



S/P Cervical Conization to Stich or Not to Stich?

Dana Vitner

Rambam Health Care Campus

Should we
stich all
women with
a previous
conization?



Questions

- Is there a predictive value to serial TVS CL?
- Is there a relation to **timing of conization** and pregnancy?
- Is there a relation to the **depth** of conization?
- Is there an increased **risk for CD** in subsequent pregnancy?

Cervical Insufficiency

“The inability of the uterine cervix to retain a pregnancy in the second trimester in the absence of clinical contractions, labor, or both”

ACOG Practice Bulletin No.142: Cerclage for the management of cervical insufficiency. *Obstet Gynecol.* 2014;123(2 Pt 1):372.



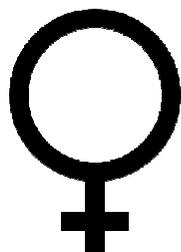
ACOG

The American College of
Obstetricians and Gynecologists

Pathogenesis

Structural cervical weakness is the likely cause of many recurrent second-trimester losses and live births.

The weakness may be **secondary to prior cervical or uterine surgery**



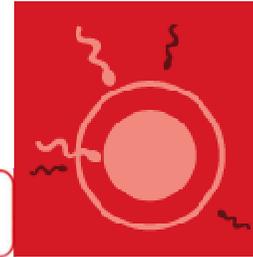
Risk factors

- **History of second-trimester loss/birth + short cervical length**
- **Cervical trauma**
- **Congenital cervical abnormalities** - rarely associated with structural cervical weakness

Prophylactic cerclage in pregnancy. Effect in women with a history of conization

H Zeisler¹, E A Joura, D Bancher-Todesca, E Hanzal, G Gitsch

July 1997, Austria



*reproductive
medicine*

- 69 women (30 cerclage vs. 39 without cerclage)
- Previously underwent conization
- Primary outcome: PTB < 37w

Results

- Women with prophylactic cerclage were hospitalized more often d/t threatened PTB

(with cerclage 66.7%; without cerclage 33.3% (P = .006))

- **NO DIFFERENCE in PTB rate**

23.3% in cerclage group vs. 20.5% in control group (P = .78)

Conclusion

Prophylactic cerclage DOES NOT PREVENT PTB

Tends to induce preterm uterine contractions.

It should be used more sparingly in women with a history of conization

The effect of cervical cerclage on pregnancy outcomes in women following conization

Tal Rafaeli-Yehudai, Roy Kessous, Barak Aricha-Tamir, Eyal Sheiner, Offer Erez, Michai Meirovitz, Moshe Mazor & Adi Y. Weintraub

THE JOURNAL OF
**MATERNAL-FETAL
& NEONATAL
MEDICINE**

October 2014, Israel

- 1994-2011
- 109 women post conization
- Cerclage (n=22) vs. no cerclage (n=87)



Characteristics	With cerclage (<i>n</i> = 22)	Without cerclage (<i>n</i> = 87)	<i>p</i>
Maternal age (mean + STD)	32 + 4.6	33 + 4.4	0.341
Gravity			
1	18.2%	25.3%	0.648
2-5	72.7%	62.1%	
>5	9.1%	12.6%	
Parity			
1-5	90.9%	94.3%	0.627
>5	9.1%	5.7%	
Fertility treatment	9.1%	8%	0.831

Table 2. Pathological characteristics of women following conization with and without a cerclage.

Characteristics	With cerclage (<i>n</i> = 22)	Without cerclage (<i>n</i> = 87)	<i>p</i>
Indication for conization			
CIN 1	0	2%	0.614
CIN 2-3	100%	96.8%	
Time from conization			
Less than 1 year	5.9%	22%	0.143
Cone depth (cm)	(<i>N</i> = 13)	(<i>N</i> = 23)	0.809
Mean + STD	2.647 + 0.674	2.592 + 0.625	

Results

- In a logistic regression model, **cerclage was found to be an independent risk factor for early PTB.**

(OR, 27.5; 95% CI: 2.95–256.1; $p < 0.004$)



Cerclage is associated with the increased risk of preterm birth in women who had cervical conization



Geum Joon Cho^{1†}, Yung-Taek Ouh^{1†}, Log Young Kim², Tae-Seon Lee², Geun U. Park³, Ki Hoon Ahn¹, Soon-Cheol Hong¹, Min-Jeong Oh¹ and Hai-Joong Kim^{1*}

