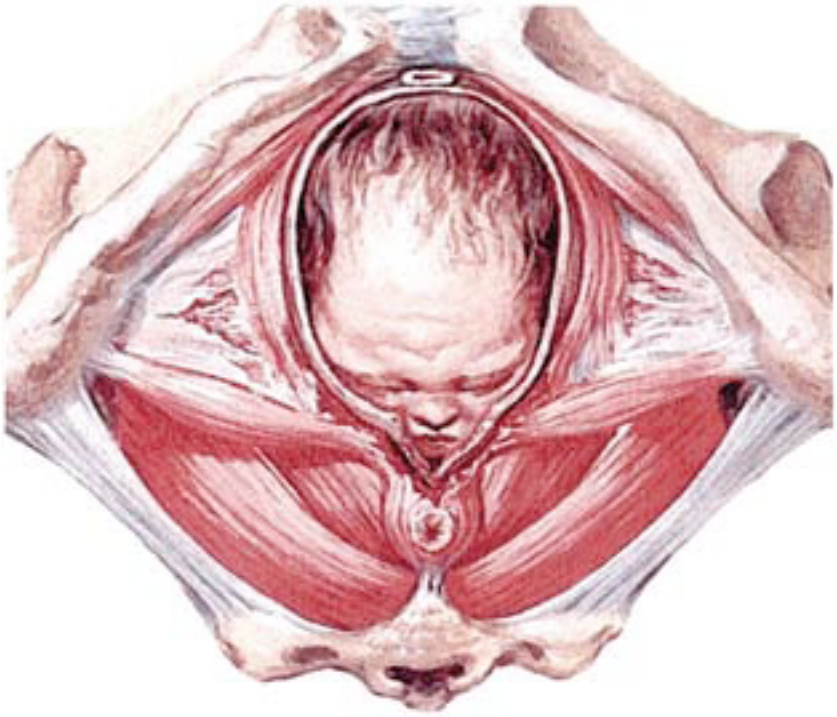
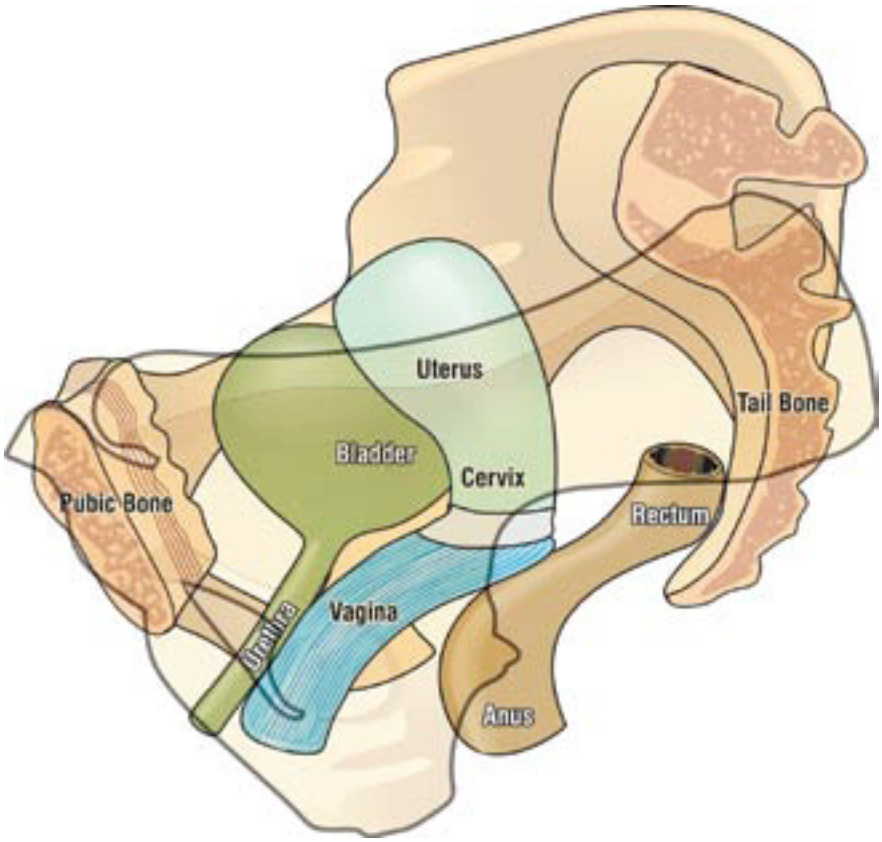


Fig. 1. Birth-related laxity. The diagram shows the baby's head severely stretching ligaments and other tissues in and outside the vagina. This may cause various degrees of looseness, prolapse of the bladder and bowel, and urine and bowel incontinence. Fundamental in any surgical treatment is the approximation of laterally displaced tissues, and the strengthening of damaged suspensory ligament(s).



ig. 2. The organs and their outlet tubes.

