

# Levator hiatus area and subsequent vaginal delivery: a longitudinal transperineal ultrasound study from mid-pregnancy to 8 years after first delivery

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## Background

The impact on subsequent vaginal delivery on the levator hiatus area is unclear. Ultrasound studies claim an insignificant role of subsequent vaginal delivery on the levator hiatus (1). On the other hand, large epidemiological studies find a strong association between subsequent vaginal deliveries and POP (2).

## Aim

Assess the levator hiatus area from mid-pregnancy to 8 years after first delivery in women with and without subsequent vaginal deliveries.

## Materials and methods

**Study design:** single center longitudinal cohort study.

**Sample:** 300 singleton nulliparous, recruited in gestational weeks 17-19 (first pregnancy)

**Inclusion:** Women with vaginal delivery at first delivery

**Exclusion:** Women who had undergone pelvic floor surgery during the follow-up, women with missing data on subsequent delivery

**Assessment:** three and- four dimensional transperineal ultrasound examination using the GE Kretz Voluson E8 (GE Medical Systems) with 4-8MHz curved array 3D/4D ultrasound transducer (RAB4-8l/obstetric) was performed. Ultrasound volumes were acquired at rest, maximum pelvic floor muscle (PFM) contraction and maximum Valsalva maneuver. Render mode was used for off-line analysis.

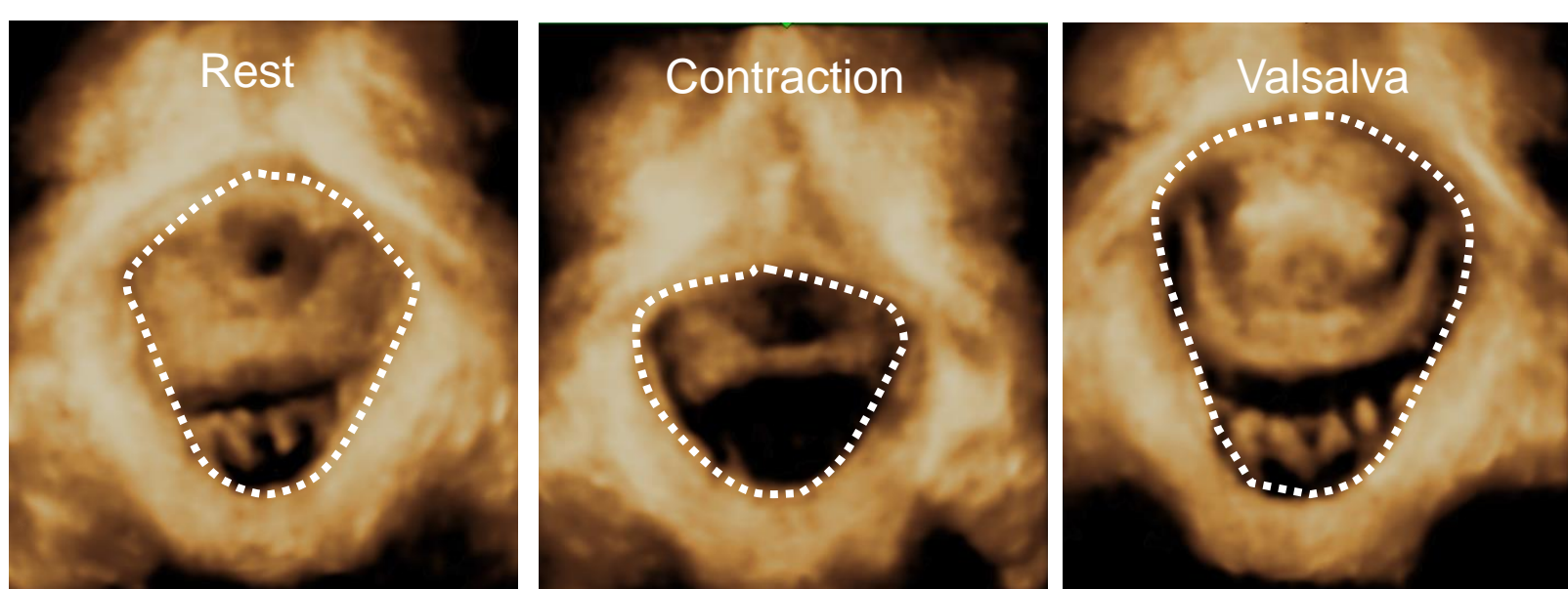


Figure 1: Levator hiatus area (dotted-line) at rest, contraction, Valsalva

**Follow-up:** 21 weeks of gestation during first pregnancy and 1 and 8 years after first delivery

**Exposure measure:** Subsequent vaginal delivery

### Subsequent vaginal group:

Women with at least one subsequent vaginal delivery after vaginal delivery at first delivery.

