

Coitus and orgasm at term: effect on spontaneous labour and pregnancy outcome

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ABSTRACT

Introduction: Coitus and orgasm in late pregnancy are believed to facilitate the onset of labour. We aim to evaluate the relationship at term of reported coitus and orgasm with spontaneous labour.

Methods: Women at term scheduled for non-urgent labour induction were asked to keep a coitus and orgasm diary. These women were recruited for a randomised trial on the effect of coitus to promote spontaneous labour. For this analysis, the women were categorised into coitally-active and abstinent groups according to their coital diary. Spontaneous labour prior to the date of scheduled labour induction was the primary outcome. Labour, delivery and neonatal outcome were also evaluated. Multivariable logistic regression analysis was used to control for significant variables.

Results: On univariate analysis, the inverse association of coitus with spontaneous labour was borderline (odds ratio [OR] 0.6; 95 percent confidence interval [CI] 0.3–1.0; p-value is 0.052). Orgasm was not associated with spontaneous labour (p-value is 0.33). After adjustment, coitus (adjusted OR 0.4; 95 percent CI 0.2–0.8; p-value is 0.009) displayed a significant inverse association with spontaneous labour. Coitus and orgasm were not associated with any other adverse pregnancy outcome.

Conclusion: Women who reported coitus were less likely to go into spontaneous labour prior to their scheduled labour induction. Reported coitus and orgasm were not associated with adverse pregnancy outcome.

Keywords: coitus, orgasm, pregnancy outcome, spontaneous labour

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INTRODUCTION

Sexual intercourse to promote labour onset is biologically plausible as prostaglandin E is present in semen,⁽¹⁾ breast stimulation promotes labour onset⁽²⁾ and uterine activity is provoked by orgasm during sexual intercourse in pregnancy.⁽³⁾ Coitus in healthy women at term is associated with a shorter gestation and a lesser need for labour induction for prolonged pregnancy, and the frequency of coitus is positively correlated with an expedited onset of labour.⁽⁴⁾ However, these findings are not consistently reported.⁽⁵⁾ Although having sex is widely believed to facilitate the onset of labour,⁽⁶⁾ safety concerns are expressed by 20%–80% of pregnant women.⁽⁴⁾

We recently reported on an intervention trial where women scheduled for non-urgent labour induction were randomised to an advise-vaginal-sex-to-promote-labour group or to a control group. This study showed that physician advice can increase reported coitus but the rate of spontaneous labour was not affected.⁽⁷⁾ The facilitation of labour onset at term is important as about 20% of term pregnancies are terminated by the induction of labour,^(8,9) and induced labour is associated with prolonged labour,⁽¹⁰⁾ Caesarean delivery^(10,11) and poorer neonatal outcome.⁽¹⁰⁾ A secondary analysis was performed on the data from the previously-reported randomised trial,⁽⁷⁾ to evaluate further the effect of reported coitus and orgasm on spontaneous labour and other pregnancy outcomes.

METHODS

The methodology for the randomised trial was previously reported.⁽⁷⁾ In brief, term women were recruited from the antenatal clinic after they had been given a non-urgent appointment for labour induction, which was typically one week in advance. After randomisation, counselling by a physician and instruction on keeping a diary to record coitus and orgasm activities, the women were allowed home. Orgasm was not defined for the subjects and the data was based on self reporting in a diary. Women randomised to the advise-sex group were encouraged to have vaginal sex to promote labour onset prior to their scheduled labour induction. For the control group, coitus was neither encouraged nor discouraged. Recruitment for the trial took

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Table I. Characteristics of 209 women stratified according to reported coitus and orgasm.

