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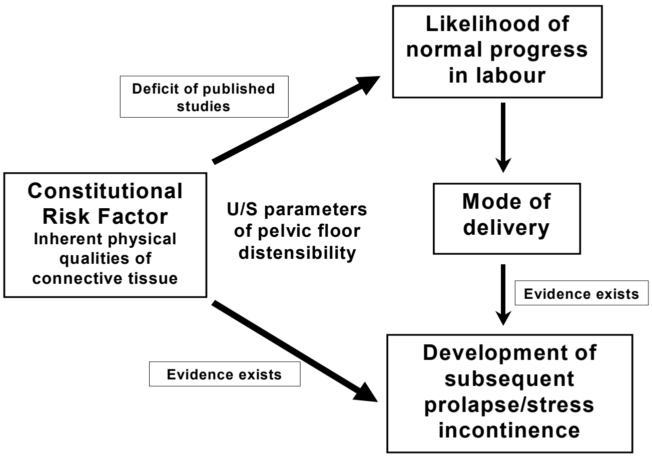
ASK NOT WHAT CHILDBIRTH CAN DO TO YOUR PELVIC FLOOR BUT WHAT YOUR PELVIC FLOOR CAN DO IN CHILDBIRTH.

Aims of Study

The interaction between pregnancy, mode of delivery and pelvic floor function is controversial. There is robust evidence to suggest a significant association between mode of delivery and both the prevalence of subsequent urinary incontinence [1], and changes to dynamic pelvic floor anatomy assessed by ultrasound [2]. This study aims to explore the hypothesis that the inherent constitutional quality of a woman's connective tissue influences the likelihood of normal progress in labour and the development of later pelvic organ prolapse and stress incontinence. By demonstrating antenatal differences in the functional anatomy of women who subsequently deliver by different routes, it supports the idea that mode of delivery may not be directly causative in determining the risk of pelvic floor dysfunction. Rather, the biomechanical qualities of pelvic floor connective tissue, which are known to be associated with pelvic floor dysfunction [3], may act as a confounding factor.



Methods

Women in the 3rd trimester of their first ongoing pregnancy were recruited from a teaching hospital antenatal clinic and obstetric ultrasound department. Pelvic ultrasound assessment was performed by a single trained operator, using the same Kretz® Combison 530 ultrasound machine. The women were placed in a modified lithotomy position with a comfortably full bladder and assessed using a 7.5 MHz mechanical sector probe to image bladder neck position at rest, bladder neck rotation from its position at maximum pelvic floor squeeze to maximum excursion at valsalva [4] and levator hiatus area at squeeze, rest and valsalva. A three-dimensional transvaginal ultrasound was performed with a 3-D 7.5 MHz probe, in order to calculate rhabdosphincter and total urethral sphincter volume. The distribution of these ultrasonically measured parameters was examined and analysed using the Kolmogorov-Smirnov test. They were found to be normally distributed. Parametric statistical tests were therefore used to compare the ultrasound parameters of women who delivered vaginally with those who laboured but went on to have an emergency caesarean section.

Results

10 of the 98 women who underwent 3rd trimester antenatal assessment were delivered by pre-labour, elective caesarean section and these data were not included in the subsequent analysis. Of the 88 women who went into labour, 67 (76%) were delivered vaginally and 21 (24%) by emergency caesarean section. The majority of these were for failure to progress or fetal distress. The mean age of the vaginal delivery group was 29.7 years with a range of 18 to 41; the mean age of the caesarean section in labour group was 31.6 years with a range of 26 to 37. Maternal age, height, weight, mean birthweight, and gestation at delivery were not statistically different between these two groups of women.