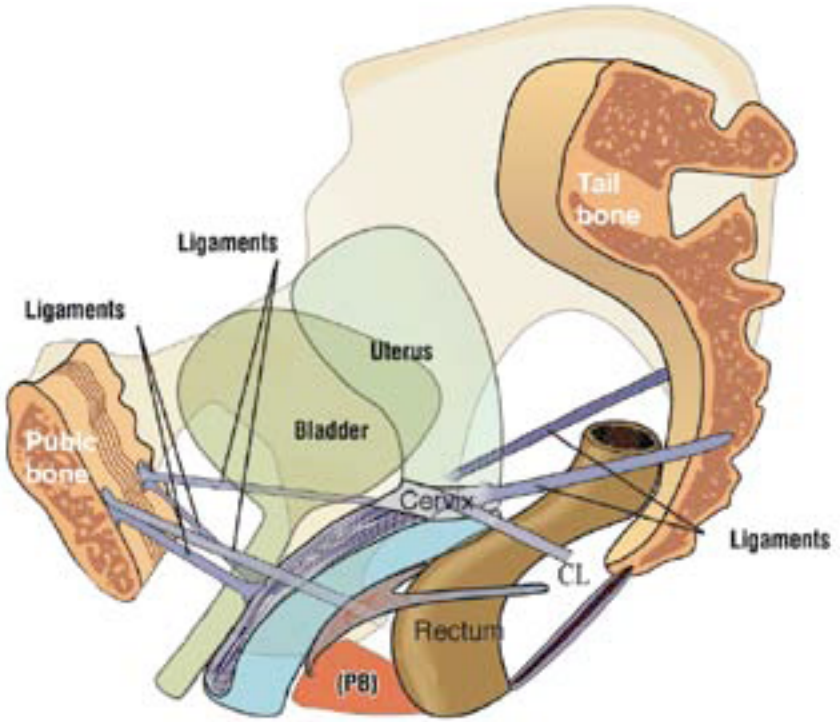


Fig. 3. Four ligaments suspend the organs from above like a suspension bridge. The perineal body (PB) supports the organs from below. CL = cardinal ligament.

