

## WHAT IS THE CLINICAL RELEVANCE OF MAJOR DEFECTS OF THE LEVATOR ANI MUSCLE?

### Hypothesis / aims of study

Major levator trauma is not uncommon in parous women symptomatic of pelvic floor dysfunction (1). Resulting muscular defects can be ascertained by magnetic resonance imaging (1) and, recently, by 3D translabial ultrasound (2). However, the significance of such morphological abnormalities remains unclear.

### Study design, materials and methods

In a prospective observational study involving women presenting for routine urogynaecological investigation of pelvic floor disorders, 338 patients were seen for an interview, clinical examination, multichannel urodynamics (Neomedix Acquidata Minim 4/8 fluid-filled system) and translabial ultrasound using a 3D/4D capable system (Medison SA 8000 with 7-4 MHz abdominal transducer). The ultrasound examination was performed supine and after voiding, with 3D datasets obtained at rest, on maximal Valsalva and on maximal pelvic floor contraction. Acquisition angles were set to the maximum of 70 degrees to allow inclusion of the whole levator hiatus.

Analysis of the stored datasets was undertaken at a later date by the first author, blinded against clinical and urodynamic findings, using the software GE Kretz 4D View (Version 2.1) on a PC. Defects of the pubovisceral muscle were diagnosed if there was a deficiency of its anteromedial aspect at the insertion on the arcus tendineus of the levator ani. Questionable cases were reviewed by the second author, also blinded against other findings. The presence of defects was then correlated with symptoms, clinical findings and urodynamic results.

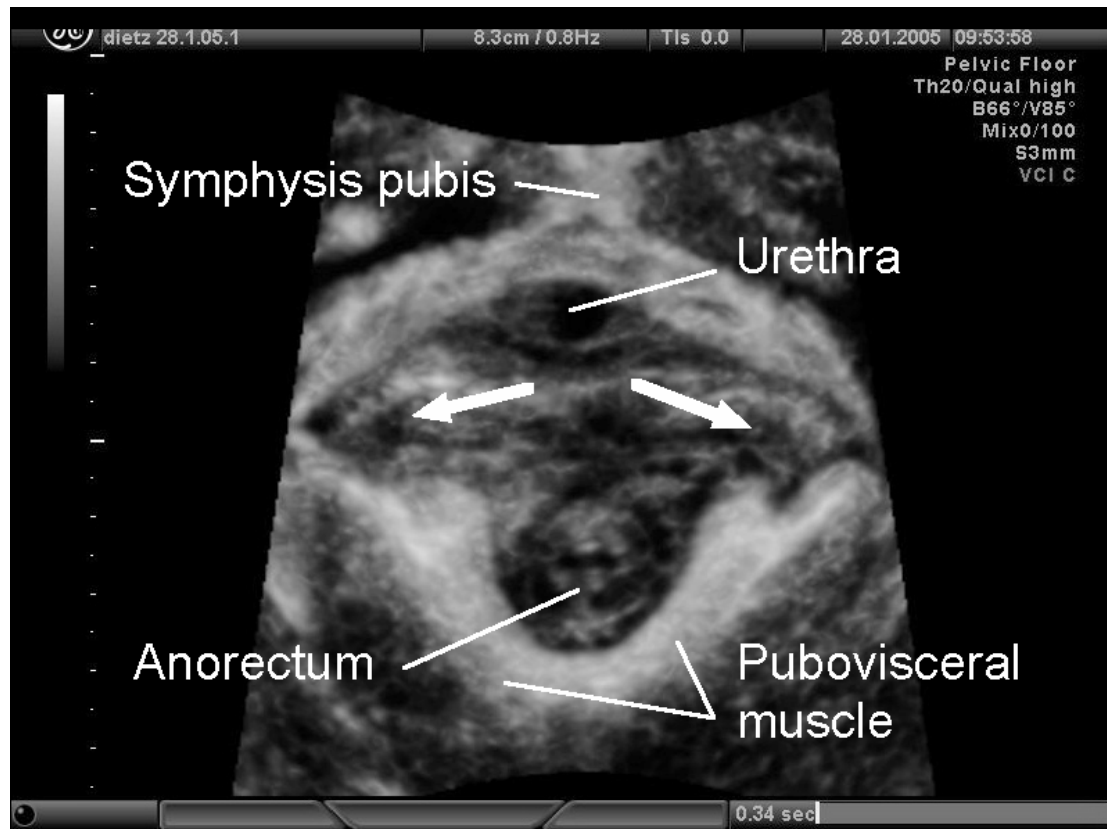


Figure 1: Bilateral avulsion injury of the pubovisceral muscle as demonstrated by 3D pelvic floor ultrasound. This patient had suffered a traumatic forceps delivery 4 years prior to assessment.

## Results

Five volume datasets could not be evaluated due to technical problems (corrupt dataset, incomplete imaging of the hiatus, poor imaging conditions in very elderly women), leaving 333 datasets for analysis. The average age was 52.8 (range 17.9- 87.5), mean parity was 2.6 (0-8), with 35 women being nulliparous. Patients complained of stress incontinence (81%), urge incontinence (74%), frequency (40%), nocturia (49%) and symptoms of voiding dysfunction (36%). 42 (13%) had had previous anti- incontinence surgery, and 104 (31%) a hysterectomy. Mean bladder neck descent was 29.4 (range 0.5-58) mm.

Defects of the pubovisceral muscle were found in 46 women (13.8% overall, or 15.4% of parous women). 13 were bilateral such as the one shown in Figure 1, 18 unilateral on the right, and 15 unilateral on the left. They only occurred amongst women who had delivered vaginally (P= 0.007) and were associated with the number of vaginal deliveries (P= 0.065), increased bladder neck descent (P= 0.004) and cystocele descent on ultrasound (P= 0.001). Higher grades of prolapse of the anterior (P< 0.001) and central compartment (P= 0.002) were more common in women with levator avulsion. However, there was no association with urodynamic findings or the symptom of stress incontinence.

## Interpretation of results

Avulsion injury of the pubovisceral muscle, i.e., detachment of the most inferomedial aspects of the levator ani from the pelvic sidewall, was seen in 15.4% of parous women in this series of patients presenting to a Urogynaecological clinic. This figure compares well with the 18% prevalence of pubovisceral muscle defects observed on MRI in primiparae(1).

In addition to providing valuable prevalence data, this study allows insights into the clinical relevance of major levator trauma. Avulsion of the pubovisceral muscle off the pelvic sidewall was associated with increased mobility of the anterior vaginal wall and uterus (both on clinical examination and on ultrasound), but not with any specific symptoms or findings on urodynamic testing. While it is acknowledged that a true cross- sectional study would be necessary to investigate the relevance of morphological abnormalities of the levator ani in the general population, it is interesting that defects as seen on 3D pelvic floor ultrasound were associated with prolapse rather than incontinence, paralleling the findings of epidemiological studies (3) which consistently show a stronger association between prolapse and childbirth than between parity and incontinence.

## Concluding message

Major morphological abnormalities of the pubovisceral muscle are common in a population symptomatic for pelvic floor disorders. They are associated with prolapse of the anterior and central compartment, but not with symptoms of bladder dysfunction or urodynamic findings.

## References

- 1 Obstet Gynecol 2003 (101); 46-53.
- 2 Ultrasound Obstet Gynaecol 2004 (23) ; 615-625.
- 3 Aust NZ J Obstet Gynaecol 2005 (45); 3-11.