

## HOW DO THEY VARY SIGNIFICANTLY?

Abstract number #547

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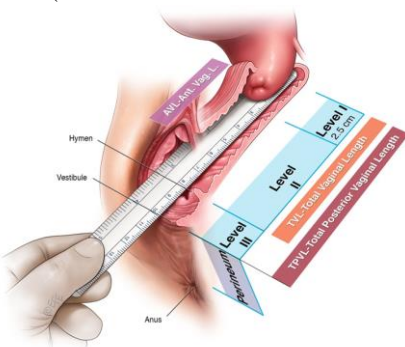
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### Hypothesis/ Aims of study

Vaginal length has been subject to few dedicated articles with significant findings. We wish to examine the total vaginal length<sup>1</sup> (TVL - vault to hymen posteriorly [Fig 1]) and the total posterior vaginal length<sup>2,3</sup> (TPVL – vault to anterior perineum posteriorly [Fig 1]) in relation to posterior vaginal compartment repairs (PR) in a large series of women, looking for (i) the mean vaginal lengths, (ii) effect of PR and (iii) other factors that might significantly impact those figures.

### Study design, Methods

At 300 consecutive PRs, mostly following prior or concomitant hysterectomy, the (i) TVL<sup>1</sup> (cm) and TPVL<sup>2</sup> (cm) were measured pre- and immediately postoperatively. Using linear regression, preoperative measurements were tested for their association with a range of demographic and surgical factors including: age; parity; weight; height; BMI, menopause, prior hysterectomy, POP-Q<sup>1</sup> (points C, Ap and Bp, genital hiatus - GH) and PR-Q<sup>2</sup> points (perineal gap - PG, posterior vaginal vault descent - PVVD, mid vaginal laxity – MVL undisplaced, rectovaginal fascial laxity - RVFL) posterior prolapse markers. Units used for lengths were mm (calculations); cm (conclusions)



**Fig 1:** Vaginal levels and lengths illustrating TVL and TPVL

### Results

**Perioperative:** Mean pre-op TPVL was 9.25cm, a mean 1.76cm (23.5%) longer than the mean pre-op TVL of 7.49cm. Post-op TPVL was reduced by a mean 0.17cm (1.8%) to a mean 9.08cm and TVL by a mean 0.08cm (1.1%), to a mean 7.41cm, neither reduction being significant.

**Age and menopause:** Both TVL and TPVL have a significant inverse relationship to both factors.

**Weight, height, BMI (body size):** Both TVL and TPVL have a significant positive relationship.

**Parity or prior hysterectomy:** There was no relationship with TVL or TPVL

**Pelvic organ prolapse:** TVL/TPVL had significant positive relationships with two PR-Q<sup>2</sup> prolapse markers (PVVD, RVFL) suggesting vaginal length may increase with prolapse. Their only relationship with the POP-Q markers (Point C) was a surprising inverse one.

### Discussion

Both TPVL (mean 9.25cm) /TVL (mean 7.49cm) have minimal change following PR. Both lengths have (i) positive relationships with weight, height, BMI and possibly prolapse (PR-Q prolapse markers only) and (ii) inverse relationships with age, menopause and Point C. There appears no relationship with parity and prior hysterectomy.

Covariate	Coef. (95%CI)*	P*
Age in years	-0.40 (-0.53 to -0.27)	<0.001
Weight in kg	0.22 (0.11 – 0.33)	<0.001
Height in cm	0.42 (0.19 – 0.65)	<0.001
BMI (kg/m <sup>2</sup> )	0.44 (0.12 – 0.77)	0.008
Parity (per one birth)	0.17 (-1.22 – 1.57)	0.81
Perineal gap (mm)	0.26 (0.09 – 0.42)	0.002
PVVD (mm)	0.18 (0.09 – 0.26)	<0.001
MVL, undisplaced precop (mm)	0.72 (0.48 – 0.95)	<0.001
Rectovaginal fascial laxity(mm)	0.54 (0.31 – 0.77)	<0.001
Point C (mm)	-0.20 (-0.26 to -0.13)	<0.001
Point Ap (mm)	-0.68 (-1.85 to 0.49)	0.25
Point Bp (mm)	-0.06 (-0.17 – 0.05)	0.30
Genital hiatus (mm)	-0.002 (-0.18 – 0.17)	0.98
Menopause (Yes versus no)	-14.1 (-18.6 to – 9.5)	<0.001
Hysterectomy (Yes versus no)	1.17 (-1.88 – 4.76)	0.40

**Table 1:** Associations with an outcome variable of pre-operative total vaginal length (TVL). Covariates with P<0.05 are shown in bold. TPVL Table (not-shown) is very similar.

### Conclusions

Vaginal length appears to be well-maintained by posterior vaginal repairs. An increase in vaginal length with increasing body size factors was noted. Ageing and menopause reduction in vaginal length was confirmed.

**Table 2:** Univariate and multivariate regression models showing the significant relationships between TVL (TVPL essentially the same) and demographic and prolapse markers.

Covariate	UNIVARIATE		MULTIVARIATE	
	Coef. (95% CI)	P	Coef. (95% CI)	P
Age in years	-0.4 (-0.53 – 0.28)	<0.001	-0.20 (-0.36 – 0.05)	0.01
Weight in kg	0.22 (0.11 – 0.33)	<0.001	0.19 (0.09 – 0.29)	<0.001
Menopause (Yes vs no)	-14.07 (-18.58 to -9.55)	<0.001	-8.01 (-13.52 to -2.51)	0.004
Point C (mm)	-0.19 (-0.26 – -0.13)	<0.001	-0.09 (-0.17 – -0.02)	0.009
PVVD (mm)	0.18 (0.10 – 0.26)	<0.001	0.16 (0.09 – 0.24)	<0.001
Rectovaginal fascial laxity	0.59 (0.36 – 0.83)	<0.001	0.44 (0.21 – 0.67)	<0.001