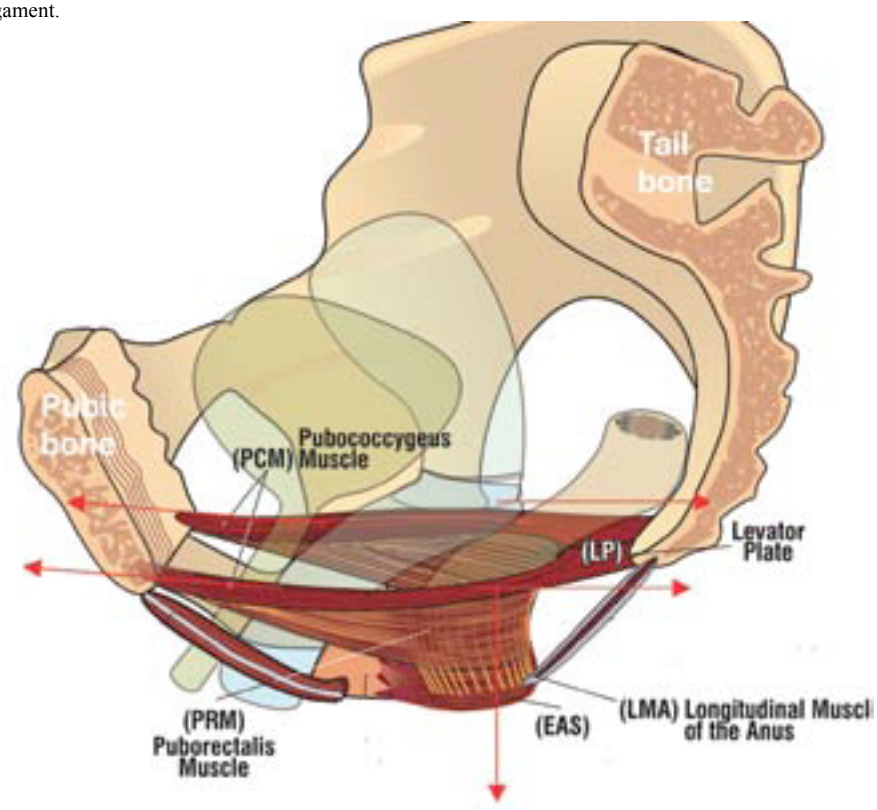


Fig. 4. The muscles support the organs, vagina, bladder, and bowel from below, and also, open and close them by three external directional muscle forces (arrows).

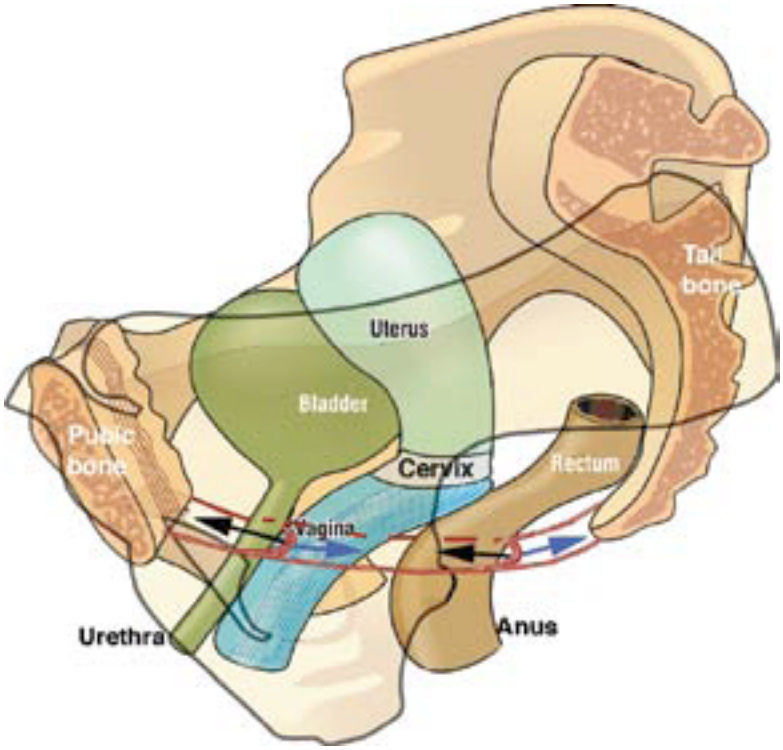


Fig. 5. An external striated muscle opening and closure mechanism. The red lines represent the pelvic muscles. Fibromuscular extensions from these muscle fibers loop around the urethra and anorectum to activate closure and opening.

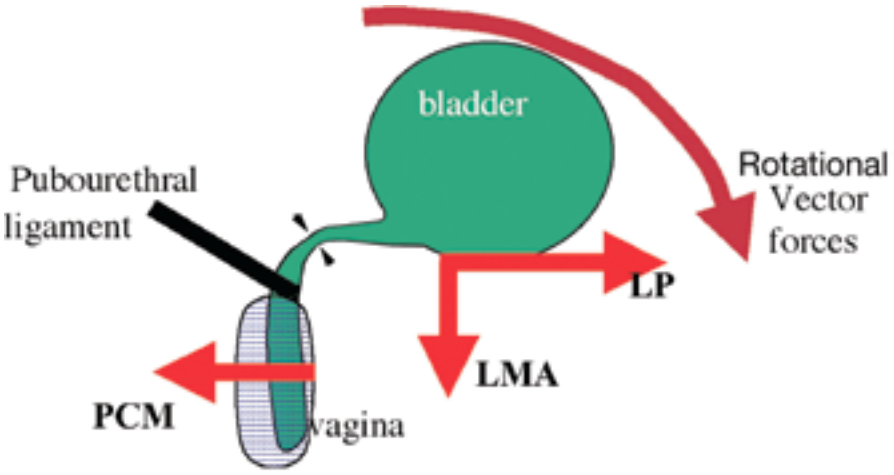


Fig. 6. The mechanism for urethrovesical closure. Backward/downward muscle vector forces (arrows) stretch the proximal urethra around the pubourethral ligament, narrowing and kinking it; a forward vector stretches the suburethral hammock forwards against the pubourethral ligament for distal urethral closure. LP = levator plate; LMA = longitudinal muscle of the anus; PCM = anterior portion of pubococcygeus muscle.

