

## HOW COMMON IS LEVATOR MUSCLE DEFECT IN WOMEN WITH ACONTRACTILE PELVIC FLOOR MUSCLES?

### Hypothesis / aims of study

Many women with pelvic floor dysfunction are unable to voluntarily contract their pelvic floor muscles. This may give rise to a pessimistic outlook as to the success of pelvic floor muscle training (PFMT). One of the factors associated with pelvic floor dysfunction is levator avulsion which occurs in upto 36% of women following vaginal delivery (1). In 2009, previous authors showed, in a cohort of patients with stress urinary incontinence, that pelvic floor neuropathy did not contribute to the inability to contract the pelvic floor muscles but levator avulsion seemed to be an associated factor (2). This study hypothesized that women with either pelvic organ prolapse ± urinary incontinence who cannot contract their pelvic floor muscles, despite specialised pelvic floor physiotherapy, are likely to have an avulsion defect of the levator ani muscle, visible on 3-dimensional ultrasound.

### Study design, materials and methods

Patients who presented to a tertiary Urogynaecological centre between June 2009 – March 2012 with symptoms of urinary incontinence ± prolapse were included. All patients underwent a standard Urogynaecological history and a clinical assessment including a Modified Oxford score (MOS). Patients with an MOS of 0 or 1 at their initial consultation who remained unable to contract their pelvic floor muscles despite specialised pelvic floor physiotherapy with a trained physiotherapist were recruited for transperineal ultrasound. Ultrasound imaging was performed with patient at rest, on maximum pelvic floor muscle contraction and on maximum valsalva, in supine position after bladder emptying. Integrity of the levator ani muscle attachment was assessed using tomographic ultrasound imaging (TUI), as previously described (3). Statistical analysis was performed using Prism version 6.0b (GraphPad Software, La Jolla California USA). Normality was assessed by D'Agostino-Pearson omnibus test, Mann-Whitney U test was used for continuous non-parametric data. Fisher's exact test was used for categorical data, a  $p < 0.05$  was considered statistically significant.

### Results

Of 625 patients who presented with a main complaint of either urinary incontinence ± prolapse, 150 (24%) women were unable to contract their pelvic floor muscle at initial assessment. The flowchart in Figure 1 shows an account for the final numbers recruited. Eighty five women (81%) were able to contract their pelvic floor muscle following PFM training (median sessions 3 [IQR 2-4]) whilst 20/150 (15.3%) could not contract and were termed 'non-contractors'. Of the non-contractors, 12 consented to participate. The median age of participants was 65 years (IQR 57-79), median BMI 33kg/m<sup>2</sup> (IQR 30-35) and median parity 1.5 (IQR 1-3). There were 8/12 (67%) patients with main complaint of urinary incontinence, 3/12 (25%) with mixed incontinence and prolapse and 1/12 (8%) with only prolapse symptoms.

