the cardiorespiratory system. The authors hypothesized that the selected population would present a relationship between PFM contraction capacity and oxygen consumption. (They do not specify what that relationship might be…)

**Study Design/Study Format:** Cross sectional study design (no randomization)

Power calculation based on prior research reporting a correlation between hand grip strength and functional capacity- sample size = 41. Subjects n=61, 20 of these women were only recruited to evaluate the reliability of the reference equation (explained below). Inclusion criteria: 18+, eutrophic BMI, no UI or POP according to POP-Q, no prior pelvic surgery, minimum of 1/5 MMT on Oxford, must be able to reach ventilatory anaerobic threshold (VAT) during the cardiopulmonary exercise test (CPX). Sample: age 35 +/- 16, oldest was 51

**Methods:**
All volunteers underwent two evaluations:
1. initial evaluation = medical hx and habitual physical activity (HPA) assessment by Baecke’s questionnaire, provides a score that classifies the individual as sedentary (< 6) or active (> 6). Eval of UI symptoms by 2 King’s Health Questionnaires, and PFM functional assessment by digital palpation and perineometry.
2. 2nd day of testing- CPX cardiopulmonary exercise test using electromagnetic braking cycle ergometer, ventilator and metabolic variables and HR were recorded throughout the test. Other measures:
   - BP measured pre, every 3 minutes, at ex peak, and post test.
   - Tidal volume
   - Power
   - # cycling rotation/min
   - VO2 = oxygen consumption
   - VCO2= carbon dioxide production
   - E= pulmonary ventilation.
   - VAT was derived from formula described on p3/8
**Results:**
- 75% physically active, 17% very active, and 8% sedentary
- 17% presented grade 1 PFM contraction, 31.8% grade 2, 26.8% grade 3, and 24.4% grade 4, according to the modified Oxford Scale.
- Avg PFM contraction pressure obtained by perineometer was 53±26 cmH\(_2\)O
- Avg. oxygen consumption at VAT (VO\(_{2\text{VAT}}\)) obtained from CPX was 14±2 mL kg\(^{-1}\) min\(^{-1}\).
- Significant correlations were found between
  - PFM contraction pressure and VO\(_{2\text{VAT}}\) (r=0.55; P<0.001);
  - PFM contraction pressure and HPA score (r=0.38; P=0.02);
  - age and VO\(_{2\text{VAT}}\) (r=-0.25; P=0.049);
  - VO\(_{2\text{VAT}}\) and HPA score (r=0.36; P=0.02).
- An age-adjusted multiple linear regression equation (R\(^2\)=0.32) was derived to estimate VO\(_{2\text{VAT}}\) from the contraction value obtained by perineometer, so that the PFM contraction pressure was able to predict VO\(_{2\text{VAT}}\).
  - VO\(_{2\text{VAT}}\) (mL kg\(^{-1}\) min\(^{-1}\)) = 12.248 + (0.0441 PFM strength) - (0.0252 Age). Estimated error: 1.916. R\(^2\)=0.32 (R\(^2\)=equation power).
  - The equation was validated using data from another group of 20 healthy women (33±12 years; PFM contraction: 49±23 cmH\(_2\)O) and no significant difference was found between actual VO\(_{2\text{VAT}}\) and predicted VO\(_{2\text{VAT}}\) (13.1±1.9 vs 13.8±2.0 mL kg\(^{-1}\) min\(^{-1}\)).

**Discussion:**
- PFM contraction pressure can present significant correlations with physical capacity, assessed by a questionnaire, as well as with the aerobic capacity, assessed by CPX testing.
- The age-adjusted equation allows predicting VO\(_{2\text{VAT}}\) from the PFM contraction value obtained by perineometer.
- The relevance of this study is that it contributes to our understanding of the great physiological importance of the PFM, whose perception and function can be impaired in the female population.
- when participants were divided into groups depending on their PFM muscle strength, authors observed that there was no difference in age, i.e., participants with worse scores were not necessarily older.
- findings highlight the importance of performing regular physical activity also to preserve PFM functionality.
- The relationship between PFM function and aerobic capacity reinforces the importance of submaximal exercise programs, which should be combined with specific interventions to preserve these muscles' integrity and to improve UI in patients with lower urinary tract dysfunction. In addition, it is noteworthy that although the improvement in cardiopulmonary conditioning is associated with better PFM function, there is no evidence that an isolated
cardiopulmonary training can improve symptoms related to UI.

Limitations:
- age 35 +/- 16, oldest was 51, can not generalize to older population
- other unknown factors may directly influence this equation; age and PFM function explained only 32% of oxygen consumption at VAT.
- What is the practical application? Not addressed by authors

Conclusion/Summary:
In conclusion, PFM function is associated with aerobic capacity in healthy YOUNGER THAN AGE 52 women and PFM contraction pressure may be used to estimate VO2VAT in this population.

Clinical Application
- What other factors likely explain oxygen consumption at VAT?
- How does this information affect your clinical practice?
- Can PFM performance practically be used for oxygen consumption prediction, as the handgrip strength?
- Can handgrip strength indicate pfm function and visa versa?