	Coitus (n = 105)	No coitus (n = 104)	p-value	Orgasm (n = 87)	No orgasm (n = 122)	p-value
Age (years)	29.3 ± 4.4	29.3 ± 4.6	1.0	29.1 ± 4.3	29.5 ± 4.6	0.57
Age ≥ 35 years	14 (13.3)	12 (11.5)	0.83	10 (11.5)	16 (13.1)	0.83
Ethnicity						
Malay	71 (67.6)	58 (55.8)	0.19	61 (70.1)	68 (55.7)	0.061
Chinese	15 (14.3)	20 (19.2)		8 (9.2)	27 (22.1)	
Indian	13 (12.4)	22 (21.2)		13 (14.9)	22 (18.0)	
Others	6 (5.7)	4 (3.8)		5 (5.7)	5 (4.1)	
Gravidity	2.1 ± 1.4	2.0 ± 1.1	0.62	2.1 ± 1.4	2.1 ± 1.2	0.99
	2 [2]	2 [2]	0.90	2 [2]	2 [2]	0.50
Parity	0.9 ± 1.3	0.7 ± 0.9	0.19	0.9 ± 1.3	0.8 ± 1.0	0.37
	0 [1]	0 [1]	0.53	0 [1]	0 [1]	0.78
Nullipara	54 (51.4)	54 (51.9)	1.0	45 (51.7)	63 (51.6)	1.0
Gestation at recruitment (weeks)	39.6 ± 1.3	39.7 ± 1.1	0.65	39.6 ± 1.3	39.7 ± 1.1	0.60
Gestation at recruitment > 280 days	75 (71.4)	71 (68.3)	0.65	63 (72.4)	83 (68.0)	0.54
Gestation at scheduled LI (weeks)	40.6 ± 1.1	40.6 ± 1.1	0.82	40.6 ± 1.1	40.6 ± 1.1	0.68
Recruitment to scheduled LI interval ≥ 7 days	61 (58.1)	46 (44.2)	0.053	51 (58.6)	56 (45.9)	0.092
Gestational age determined by						
Menstrual dates (supported by US)	94 (89.5)	88 (84.6)	0.31	79 (90.8)	103 (84.4)	0.21
US only	11 (10.5)	16 (15.4)		8 (9.2)	19 (15.6)	
Indication for LI at recruitment						
Prolonged pregnancy (≥ 41 weeks)	66 (62.9)	62 (59.6)	0.67	55 (63.2)	73 (59.8)	0.67
Others*	39 (37.1)	42 (40.4)		32 (36.8)	49 (40.2)	
Randomisation to						
Advise-coitus group	65 (61.9)	43 (41.3)	0.004	56 (64.4)	52 (42.6)	0.002
Control group	40 (38.1)	61 (58.7)		31 (35.6)	70 (57.4)	

Data is expressed as mean and standard deviation, no. (%) and/or median [interquartile range].

US: ultrasonography; LI: induction of labour

Analyses by *t*-test for comparison of means, Mann-Whitney U test for ordinal data, Fisher's exact test for 2 × 2 categorical datasets and chi-square test for larger than 2 × 2 categorical datasets.

* Include diabetes mellitus in pregnancy, hypertension and more than one listed indication.

place between December 2005 and June 2006. The women were provided with standard obstetric care.

After delivery, the coitus and orgasm diaries were collected (or for those women who did not deliver at our centre, the data was collected by telephone) and the charts obtained. The admission and delivery details were transferred to a standard data sheet. The women were categorised into two groups based on reported coital activity during the study period (between recruitment and admission for birth) for this analysis. Reported orgasm was taken as another variable. The primary outcome was spontaneous labour onset which was defined either as spontaneous regular contractions leading to cervical changes of at least 3 cm dilatation, or prelabour rupture of membranes on or before the original appointment date for labour induction. The secondary outcomes, including recruitment to hospital admission for birth interval, recruitment-to-delivery interval, the Bishop Score on admission, premature membrane rupture, the use of dinoprostone or oxytocin during labour, meconium liquor, epidural anaesthesia, mode of delivery, postpartum blood loss, umbilical cord pH, Apgar score, neonatal admission

and maternal fever, were also considered.

In our centre, women with otherwise uncomplicated pregnancies were usually offered induction of labour for prolonged pregnancy ≥ 41 weeks' gestation. Women with gestational diabetes mellitus were offered induction at 40 weeks' gestation if they were well controlled on diet alone and at 38 weeks' gestation if they were on insulin. The trial was approved by the Medical Ethics Committee of the University of Malaya Medical Centre, Malaysia. The Statistical Package for Social Sciences version 15.0 (SPSS Inc, Chicago, IL, USA) and GraphPad InStat software (GraphPad Software Inc, San Diego, CA, USA) were used for data analysis. The student's *t*-test was used to compare the means of continuous variables, Mann-Whitney U test for ordinal data, Fisher's exact test for categorical 2 × 2 datasets and chi-square for larger categorical datasets, and the odds-ratio (OR) and its 95% confidence interval (CI) were calculated. Multivariable logistic regression analysis was used, incorporating all the covariables with crude *p* ≤ 0.1 to the primary outcome of spontaneous labour. *p* < 0.05 in any test was considered statistically significant, and all the tests used two-sided results.

