

**DYNAMIC CHARACTERISTICS OF THE VAGINAL HIGH PRESSURE ZONE ASSESSED BY 3-DIMENSIONAL ULTRASOUND IMAGES OF THE PELVIC FLOOR**Hypothesis / aims of study

Vaginal high pressure zone (HPZ) is a measure of the pelvic floor strength, its pressure increases with vaginal distension. We determined the dynamic characteristics of the vaginal HPZ by examining changes in pressure and ultrasound images during vaginal distension.

Study design, materials and methods

7 nulliparous females (mean age 25±4, range 22-33 years) were studied; a 10 cm long polyethylene bag of 35 mm maximal diameter was placed across the vagina and gradually inflated with water, volumes ranging from 45 cc to 70 cc. At each bag volume, a 3D US image of the pelvic floor was obtained using a 3-9 MHz transducer placed on the perineum (Philips HD 11, Philips medical system, Bothell, WA) and the pressures were recorded at rest and during sustained contraction of the pelvic floor. A 2D US image in the axial plane of a line connecting the lower end of the pubic bone to the apex of the anorectal angle was extracted from the 3D US image and analyzed for the bag size in the anterior-posterior (AP) and the right-left lateral planes (RL) using an image software program.

Results

The bag in the region of the Vaginal HPZ was completely collapsed at low bag volumes; increase in the bag volume resulted in gradual opening of the vaginal HPZ with characteristic increase in the AP and RL dimensions. Pelvic floor contraction caused a decrease in the AP but not the RL dimension.

Table 1: Effect of bag volume on the bag pressure (mmHg) in at rest and squeeze

Bag volume	45 cc	50 cc	55 cc	60 cc	65 cc	70 cc
Rest pressure	19±18	21±18	24±17	28±16	39±19	61±27
Squeeze Pressure	37±22	43±19	49±21	61±27	79±28	110±38

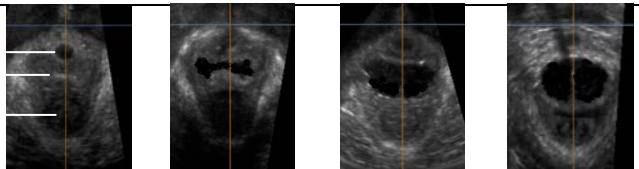
Table 2: Effect of bag volume on the AP and the lateral dimension of the vaginal HPZ

US Image, at 3 different bag volumes (, p<0.05 at comparing with rest; na, non-available)

Bag volume		No bag	45 cc	60 cc	70 cc
AP dimension	rest (cm)	na	0.44±0.22	1.19±0.29	1.97±0.49
	squeeze (cm)	na	0.22±0.22*	1.05±0.32*	1.87±0.41*
RL dimension	rest (cm)	na	2.13±0.25	2.91±0.40	3.29±0.25
	squeeze (cm)	na	2.01±0.29	2.87±0.32	3.36±0.21

US images

urethra  
vagina  
Anal canal

Interpretation of results

The changes in the shape of the vaginal HPZ during bag distension suggest that force responsible for the genesis of vaginal HPZ is directed predominantly in the AP but not in the lateral direction.

Concluding message

We propose that the puborectalis muscle component of the pelvic floor muscle is responsible for the genesis of the vaginal HPZ.

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**DISCLOSURES:** NONE

**HUMAN SUBJECTS:** This study was approved by the UCSD Institutional Review Board and followed the Declaration of Helsinki Informed consent was obtained from the patients.