

Pelvic Physical Therapy Distance Journal Club

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Recovery of pelvic floor muscle strength and endurance 6 and 12 months postpartum in primiparous women – a prospective cohort study. Bø K, Naesøs K, Staer-Jenson J et al. Int Urogynecol J. 2022;33:3455-3464. Doi:10.1007/s00192-022-05334-4.

Introduction:

- Vaginal birth, especially instrumented delivery is an established risk factor for PFMD.
- Scant research of longitudinal studies that investigate vaginal resting pressure (VRP) and PFM strength and endurance parameters from pregnancy into PP.
- Same authors previously reported on PFM variables assessed by manometry of first-time pregnant women from gestational wk 22 to 6 wks PP.
 - At 6 wks reduction in VRP, PFM strength and endurance after normal vaginal deliveries noted.
 - PFM strength significantly more reduced after instrumental versus non-instrumental deliveries.
 - PFM strength & endurance, and vaginal pressure significantly more impacted in vaginal versus cesarean deliveries.
- There is a lack of research that explores the natural recovery of injured and intact PFMs in the first year PP.

Aim/Primary Aim:

- Investigate whether VRP and PFM strength and endurance at 6- and 12-months PP returned to mid-pregnancy levels in women who had normal, instrumented, and cesarean section deliveries.
- Assess influence of demographics and obstetric variables on recovery of VRP, PFM strength and endurance at 12 months PP.

Study Design/Study Format: Prospective study

Methods:

- Nulliparous women scheduled for delivery recruited in gestational wks 18-22 in first pregnancy and followed until 12 months PP.
- Sample size of 300 based on power calculation for expected change in LH dimensions from pregnancy to PP determined.
 - 71 subjects at 6 wks were utilized for an additional study investigating the effect of 4 months of PFMT on UI.
- Data collected: Demographic information between gestational wk 18-22 (considered mid-pregnancy). Delivery data collected by EMR and data on PFM training (self report) collected with electronic questionnaire at mid-pregnancy, 6 months and 12 months PP.
- LA evaluated for defects by blinded gynecologist with transperineal US at 6 weeks PP. Major defects further assessed using tomographic imaging of the axial plane at maximal PFM contraction and diagnosed according to prior protocol

- PFM strength and endurance measured by 2 PT's blinded to delivery mode for 6 and 12 month PP visits.
 - Prior to first measurements, trained how to perform a correct PFM contraction.
 - VRP and PFM strength measurements performed using air-filled vaginal balloon connecting to high precision pressure transducer.
- Statistical analysis: performed using SPSS version 26.
 - p values < 0.05 considered statistically significant

Results:

- 235/300 nulliparous pregnant women had complete dataset through 12 months. Loss to follow-up 21%.
- Normal vaginal birth group: 157/235 in this group; Table 3.
 - 6 months PP compared to mid-pregnancy: VRP and PFM significantly reduced strength, but no difference in endurance.
 - 12 months PP compared to mid-pregnancy: VRP and PFM strength significantly reduced, and significant increase in endurance.
 - Change from 6 months PP to 12 months PP: PFM strength and endurance significantly improved but not VRP.
- Instrumental vaginal delivery group: 43/235 in this group; Table 2 and 3
 - 6 months PP compared to mid-pregnancy: VRP, strength and endurance all significantly reduced
 - 12 months PP compared to mid-pregnancy: VRP and strength significantly reduced but no difference with endurance.
 - Change from 6 months PP to 12 months PP: PFM strength and endurance statistically improved but not VRP.
- Cesarean section group: 35/235 in this group and of those 27/35 had emergency cesareans Table 2 and 3
 - 6 months PP compared to mid-pregnancy: VRP significantly reduced, no change to PFM strength, and endurance significantly increased
 - 12 months PP compared to mid-pregnancy: VRP significantly reduced, but PFM strength and endurance increased.
 - Change from 6 months PP to 12 months PP: No significant changes
- Comparison between delivery modes: Table 4
 - Between mid-pregnancy to 12 months PP
 - No difference between normal vaginal delivery and instrumental group in any of the measurements.
 - Significant changes in VRP, strength, and endurance between normal vaginal delivery and cesarean group & instrumented compared to cesarean group.
 - Between 6 months to 12 months PP
 - No difference between normal vaginal delivery and instrumental group; normal vaginal delivery compared to cesarean group or instrumented and cesarean in any of the measurements.
- Linear regression of variables and VRP, PFM strength and PFM endurance from mid-pregnancy to 12 months: Table 5

- Cesarean protective against negative changes in PFM from mid-pregnancy to 12 months PP.
- Statistically significant negative influence of recovery with higher BMI, a longer second stage labor and major tears of LA muscle.
 - Tear being most influential of any of variables.
- Regular PFM exercises (≥ 3 times/week) at 6 months PP, having an epidural, and larger head circumference did not influence results.

Discussion:

- Least impacted group was cesarean delivery, with recovery of strength and endurance, but VRP remained reduced at 6- and 12-month PP.
- No difference between normal vaginal and instrumented delivery groups at 6- and 12-month PP measurements.
- Only one other study (Elenskaia et al) followed PFM variables strength and VRP longitudinally from pregnancy to 12 months PP using manometry.
 - PFM recovered by 12 months PP, and VRP not as significantly reduced at final measurement
- Delivery mode, BMI at 12 months PP, longer second stage of labor, and major tears of the LA muscle factors identified as having negative influence on PFM recovery.
- Subgroup from study also part of RCT with one arm having supervised PFM training once a week and instruction to perform daily exercise (published in Hilde, et al), and no significant difference between exercisers and controls in manometry measurements of PFM function identified.
- The reduction of PFM strength and endurance in both vaginal delivery groups compared to mid-pregnancy values is a significant finding and has potential to guide future practice.
- VRP did not significantly improve from 6 to 12 months, and all groups had a significantly lower levels of VRP compared to mid-pregnancy level.

Strengths/weaknesses:

- **Weaknesses:** Use of 2 assessors for all measurements. No pre-pregnancy measurements and no information about breastfeeding or hormone therapy. Low diversity of subjects (96% white and 77% college educated).
- **Strengths:** Longitudinal, prospective design of study, relatively few losses to follow-up, and use of reliable and valid measurements to assess PFM variables and to identify major tears. Examiners were blinded to birth history, and the ability to properly contract the PFM were confirmed before testing.

Conclusion/Summary:

- 12 months PP following a vaginal delivery, PFM strength, endurance, and VRP have not fully recovered to mid-pregnancy values.
- 12 months PP following cesarean delivery, pelvic floor strength and endurance are significantly higher than at mid-pregnancy, but VRP is still significantly impaired.
- Delivery mode, BMI at 12 months PP, longer second stage of labor, and major tears of the LA muscle were factors identified as having negative influence on PFM recovery.

Clinical Application:

- Information useful for counseling PP women regarding return to sports/activities, and regarding appropriate recovery time before potential planned future pregnancy.
- Risk factors identified that have negative influence on recovery of PFMs, which could be used in future screening tool for identifying women that may benefit from formal exam and treatment.

List discussion questions

- 1) In vaginal deliveries groups, the endurance had recovered at 6 and 12 months, but the strength was still significantly impaired. Does this study support focusing on type 2 function of pelvic floor with training in PP women or a different goal with strengthening?
- 2) Why do you think VRP does not change even though other variables improve?