Table II. Outcomes stratified according to reported coitus.

Outcome	Total* no.	Coitus (n = 105)	No coitus (n = 104)	Odds ratio (95% confidence interval)	p-value
Onset of spontaneous labour [†]	209	49 (46.7)	63 (60.6)	0.6 (0.3–1.0)	0.052
Recruitment to admission interval (days)	208	5.7 ± 3.8	3.8 ± 2.6		< 0.001
Recruitment to delivery interval (days)	209	6.1 ± 4.1	4.6 ± 3.2		0.005
Postpartum blood loss	204	314 ± 214	303 ± 161		0.69
Blood loss ≥ 500 ml		14 (13.7)	12 (11.8)	1.2 (0.6–2.4)	0.83
Umbilical cord blood pH	202	7.3 ± 0.07	7.29 ± 0.08		0.12
Cord blood pH < 7.1		0 (0)	2 (2.0)	‡	0.24
Apgar score at five minutes	205	9.9 ± 0.3	9.8 ± 0.5		0.028
Apgar score < 7 at five minutes		0 (0)	0 (0)	‡	‡
Birth weight (kg)	206	3.2 ± 0.4	3.2 ± 0.5		0.65
Initial Bishop score at admission	204	3.9 ± 2.5	4.3 ± 2.5		0.26
		4 [4]	5 [4]		0.26
Bishop score < 5 at admission		60 (58.8)	48 (47.1)	1.3 (1.0–1.6)	0.12
Mode of delivery	209				
Normal vaginal		73 (69.5)	74 (71.5)		0.73
Instrumental vaginal		6 (5.7)	8 (7.7)		
Caesarean section		26 (24.8)	22 (21.2)		
Indications for caesarean	48				
Non-reassuring foetal status		5 (19.2)	6 (27.3)		0.58
Failure to progress		15 (57.7)	9 (40.9)		
Failed induction		3 (11.5)	2 (9.1)		
Others		3 (10.4)	5 (22.7)		
Fever [§]	205	22 (21.4)	22 (21.6)	1.0 (0.6–1.7)	1.0
PROM [¶]	208	7 (6.7)	14 (13.5)	0.5 (0.2–1.2)	0.17
Any dinoprostone use	209	48 (45.7)	35 (33.7)	1.4 (1.0–1.9)	0.09
Any oxytocin use during labour	208	59 (56.7)	54 (51.9)	1.1 (0.9–1.4)	0.58
Epidural	208	27 (25.7)	34 (33.0)	0.8 (0.5–1.2)	0.29
Meconium-stained liquor ^{**}	207	12 (11.4)	14 (13.7)	0.8 (0.4–1.7)	0.68
Neonatal admission	209	2 (1.9)	3 (2.9)	0.7 (0.1–3.9)	0.68

Data is expressed as mean and standard deviation, no. (%) and/or median [interquartile range].

Analysis by the t-test for means of continuous data, Mann-Whitney U test for ordinal data, Fisher's exact test for 2 × 2 categorical datasets and chi-square test for larger datasets.

*Incomplete data in some parameters due to combinations of the following: delivery at home (one), delivery in other hospitals (three), omission to do umbilical cord blood gas analysis (one).

[†]Spontaneous labour is defined as the presentation to hospital for birth with either regular contractions and cervical dilatation ≥ 3cm, or confirmed rupture of membranes on/before the scheduled date for induction of labour.

[‡]p-value or odds ratio was not calculated for at least one zero cell in the 2 × 2 table.

[§]Fever is defined as temperature ≥ 38°C on at least one occasion from any time during labour until hospital discharge.

[¶]Prelabour rupture of membranes as initial presentation at admission for birth.

