International Continence Society August 22-26, 1999 29th Annual Meeting Denver, Colorado

Category No. 3 | Video Demonstration | Ref. No. 168

Abstract Reproduction Form B-1

Author(s): V Gill and P Neumann

Double Spacing

Institution City Country: School of Physiotherapy, University of South Australia Adelaide, AUSTRALIA

Double Spacing

Title (type in CAPITAL LETTERS): EMG EVIDENCE OF ABDOMINAL MUSCLE ACTIVITY DURING PELVIC FLOOR MUSCLE CONTRACTION

Isolation of pelvic floor muscle (PFM) activity, specifically eliminating abdominal muscle activity, is incorporated in many guidelines for PFM exercise. Abdominal muscle activity is regarded as undesirable because it may increase intrabdominal pressure (IAP) and cause a Valsalva response.

Abdominal muscle activity during PFM exercise has been detected via palpation of the abdominal wall, surface EMG recording techniques and monitoring of IAP. PFM contraction has been measured vaginally with surface EMG techniques and pressure recorded via a vaginal balloon.

Only one small study has investigated the electrical evidence of concomitant activity in the abdominal and pelvic floor muscle groups. Using surface EMG recording, an increase in lower Rectus Abdominis (RA) activity was considered to be unavoidable in efficient PFM training (1). However, the abdominal wall is comprised of muscle layers with different actions. Three of its four muscles can be evaluated using surface EMG (SEMG) recording techniques. Due to its deep position, Transversus Abdominis (TA) must be investigated using intramuscular needle electrodes.

Despite the still-common advice to eliminate abdominal muscle activity during PFM exercise, there are no investigations of the resulting PFM contraction.

Aim of study

Development of a method to identify activity in abdominal muscles and PFM during:

1. maximum PFM contraction
2. PFM contraction with specific inhibition of abdominal muscle activity.

Method

Subjects were four women aged 25-42 years (mean 34), lean, nulliparous and continent. Subjects were trained and tested vaginally by an experienced physiotherapist to contract the PFM correctly.
Test activities were PFM contractions in lying and standing positions.
Measurements were the simultaneous recording of:

1. Intra abdominal pressure (IAP)
2. Intra vaginal pressure (IVP)
3. Surface EMG (SEMG) overlying:
   a) Lower Rectus Abdominis (LRA)
   b) External Oblique Abdominis (EOA)
   c) Internal Oblique Abdominis (IOA)
4. Intramuscular EMG (IEMG) of Transversus Abdominis (TA).
5. Surface EMG of PFM.

To assess reliability, all tests were repeated one week later.
All EMG data was normalised prior to descriptive analysis of muscle activity.

Category No.	Video Demonstration	Ref. No. (Page 2)
3	☐	168

Abstract Reproduction Form B-2

Author(s): V Gill and P Neumann

Test re-test reliability was investigated using Pearson's Correlation Co-efficient r and t tests.

Results

Abdominal muscle activity was identified with all PFM contractions in lying and standing positions. Greatest EMG activity occurred in the deepest muscles of the abdominal wall (TA and IOA), with minimal recruitment of superficial muscles (RA and EOA). IAP remained below 22 cm H_2O during PFM contractions.
Attempts to inhibit abdominal muscle activity were largely unsuccessful.

Test-retest reliability was higher for surface than intramuscular EMG recording, but satisfactory (results will be tabled).

Conclusion

Strong PFM contractions simultaneously activated the deep muscles of the abdominal wall (TA and IOA). Minimal activity was shown in the superficial muscles (EOA and RA) of all four trained subjects.
It was possible to reduce, but not eliminate, abdominal muscle activity when contracting the PFM. However, minimising abdominal muscle activity resulted in PFM contractions so low in intensity that no principles of strength training would be satisfied.
The results of this small study challenge instructions, which recommend relaxing the abdominal wall during PFM exercise.
Further investigation of apparent synergistic interaction of the deep abdominal muscles with PFM contraction is warranted.

References

1. Bø et al (1990): Pelvic floor muscle exercise for the treatment of female stress urinary incontinence: 11. Validity of vaginal pressure measurements of pelvic floor muscle strength and the necessity of supplementary methods for control of correct contraction. Neurourology & Urodynamics 9:479-487.