July 2018, Korea

BMC
Pregnancy and
Childbirth



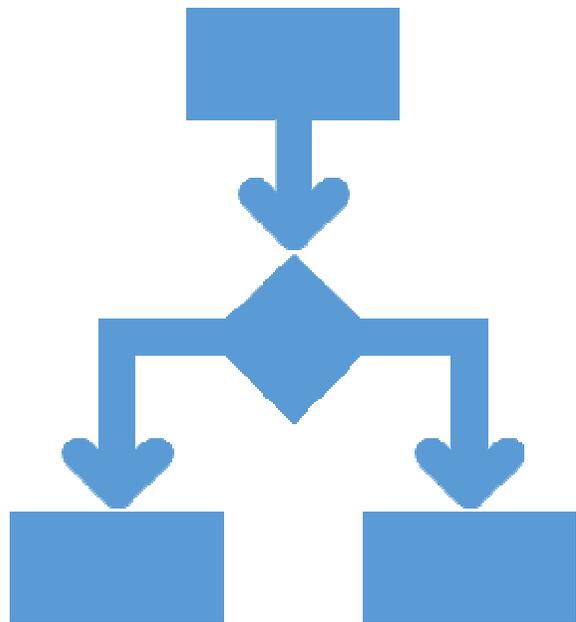
BioMed Central
The Quality Standard

- Women who had a conization in 2009 and a subsequent first delivery
- 2009-2013
- 161 with **cerclage** vs. 1,014 with **no cerclage**

Table 1 Basic characteristics of the study participants

	Pregnant women		P-value
	Without cerclage (n = 914)	With cerclage (n = 161)	
Age (years)	30.69 ± 2.32	30.79 ± 2.41	0.481
Cesarean section (%)	185 (20.24)	63 (39.13)	< 0.001
Multiple pregnancy (%)	22 (2.41)	6 (3.73)	0.320
Years since delivery from conization (years)	2.14 ± 1.05	2.07 ± 1.03	0.733
Preterm delivery (weeks)	39 (4.27)	17 (10.56)	< 0.001
pPROM (%)	22 (2.41)	10 (6.21)	0.867

pPROM, preterm premature rupture of membranes



Results

- **Cerclage following a conization had an increased risk of PTB compared with women without cerclage (OR 2.6, 95% CI, 1.4-4.9).**

Table 2 Adjusted odds ratios (OR) and 95% confidence interval (CI) for the risk of preterm birth

	OR	95% CI
Age (years)	1.0	0.9, 1.0
Cerclage (yes)	2.6	1.4, 4.9
Multiple pregnancy (yes)	10.5	4.4, 25.2
Years since delivery from conization (years)	0.9	0.7, 1.2

The model is adjusted for variables in the Table; 95% CI, 95% confidence interval

Table 3 Adjusted odds ratios (OR) and 95% confidence interval (CI) for the risk of pPROM

	OR	95% CI
Age (years)	1.0	0.9, 1.1
Cerclage (yes)	2.6	1.2, 5.64
Multiple pregnancy (yes)	5.8	1.9, 18.3
Years since delivery from conization (years)	0.8	0.6, 1.2

The model is adjusted for variables in the Table; 95% CI, 95% confidence interval



Conclusion

Cerclage is associated with an increased risk of PTB and PPRM in women who underwent conization

Risk of preterm birth after the excisional surgery for cervical lesions: a propensity-score matching study in Japan

March 2021, Japan

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**MATERNAL-FETAL
& NEONATAL
MEDICINE**

