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Wanderley Souto Ferreira C[1], Kamisan Atan I[2], Martin A[3], Shek K L[2], Dietz H P[2]
1. *Department of Physiotherapy, Federal University of Pernambuco, Brazil,* ***2.*** *Sydney Medical School Nepean, University of Sydney, Australia,* ***3.*** *NHMRC Clinical Trials Centre, University of Sydney, Australia*

DOES PELVIC ORGAN SUPPORT DETERIORATE IN THE YEARS FOLLOWING A FIRST BIRTH?

Hypothesis / aims of study

The pelvic floor is affected by hormones during pregnancy (1) and suffers distension during vaginal delivery. Both can lead to changes in morphology and function (2). It has been claimed that pelvic organ support may deteriorate over time following vaginal childbirth (the 'ship in dock hypothesis') (3), but to date experimental evidence for this hypothesis is lacking. The aim of this study was to observe the development of pelvic organ support over time, following a first birth.

Study design, materials and methods

This was a retrospective observational study using archived data sets of women seen in the context of two prospective perinatal imaging studies. All subjects had undergone a local standardized interview, a clinical examination and 4D translabial ultrasound (TLUS), with the patient supine and after voiding, at maximum Valsalva, 3 months and 2 - 5 years post-partum. TLUS volume data sets were analysed at a later date, on a PC using a proprietary software by the first author, blinded against all other data. Main outcome measures were bladder neck descent (BND), position of bladder, uterus and rectal ampulla in relation to the pubic symphysis (SP), rectocele depth and levator hiatal area at maximum Valsalva (Figure 1). Means at the two time points were compared using paired Student's T-test (paired) for normally distributed data. Differences in proportions at the two time points were tested using McNemar's test. Predictors of change over time in continuous variables were explored using linear modelling methods

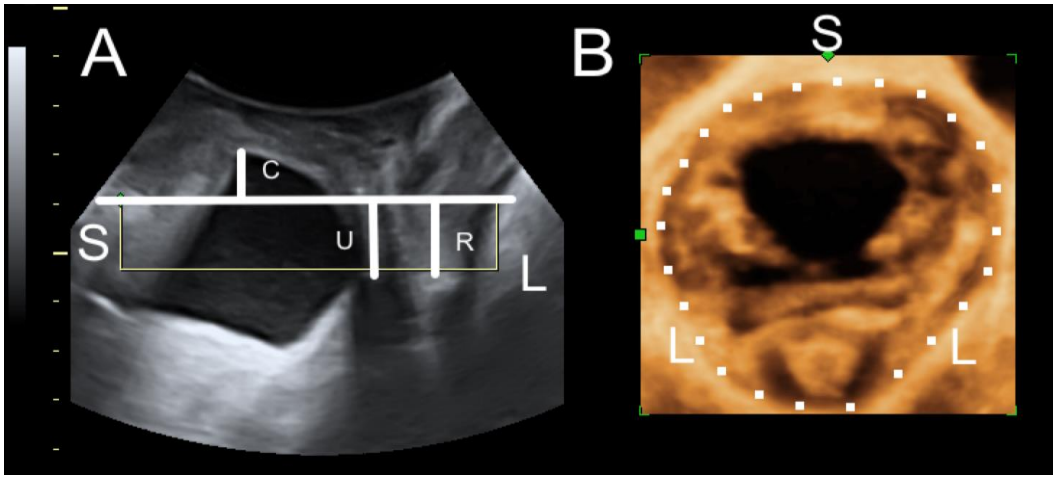

Figure 1*: Quantification of organ mobility and hiatal distension on translabial ultrasound. (A) shows measurement of organ descent against the symphysis pubis (S), with C signifying bladder descent to about 1 cm below the symphysis, U showing uterine descent to about 1.5 cm above the SP, and R showing descent of the rectal ampulla to the same level. (B) demonstrates the measurement of hiatal area on Valsalva, with the dotted line indicating hiatal circumference. S= symphysis pubis, L= levator ani.*

