



# What factors of an intrapartum caesarean section contribute to the increased risk of preterm birth in a subsequent pregnancy?

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## INTRODUCTION

Preterm birth is a major cause of neonatal morbidity and mortality with 8.7% of babies born preterm in Australia (1). There is growing evidence that having a caesarean section in a previous pregnancy, particularly at full dilatation, is associated with increased risk of subsequent preterm births (2, 3). This study aimed to investigate the association between factors during intrapartum caesarean sections in an index pregnancy and spontaneous preterm birth in subsequent pregnancies.

## TABLES

Table 1 – bivariate analysis

		No spont PTB	Spont PTB	p value
		(median IQR)		
<b>BMI</b>		23.3 (20.7-27.2)	22.4(20.3-25.5)	0.34
<b>Gestational Age</b>		40(39-41)	39 (38-40.5)	0.10
<b>Birthweight (g)</b>		3530 (3180-3868)	3420 (3110-3899)	0.65
<b>Interpregnancy interval (months)</b>		29 (21-39)	32.5 (21-48.5)	0.48
		n (%)		
<b>Ethnicity</b>	Caucasian (total = 197)	782 (98.1%)	15 (1.9%)	0.76
	Non Caucasian (total = 810)	793 (97.9%)	17 (2.1%)	
<b>Smoker</b>	No (total = 1406)	1377 (97.9%)	29 (2.1%)	0.58
	Yes (total = 202)	199 (98.5%)	3 (1.5%)	
<b>Assisted Conception</b>	No (total = 1538)	1508 (98.0%)	30 (2.0%)	0.60
	Yes (total = 70)	68 (97.1%)	2 (2.9%)	
<b>Labour onset</b>	Spontaneous (total = 646)	628 (97.2%)	18 (2.8%)	0.16
	Induced (total = 851)	838 (98.5%)	13 (1.5%)	
	CS – no labour (total = 111)	110 (99.1%)	1 (0.9%)	
<b>Category of CS</b>	Cat 1 (total = 495)	485 (98.0%)	10 (2.0%)	0.82
	Cat 2 (total = 840)	823 (98.0%)	17 (2.0%)	
	Cat 3 (total = 229)	224 (97.8%)	5 (2.2%)	
	Cat 4 (total = 44)	44 (100%)	0 (0%)	
<b>CS at full dilatation</b>	No (total = 1333)	1310 (98.3%)	23 (1.7%)	0.09
	Yes (total = 275)	266 (96.7%)	9 (3.3%)	
<b>Antibiotics in labour</b>	No (total = 461)	452 (98.0%)	9 (2.0%)	0.95
	Yes (total = 1147)	1124 (98.0%)	23 (2.0%)	
<b>Primary operator</b>	Registrar (total = 1401)	1374 (98.1%)	27 (1.9%)	0.64
	Consultant (total = 207)	202 (97.6%)	5 (2.4%)	
<b>Time of birth</b>	In hours (total = 556)	542 (97.5%)	14 (2.5%)	0.27
	Out of hours (total = 1052)	1034 (98.3%)	18 (1.7%)	
<b>Uterine extension</b>	No (total = 1477)	1446 (97.9%)	31 (2.1%)	0.33
	Yes (total = 122)	121 (99.2%)	1 (0.8%)	
<b>Forceps @CS</b>	No (total = 1412)	1383 (97.9%)	29 (2.1%)	0.68
	Yes (total = 187)	184 (98.4%)	3 (1.6%)	
<b>Fetal pillow</b>	No (total = 1501)	1474 (98.2%)	27 (1.8%)	0.02
	Yes (total = 98)	93 (94.9%)	5 (5.1%)	

Table 2 – logistic regression

	Odds Ratio (95% CI)	P value
<b>CS at fully dilated</b>	1.36 (0.56-3.28)	0.50
<b>Labour onset – no labour</b>	0.31 (0.04-2.44)	0.27
<b>Labour onset – induced</b>	0.57 (0.27-1.19)	0.14
<b>Gestational age</b>	0.77 (0.58-1.01)	0.06
<b>Fetal Pillow used</b>	2.25 (0.76-6.63)	0.14

## METHODS

A retrospective cohort study of all women who had a non-elective caesarean section at term for their first birth and a subsequent second birth at any gestation greater than 20 weeks at a tertiary institution was performed. Women experiencing a multiple pregnancy, malpresentation or structural abnormalities in their subsequent pregnancy were excluded. Demographics and clinical data related to the index pregnancy was collected and underwent bivariate analysis with the primary outcome of spontaneous preterm birth in the subsequent pregnancy. Variables identified as potentially clinically relevant in the bivariate analyses were included in a logistic regression analysis.

## RESULTS

There were 1608 women identified as meeting the inclusion and exclusion criteria. Of these, 71 (4.4%) delivered prior to 37 weeks in their subsequent pregnancy but only 32 (2.0%) experienced spontaneous preterm births. Results of the bivariate analyses are shown in Table 1. Table 2 demonstrates the results of the logistic regression with gestation at first birth being the most significant factor determining risk of preterm birth in subsequent pregnancy. The association between subsequent preterm birth and use of fetal pillow at delivery was no longer significant after controlling for caesarean section at full dilatation, onset of labour and gestational age at first birth.

## DISCUSSION

Angle extension and resulting cervical shortening has been hypothesised to increase the risk of subsequent preterm birth. However only 0.8% of the study population who had an angle extension experienced a subsequent spontaneous preterm birth compared to 2.1% without an angle extension (p value 0.33). This is likely as a result of the small patient population identified in the study. There was a low rate of subsequent preterm births likely as women who delivered at term in their first pregnancy were selected thereby ruling out patients who already experienced a preterm birth in their first pregnancy. Large state or national databases would be required to obtain numbers larger enough to perform an analysis. The association between use of fetal pillow and spontaneous preterm birth (although not statistically significant) could warrant further investigation. While a biological mechanism for this association is not apparent, the use of fetal pillow may be a surrogate marker of low fetal station at caesarean section or obstructed labour.



### References

1. Health A0, Welfare. Australia's mothers and babies data visualisations. Canberra: AIHW; 2020.
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3. Wood SL, Tang S, Crawford S. Cesarean delivery in the second stage of labor and the risk of subsequent premature birth. American journal of obstetrics and gynecology. 2017;217(1):63. e1-. e10.