THE UNIVERSITY OF OKLAHOMA College of Medicine

Female Pelvic Medicine & Reconstructive Surgery

Perineal body anatomy as seen in 3-Dimensional Endovaginal Ultrasonography in asymptomatic nullipara

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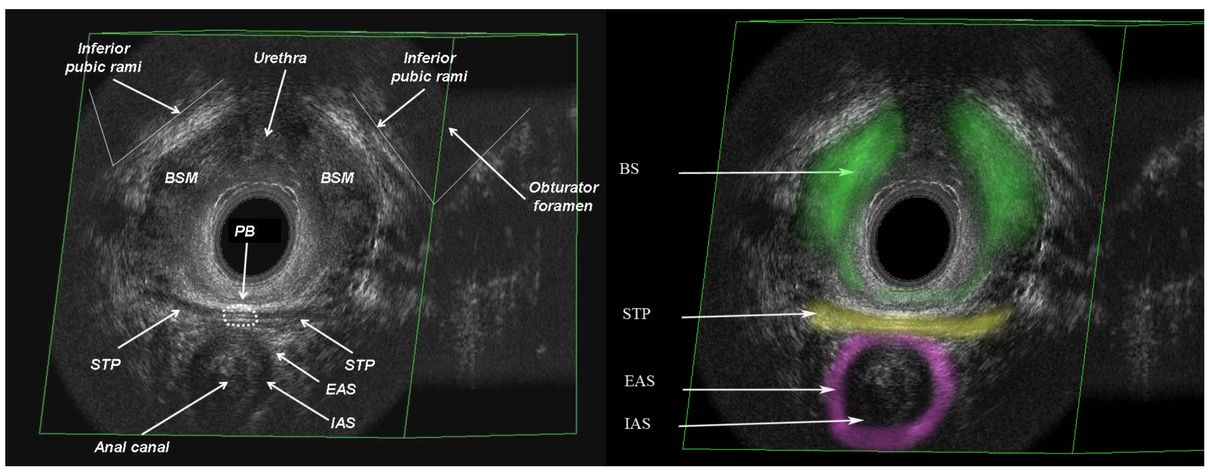
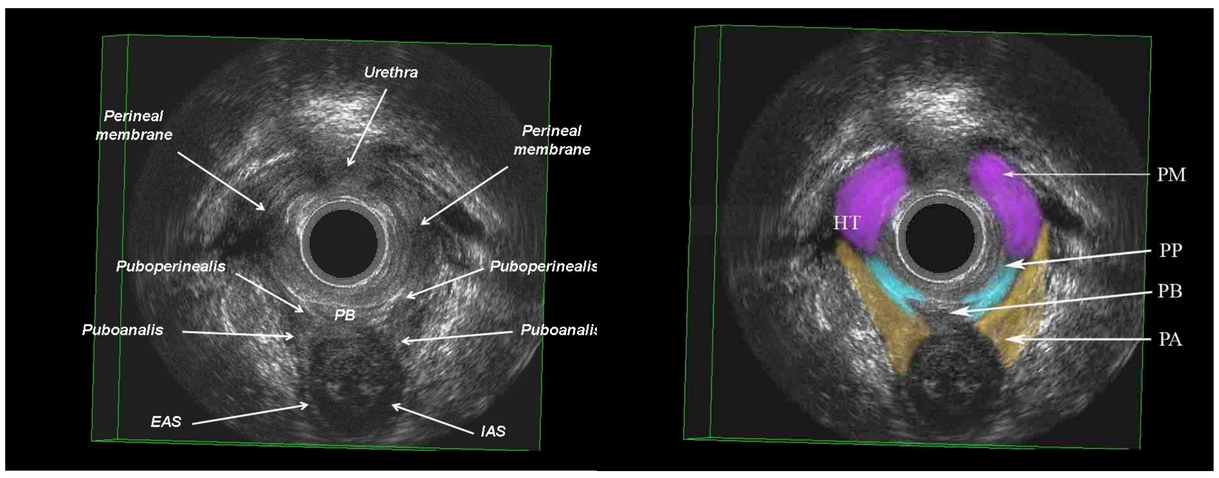
Objective: The study aim was to describe the characteristic complex anatomy of the perineal body using high resolution 3D endovaginal ultrasound (3D-EVUS).

Methods: The first part of this study was designed to validate the identification of perineal structures as seen on 3D-EVUS performed with a 9-16 MHz rotational 360° transducer. Fresh frozen pelves were prepared and echogenic structures suspicious for being perineal body, superficial and deep transverse perineal muscles, the external anal sphincter and pubovaginalis, puboperinealis, puboanalis, puborectalis and iliococcygeus muscles were tagged with biopsy needles, and marked with indigo carmine dye for localization during dissection. In the second part of this study, consecutive nulliparous asymptomatic females were imaged with 3D-EVUS using the same transducer. Inter-rater reproducibility for the analyses of perineal body was assessed off-line from stored 3D volumes using a standardized technique.