**Any meconium seen up to delivery.

RESULTS

Of the 215 women randomised, five withdrew from the trial very shortly after randomisation, and another woman did not return her diary of coital activity and orgasm, leaving 209 cases for analysis. Of the 209 women, 105 reported coitus, 104 were abstinent and spontaneous labour occurred in 112 (53.6%). The characteristics of the women were stratified according to the reported coitus or orgasm, as listed in Table I. All the listed characteristics were similar except for the randomised allocation to the advise-sex or control group, as previously reported.⁽⁷⁾ A recruitment to a scheduled induction interval ≥ 7 days was borderline with

regard to reported coitus and orgasm ($p = 0.053$ and $p = 0.092$), respectively.

Analyses of reported coitus and outcomes are listed in Table II. The mean Apgar score at five minutes were marginally higher (9.9 ± 0.3 vs. 9.8 ± 0.5 ; $p = 0.028$) in the reported coitus group. Mean intervals from recruitment to hospital admission and to birth were longer among women who reported coitus. Onset of spontaneous labour was borderline; 46.7% vs. 60.6% (OR 0.6, 95% CI 0.3–1.0; $p = 0.052$) with fewer women who reported coitus presenting in spontaneous labour by the appointment date for labour induction. No other adverse outcome was associated with

Table III. Outcomes stratified according to reported orgasm.

Outcome	Total* no.	Orgasm (n = 87)	No orgasm (n = 122)	Odds ratio (95% confidence interval)	p-value
Onset of spontaneous labour [†]	209	43 (49.4)	69 (56.6)	0.8 (0.4–1.3)	0.33
Recruitment to admission interval (days)	208	5.9 ± 3.9	3.9 ± 2.8		< 0.001
Recruitment to delivery interval (days)	209	6.2 ± 4.2	4.7 ± 3.3		0.003
Postpartum blood loss	204	321 ± 231	300 ± 153		0.45
Blood loss ≥ 500 ml		13 (15.5)	13 (10.8)	1.5 (0.7–3.4)	0.40
Umbilical cord blood pH	202	7.31 ± 0.07	7.29 ± 0.08		0.12
Cord blood pH < 7.1		0 (0)	2 (1.7)	‡	0.51
Apgar score at five minutes	205	9.9 ± 0.3	9.8 ± 0.5		0.15
Apgar score < 7 at five minutes		0 (0)	0 (0)	‡	‡
Birth weight (kg)	206	3.2 ± 0.4	3.2 ± 0.5		0.72
Initial Bishop score at admission	204	4.0 ± 2.5	4.2 ± 2.5		0.64
		4 [4]	4.5 [4]		0.69
Bishop score < 5 at admission		48 (57.1)	60 (50.0)	1.3 (0.8–2.3)	0.32
Mode of delivery	209				
Normal vaginal		60 (69.0)	87 (71.3)		0.41
Instrumental vaginal		4 (4.6)	10 (8.2)		
Caesarean section		23 (26.4)	25 (20.5)		
Indications for caesarean	48				
Non-reassuring foetal status		4 (17.4)	7 (28.0)		0.31
Failure to progress		14 (60.9)	10 (40.0)		
Failed induction		3 (13.0)	2 (8.0)		
Others		2 (8.7)	6 (24.0)		
Fever [§]	205	21 (24.7)	23 (19.2)	1.4 (0.7–2.7)	0.39
PROM [¶]	208	6 (7.0)	15 (12.3)	0.5 (0.2–1.4)	0.25
Any dinoprostone use	209	38 (43.7)	45 (36.9)	1.3 (0.8–2.3)	0.39
Any oxytocin use during labour	208	48 (55.8)	65 (53.3)	1.1 (0.6–1.9)	0.78
Epidural	208	24 (27.6)	37 (30.6)	0.9 (0.5–1.6)	0.76
Meconium stained liquor ^{**}	207	10 (11.5)	16 (13.3)	0.8 (0.4–2.0)	0.83
Neonatal admission	209	2 (2.3)	3 (2.5)	0.9 (0.2–5.7)	1.0

Data is expressed as mean ± standard deviation, no. (%) and/or median [interquartile range].

Analysis by the t-test for means of continuous data, Mann-Whitney U test for ordinal data, Fisher's exact test for 2 × 2 categorical datasets and chi-square test for larger datasets.

*Incomplete data in some parameters due to combinations of the following: delivery at home (one), delivery in other hospitals (three), omission to do umbilical cord blood gas analysis (one).