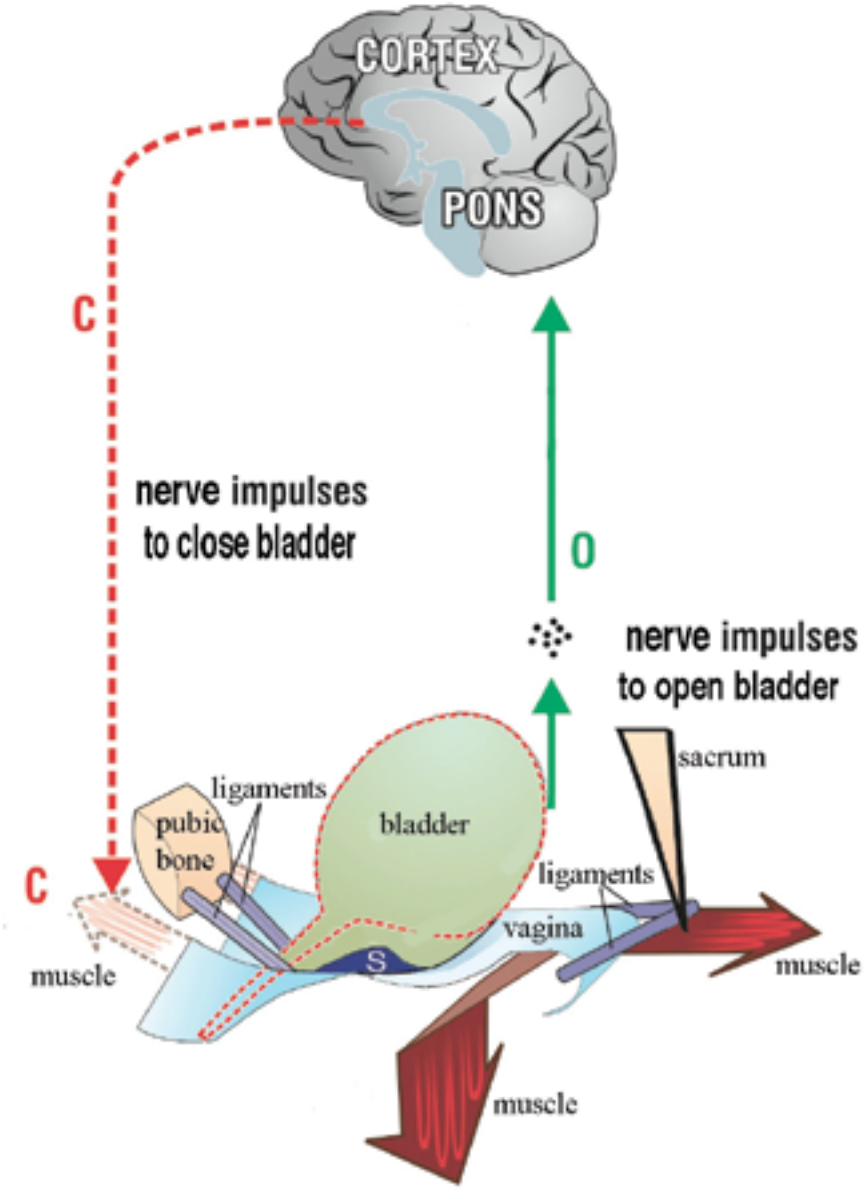


Fig. 7. The cortex of the brain gives directions for closure (C), and opening (O). Stretch receptors "S", at the base of the bladder sense when the bladder is full and send impulses to the brain. Depending on the situation, the brain sends directions either for closure (C), or opening (O). Like instructions from the orchestra conductor, these directions, "C" and "O", engage all the muscles, nerves, ligaments, and tissues required for each function. The Pons, a lower part of the brain, works as a coordinating station.