### Primiparous vaginal group:

Women with no further deliveries/ subsequent cesarean section after first vaginal delivery.

**Outcome measure:** Change of the levator hiatus area over time

**Statistics:** Linear mixed models were estimated. The mean levator hiatus area (with 95% confidence intervals (CIs)) and mean differences (with 95% CIs) from the post hoc analysis are presented.

## Results

### Subsequent vaginal group: N= 139

N= 113 had one subsequent delivery

N= 26 had two subsequent deliveries

### Primiparous vaginal group: N= 27

N= 22 had no subsequent delivery

N= 5 had one subsequent cesarean section

Total sample size n=166. No difference in pre-pregnancy BMI, age, and follow-up time points between study groups.

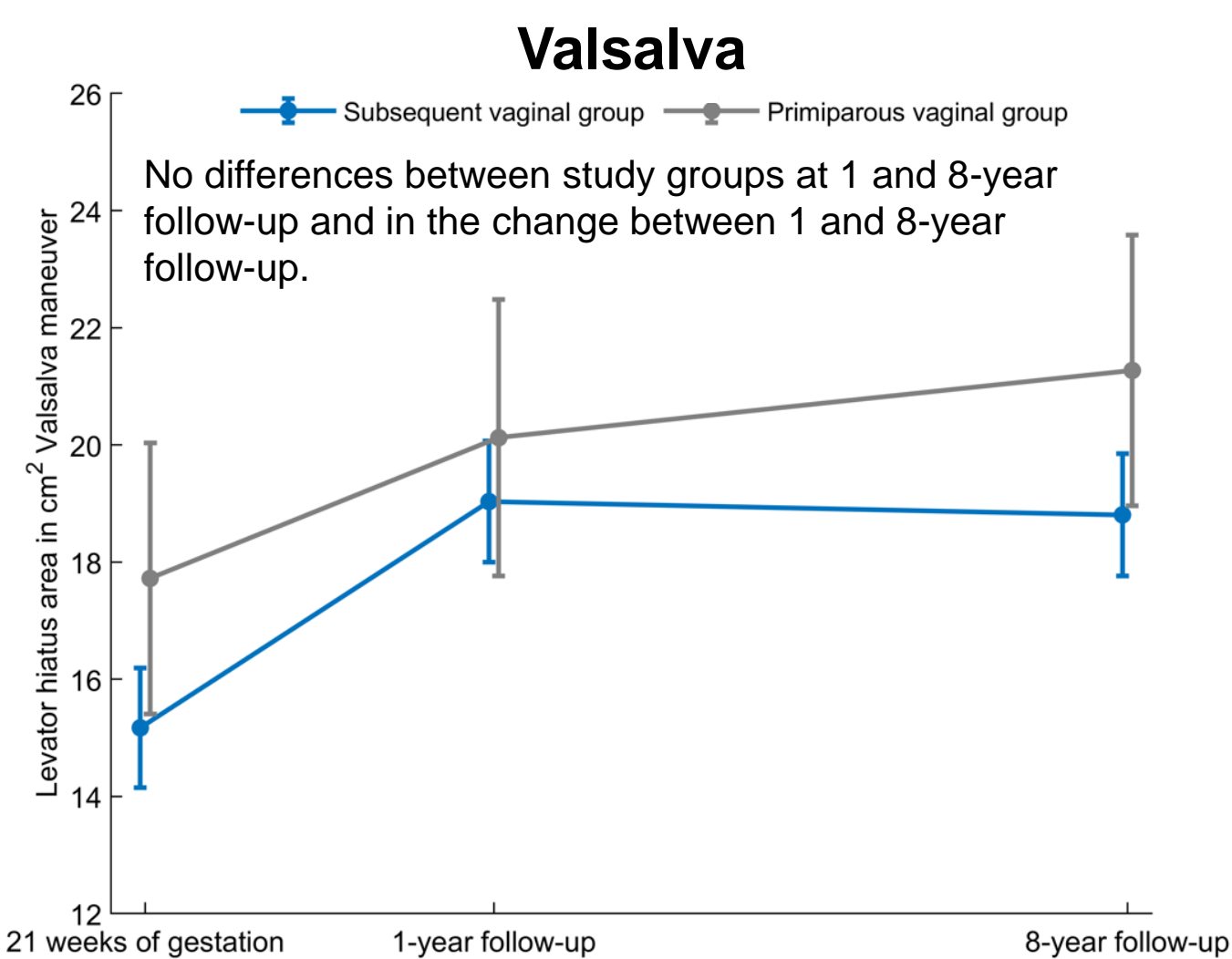
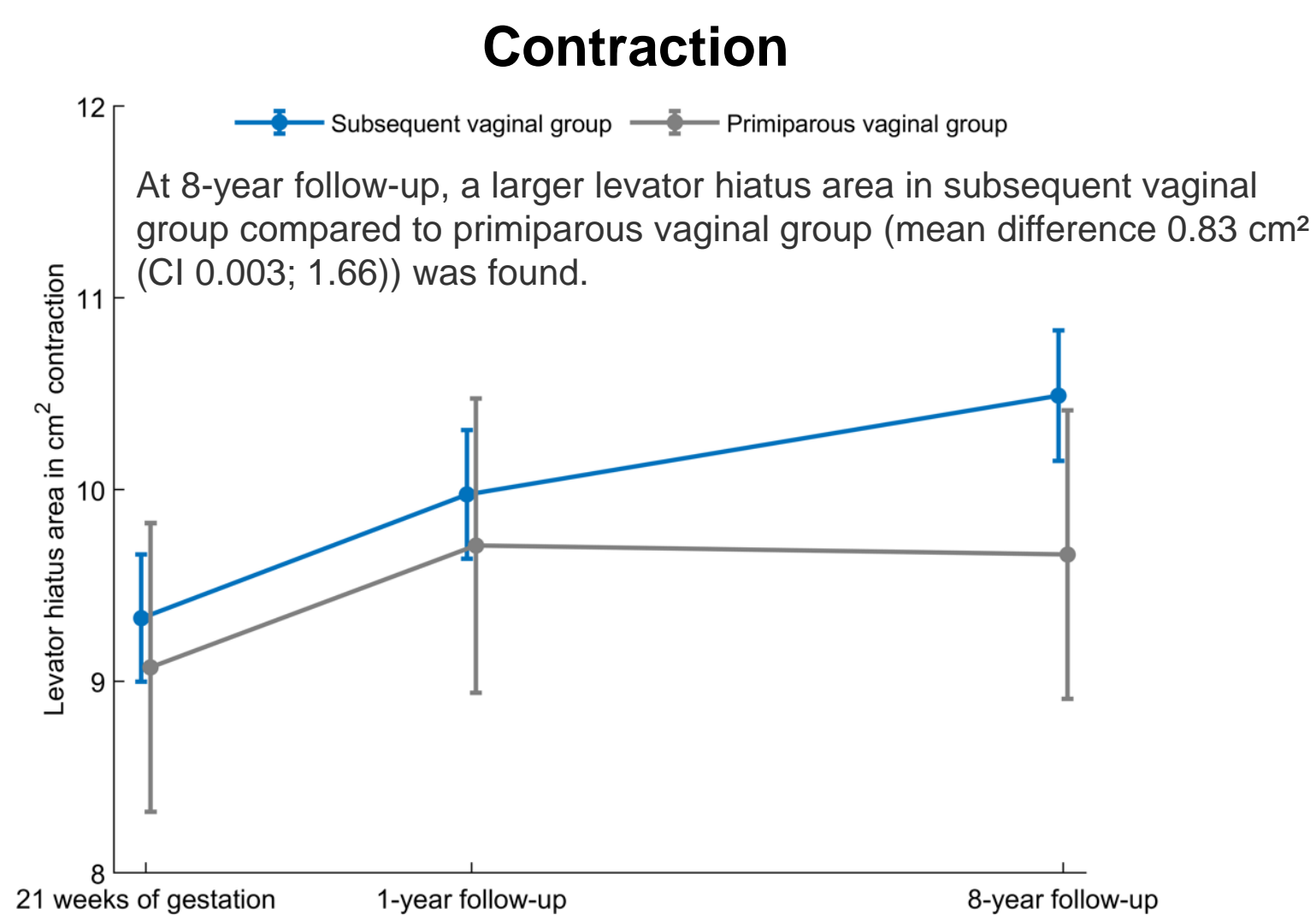
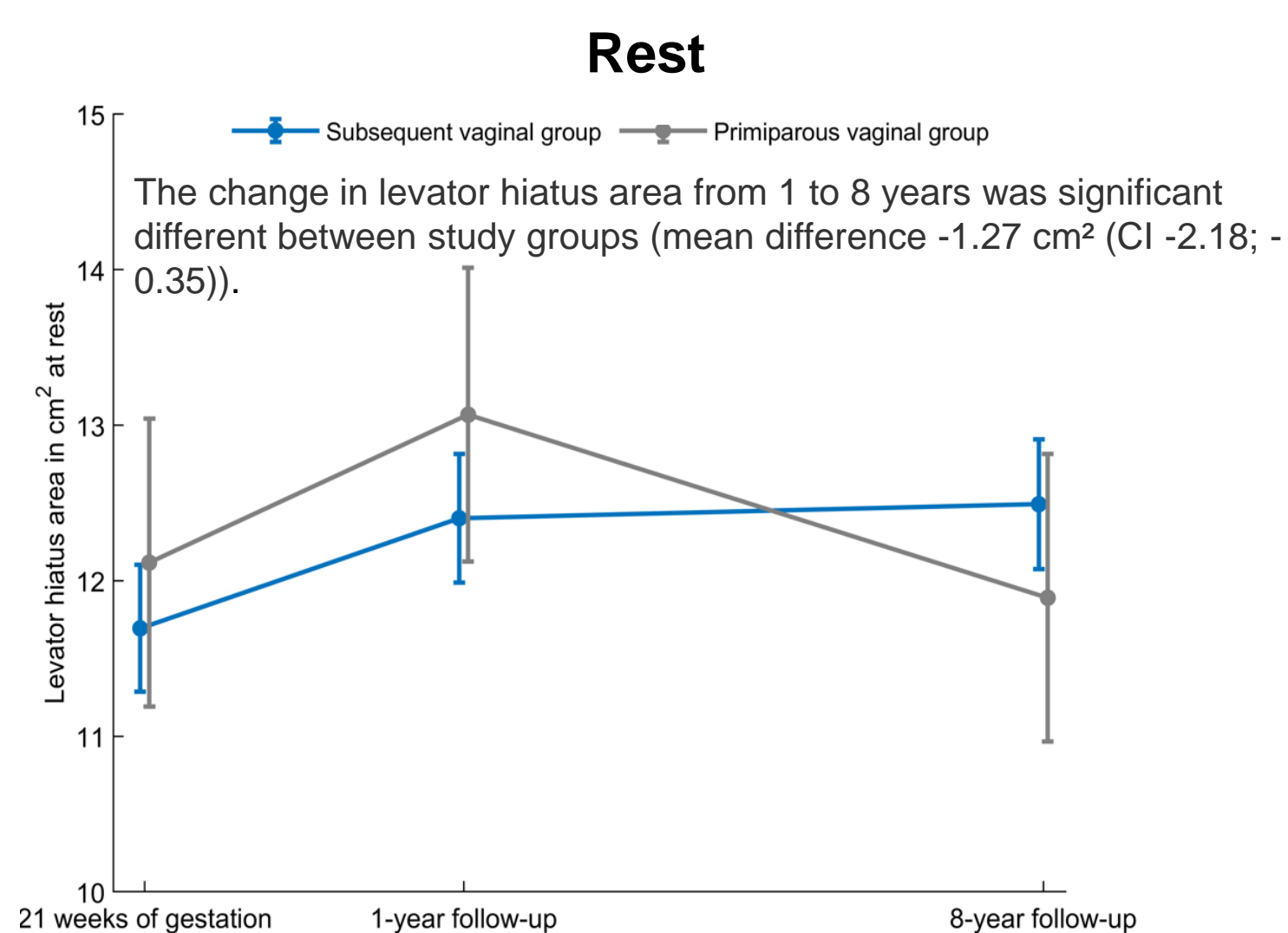


Figure 2: Mean levator hiatus area (with 95% CI) at rest, contraction, Valsalva at 21 weeks of gestation (first pregnancy), 1 year, and 8 years after first delivery in women with and without subsequent vaginal delivery.

## Conclusion

Subsequent vaginal delivery was associated with levator hiatus area at rest and contraction, but not at Valsalva 8 years after first vaginal delivery.

### References

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- Patel DA, Xu X, Thomason AD, Ransom SB, Ivy JS, DeLancey JO. Childbirth and pelvic floor dysfunction: an epidemiologic approach to the assessment of prevention opportunities at delivery. *Am J Obstet Gynecol* 2006; 195: 23-28