[†]Spontaneous labour is defined as presentation to hospital for birth with either regular contractions and cervical dilatation ≥ 3 cm, or confirmed rupture of membranes on/before the scheduled date for induction of labour.

[‡]p-value or odds ratio was not calculated for at least one zero cell in the 2 × 2 table.

[§]Fever is defined as temperature ≥ 38°C on at least one occasion from any time during labour until hospital discharge.

[¶]Prelabour rupture of membranes as initial presentation at admission for birth.

**Any meconium seen up to delivery.

reported coitus. Analyses of reported orgasm and outcomes are listed in Table III. Mean intervals from recruitment to hospital admission and to birth intervals were longer among women who reported orgasm. Reported orgasm was not associated with spontaneous onset of labour ($p = 0.33$). No adverse outcome was associated with reported orgasm.

We further analysed the effect of increasing exposure to coitus by subdividing women who reported coitus into subgroups of those who had only reported coitus on one day and those who reported coitus on two or more days in their diaries. Spontaneous labour rates were 63/104 (60.6%) vs. 28/48 (58.3%) vs. 21/57 (36.8%) for abstinence, one

day of coitus reported and ≥ two days of reported coitus, respectively (chi-square test, $p = 0.012$; and chi-square test for trend, $p = 0.006$).

Univariate and adjusted analyses of covariables to onset of spontaneous labour as the primary outcome are shown in Table IV. On univariate analysis, maternal age ≥ 35 years, recruitment at gestation > 280 days, recruitment to scheduled induction of labour interval ≥ 7 days, induction of labour indicated by prolonged pregnancy and reported coitus had a $p < 0.1$, and were incorporated into the model for multivariable logistic regression analysis. Reported orgasm did not show a significant

Table IV. Variables stratified according to spontaneous onset of labour before the scheduled labour induction.

	Spontaneous onset of labour*		Odds ratio (95% confidence interval)	p-value	Adjusted odds ratio (95% confidence interval)†	Adjusted p-value‡
	Yes (n = 112)	No (n = 97)				
Maternal age (years)	28.6 ± 4.3	30.2 ± 4.5		0.007		
Age ≥ 35 years	9 (8.0)	17 (17.5)	0.4 (0.2–1.0)	0.057	0.5 (0.2–1.2)	0.12
Gravidity	2.0 ± 1.1	2.2 ± 1.5		0.32		
	2 [1]	2 [2]		0.95		
Parity	0.7 ± 0.9	0.9 ± 1.3		0.17		
	1 [1]	0 [2]		0.77		
Nulliparous	55 (49.1)	53 (54.6)	0.8 (0.5–1.4)	0.49		
Ethnicity						
Malay	72 (64.3)	57 (58.8)		0.46		
Chinese	19 (17.0)	16 (16.5)				
Indian	18 (16.1)	17 (17.5)				
Others	3 (2.7)	7 (7.2)				
Gestation at recruitment (weeks)	39.8 ± 1.0	39.5 ± 1.3		0.088		
Gestation at recruitment > 280 days	86 (76.8)	60 (61.9)	2.0 (1.1–3.7)	0.023	0.6 (0.2–1.8)	0.38
Recruitment to induction interval (days)	7.4 ± 3.1	6.1 ± 3.4		0.003		
Interval ≥ 7 days	70 (62.5)	37 (38.1)	2.7 (1.5–4.7)	0.001	2.9 (1.6–5.4)	0.001
Indication for labour induction						
Prolonged pregnancy	80 (71.4)	48 (49.5)	2.6 (1.4–4.5)	0.002	3.1 (1.2–8.2)	0.023
Others‡	32 (28.6)	49 (50.5)				
Randomised to advise-coitus group§	60 (53.6)	48 (49.5)	1.2 (0.7–2.0)	0.58		
Coitus reported¶	49 (43.8)	56 (57.7)	0.6 (0.3–1.0)	0.052	0.4 (0.2–0.8)	0.009
Orgasm reported¶	43 (38.4)	44 (45.4)	0.8 (0.4–1.3)	0.33		

Data is expressed as mean ± standard deviation, no. (%) and/or median [interquartile range].

