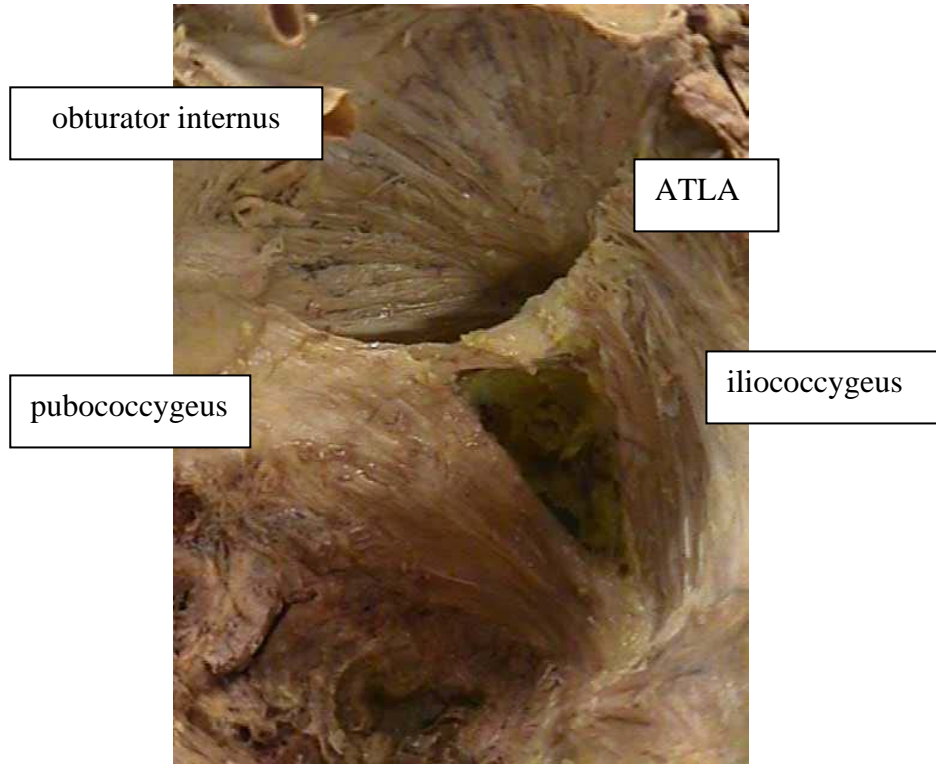


Levator injuries: a clinical classification

LEVATOR ANI IN A NULLIPAROUS CADAVER



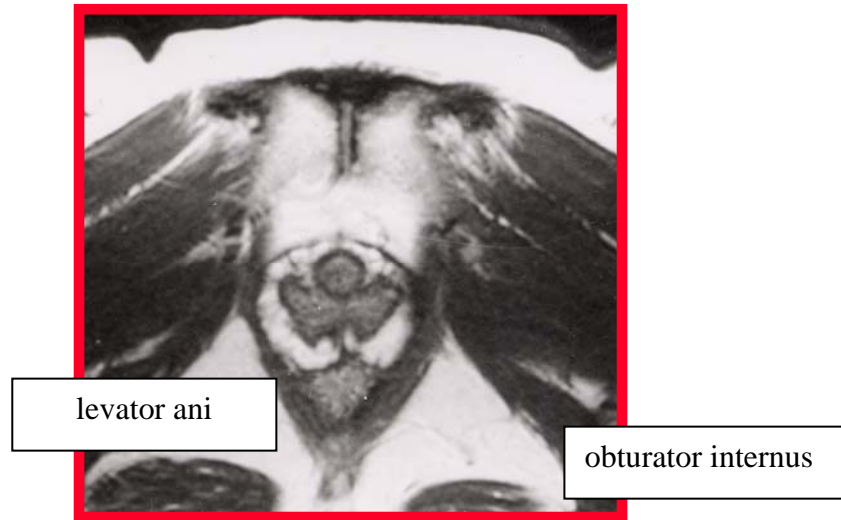
Morphology

Levator ani remains poorly appreciated and not always understood – though there has been some recent progress – largely through the efforts of the Michigan group led by John DeLancey.