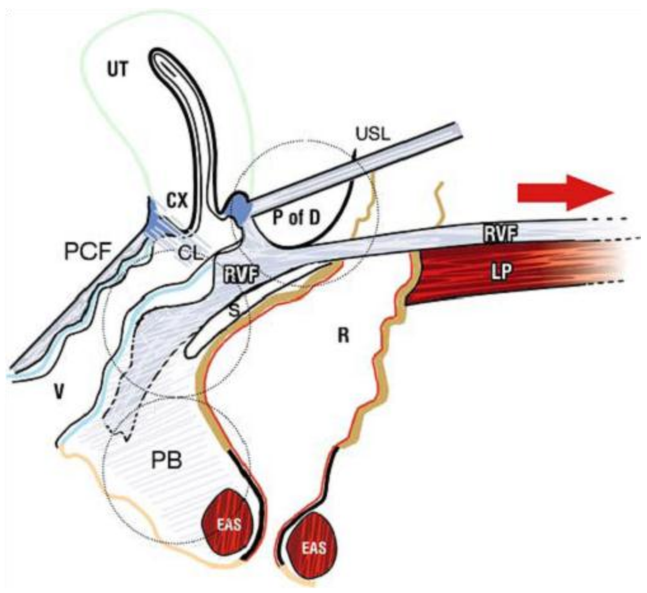
Results: Five fresh frozen pelves and forty-four nulliparous asymptomatic females were assessed. The perineal body is visualized on sagittal scan as a pyramidal, mixed echogenicity structure in the midline between rectum and vagina. This area can be divided into two regions in the axial plane: 1) superficial: the lower portion of the perineal body is in contact with the superficial transverse perineal muscle, the bulbospongiousus muscle and the external anal sphincter, and 3) deep region, the upper portion of the perineal body is in contact with puboperinealis and puboanalis muscles. Good inter-rater reproducibility for perineal body assessment was reported.

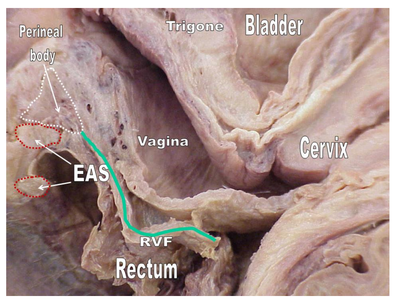


Lower level anatomy of the perineal body (PB). Perineal muscles are visualized in the axial plane to insert into the superficial region of the PB. BSM= bulbospongiosus muscle, EAS= external anal sphincter, IAS= internal anal sphincter, STP= superficial transverse perineal muscle

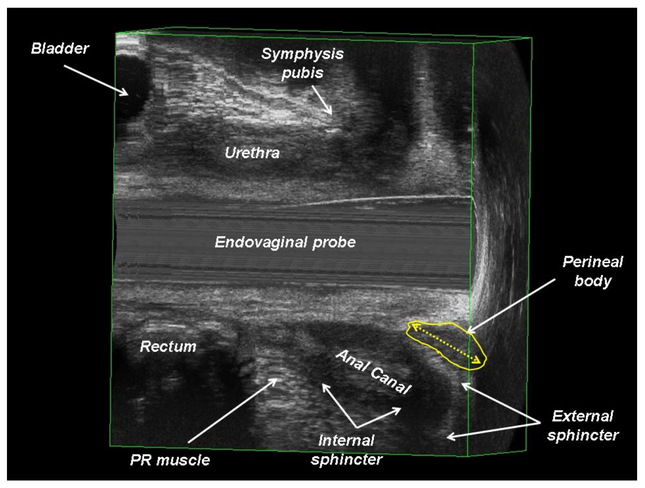


Upper level anatomy of the perineal body (PB). Pubovisceral components of the levator ani are visualized in the axial plane to insert into the deep region of the PB. PA= puboanalis muscle, PM= perineal membrane, PP= puboperinealis muscle, EAS= external anal sphincter





The dynamic structural supports of the posterior vaginal wall – schematic sagittal drawing. The vagina (V) and rectum (R) are suspended between the perineal body (PB) and uterosacral ligaments (USL). PB is anchored by contraction of the external anal sphincters (EAS) and the perineal muscles. The rectovaginal fascia (RVF) is attached to the uterosacral ligaments (USL) and cardinal ligaments (CL). The rectovaginal space (S) allows independent movement of the vagina and rectum (R). CX= cervix; UT= uterus; PCF= pubocervical fascia; P of D= Pouch of Douglas.



The lateral extension of the perineal body is measured in the mid-sagittal plane. PR= puborectalis muscle

Conclusion: Perineal body has a complex 3D structure with several attachments that are not separate entities, but form an interconnected support apparatus. However, there is still a considerable variation in anatomical descriptions of the PB and even more debate in regards to its attachments, and anatomical relationships.

This study demonstrates that advanced high-resolution 3D-EVUS can provide a detailed and reproducible assessment of the complex spatial arrangement and the structural relationships of the PB in asymptomatic, nulliparous, living women. This modality correlates well with other imaging techniques. Over MRI, ultrasound has several advantages: relatively easy to perform, time efficient, minimal discomfort and cost-effectiveness. However, more work remains to be done before 3D-EVUS can be recommended for clinical assessment of PB in patients with pelvic floor disorders.

References

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