MOUNT SINAI HOSPITAL

UNIVERSITY OF TORONTO

Current Status and Clinical Utility of Cervical Assessment

Wendy L. Whittle *MD, PhD, FRCSC*

Prevention of Preterm Birth Clinic
Fetal Medicine Unit
Department of Obstetrics and Gynecology
Mount Sinai Hospital; University of Toronto

Spontaneous Preterm Birth (SPTB):

Assumptions:

#1. Spontaneous preterm birth has a significant impact on the health and well being of the infant, the family, the health care system and the society.

#2. Identifying women at increased risk of spontaneous preterm birth allows for targeted therapy to prevent the preterm birth and its consequences.

SPTB: The Impact

- Incidence ~5-11% of all pregnancies (3-7% @ <34w GA)
  - Ireland 4.5%
  - United States 12.7%
  - Canada 7.6%

- 70% morbidity/mortality not associated with anomalies
- 40x risk death in 1st year

- short term: BPD, IVH, ROP, infection

- longterm: 1/2 children with CP
  1/3 children with abn vision
  1/4 children with chronic lung disease
  1/5 children with MR

SPTB: The Impact

Morbidity persists to adulthood:

- increased incidence behavioral problems
- low birth weight linked to CAD

Hospital Cost

$ 9700 per NICU stay

$ 117 000 if BW <750g

4% operating expenses

Recurrence Risk

- 2.0 fold
- up to 40% risk if > 2 prior SPTB

What tools can we use to predict SPTB?

SPTB: Cervical Assessment

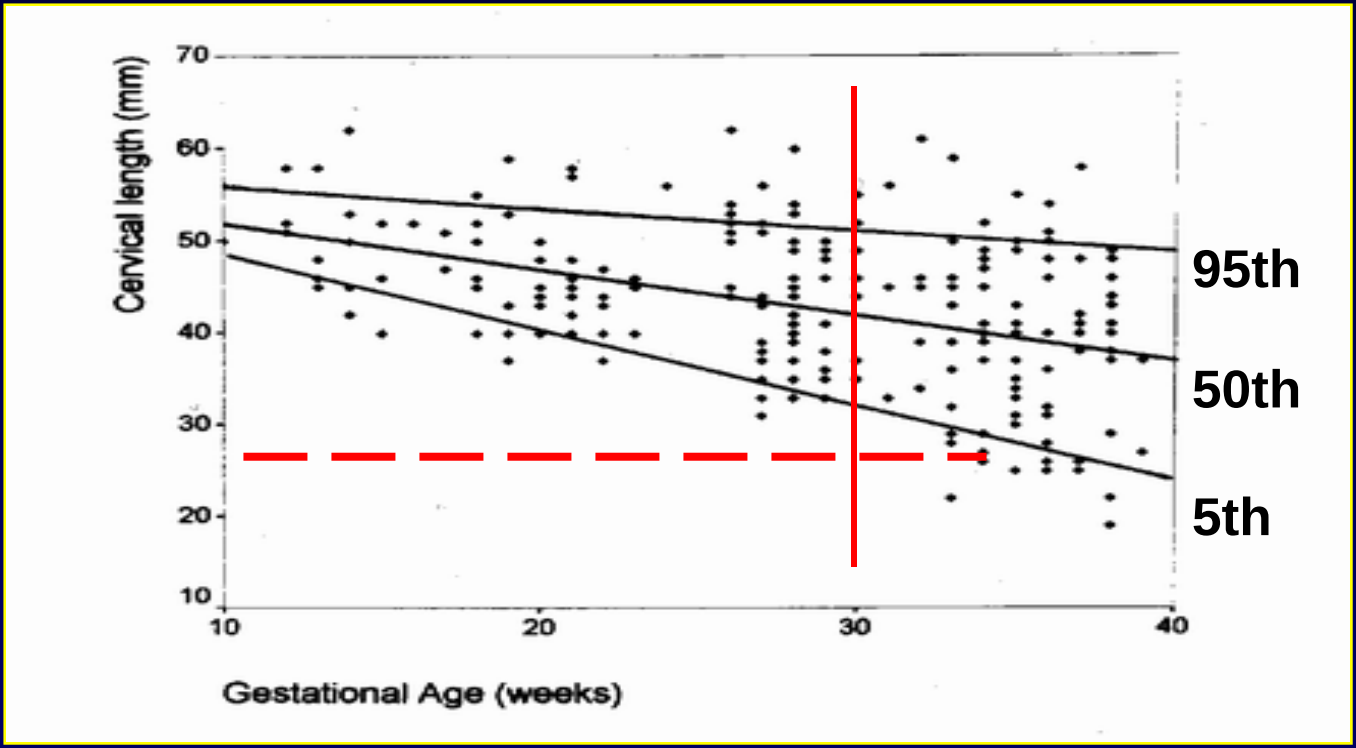
Role of the cervix through gestation:

1. Act as barrier to delivery of the infant: load bearing strength
   - structure: ECM: collagen type I and III
     proteoglycan
     elastin
     Cellular: epithelium (glands)
     fibroblast
     vessel
   - increase cellular content by 50%

2. Act as barrier to ascending infection: immune function
   - gland cells: immune cell surface markers
   - mucus, NK like cells

Transvaginal Sonographic Cervical Length Changes During Normal Pregnancy

Gramellini et al; J Ultrasound Med (2002)



Non-pregnant: 3.1-3.8 cm

First Trimester: 4.6 -5.2 cm

Same pattern: nulliparous and multiparous

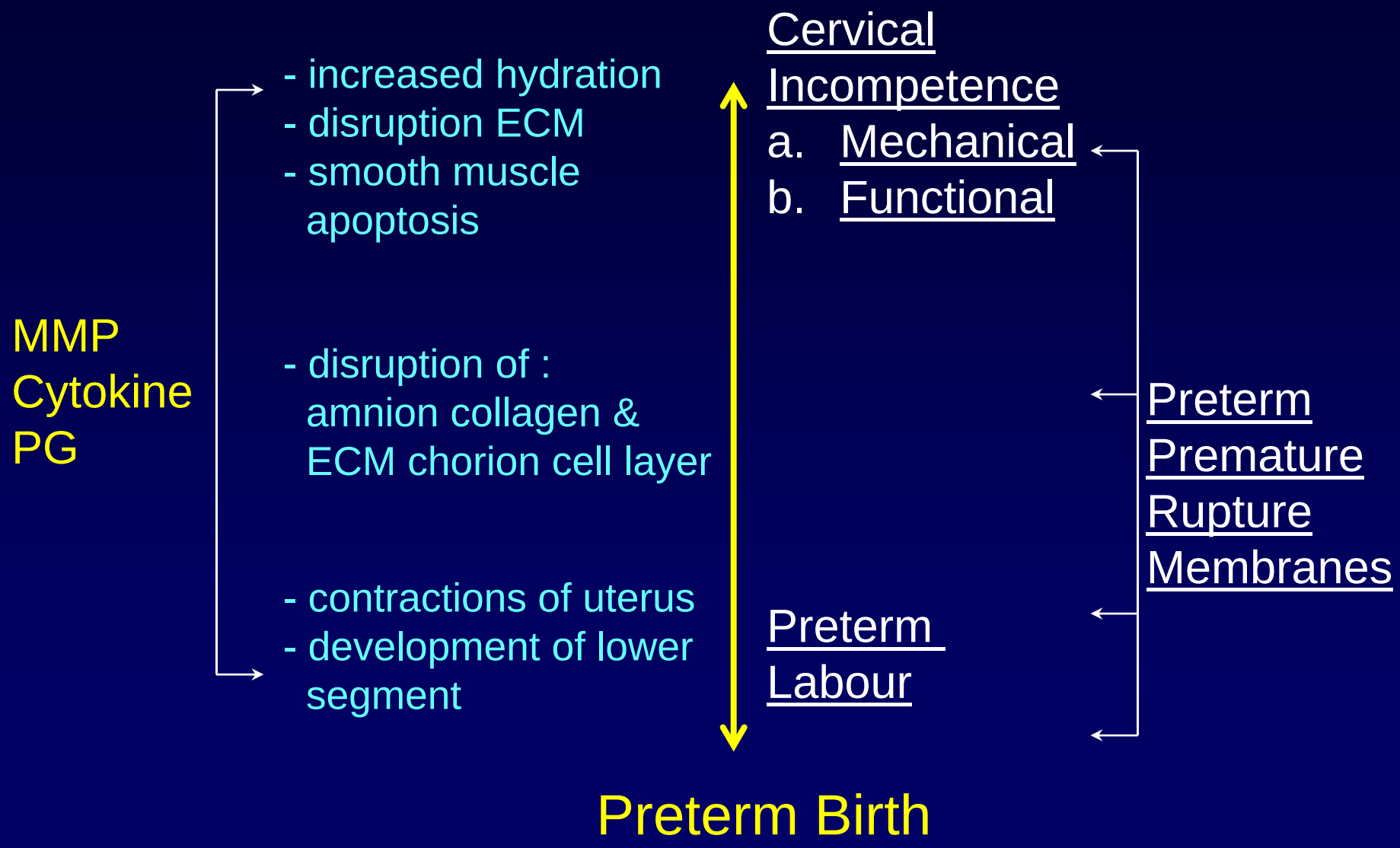