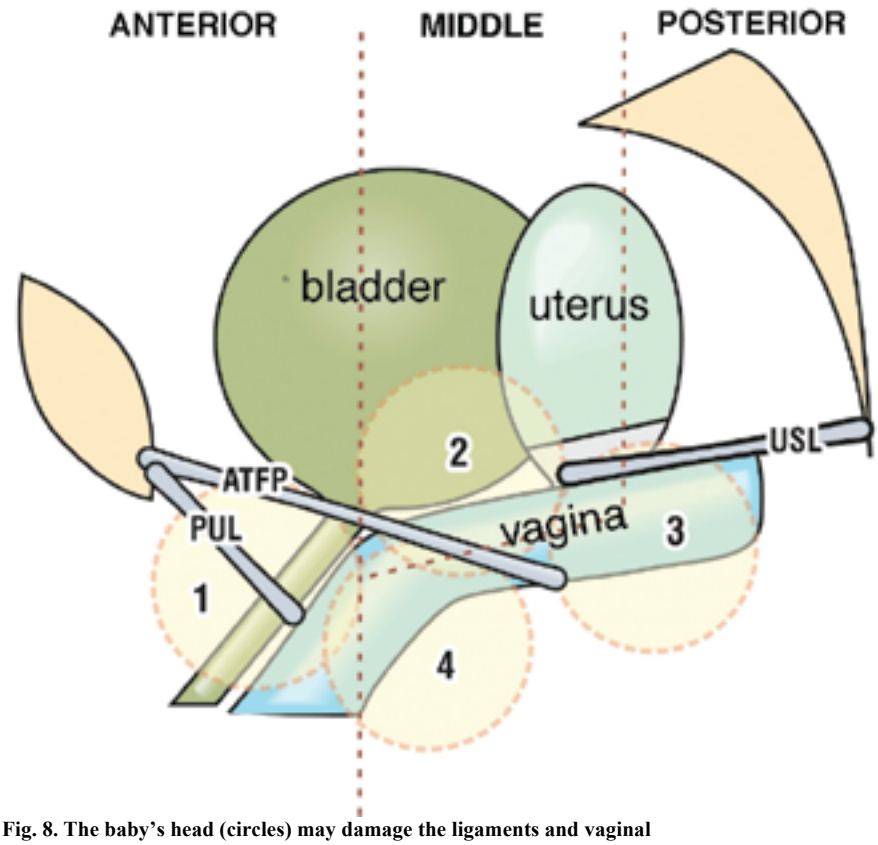


Fig. 8. The baby's head (circles) may damage the ligaments and vaginal tissues to varying degrees as it descends through the vagina to cause stress incontinence'1', cystocele '2', uterine/apical prolapse '3', and rectocoele '4'. PUL = pubourethral ligament; ATFP = arcus tendineus fascia pelvis; USL = uterosacral ligament. Not shown are cardinal ligament (Middle Zone) and Perineal Body (Posterior zone) [33].