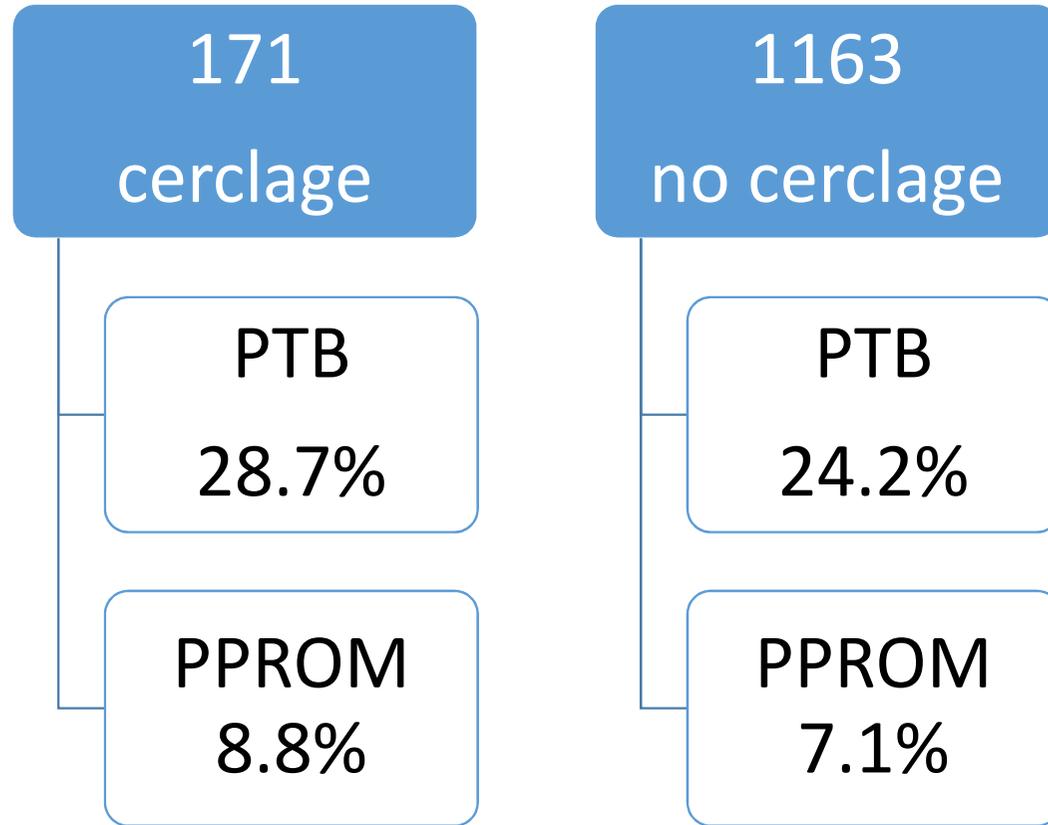
Kei Miyakoshi, Atsuo Itakura, Takayuki Abe, Eiji Kondoh, Yasuhisa Terao, Tsutomu Tabata, Hiromi Hamada, Kyoko Tanaka, Mamoru Tanaka, Naohiro Kanayama & Satoru Takeda

- Japan Perinatal Registry Network Database
- Cases included **pregnancies after the surgery** (n=1,389)
- Controls comprised of **matched pregnancies** without pre-pregnancy surgery (n=1,389)
- **Primary outcome: PTB**

Table 2. Pregnancy outcomes in the propensity-score matched population.

	Control (<i>n</i> = 1389)	Case (<i>n</i> = 1389)	<i>p</i>
Gestational age at delivery (wks)	38.3 ± 2.3	37.1 ± 3.4	<.0001
Preterm birth (birth < 36 weeks)	147 (10.6%)	351 (25.3%)	<.0001
PROM	167 (12.0%)	292 (21.0%)	<.0001
<36 weeks	49 (3.5%)	194 (14.0%)	<.0001
Thirty-seven weeks ≤	128 (8.5%)	98 (7.1%)	.156
Bulging membrane	10 (0.7%)	19 (1.4%)	.093
Birth weight (g)	2930 ± 523	2745 ± 648	<.0001
Low birth weight	200 (14.4%)	343 (24.7%)	<.0001
Mode of delivery			
Vaginal delivery	975 (70.2%)	925 (66.6%)	.041
Cesarean section	414 (29.8%)	464 (33.4%)	.041

Diabetes mellitus: type 1 or type 2 diabetes mellitus; PROM: prelabor rupture of membranes; low birth weight: birthweight <2500 g. Data: mean ± SD or *n* (%).



No statistical significance

Conclusion

- Pre-pregnancy excisional cervical surgery was associated with the increased risk of PTB
- **Prophylactic cerclage did not reduce the risk of PTB**

Can prophylactic transvaginal cervical cerclage improve pregnancy outcome in patients receiving cervical conization? A meta-analysis

Ting Wang*, Ruoan Jiang*, Yingsha Yao, Xiufeng Huang

Department of Obstetrics and Gynecology, Women's Hospital Zhejiang University School of Medicine, China