SPTB: Cervical Assessment

Role of the cervix @ end of gestation: efface / dilate

- breakdown ECM
- smooth muscle apoptosis
- increase H_2O content
- dilatation under pressure

If a cervix prematurely effaces and/or shortens then the cervix has become an anatomic marker of a pathological process

SPTB: Why use cervical length ?



Can cervical length predict SPTB ?

Question: Can the length of the cervix measured at 24 and 28w predict SPTB < 35w ?

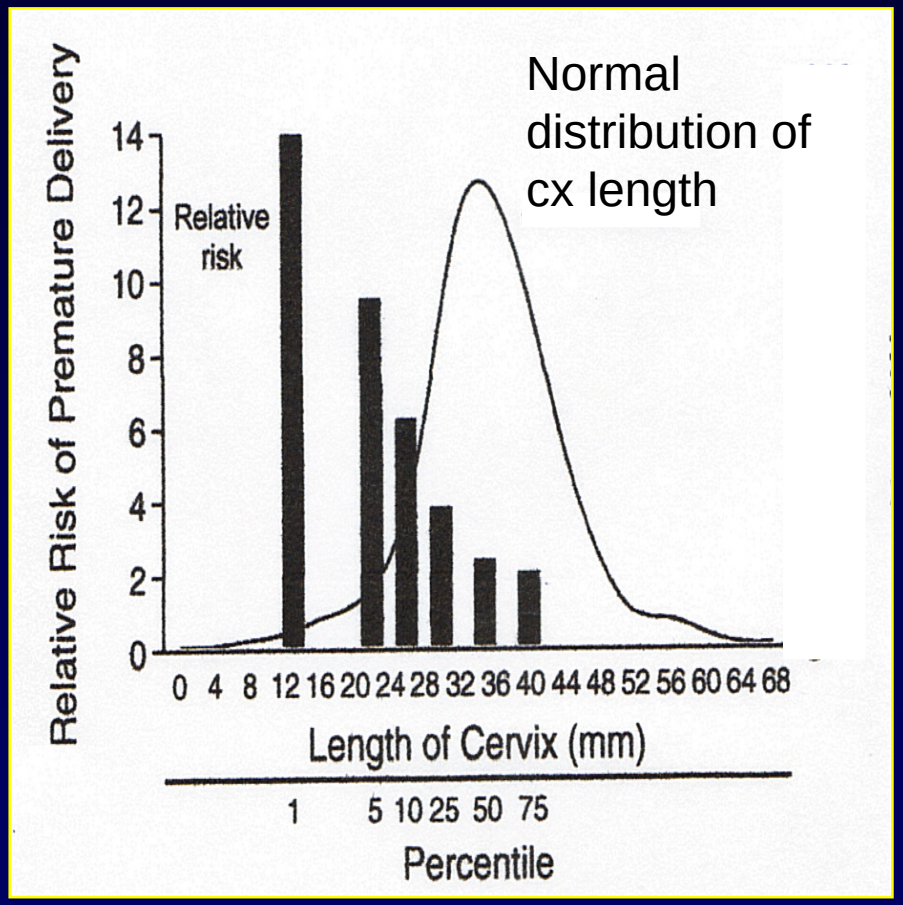
Method: Multicentre, prospective study
Asymptomatic general population
2915 subjects at 24w
2531 subjects at 28w (delivered, lost)