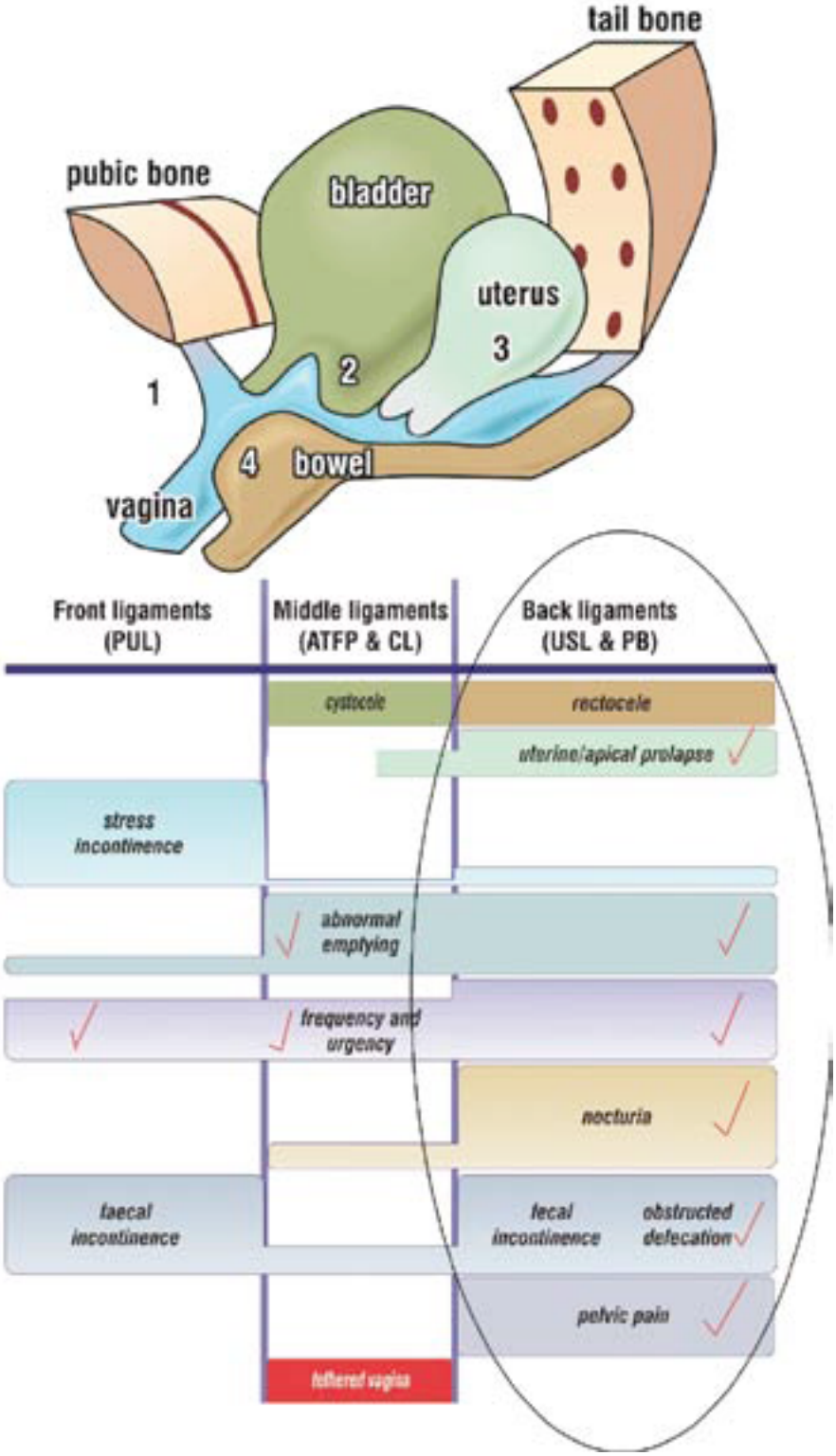


Fig. 9. Pictorial Diagnostic Algorithm relates prolapse (cystocoele "2", rectocele "4" and uterus "3"), to symptoms. Both prolapse and symptoms are caused by looseness in the suspensory ligaments and their associated tissues. The anterior (pubourethral) and posterior (uterosacral) ligaments are in purple. The middle ligaments (ATFP& cardinal) are not shown in this diagram. There are three columns, one for each ligament group and the symptoms and prolapses (lumps) associated with damage to these ligaments. In patients who have urgency, grouping of symptoms is the key to diagnosing the zone of damage, as any zone may cause urgency. In this patient, the symptoms (ticked) indicate damaged posterior ligaments (uterosacral).

Fig. 10. TFS surgical system. The soft tissue anchor (blue) sits on the applicator. The tape (white) is a ‘next generation” non-stretch lightweight macroporous monofilament polypropylene tape. The polypropylene tape passes through the unidirectional ‘trapdoor’ at the base of the anchor. This one-way system of tightening brings the laterally displaced ligaments and fascia towards the midline