Analysis by Student *t*-test continuous variables, Mann-Whitney U test for ordinal data, Fisher's exact test, chi-square test and multi-variable logistic regression incorporating all covariables with unadjusted $p < 0.1$.

*Spontaneous labour is defined as the presentation to hospital for birth with either regular contractions and cervical dilatation ≥ 3 cm, or confirmed rupture of membranes on/before the scheduled date for induction of labour.

†Adjusted odds ratios and p-values shown for variables incorporated in the multivariable logistic regression analysis.

‡Include diabetes mellitus in pregnancy, hypertension, non-reassuring foetal status and more than one indication listed.

§Random allocation to advise-coitus or control group of randomised trial.

¶Vaginal sex or orgasm reported by the women in the interval between recruitment into the randomised trial and admission for birth.

association with spontaneous labour ($p = 0.33$). Following adjustment, recruitment to scheduled induction ≥ 7 days, labour induction indicated by prolonged pregnancy and reported coitus were independently associated with onset of spontaneous labour.

DISCUSSION

Our finding that reported coitus at term was associated with a reduced spontaneous labour rate was unexpected. Similarly unexpected was the inverse trend of spontaneous labour rates with frequency of reported coitus. Uterine activity in the immediate period after coitus is increased in women at high risk of preterm labour;⁽¹²⁾ similarly, we had anticipated that women at term should be physiologically most receptive to stimuli to promote labour onset. Prospective studies on the effect of coitus at term on labour onset have produced mixed results: one has shown a positive impact⁽⁴⁾

while the other has not shown any association.⁽⁵⁾ Sexual intercourse has been reported to have a protective effect on preterm labour in certain circumstances,^(13–15) but most studies have reported no association.^(16–22) Other reports on coitus in pregnancy have even demonstrated an increased risk of prematurity⁽²³⁾ with the adverse effect most marked in women at high risk of preterm delivery.^(24,25) The effect of coitus on both term and preterm labour appears unsettled in the literature.

We have not found reported orgasm to be associated with labour onset. Orgasm has been reported to be potentially protective of preterm birth^(14,21) but more intense orgasm might increase the risk of prematurity,⁽²⁶⁾ while other reports have not found any association.^(22,24) The five-minute Apgar score was significantly higher in women who had reported coitus, but this small difference was unlikely to have any clinical importance, as no neonate had a five-

minute Apgar score of ≤ 6 . Neither umbilical cord blood pH nor neonatal admission rates were any different. It was reassuring that no other adverse association to reported coitus or orgasm was found. Our study was not adequately powered to examine the rarer but potentially serious adverse outcomes like abruption placenta or intrauterine deaths.

The rationale behind our finding of an inverse association between reported coitus and frequency of coitus to spontaneous labour onset, might be complex. The median interval for recruitment to admission for birth was 3.5 vs. 4 days for sexually-active and abstinent women, respectively, showing a significant difference. The time period available for sexual intercourse was particularly limited in a substantial proportion of abstinent women before their onset of spontaneous labour. This suggests that abstinence might be a consequence of imminent labour limiting the opportunity for coitus. It is also plausible that abstinence might be caused by reduced libido due to preceding symptoms or signs of imminent labour, like uterine contractions and vaginal discharge (e.g. passage of a show). Therefore, the inverse association of reported coitus with spontaneous labour might be due to selection caused by a lack of opportunity or by reduced libido, rather than coitus having a direct biological effect on prolonging gestation.

Although there is some data to indicate that the risk of preterm labour might decrease with coitus or orgasm during pregnancy, there is little biological rationale to account for this observation. Similarly at term, biological mechanisms for coitus delaying the onset of labour have not been developed. Labour onset is still incompletely understood; a delay in labour onset mediated via the hypothalamic-pituitary-endocrine axes is speculative, though possible. The possibility of a Type 1 statistical error in our finding also cannot be discounted as our analyses were of a secondary nature.

Our analysis had some additional limitations – we did not validate whether coitus or orgasm had actually occurred as we relied on the self-reported diaries recorded by the women. We also did not have the data to address the issue of libido or other motivational factors that might influence coitus. Our finding was consistent with coitus having an inverse relationship with spontaneous onset of labour at term; the rationale for the observation might however be complex. Further research to clarify the effect of coitus and orgasm on the onset of labour at term is needed.

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