Results: - SPTB was indirectly correlated with cx length

- Significant at both 24 and 28w

Iams et al, NEJM; 1996.

Compared with the 75th%tile of length (4 cm)



Cx Length	RR
≤ 4 cm (75th%ile)	1.98
≤ 3.5 cm (50th %tile)	2.35
≤ 3.0 cm (25th %tile)	3.79
≤ 2.6 cm (10th %tile)	6.49
≤ 2.2 cm (5th%tile)	9.49
≤ 1.3 cm (1st %tile)	13.99

Baseline risk 7.6% x 6.49 RR (<10th %tile) = 46.7% SPTB

Accuracy of cervical transvaginal sonography predicting preterm birth : a systematic review

Honest et al, Ultrsound Obstet Gynecol 2003.

Goal: Obtain valid and reliable accuracy estimates of TVUS in predicting SPTB

Method: Systematic review

Criteria: asymptomatic / symptomatic
general population
known GA at birth
observational cohort

46 studies 31 577 women

Results: Odds ratio for SPTB varies:

- GA at assessment
- Cut off for PTB (< 32w, <34w, <37w)

Summary: Cervical Length and SPTB

Singleton Asymptomatic Patient
PTB < 34 weeks

@ < 20 weeks gestation:

	< 25 mm LR was 6.29	(x 7.6% = 47.8%)	5 studies
**	< 15 mm LR was 30	(x 7.6% = > 100%)	1 study
	> 25 mm neg LR was 0.75		

@ 20-24 weeks gestation:

	< 25 mm LR was 4.4	(x 7.6% = 33.4%)	3 studies
**	< 15 mm LR was 27.9	(x 7.6 = > 100%)	1 study
	> 25 mm neg LR was 0.4	(x 7.6% = 3.0%)	

Honest et al, Ultrasound Obstet Gynecol (2003)