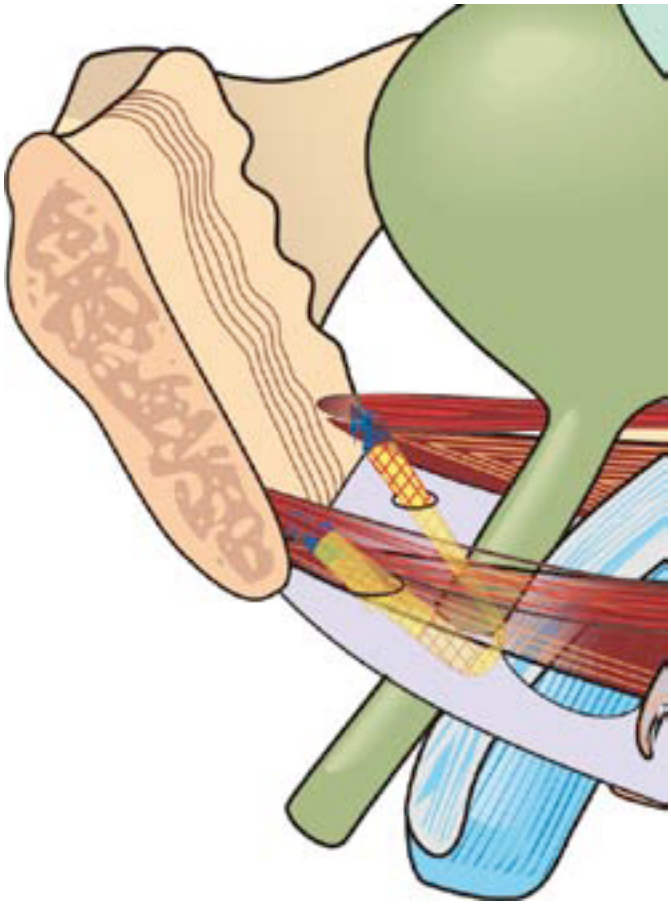


Fig. 11. The midurethral TFS tensioned minisling is inserted exclusively from the vagina at midurethra. It is tightened over an 18 gauge Foley catheter.

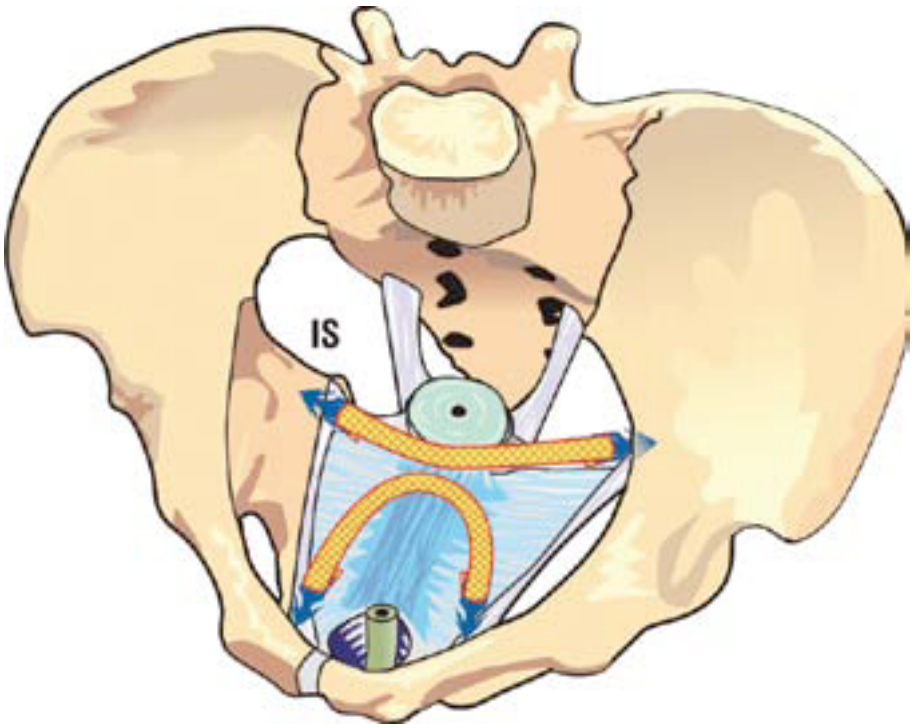


Fig. 12. TFS repair of cystocele. The horizontal cardinal ligament TFS sling when tightened approximates laterally displaced cardinal ligaments and fascia, creates an artificial collagenous anterior cervical ring, and re-attaches pubocervical fascia (blue) to the ring. It supports the proximal half of the vaginal membrane. The U-shaped “U-Sling”, when tightened, restores the laterally displaced pubocervical fascia and supports the distal half of the vaginal membrane.

