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Editorial

To act as a unit

Agir como unidade

Pelvic floor disorders are not isolated in nature; rather they often involve urological, gynaecological and colorectal issues. The pelvic floor has been artificially divided in three different regions (anterior, middle and posterior compartments); however it is a mechanical apparatus that "acts as a unit". It consists of muscles (levator ani muscle, anal sphincters and perineal muscles) under neural control held together by connective tissues (pubocervical fascia, rectovaginal fascia, perineal membrane, uterosacral ligaments, coronal ligaments, pubourethral ligaments) arranged in a unique three-dimensional arrangement.[1] Together, the unique structure formed by these three types of tissue influence pelvic organ (bladder and urethra, uterus and vagina, rectum and anal canal) support and function (opening and closure of the levator hiatus, control of urinary and fecal continence, vaginal delivery, sexual activity).[1] Our ability to understand pelvic floor disorders (urinary incontinence, voiding dysfunction, cystocele, uterine prolapse, vaginal vault prolapse, enterocele, fecal incontinence, obstructed defecation, rectocele, intussusception, pelvic floor dyssynergy, pelvic pain), treatment failure and prevention strategy must, therefore, arise from the understanding of these three tissue elements and their structural and functional interactions. Although patients may present with symptoms that involve only one compartment, 95% of them have abnormalities in all three compartments.[2] As consequence, the specialist (urologist, gynecologist, gastroenterologist and colorectal surgeon) approaching the pelvic floor should not have a vertical vision, confined to the proper area of interest, but a transverse, multicompartimental vision, always considering that the pelvic floor "acts as a unit" and, as consequence, pelvic floor disorders rarely occur in isolation.

The diagnostic evaluation has a fundamental role in order to identify all pelvic floor dysfunctions and to provide the adequate information for a management that consider the consequences of therapy on adjacent organs and avoid sequential surgeries. The increasing availability of ultrasound equipment in the clinical setting, and the recent development of 3D and 4D ultrasound, have renewed interest in using this modality to image the pelvic floor anatomy as a key to understanding dysfunction.[3] Ultrasound has several important advantages over other imaging modalities (defecography, cystography, Magnetic Resonance), including the absence of ionizing radiation, relative ease of use, minimal discomfort, cost-effectiveness, relatively short time required and wide availability. Division into anterior, middle and posterior compartments has led to fragmentation of assessment: the anterior compartment containing urethra and bladder has been the realm of the urologist and urogynecologist, who use transperineal ultrasound (TPUS) as their modality of choice for scanning;[4] the middle compartment containing the uterus and reproductive organs has been the domain of gynecologists, who use mainly endovaginal ultrasonography (EVUS) for assessment;[5] and the posterior compartment containing the small and large bowels and the anorectum belonged to the colorectal surgeons, who prefer endoanal ultrasonography (EAUS) and echodefecography (EDF).[6-7] This artificial division of the pelvis fails to recognize the close anatomical relationship of these compartments. The dysfunction of one compartment influences structure and function of another. For this reason, imaging should evolve from assessment involving a single compartment, with the inherent limitations, to an 'integrated approach' for multicompartmental evaluation.[3] Combining different ultrasonographic modalities (static and dynamic) has the potential to complement the advantages and to overcome the limitations of each of these tools and provides a comprehensive evaluation of the pelvic floor. The clinical relevance of this "integrated approach" is to improve the clinical management of pelvic floor disorders and to reduce inappropriate surgical treatments and the high rates of post-operative failures.

The principles underlying reconstructive surgery are either restoration of normal anatomy and thereby a presumed

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return to normal function, or creation of compensatory anatomical mechanisms.[1] To date, decisions have been based on clinical assessment, which has a limited role in evaluating the morphological changes leading to pelvic floor disorders. Obstructed defecation, fecal and urinary incontinence, and voiding dysfunction are frequently concurrent issues in patients with pelvic organ prolapse, suggesting a more widespread pelvic floor disorder affecting both support and sphincter function, and requiring more specific investigation. Moreover, it is often unclear as to whether, or to what degree, given symptoms are related to the degree of prolapse.[1] It is, therefore, important to make an accurate preoperative assessment, yet there is controversy concerning the role of diagnostic testing in selecting treatment for pelvic floor disorders. Several studies have looked specifically at the clinical utility of imaging investigations, with varying results.[8-9] The greatest utility of ultrasonography in patients with pelvic organ prolapse is to identify not just the clinical manifestation (cystocele, uterine prolapse, rectocele or enterocele) but the underlying anatomical and functional abnormalities of the pelvic floor muscles and connective tissues. Levator ani damage, avulsion defects, abnormal levator ani contractility, pathologically enlarged levator hiatus (ballooning), pubocervical and rectovaginal fascia damages, anal sphincter lesions may be diagnosed on TPUS, EVUS and EAUS.[3] Ultrasonography also has the advantage of enabling evaluation of function of the pelvic floor with various dynamic maneuvers. It should be performed as an initial examination in patients with pelvic floor disorders. Positive findings on ultrasound may avoid more invasive tests, whereas negative findings require confirmation by defecation proctography and/or dynamic magnetic resonance imaging (MRI). In patients with urinary incontinence, ultrasonography can provide useful information on the anatomy and function of the lower urinary tract. Urethral mobility, urethral vascularity, funneling of the internal urethral meatus, bladder neck descent and bladder wall thickness may be evaluated on TPUS.[3] In addition, ultrasonography allows evaluation of anti-incontinence procedures (mesh or tapes positioning) and helps in understanding their failure.[3] In patients with fecal incontinence, EAUS has been recommended by the International Urogynecological Association/International Continence Society joint report as the gold standard investigation to identify anal sphincter injury.[10]

The goal of pelvic surgery is to relieve patient symptoms and to restore anatomy and function whenever possible. There is no doubt that the additional knowledge gained from multicompartmental ultrasonography of the pelvic floor, with a systematic 'integrated' approach, will improve our chances of actually reaching this goal. Imaging findings are already leading to either modification or a choice of specific operative procedures, and current research is being directed towards the impact of imaging on patient outcomes, in both short and long terms.

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