*co-first authors



April 2021, China

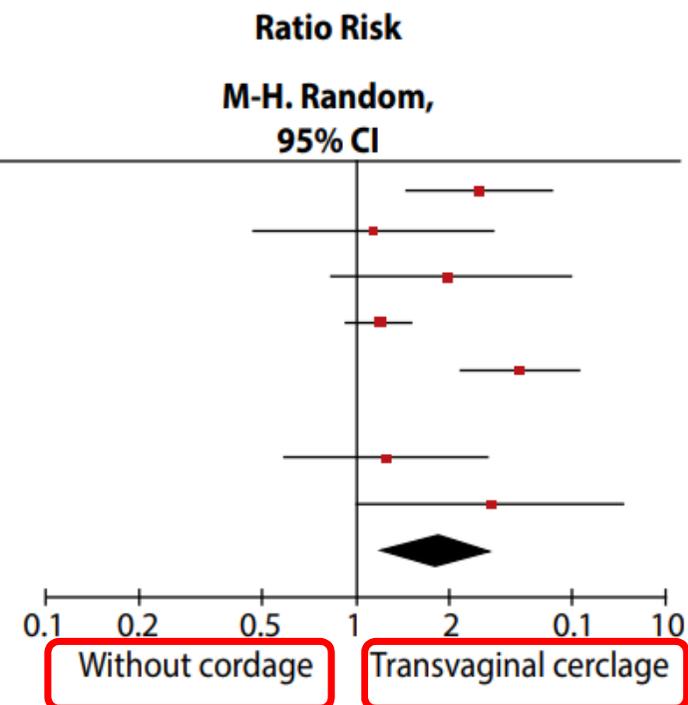
- Systematic review
- Women with a history of conization (CIN or early cervical cancer)
- 9 studies, 3560 women
- 1997-2014
- Korea, China, Mexico, Israel, Japan, Austria, UK

Study or subgroup	Transvaginal cerclage		Without cerclage		Weight	Ratio Risk
	Events	Total	Events	Total		M-H, Random, 95% CI
Geum Joon Cho et al. 2018	17	161	39	914	16.4%	2.47 [1.44, 4.27]
Harald Zeisler et al. 1997	7	30	8	39	11.0%	1.14 [0.46, 2.79]
Ka Hyun Nam et al. 2010	3	6	15	59	10.8%	1.97 [0.79, 4.89]
Kei Miyakoshi et al. 2019	49	171	281	1163	21.0%	1.19 [0.92, 1.53]
Lindsay M. Kindinger et al. 2016	24	98	46	627	18.1%	3.34 [2.14, 5.21]
Minting Wei et al. 2018	16	74	0	0		Not estimable
MiYoung Shin et al. 2010	9	25	9	31	12.9%	1.24 [0.58, 2.65]
Sharon Armarnik at al. 2011	7	18	5	35	9.8%	2.72 [1.00, 7.38]
Total (95% CI)		583		2868	100.0%	1.85 [1.22, 2.80]
Total events	132		403			

Heterogeneity: $\tau^2 = 0.19$; $\chi^2 = 20.40$, $df = 6$ ($p = 0.002$); $I^2 = 71\%$

Test for overall effect: $Z = 2.92$ ($p = 0.004$)

< 37 weeks

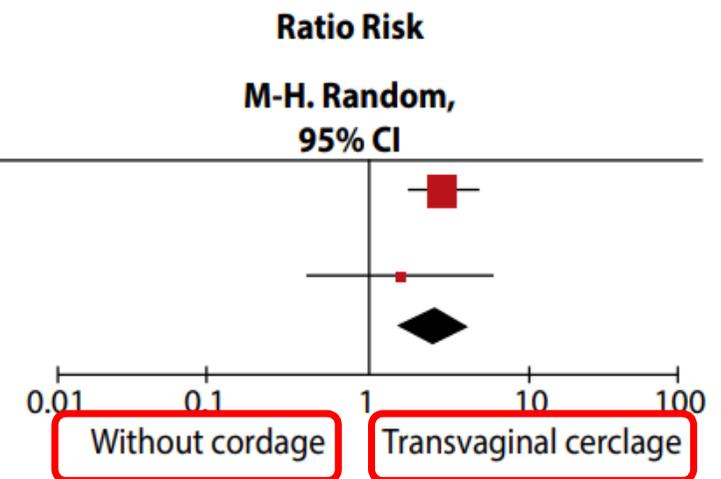


Study or subgroup	Transvaginal cerclage		Without cerclage		Weight	Ratio Risk
	Events	Total	Events	Total		M-H, Random, 95% CI
Lindsay M. Kindinger et al. 2016	18	98	38	627	79.3%	3.03 [1.80, 5.09]
Minting Wei et al. 2018	8	74	0	0		Not estimable
MiYoung Shin et al. 2010	4	25	3	31	20.7%	1.65 [0.41, 6.71]
Total (95% CI)		197		658	100.0%	2.75 [1.69, 4.47]
Total events	30		41			