Summary: Cervical Length and SPTB

Singleton Asymptomatic Patient
PTB < 34 weeks

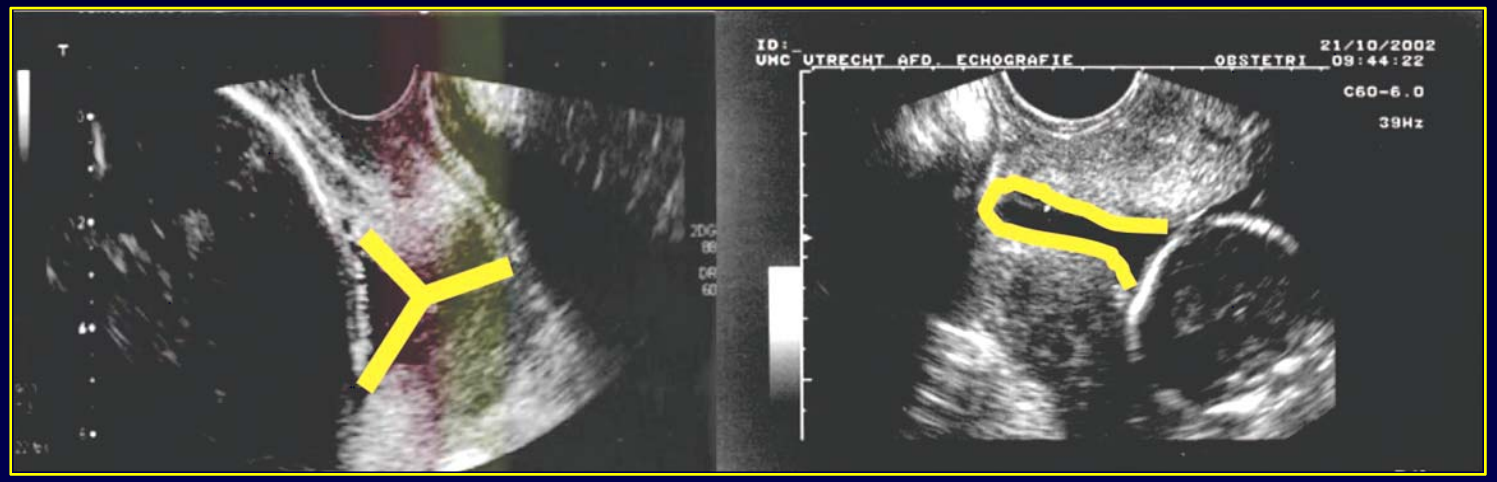
@ > 24 weeks gestation:

< 25 mm LR was 4.0	(x 7.6% = 33.0%)	4 studies
< 15 mm LR was 7.9	(x 7.6 = 60.0%)	1 study

> 25 mm neg LR was 0.62 (risk reduced by 62% to 2.9%)

Honest et al, Ultrasound Obstet Gynecol (2003)

SPTB: The Role of Cervix Funneling



Controversies in Measuring the Funnel:

? Independent or dependent of cx length

? Which measurement:
- presence or absence
- funnel width
- funnel length
- funnel shape
- % of the total cervical length
- canal width

Cervical length and funneling at 23 weeks of gestation in the prediction of spontaneous early preterm delivery

To et al, Ultrasound Obstet Gynecol; 2001

Goal: to determine the possible additional risk of SPTB if funneling is present

Method:
6819 singleton pregnancies
22-24 weeks
screening test for PTB

Results:
4% pregnancies have funnel present
98% if length ≤1.5 cm
25% if length 1.6-3.0 cm
1% if length > 3.0 cm

6.9% PTB LR 1.8

Presence of funnel did not improve LR

Does the presence of a funnel increase the risk of adverse perinatal outcome in a patient with a short cervix?

Rust et al, AJOG; 2005.

Goal: to determine whether the presence of a funnel alters the outcome of patients with a short cervix

Method: singleton pregnancies
≤ 2.5 cm +/- funnel (n=82)

Results: - presence of funnel had increase incidence of:
- PTL
- abruptio
- PPROM
- neonatal mortality / morbidity

- size did not correlate with rate of PTB
- as a categorical variable – correlated with SPTB

SPTB: Consensus Role of Cx Length & Funnel

In the asymptomatic general population:

- Cut off of <10th%tile (2.5cm) best predictive values at each GA

- Funnel best used as a categorical variable: present / absent

- Predictive value appears to be related to length: not strictly additive

SPTB: The Effect of Fundal Pressure

Goal of fundal pressure: to ellicit cervical shortening and funneling to unmask cervical incompetence
" test of competence"

