AUCKLAND BIOENGINEERING INSTITUTE
THE UNIVERSITY OF AUCKLAND NEW ZEALAND
Te Whare Wānanga o Tāmaki Makaurau

Changes in pelvic floor biometry following vaginal delivery: the impact of muscle trauma

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Background

Pelvic organ prolapse (POP) occurs when pelvic organs descend from their usual position [1].

Childbirth induced injury to the pelvic floor muscles (PFMs) is a leading risk factor for POP [2].

Change in the biometry of the pelvic floor (PF) following childbirth is thought to be different between women with and without trauma (Fig. 1, 4).

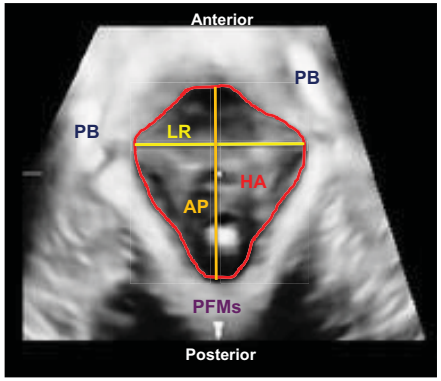

Figure 1. Representative ultrasound image of intact pelvic floor muscles with biometry indicated. LR = left-right diameter; AP = anteroposterior diameter; HA = hiatal area; PFMs = pelvic floor muscles; PB = pubic bone [3].

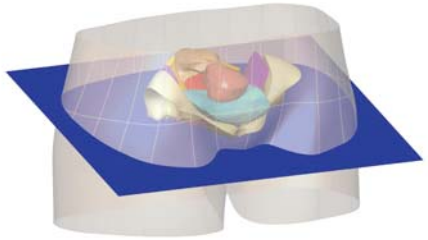

Figure 2. Schematic representation of the angled axial plane for the transperineal ultrasound (blue).

Aim

To compare the change in PF biometry between women with and without PFM trauma.

Method

- First-time pregnant women were assessed at the end of pregnancy and 3 months after delivery.
- Assessments included transperineal ultrasound measurements of PF biometry (Fig. 1, 2):

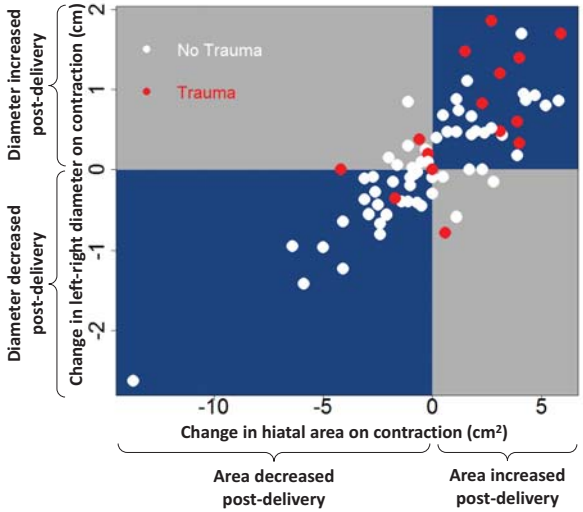

Figure 3. Changes in left-right diameter and hiatal area on contraction for women with (n = 60) and without (n = 15) pelvic floor muscle trauma.

- Hiatal area (HA)
- left-right (LR) diameter
- anteroposterior (AP) diameter

at rest, on PFM contraction, and during voluntary valsalva.

- Change in measures from pre- to post-delivery were analysed; positive change indicates an increase in measurements and vice versa.
- Two independent sample t-tests were used to assess the statistical significance of the changes between women with and without PFM trauma.

Results

To date, 166 antenatal participants recruited with 121 returning for postnatal visit. Ultrasound analysis is based on 75 participants with complete sets of data.

The PFM trauma prevalence is 21 %.

Change in LR diameter (p=0.01) and HA (p=0.02) on contraction and also LR diameter on valsalva (p=0.01) are statistically significantly different between the trauma and non-trauma group. There is no evidence to suggest that this is the case at rest.

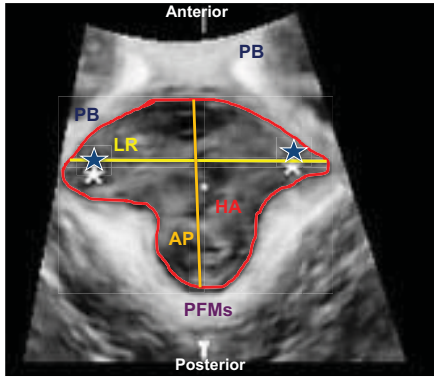

Figure 4. Representative ultrasound image of complete bilateral trauma to the pelvic floor muscles with biometry indicated. LR = left-right diameter; AP = anteroposterior diameter; HA = hiatal area; PFMs = pelvic floor muscles; PB = pubic bone. ★ indicate tearing of muscle from pelvic bone [3].

During PFM contraction, change in LR diameter is positively correlated with change in HA. Most women with trauma show increase in biometric measures (in at least 1 metric) post-delivery (Fig. 3).

Summary

- Following vaginal delivery, on average, women with trauma have increased HA and LR diameter compared to pre-delivery.
- This may be a result of PFM trauma which predisposes women to a greater risk of POP.

References

1. Davila GW, Ghoniem GM, Wexner SD. Pelvic Floor Dysfunction. : Springer; 2006. **2.** Dietz H, Simpson J. Levator trauma is associated with pelvic organ prolapse. BJOG: An International Journal of Obstetrics & Gynaecology 2008;1. **3.** Dietz H, Shek C. Validity and reproducibility of the digital detection of levator trauma. International Urogynecology Journal 2008;19(8):1097-1101.