Heterogeneity: $\text{Chi}^2 = 0.64$, $\text{df} = 1$ ($p = 0.42$); $I^2 = 0\%$

Test for overall effect: $Z = 4.06$ ($p < 0.0001$)

34–36 ± 6 weeks

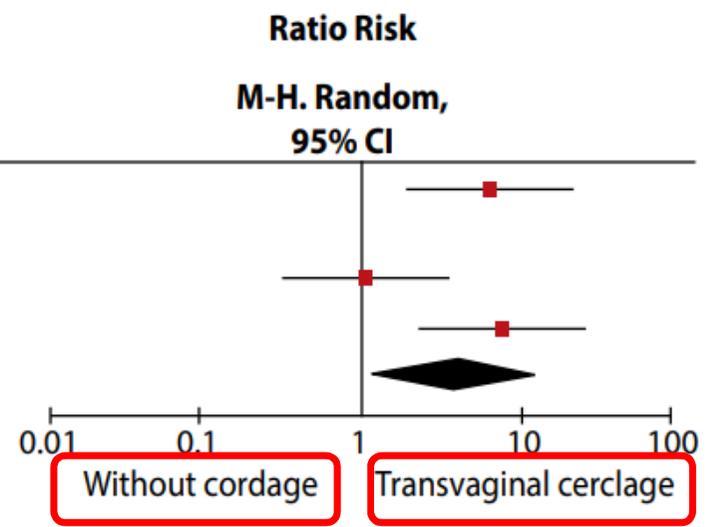


Study or subgroup	Transvaginal cerclage		Without cerclage		Weight	Ratio Risk
	Events	Total	Events	Total		M-H, Random, 95% CI
Lindsay M. Kindinger et al. 2016	6	98	8	627	33.6%	4.80 [1.70, 13.53]
Minting Wei et al. 2018	8	74	0	0		Not estimable
MiYoung Shin et al. 2010	5	25	6	31	33.0%	1.03 [0.36, 2.99]
Tal Rafaeli-Yehudai et al. 2014	7	22	5	87	33.4%	5.54 [1.94, 15.79]
Total (95% CI)		219		745	100.0%	3.03 [1.06, 8.67]
Total events	26		19			

Heterogeneity: $\tau^2 = 0.58$; $\chi^2 = 6.01$, $df = 2$ ($p = 0.05$); $I^2 = 67\%$

Test for overall effect: $Z = 2.07$ ($p < 0.04$)

< 34 weeks



Conclusions

PTB was higher in women following cervical conization with cerclage vs. no cerclage



Original Article

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Yonsei Medical Journal
YMJ

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Prophylactic Cerclage to Prevent Preterm Birth after Conization: A Cohort Study Using Data from the National Health Insurance Service of Korea

December 2021, Korea

- Prophylactic cerclage in women with a history of conization?
- Primary outcome: PTB < 37
- 1st singleton delivery after conization
- 2003-2008

Results

Prophylactic Cerclage to Prevent Preterm Birth after Conization: A Cohort Study Using Data from the National Health Insurance Service of Korea

- 8,322 women
- no cerclage group (n=7,147) vs. cerclage group (n=1,175)

Table 2. Patient Outcomes in the Cerclage and No Cerclage Groups

	No cerclage (n=7147)	Cerclage (n=1175)	p value	Unadjusted OR (95% CI)	Adjusted OR (95% CI)*
No. of admissions	0.25±0.59	1.44±0.76	<0.0001		
Admissions before delivery	1410 (19.73)	1171 (99.66)	<0.0001		
Antibiotics use	230 (3.22)	159 (13.53)	<0.0001	4.71 (3.81, 5.82)	6.11 (4.73, 7.9)
Tocolytics use [†]	316 (4.42)	259 (22.04)	<0.0001	6.11 (5.12, 7.3)	8.76 (6.93, 11.06)
Cesarean delivery [‡]	2901/6594 (43.99)	545/1042 (52.3)	<0.0001	1.4 (1.23, 1.59)	1.6 (1.38, 1.85)
Preterm labor	803 (11.24)	419 (35.66)	<0.0001	4.38 (3.81, 5.04)	5.97 (5.03, 7.07)
Preterm birth	225 (3.15)	98 (8.34)	<0.0001	2.8 (2.19, 3.58)	4.02 (3.01, 5.37)
Preterm PROM	1639 (22.93)	307 (26.13)	0.0182	1.19 (1.03, 1.37)	1.72 (1.47, 2.02)

OR, odds ratio; CI, confidence interval; PROM, premature rupture of membranes.