Response to fundal pressure: decrease in cx length with 15 sec fundal pressure

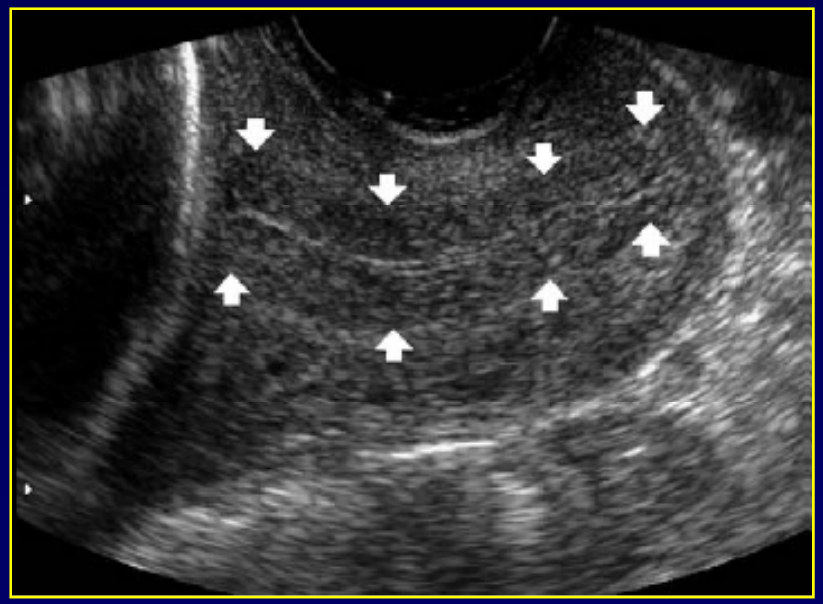
2 Studies:

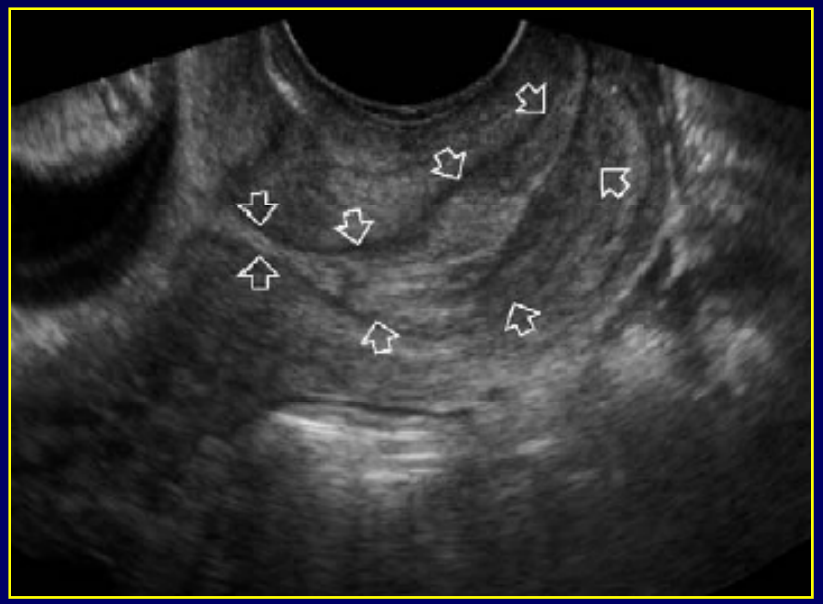
Guzman et al, 1994 (n=181)
- A larger portion of patients who had + response to FP (n=31) delivered preterm compared with no response (n=150) {6% vrs 50%}

Guzman et al, 1997 (n=10)
- + FP response identified a cx that underwent subsequent shortening

