

RECOVERY OF THE PUBORECTALIS MUSCLE AFTER VAGINAL DELIVERY, A PILOT STUDY

Hypothesis / aims of study

During passage of the fetal head, at the time of delivery, the pelvic floor muscles are stretched and compressed against the pelvic sidewall, which could induce injuries. Little is known about normal recovery of the pelvic floor in the first weeks after vaginal delivery. Only one study (1) looked at the ultrasound images of the puborectalis muscle at 4 days and 3 months after first delivery. This study noticed the occurrence of hematomas and abruptions of the muscle from its attachment at the pubic bone. One other study (2) looked at the recovery of the levator hiatus 6 weeks, 6 months and 12 months after first delivery measuring the hiatal area and the rest to Valsalva hiatal area difference. This study showed that the levator ani muscle had the ability to recover, mostly during the first 6 months after delivery. Understanding the normal recovery of the pelvic floor after delivery is of importance when we consider early interventions to improve this recovery. Our aim is to use measurements of the levator hiatus after delivery compared to pregnancy state as a marker for recovery of the muscle.

Study design, materials and methods

This study is part of a prospective multicenter cohort study. Study population: Pregnant nulliparous women with a singleton pregnancy attending the prenatal clinic. Methods: Performing ultrasound assessment of the pelvic floor at 12 weeks gestation. Twenty out of a total of 306 women will have ultrasound follow-up after vaginal delivery (at 1 day, 1, 2, 3, 4, 6, 12, 18 and 24 weeks after delivery) to assess regeneration after delivery trauma. A perineal ultrasound is made at rest, on contraction and on Valsalva maneuver. We investigate the levator hiatus during recovery/regeneration. The analysis was performed offline. After storage on a hard disk, offline analysis was performed using 4D View 7.0 (GE Medical Systems Kretztechnik, Zipf, Austria). The correct plane of the puborectalis muscle in axial position is selected, levator hiatus was calculated and contractibility and distensibility were computed by subtracting hiatal area on contraction from hiatal area at rest and hiatal area at rest from hiatal area on Valsalva maneuver, respectively. Statistical analysis was performed with SPSS version 22.0 for Windows using median, range and the Wilcoxon Signed Rank Test with $p < 0.05$ considered significant.

Results

Hiatal areas at 1 week postpartum during rest, contraction and Valsalva were significantly increased, compared to 12 weeks' gestation. Hiatal areas during contraction and Valsalva remained significantly increased at 6 weeks postpartum compared to 12 weeks' gestation. The hiatal areas at 12 weeks postpartum remained significantly increased compared to 12 weeks' gestation but only during Valsalva maneuver. There were no significant differences in hiatal area at 24 weeks postpartum compared to 12 weeks' gestation.

The difference in hiatal area between rest and contraction (contractility) was significantly lower at 1 week and 6 weeks postpartum compared to 12 weeks' gestation. The difference in hiatal area between Valsalva and rest (distensibility) was significantly increased at 6, 12 and 24 weeks postpartum compared to 12 weeks' gestation.

Table 1: Median hiatal area at 12 weeks' gestation and 1, 6, 12 and 24 weeks postpartum

	12 weeks' gestation (median (range))	1 week postpartum (median (range))	P*	6 weeks postpartum (median (range))	P*	12 weeks postpartum (median (range))	P*	24 weeks postpartum (median (range))	P*
Rest	(n=20)	(n=20)		(n=20)		(n=20)		(n=18)	
Hiatal area (cm ²)	10.67 (8.23 – 14.66)	12.24 (9.09 – 15.71)	0.02	11.08 (9.16 – 18.59)	0.58	11.74 (8.53 – 15.59)	0.26	11.11 (8.94 – 14.70)	0.81 ^x
Contraction	(n=20)	(n=20)		(n=20)		(n=20)		(n=18)	
Hiatal area (cm ²)	9.23 (6.74 – 14.81)	11.95 (9.06 – 14.20)	<0.01	10.88 (7.36 – 16.40)	0.02	9.88 (7.49 – 13.07)	0.31	10.54 (7.97 – 13.22)	0.32 ^x
Valsalva	(n=19)	(n=19)		(n=19)		(n=19)		(n=17)	
Hiatal area (cm ²)	11.57 (9.2 – 19.12)	14.64 (10.31 – 22.68)	0.01	15.42 (10.35 – 25.26)	<0.01	16.06 (11.01 – 27.75)	<0.01	14.89 (9.93 – 22.07)	0.08 ^y

* compared with 12 weeks' gestation

^x compared with the same 18 patients at 12 weeks' gestation

^y compared with the same 17 patients at 12 weeks' gestation

Table 2: Contractility and distensibility at 12 weeks' gestation and 1, 6, 12 and 24 weeks postpartum

	12 weeks' gestation (median (range))	1 week postpartum (median (range))	P*	6 weeks postpartum (median (range))	P*	12 weeks postpartum (median (range))	P*	24 weeks postpartum (median (range))	P*
Rest contraction –	(n=20)	(n=20)		(n=20)		(n=20)		(n=18)	
Δ Hiatal area (cm ²)	1.59 (-0.15 – 3.64)	0.40 (-0.87 – 2.99)	0.01	0.56 (-1.89 – 3.50)	0.04	1.71 (-1.83 – 3.50)	0.70	0.90 (-2.82 – 3.07)	0.30 ^x
Valsalva rest –	(n=19)	(n=19)		(n=19)		(n=19)		(n=17)	
Δ Hiatal area (cm ²)	0.90 (-0.99 – 8.13)	2.81 (-0.30 – 9.78)	0.09	5.03 (1.17 – 14.84)	<0.01	4.18 (0.24 – 14.91)	<0.01	2.75 (0.05 – 10.22)	0.03[‡]

* compared with 12 weeks' gestation

^x compared with the same 18 patients at 12 weeks' gestation

[‡] compared with the same 17 patients at 12 weeks' gestation

Interpretation of results

After first vaginal delivery, levator hiatal area increased. But the levator ani muscle is able to recover within 24 weeks after delivery. Recovery occurs in resting state first (6 weeks after delivery), than women will be able to contract again (12 weeks after delivery) and the ability to do the Valsalva maneuver with a smaller hiatal area is the last stage of recovery (24 weeks after delivery).

Concluding message

Complete levator ani muscle recovery after fist delivery is seen at 24 weeks after delivery and not yet at 12 weeks after delivery. This knowledge is important to understand pelvic floor complaints postpartum and to decide if (future) therapy should be initiated.

References

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