

## ACTIVITY OF THE PELVIC FLOOR MUSCLES DURING A RANGE OF ABDOMINAL MANOEUVRES

### Hypothesis / aims of study

Although it is accepted that contraction of the pelvic floor muscles accompanies activity of the abdominal muscles, there is an ongoing debate about its role in pelvic floor re-education (1, 2). One factor that may affect the increase of the pelvic floor muscle (PFM) activity may be a considerable variation in the pattern and amplitude of abdominal activity performed by the participants. This study aimed to investigate the effect of four different abdominal manoeuvres on the activity of the pelvic floor muscles in healthy women.

### Study design, materials and methods

The study involved 7 healthy women with no history of pelvic floor dysfunction which was screened for with a validated pelvic floor questionnaire. EMG recordings were made from the pelvic floor muscles with an intravaginal probe (Periform®). Subjects were in supine position and performed an isolated contraction of the transversus abdominis muscle (TrA), an abdominal brace, a gentle Valsalva, and a gentle head lift. All tasks were performed to the same level of perceived effort. Participants were instructed to perform the contractions with an effort of 3 on a modified Borg scale (1-15 scale) which relates to a "very light effort". Pelvic floor muscle contractions were performed at both gentle and moderately strong levels (3 and 7 on the Borg scale). Participants also performed a maximal voluntary pelvic floor contraction (MVPFC) for normalization of the EMG amplitude. Root mean square (RMS) PFM EMG amplitude was calculated for 1 second during the performance of each task and was normalised to the RMS EMG amplitude during the MVC and at rest. EMG activity was compared between tasks using a repeated measure ANOVA with one repeated measure (task).

### Results

When participants performed contractions of the abdominal muscles with "very light effort" activity of the pelvic floor muscles was 23-28% of the maximal voluntary pelvic floor contraction. During the isolated transversus abdominis contraction ( $P < 0.02$ ) and the brace manoeuvre ( $P < 0.02$ ) the amplitude of PFM EMG activity was significantly greater than that recorded at rest. There was a trend for the PFM EMG activity to increase with the Valsalva ( $P < 0.06$ ) but there was no increase with the head lift ( $P < 0.11$ ). Activity of the PFM increased to 34% MVC ( $P < 0.001$ ) during the gentle PF contraction and 49% MVC during the strong PF contraction ( $P < 0.001$ ). When the activity of the PFM was compared with the different abdominal muscle contractions, there was no difference in the amplitude of the increase in PFM EMG (all:  $P > 0.39$ ). PFM EMG was greater during gentle pelvic floor contraction than during the head lift ( $P < 0.04$ ), greater during the strong pelvic floor contraction than all other tasks (all:  $P < 0.005$ ).

### Interpretation of results

The results of this study indicate that activity of the PFM is increased similarly during a range of abdominal muscle contraction strategies, and there was no difference between tasks. Although these data suggest that the amplitude of PFM muscle EMG activity was similar for all tasks, previous data showed that variation in the direction of displacement of the pelvic floor may be observed with abdominal muscle contractions when measured with ultrasound imaging (3). It is important to consider that the movement of the pelvic floor is the net result of tension in the pelvic floor, intra-abdominal pressure and passive tension. Therefore the present data that suggest similar levels of muscle activity of the pelvic floor muscles with different abdominal manoeuvres cannot be assumed to induce identical displacements of the pelvic floor. Changes in intra-abdominal pressure and direct measurement of the movement of the pelvic floor with ultrasound imaging are the topic of ongoing work.

### Concluding message

Increased PFM activity accompanies most of routine manoeuvres.

### References

- (1) Neurourol Urodynam 2001; 20: 31-42
- (2) Neurourol Urodynam 2003; 22: 282-288
- (3) Int Urogynecol J 2005; 16: 285-292

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**HUMAN SUBJECTS:** This study was approved by the Institutional Medical Research Ethics Committee and followed the Declaration of Helsinki Informed consent was obtained from the patients.