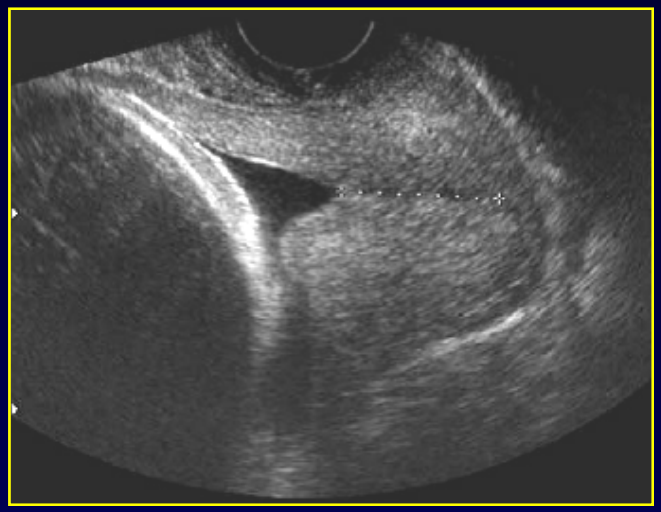
SPTB: The Effect of Gland Area

? Does the absence of the gland area predict PTB





Other Cervical Characteristics: Gland Area

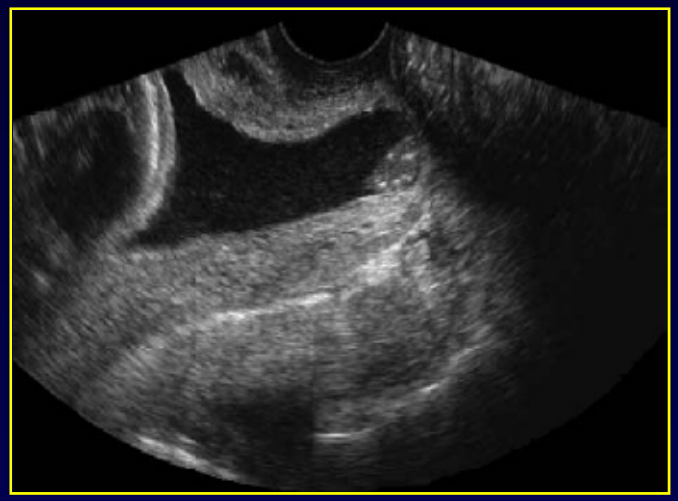


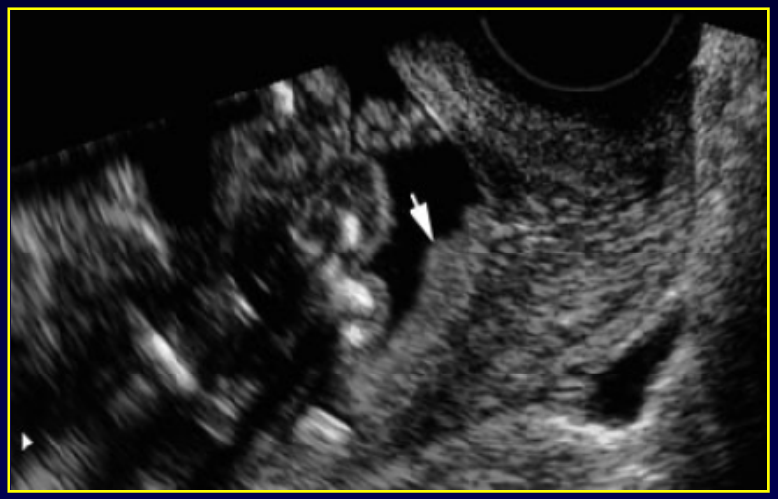
Ultrasonographic parameters	Category	*n* (%)	Sens (%)	Spec (%)	PPV (%)	NPV (%)	*p* (x^2)	OR crude	OR adj (*p*)
Cervical length	<20 mm	4	18.0	98.1	40.0	94.8	<0.001	12.2	2.1 (0.664)
	≥20 mm	17						1.0	1.0
Cervical funneling	Present	3	14.3	96.5	21.4	94.4	0.016	4.6	0.6 (0.745)
	Absent	18						1.0	1.0
Cervical gland area	Absent	8	38.1	99.7	88.9	96.0	<0.001	194.5	175.1(<0.001)
	Present	13						1.0	1.0
	Total	21							