In this image of a nulliparous cadaver, you will note the cross sections of the urethra, vagina (butterfly shape) and rectum in the bottom left corner. The right pelvic side wall is clothed by the obturator internus below which are pubococcygeus and iliococcygeus taking origin from the pubis and arcus tendineus levator ani (the white line in the obturator fascia which has been largely removed in this specimen).

The nerve supply comes from the pudendal nerve, perineal branch of S4 and coccygeal plexus. It is the “shock-absorber” that underpins visceral support and the superior fascial attachments. Reconstructive surgery that is performed in women with denervation of the levator ani (or other injuries) may be “unsupported” (see life table analyses of different reconstructive surgical operations over 10 years). Sometimes early use of non-autologous repair techniques that address all three levels of vaginal support may be necessary.

LEVATOR ANI IN A NULLIPAROUS AXIAL MR SCAN



Radiology

This is an axial section of the lower pelvis just below the level of the urethrovesical junction at the widest diameter of the proximal urethra – where longitudinal smooth muscle is surrounded by circular striated muscle. The pubourethral and pubovesical suspensory apparatus occupy the retropubic space. (Zacharin, 1957, 1963, 1968)

The vagina has both superior and inferior fornices that are maintained by attachment to the lateral pelvic sidewall via the pubocervical and rectovaginal fasciae over their first four centimetres (DeLancey, 2003).

The levator ani takes origin from the arcus tendineus levator ani which is a thickening in the obturator fascia, it encloses the urethra, vagina and rectum. Contraction elevates the lower pelvic viscera.

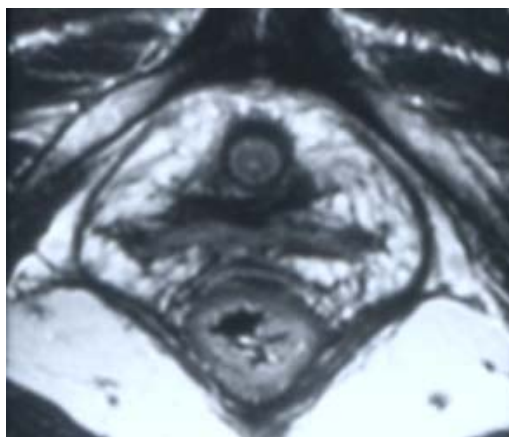
Injuries to the levator ani

Vaginal delivery may injure the levator ani in a number of different patterns sometimes termed “defects” (DeLancey, 2003). These may be one of the more common sources of myofascial injury that may cause loss of support or chronic pelvic pain. Grade 2 injuries are frequently associated with concomitant injuries to the overlying inferior hypogastric plexus. There are many other sources of chronic pelvic pain associated with the levator muscles (Howard, 2000).

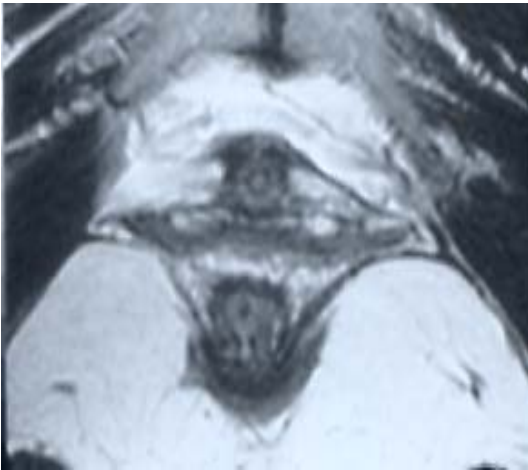
- Grade 0** Small local injuries to the muscle can create “trigger points” that elicit specific tenderness in response to touch (Slocumb, 1984)
- Grade 1** Avulsion of the pubococcygeus from its pubic origin
- Grade 2** Avulsion of the pubococcygeus or iliococcygeus from the arcus tendineus levator ani
- Grade 3** Denervation of the levator ani
- Grade 4** Denervation of the levator ani with any of the other avulsion injuries.



Grade 1 Levator defect: Avulsion of the right pubococcygeus from its pubic origin.



Grade 2 Levator defect Avulsion of the levator ani from the ATLA over obturator internus



Grade 4 Levator defect

Denervation and atrophy of the levator ani with left sided Grade 2 injury.

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