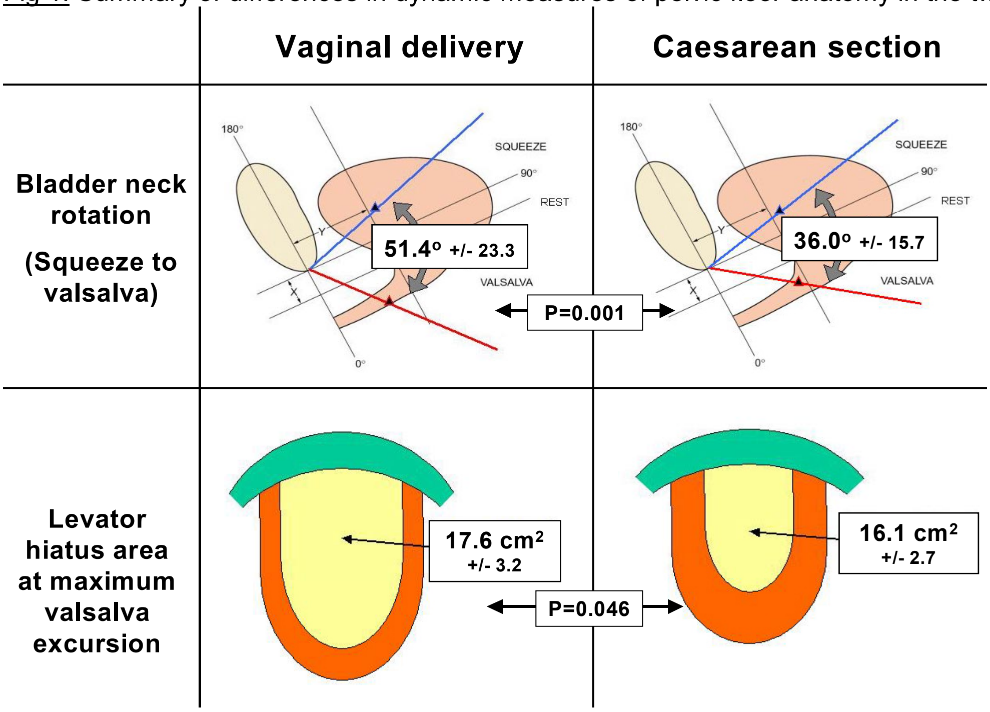
Table 1: Differences in antenatal 3rd trimester pelvic ultrasound parameters between women who subsequently delivered by vaginal delivery and emergency caesarean section

U/S parameter	Antenatal values (mean +/- 1 sd)		vaginal delivery group vs c-section group	
	Vag. delivery (n=67)	C-section (n=21)	*Mean diff*	*P value*
Bladder neck at rest (degrees)	92.5 (19.2)	98.6 (14.3)	+5.93	0.141
Bladder neck rotation* (degrees)	51.4 (23.3)	36.0 (15.7)	-15.3	0.001
Levator hiatus area^{valsalva} (cm^2)	17.6 (3.21)	16.1 (2.70)	-1.47	0.046
Levator hiatus area^{rest} (cm^2)	15.0 (2.63)	14.4 (1.96)	-0.553	0.305
Levator hiatus area^{squeeze} (cm^2)	13.6 (2.08)	13.5 (1.61)	-0.034	0.938
Rhabdosphincter volume (cm^3)	0.98 (0.24)	1.09 (0.48)	+0.114	0.306
Total sphincter volume (cm^3)	2.11 (0.50)	2.18 (0.59)	+0.060	0.601

*rotation=angular rotation from position at max. pelvic floor contraction to max. excursion on valsalva

There are no significant differences in the static anatomical parameters between the groups. However, there are significant differences in bladder neck rotation and levator hiatus area at valsalva, the two dynamic ultrasound parameters that best reflect pelvic floor distensibility.

Fig 1: Summary of differences in dynamic measures of pelvic floor anatomy in the two groups



Conclusions

The observable differences in the mechanical distensibility of the pelvic floor in these two groups of nulliparous women, suggest a fundamental difference in tissue qualities prior to delivery. These inherent biomechanical properties may play a role in determining the outcome of labour and also in the development of subsequent prolapse and stress incontinence. Further investigation is undoubtedly needed into the complex relationship that exists between the 'quality' of the connective tissues that support the pelvic viscera, the influence that these exert on the progress of labour, and the negative effect that different modes of delivery may have on the pelvic floor and its consequent function.

References

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