Data are presented as a n (%) or mean±standard deviation.

*Adjusted for maternal age, years from conization to delivery, level of income, residential area, Charlson comorbidity index, smoking, drinking, exercise, and body mass index, [†]Hypertension was additionally adjusted, [‡]Type of delivery was not identified in 683 deliveries.

Results

Prophylactic Cerclage to Prevent Preterm Birth after Conization: A Cohort Study Using Data from the National Health Insurance Service of Korea

- no cerclage (5,749) vs. early cerclage (669) vs. late cerclage (291)
- **PTB was higher in cerclage group (OR 2.42, 95%CI 1.49-3.92)**
- **Adverse outcome was higher in cerclage group**
- **Early cerclage DOES NOT prevent PTB in pregnancy with a history of conization**



Are serial CL
measurements
predictive of PTB in
women with a prior
cone biopsy?



Prior cone biopsy: Prediction of preterm birth by cervical ultrasound

Vincenzo Berghella, MD • Leonardo Pereira, MD • Aileen Gariepy, MD • Giuliana Simonazzi, MD

DOI: <https://doi.org/10.1016/j.ajog.2004.06.087>

AJOG American
Journal of
Obstetrics &
Gynecology
The Gray Journal Founded 1889

October 2004

- 109 women
- Cervical cone biopsy by cold knife (45), LEEP, (55), or laser (9)
- TVS 16-24 w

- Primary outcome: PTB < 35 w

30 women (28%)
CL < 25 mm

9 women
(30%) PTB <
35 weeks

79 women (72%)
normal cervix

5 women
(6%) PTB < 35
weeks

14/109 women PTB < 35 weeks – 12.8%

TVS CL is predictive of PTB in women with prior cone biopsy.

Conclusion

Preterm Birth Prevention Post-Conization: A Model of Cervical Length Screening with Targeted Cerclage

Lindsay M. Kindinger^{1,2}, Maria Kyrgiou^{1,3*}, David A. MacIntyre¹, Stefano Cacciatore¹, Angela Yulia^{1,4}, Joanna Cook¹, Vasso Terzidou^{1,4}, T. G. Teoh^{1,2}, Phillip R. Bennett^{1,3}

November 2016, UK



- **A screening model to differentiate pregnancies post-conization into low- and high-risk for PTB, and to evaluate the efficacy of ultrasound indicated cervical cerclage < 25mm.**
- 2004-2014
- 3 centers in UK, 725 women

Low risk (n=581) vs. High risk (n=144)

Low risk women: term delivery, normal cervix, no cerclage

High risk women: US-indicated cerclage or PTB

Results

- There was **no difference in the mean CL** in women **with cerclage** of those **delivering before or after 37 weeks**
- **CL at insertion of cerclage did not predict PTB** post-cerclage.
- **The difference in CL was greatest after 20 weeks**, indicating that these women at high-risk start with a reassuring CL before 20 weeks (above 25mm), and go onto shorten



Conclusion

PTB in women post-conization may be reduced by **targeted cervical cerclage**.

Is there a relation
to **timing of
conization** and
pregnancy?

Is there a relation
to the **depth** of
conization?

Is there an
increased risk for
CD in subsequent
pregnancy?

