Pelvic Physical Therapy Distance Journal Club
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Background: Hypopressive Exercises (HE) are intended to reduce intra-abdominal pressure. See paragraph 2 p794 for description of HEs. Previous studies relating HE to pelvic floor function have used subjects who have never performed HE previous to the study/data collection. Additionally, no studies have investigated application of HEs in patients with or at risk of Pelvic floor Dysfunction/disorders. Hypothesis: HEs performed by experienced women would activate the pelvic floor and deep abdominal muscles and that the HE maneuver, as opposed to the posture alone, is essential to produce activation.

Introduction and Purpose: This study is unique in that it has patients who are trained previous to the start of the study and the patients have known “pelvic floor dysfunction.” The primary objective was to evaluate hypopressive postures and/or maneuvers in relation to (a) a peak PFM and abdominal muscle contraction, (b) vaginal closure force, and (c) tonic PFM and abdominal ms activation (type I fibers referenced in the article). Secondary Objectives: evaluate the influence of body position- supine vs standing vs single leg raise/hold - on PFM and abdominal ms activation on intravaginal forces in HEs.

Methods: Subjects and pre-training: Women, aged 18+, who were already participating in Pelvic PT, including HEs for past 2 months (16 visits, 45 min each, 2 times weekly). *Instructed not to contract PFM; had education session regarding PFM anatomy and function, knack, healthy bladder and bowel habits within the Pelvic PT sessions. HEP: 2 sessions weekly of 9 reps total of 3 HEs (27 reps total). The subjects were recruited for this data collection at the 16th/final PT session.

Exclusions: pregnancy, UTI or UTI symptoms, neurological disease.

Data Collection methods:
1. Vaginal PFM MMT
2. Dynamometer speculum
3. sEMG
   a. @ perineum
   b. @ right rectus Ab, right lateral ab wall, right gluteus max, right adductor longus

Assessments Included: (order of below series is not specified to be randomized but this is the order they are presented in the paper, except that dynamometer was definitely done before sEMG)

A. PFM strength via internal exam, Modified Oxford Scale
B. Dynamometer (Mean of peak force in three trials )
   1. PFM MVC - 3 reps, 10 sec rest between. “Squeeze and lift as strongly as possible”
   2. PFM activation with HE in supine - Fig 2A p.797 for position, 3 reps
C. sEMG (all locations collected data during the following assessments)
   1. PFM MVC - 3 reps, 10 sec rest between (PFM MVC = highest peak value - avg baseline (net change); mean of the three trials) “Squeeze and lift as strongly as possible”
   2. Max isometrics for comparison: rectus abs, deep abs, hip adductors, gluteals - 3 sec max effort hold (does not specify reps)
   3. PFM and ab activation in HE supine maneuver - same as dynamometer set up
   4. Max voluntary PFM - orthostatic posture - Fig 2B, p.797 posture
   5. PFM and Ab activation in HE maneuver - orthostatic posture - same posture as above

Results:
- 66 subjects completed the study (only 2 declined due to schedule conflicts). All multiparous, 85% with Pelvic Floor dysfunction (no further description), 41% postmenopausal (no mention or HRT of any kind).

- Outcomes: (Table 2, p. 798)
  A. Vaginal Closure force (Dynamometer)
     a. HE produced 51.2% (Left LE) and 55.7% (right LE) of PFM MVC (p<0.01). (some subjects produced up to 84.5% of PFM MVC)
  B. PFM and Abdominal muscle contractions vs HEs (sEMG)
     a. PFM via sEMG in supine: HE produced 86.5% (R LE) and 74.4% (L LE) of PFM MVC of 53.9uV (avg). (p <0.01).
     b. Abs via sEMG: HE produced 35.5% of isometric abdominal ms contractions. P= 0.11. There was no significant difference in this data supine vs standing.
     c. Hypopressive posture vs. maneuver -
        i. via supine dynamometer (Fig 3A, p.800): posture produced up to 8.2% of PFM MVC, and the maneuver produced up to 37.9% of PFM MVC (p value could not be located)
        ii. via sEMG (Fig 3B):
           1. Supine - indicates similar activation in posture vs maneuver
           2. standing = higher in maneuver vs posture alone ( p < 0.001).
  b. PFM and Abs supine vs standing sEMG: orthostatic position produced 89.9% of Peak PFM MVC in supine (Table 2 p.798)

*right to left differences in ab muscle activation was explained due to electrodes on the right side only for data collection. Authors relate the usefulness of the single leg HE position in supine to ASLR series used in clinical testing for load transfer.

Conclusions: This study agrees with previously published articles suggesting that HE do activate the PFMs, but not as much as volitional PFM activation. They suggest that use of HEs may help improve PFM endurance and deep ab ms endurance. The HE maneuver produced higher PFM force in supine compared to the posture alone and higher sEMG values for PFM and abs in standing vs supine.

Strengths:
- Subjects pre-trained in HEs prior to onset of study, so realistically they would probably be doing the maneuvers effectively.
- used 2 methods of testing and multiple body positions
- study results support diaphragm facilitation and “strengthening” as well as postural re-education which is often helpful in PFD

Weaknesses:
- Authors did not describe the patients “pelvic floor dysfunction” nor provide dx for PT referral
- PTs not blind to measurements during data collection and non-randomized order of testing (due to tech issues)
- no test of PFM strength, peak force or neuromuscular recruitment prior to the 16 visits of PT....but would that have caused a “training effect” in some way - maybe this is actually a strength?
- dynamometer testing can reflect changes in intra-abdominal pressure and may not truly reflect PFM activation or force accurately. Intra-abdominal pressure was not measured specifically and that would help differentiate this concern.
- Authors acknowledge possible crosstalk with sEMG and other local muscles - however they did monitor this (data table 2, p. 798)
Clinical Applications:

Hypopressive Postures alone may facilitate some PFM and deep abs recruitment in supine positions. However, to achieve some recruitment significant enough to contribute to type I muscle fiber training, HEs must include the maneuvers, not just the posture especially in standing.

Ultimately, Volitional PFM contraction produces the highest peak activation and recruitment of the PFM and should be included in a Physical therapy program for pelvic floor strengthening.

QUESTIONS TO THE GROUP:

1. Taking both articles into consideration, do HEs seem to have some value in treatment of pelvic floor dysfunction?
   a. If yes, which patients would you consider based on this study and the other presented?
2. Do you suspect the “pretrained” patients in this study provided more accurate and effective HEs for comparison and data collection?
   a. Should future studies use subjects who have previously learned HEs?
3. When instructing patients in “endurance” exercises, what instructions do you give your patients? 50% effort contraction? 75% effort contraction? Does this align with the ability to activate the pelvic floor in this study?

Other resources:

Resende APM, Stupp L, Bernardes BT, et al. Can hypopressive exercises provide additional benefits to pelvic floor muscles training in women with pelvic organ prolapse? *Neurourol Urodyn* 2012; 31:121-125. *(Letter to the editor by Rial criticizes that the intensity and volume of exercises in the groups was different and cannot be compared appropriately in addition to the fact that the description of the HEs includes abdominal wall activation, which is not a correct description - this brings into question the accuracy of the technique applied.)*