Results

Of 1148 women originally recruited, 315 have had at least 2 postnatal visits at 3-6 months, 2 years or 5 years postpartum, to date. Fifteen were excluded (missing volume data in 9, intercurrent pregnancy in 6), leaving 300 women for analysis. They were first seen on average 0.39 (SD 0.2, range 0.2-2.1) years after childbirth and again 3.1 (SD 1.5, range 1.4-8) years after the index delivery, at a mean interval of 2.71 (SD 1.5, range 0.7-7.7) years, yielding 813 woman-years of observation. Their first birth had been a normal vaginal delivery (NVD) in 54% (n=162), and a vacuum, forceps and Caesarean section delivery (CS) in 11.7% (n=35), 3.7% (n=11) and 30.7% (n=92), respectively. At the last follow up, 51.3% (n=154) had had at least one subsequent delivery (range, 1 - 3). Mean age at the second visit was 32 (SD 5.7, range 20-48) years with a mean BMI of 26.2 (SD 6.7, range 15.7-56.5) kg/m^2. One hundred and ten (36.7%) complained of symptoms of stress urinary incontinence, 39 (13%) of urge incontinence, 20 (6.7%) of symptoms of prolapse, 26 (8.7%) of voiding dysfunction and 60 (20%) of obstructed defecation (Table 1).

	First follow up	Last follow up	P-Value*
Interval†	0.39 (0.2)	3.1 (1.5)	-
Subsequent deliveries	0	153 (51.3)	-
Stress Incontinence	80 (26.7)	110 (36.7)	<0.001
Urge Incontinence	30 (10)	39 (13)	0.20
Frequency	70 (23.3)	104 (34.7)	0.001
Nocturia	25 (8.3)	47 (15.7)	0.002
VD symptoms	7 (2.3)	26 (8.7)	<0.001
OD symptoms	57 (19)	60 (20)	0.70
Prolapse symptoms	18 (6)	20 (6.7)	0.70

Table 1*: Demographic data and primary symptoms at first and last follow up. *McNemar's test. †Interval from first birth in years. 'Subsequent deliveries' relates to the number of women who had given birth again in the interval between follow-up visits. Data presented as n(%). VD= Voiding dysfunction. OD= Obstructed defecation. n=300.*

On univariate analysis, there was significant improvement, i.e., less organ descent on Valsalva, for the anterior and posterior compartments, while there was no change for uterine descent. Hiatal area also decreased between the follow-ups (see Table 2). On multivariate analysis controlling for potential confounders (such as length of follow-up, levator avulsion, birthweight, mode of delivery, second birth), these findings were confirmed. Improvement seemed to be positively associated with follow-up length, but it was less marked (although still significant) in those with evidence of major levator trauma. In women who had given birth by Caesarean Section this improvement was still significant but smaller.

	First follow up	Last follow up	Mean difference (95% CI)	P-Value
Pelvic organ descent (mm)				
Bladder neck descent	23.5±11.6	20.7±11.5	-2.8 (-4.2 to -1.4)	<0.001
Bladder	5.6± 12.2	9.7±12.2	4.2 (2.8 to 5.5)	<0.001
Uterus	20.7±14.1	20.7±13.5	-0.1 (-1.8 to 1.7)	0.953
Rectal ampulla	-0.8±14.2	1.9±15	2.7 (0.9 to 4.5)	0.004
Hiatal area on Valsalva (cm^2)	20.3±7	19.4±7.2	-0.9 (-1.6 to -0.2)	0.012

Table 2*: Measures of pelvic organ mobility and hiatal distensibility. Data is presented as mean±SD. Paired Student's T test; n=300.*

Interpretation of results

In this study population of 300 women observed for a total of 813 woman-years, pelvic organ support and hiatal distension appeared to improve over time. The degree of improvement was greater at longer follow-up intervals and less marked in women with levator avulsion. This implies ongoing 'healing' or regression of delivery- induced changes in functional anatomy, regardless of additional vaginal births. Major trauma may reduce the degree of recovery.

Concluding message

Our findings do not support the 'ship in dock hypothesis', at least not in the time frame investigated in this study. Deterioration of pelvic organ descent after childbirth, if it occurs at all, may follow a very slow time course.

References

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Disclosures

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