Depth of Cervical Cone Removed by Loop Electrosurgical Excision Procedure and Subsequent Risk of Spontaneous Preterm Delivery

Bugge Noehr, MD, Allan Jensen, MSc, PhD, Kirsten Frederiksen, MSc, PhD, Ann Tabor, MD, DMSc, and Susanne K. Kjaer, MD, DMSc

OBSTETRICS & GYNECOLOGY 

December 2009, Denmark

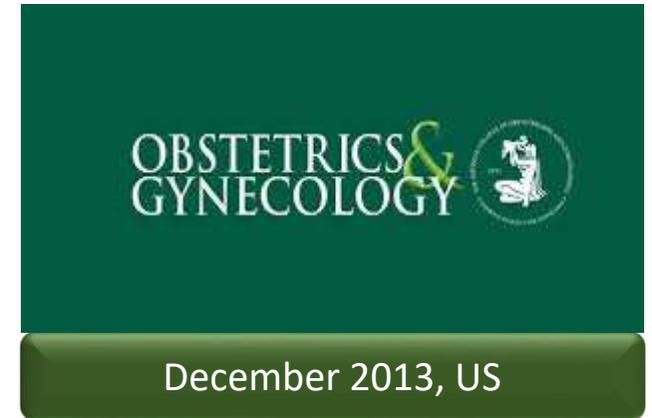
- To investigate the **association between cone depth** of the LEEP and subsequent risk of PTB.
- Denmark over a 9-year period
- **8,180 women** were subsequent to LEEP.
- 273 were subsequent to **two or more LEEPs**.

Results

- **Increasing cone depth was increased the risk of PTB**, only when exceeding **20 mm** of excision (OR 1.79, 95% CI 1.23–2.60).
- Severity of the cone histology and **time since LEEP were not associated with the risk of PTB.**
- Having had **two or more LEEPs increased the risk of PTB** X4 for when compared with no LEEP, X2 the when compared with one LEEP.

Interval From Loop Electrosurgical Excision Procedure to Pregnancy and Pregnancy Outcomes

Shayna N. Conner, MD, Alison G. Cahill, MD, MSCI, Methodius G. Tuuli, MD, MPH, David M. Stamilio, MD, MSCE, Anthony O. Odibo, MD, MSCE, Kimberly A. Roehl, MPH, and George A. Macones, MD, MSCE



- 596 women following LEEP
- 1996 – 2006
- **Median time from LEEP to pregnancy**

Results

Median time from LEEP to pregnancy did not differ for women with a term birth compared with preterm birth.

Women with a time interval < 12 months compared with ≥ 12 months presented No increased risk for PTB < 34 or < 37 w

Loop Electrosurgical Excision Procedure and the Risk for Preterm Delivery

Annu Heinonen, MD, Mika Gissler, DSc, MPOlSc, Annika Riska, MD, PhD, Jorma Paavonen, MD, PhD, Anna-Maija Tapper, MD, PhD, and Maija Jakobsson, MD, PhD

OBSTETRICS &
GYNECOLOGY 

May 2013, Finland & Sweden

- Finnish Medical Birth Register data
- 1997 - 2009
- 20,011 women who underwent LEEP during compared to 430,975 women without LEEP.
- main outcome: PTB < 37 w

RESULTS

- **Repeat LEEP was associated with an X 2.5 risk for PTB** (OR 2.59, CI 1.91-3.5).
- The severity of CIN did not increase the risk for PTB.
- LEEP for **carcinoma in situ increased the risk for PTB** (OR 3.28, CI 1.81–5.94)
No data on cone size!
- **Time interval since LEEP was not associated with PTB.**



Adverse Pregnancy Outcomes After Treatment for Cervical Intraepithelial Neoplasia

Tone Bjørge, MD, PhD, Gry B. Skare, BSc, Line Bjørge, MD, PhD, Ameli Tropé, MD, PhD, and Stefan Lönnberg, MD, PhD

OBSTETRICS & GYNECOLOGY 

December 2016, Norway

- Cancer Registry & Medical Birth Registry of Norway
- 1998-2014
- 9,554 women

Results

PTB increased with amount of tissue excised only for laser conization

No difference in PTB rate when using ablative treatment

No association between PTB rate and time from procedure to delivery

No difference in CD rate



National guidelines

- **Which patients should not be considered candidates for cerclage?**
- Evidence is lacking for the benefit of cerclage solely for the following indications: **prior loop electrosurgical excision procedure, cone biopsy, or müllerian anomaly (2014).**



RCOG

- History- or US-indicated **cerclage cannot be recommended in women with previous cervical surgery (2011)**



Royal College of
Obstetricians and Gynaecologists

Bringing to life the best in women's health care

SOGC

- Women in whom cerclage is not considered or justified, but whose history suggests a **risk of cervical insufficiency, should be offered serial TVS CL assessments (2019)**



THE SOCIETY OF
OBSTETRICIANS AND
GYNAECOLOGISTS
— OF CANADA —



Take home message

- Cerclage not for all women with a previous conization!!!

Take home message