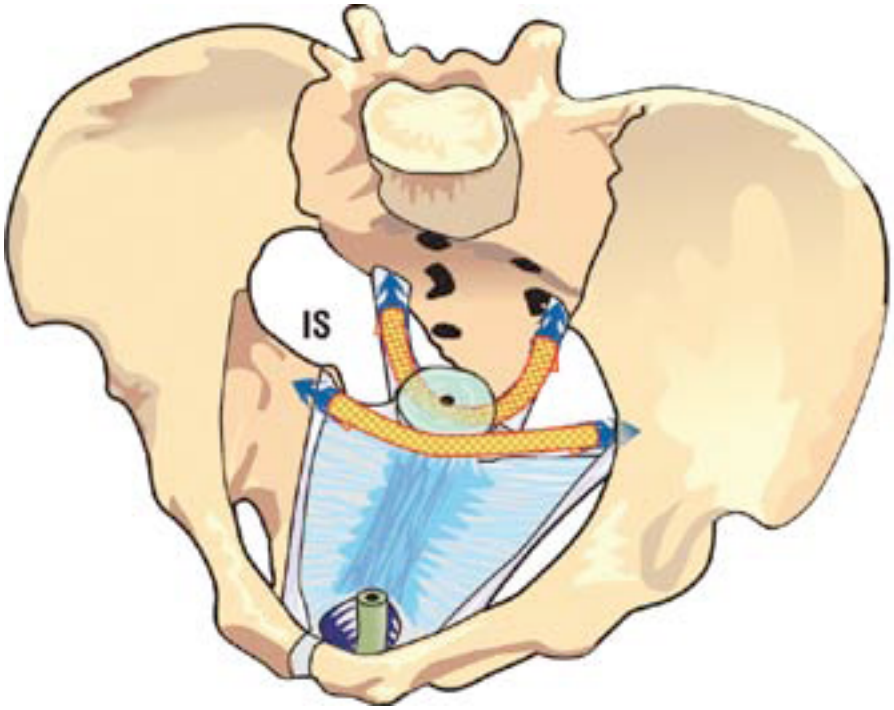


Fig. 13. TFS repair of uterine/apical prolapse. The TFS sling restores uterine position and axis by shortening cardinal with a transverse tape and uterosacral (USL) ligaments and fascia with a posterior tape.

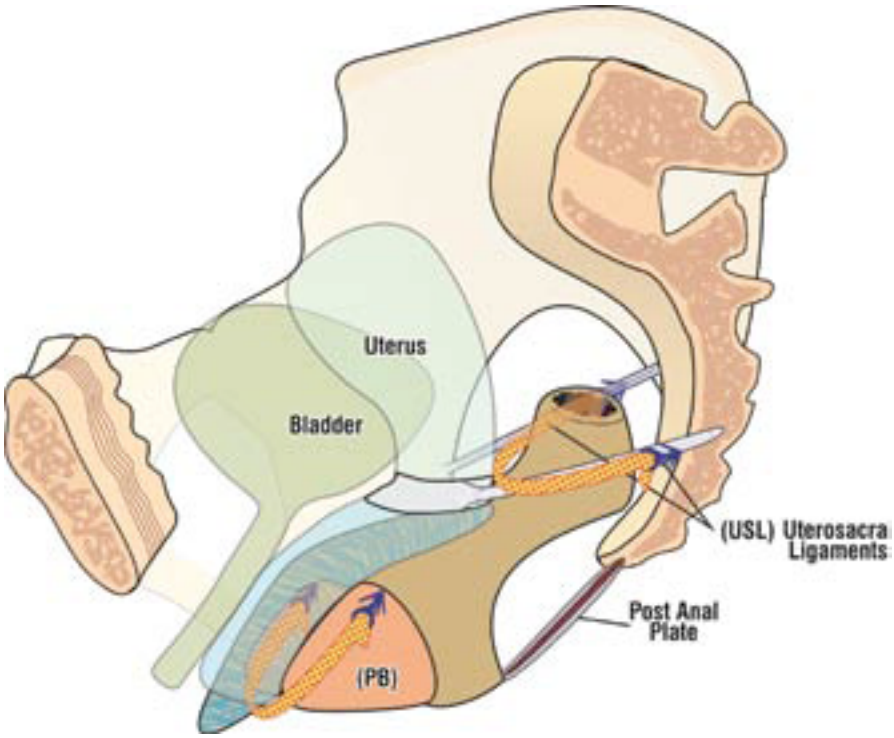


Fig. 14. TFS repair of rectocele. The TFS sling restores the anatomy of the posterior vaginal wall by shortening the uterosacral (USL) ligaments and fascia, and re-approximating the laterally displaced perineal body (PB).