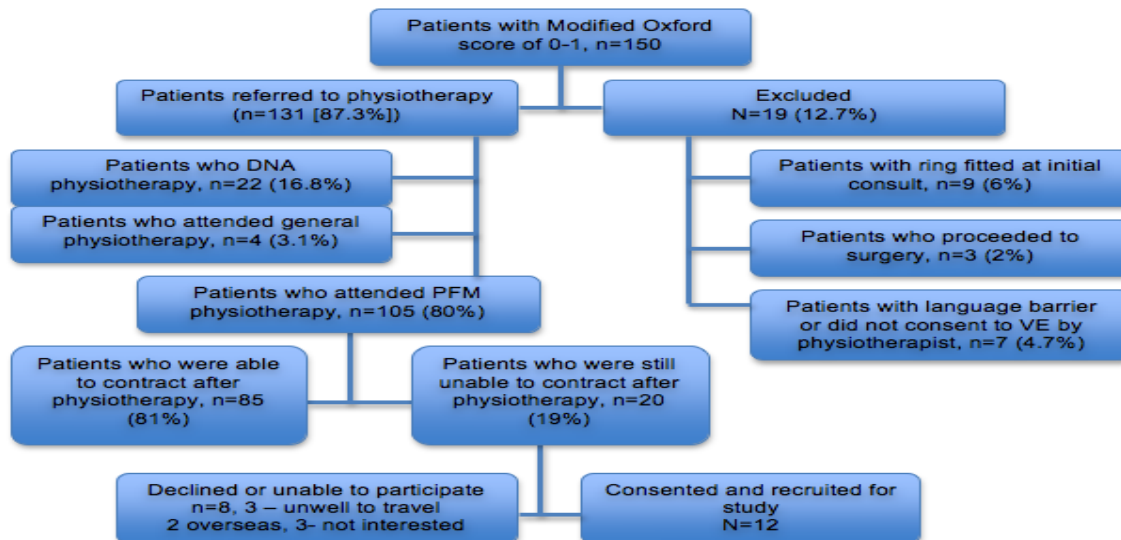


Figure 1: Flowchart of patients with Oxford score of 0-1 who were referred to physiotherapy and those who were still unable to contract after physiotherapy.

One patient was unable to perform an adequate valsalva manoeuvre, thus only 11 volume datasets were available for ultrasound analysis. Levator trauma was diagnosed in 8/12 (66.7%); 4 complete and 4 partial defects. Seven patients had excessive levator hiatal enlargement (>25cm<sup>2</sup>) and of the group with levator hiatal enlargement, 6/7 (86%) had levator ani muscle defects (Figure 2). Mean levator hiatal area in all patients was 30.55cm<sup>2</sup> (range 17.62 – 53).

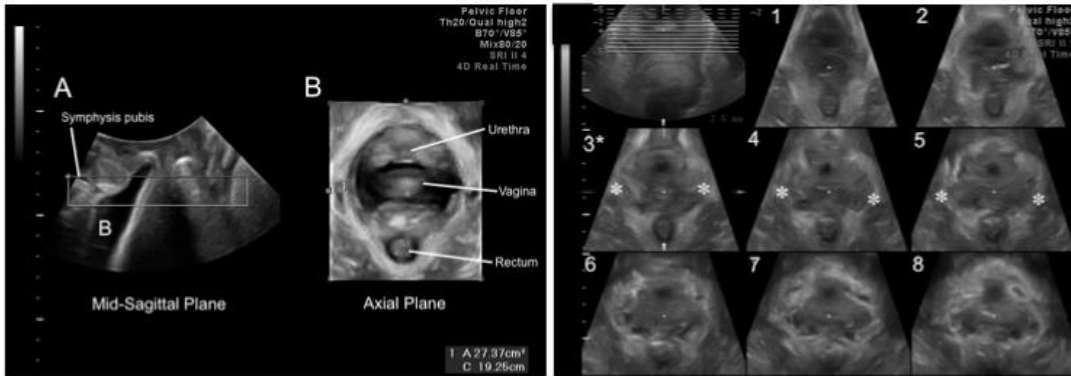


Figure 2: Image of the pelvis on the left, in mid-sagittal (A) and on axial plane (B). Levator hiatal area, as indicated by circumferential dots in (B). Image on right is the TUI of a patient with bilateral levator avulsion.

#### Interpretation of results

It is interesting to note that of the participants who were unable to contract their pelvic floor muscle initially, 81% were able to perform an adequate pelvic floor muscle contraction following a course of pelvic floor physiotherapy. Hence, our results show that a pessimistic view is not warranted in the majority of these women. However, in the cohort of women who cannot contract their pelvic floor muscle despite physiotherapy, 67% had underlying levator avulsion defect. This was also associated with levator hiatal ballooning.

#### Concluding message

In women with incontinence and prolapse, the ability to perform PFM contraction is essential to successful conservative treatment. Despite a course of physiotherapy, a small proportion of women may still be unable to perform a pelvic floor muscle contraction, largely due to levator muscle injury. On the contrary, the mechanism whereby the remaining participants who were unable to contract their pelvic floor muscle despite normal pelvic floor anatomy are not yet understood. Thus, further research into genetic or histological aspects of the quality of their pelvic floor muscles may be indicated in future.

#### References

1. Obstet Gynecol 2005;106:707-712
2. Neurourol Urodyn 2009; 28: 680-681
3. Int Urogynecol J 2011; 22: 699-704

#### Disclosures

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