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INTER-OBSERVER REPEATABILITY OF THREE-DIMENSIONAL PERINEAL ULTRASOUND IN PREGNANT WOMEN

Hypothesis / aims of study
The aim of this study was to evaluate the inter-observer repeatability of three dimensional ultrasound measurements of pelvic floor biometries in pregnant women.

Study design, materials and methods
In all, 32 nulliparity pregnant women were assessed at 36 weeks of pregnancy and 8 weeks after delivery. Perineal ultrasound scan was performed for them at rest and at valsalva maneuver (VM). Analyses were conducted offline by two observers. Bladder neck positions were measured at vertical (x) and horizontal (y) as originate from symphysis pubis. Inter-class correlation coefficients were evaluated between observers. Bladder neck displacement was calculated by square root of sum of squares of differences of x and y. Hiatal dimensions were measured at the plane of minimal hiatal dimension.

Results
Measurement of bladder neck position demonstrated statistically high inter-class correlation coefficient values of 0.93, 0.85, 0.89, 0.67 at third trimester and 0.92, 0.85, 0.95, and 0.92 at 8 weeks postnatal for rest-vertical, rest-horizontal, VM-vertical and VM-horizontal respectively. In addition, measurement of bladder neck displacement also showed statistically high inter-class correlation coefficients, 0.70 and 0.85 at third trimester and 8 weeks postnatal. (Table 1) The inter-class correlation coefficients of hiatal dimensions including hiatal width, height and areas ranged from 0.74 to 0.96 both at rest and at VM at antenatal or postnatal period. (Table 1)

Interpretation of results
There was high inter-observer repeatability of pelvic floor biometries obtained by three-dimensional perineal ultrasound both antenatal and postnatal.

Concluding message
Perineal ultrasound is a reliable method for studying pelvic floor biometries in women during pregnancy and after delivery.

Keywords
Bladder neck; Hiatal dimensions; Inter-observer repeatability; Pelvic floor biometries; Perineal ultrasound

Table

Table 1. Antenatal and postnatal measurement of the pelvic floor biometries by different operator and the inter-class correlation coefficient.

	Measurement by Operator I mean (SD)	Measurement by Operator II mean (SD)	Inter-class coefficient (95%CI)
Antenatal 36 week			
Rest-vertical	-2.8±0.6	-2.6±0.5	0.93 (0.86-0.97)
Rest-horizontal	1.1±0.5	0.5±0.6	0.85 (0.70-0.93)
VM-vertical	-2.1±0.9	-1.8±0.9	0.89 (0.77-0.95)
VM-horizontal	1.7±0.5	1.1±0.4	0.67 (0.40-0.84)
Bladder neck displacement	1.1±0.7	1.2±0.6	0.70 (0.40-0.86)
Rest-Hiatal width	4.0±0.5	3.7±0.5	0.88 (0.74-0.94)
Rest-Hiatal height	4.9±0.6	4.5±0.6	0.74 (0.55-0.88)
Rest-Hiatal area	13.0±2.4	11.4±2.0	0.78 (0.55-0.89)
VM-Hiatal width	4.1±0.5	3.9±0.5	0.91 (0.81-0.96)
VM-Hiatal height	5.3±0.9	4.8±0.8	0.89 (0.78-0.95)
VM-Hiatal area	15.2±3.9	13.6±0.8	0.93 (0.84-0.96)
Postnatal 8 week			
Rest-vertical	-3.0±0.5	-2.8±0.4	0.92 (0.83-0.96)
Rest-horizontal	1.2±0.6	0.4±0.5	0.85 (0.69-0.93)
VM-vertical	-2.0±0.7	-1.8±0.7	0.95 (0.90-0.98)
VM-horizontal	2.0±0.7	1.3±0.6	0.92 (0.83-0.96)
Bladder neck displacement	1.4±0.5	1.5±0.6	0.85 (0.70-0.93)
Rest-Hiatal width	4.2±0.6	3.8±0.6	0.85 (0.68-0.93)
Rest-Hiatal height	5.0±0.6	4.6±0.6	0.90 (0.79-0.95)
Rest-Hiatal area	13.5±2.9	11.7±2.3	0.86 (0.70-0.93)
VM-Hiatal width	4.4±0.8	4.1±0.7	0.91 (0.81-0.96)
VM-Hiatal height	5.4±0.8	5.0±0.9	0.95 (0.89-0.98)
VM-Hiatal area	16.8±4.4	14.8±4.3	0.96 (0.91-0.98)

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What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**Joint The Chinese University of Hong Kong - New Territories East Cluster Clinical Research Ethics Committee**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**