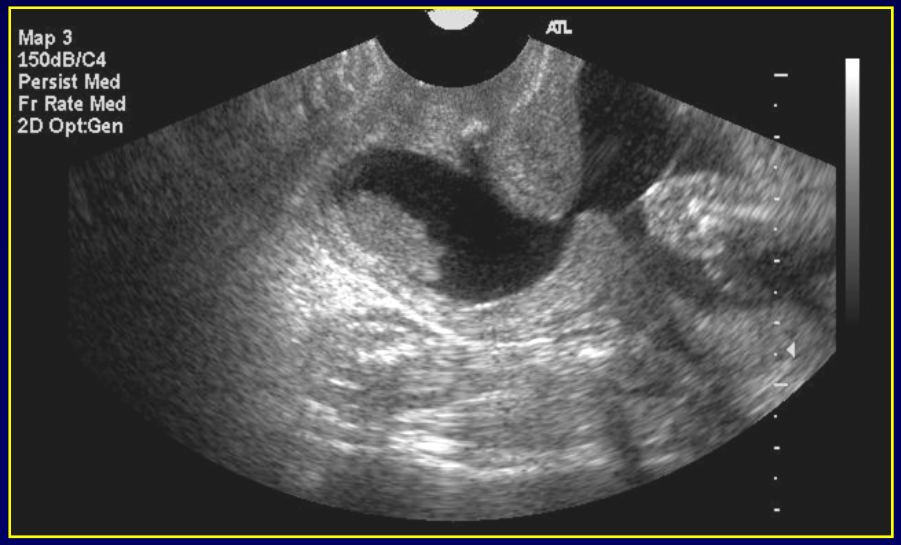
Caution: subjective measure
small study
contradicts Sekiya et al (1998)

Pires et al, Int J Gynecol Obstet, 2006

SPTB: The Effect of Debris / Sludge







? What is the prevalence and significance of sludge

Sludge present: 1% all pregnancies

Outcome variable	*OR*	*95% CI*	P
Positive amniotic fluid cultures	19.2	1.14–332	0.04*
Histological chorioamnionitis	8.3	1.3–50.9	0.02*
Admission to NICU	2.9	0.5–16.8	NS
Composite neonatal morbidity	0.85	0.16–4.6	NS
Perinatal death	3.3	0.3–40.5	NS
Spontaneous delivery			
Within 48 h	19.6	1.5–257.4	0.02*
Within 7 days	11.7	1.7–81.6	0.01*

Conclusion: sludge associated with PTB < 34w and risk of chorioamnionitis

Bujold et al, J Obstet Gynaecol Can (2006)
Espinoza et al, Ultrasound Obstet Gynecol (2005)

The Dynamic Cervix

Dynamic cervical change: real time shortening of the cervix

Question: Is the dynamic cervix predictive of PTB ?

Known Cx Incompetence
15/56 patients: cx opened spontaneously on TVUS exam

Asymptomatic Women
Dynamic change (+/- 3.4 mm) present in 9% of patients
? Unknown effect on risk of PTB

Symptomatic Women
Dynamic change (+/- 7.1 mm) present in 48% of patients
Usually occurred during a contraction
Minimal cx length and NOT dynamic change was predictive of PTB

Cervical Length Measurements and Special Circumstances

1. High risk patient (previous PTB; symptomatic)
2. In combination with FFN
3. Absolute length versus rate of change of length
4. Multiple gestation
5. Cervical length and cerclage
6. Cervical length and uterine anomalies
7. Cervical length and cervical surgery
8. Cervical length post fetal therapies
9. Cerival length and PPROM
10. Cerival length and polyhydramnious

Gestational age at cervical length measurement and incidence of preterm birth

Berghella et al, Obset Gynecol; 2007.

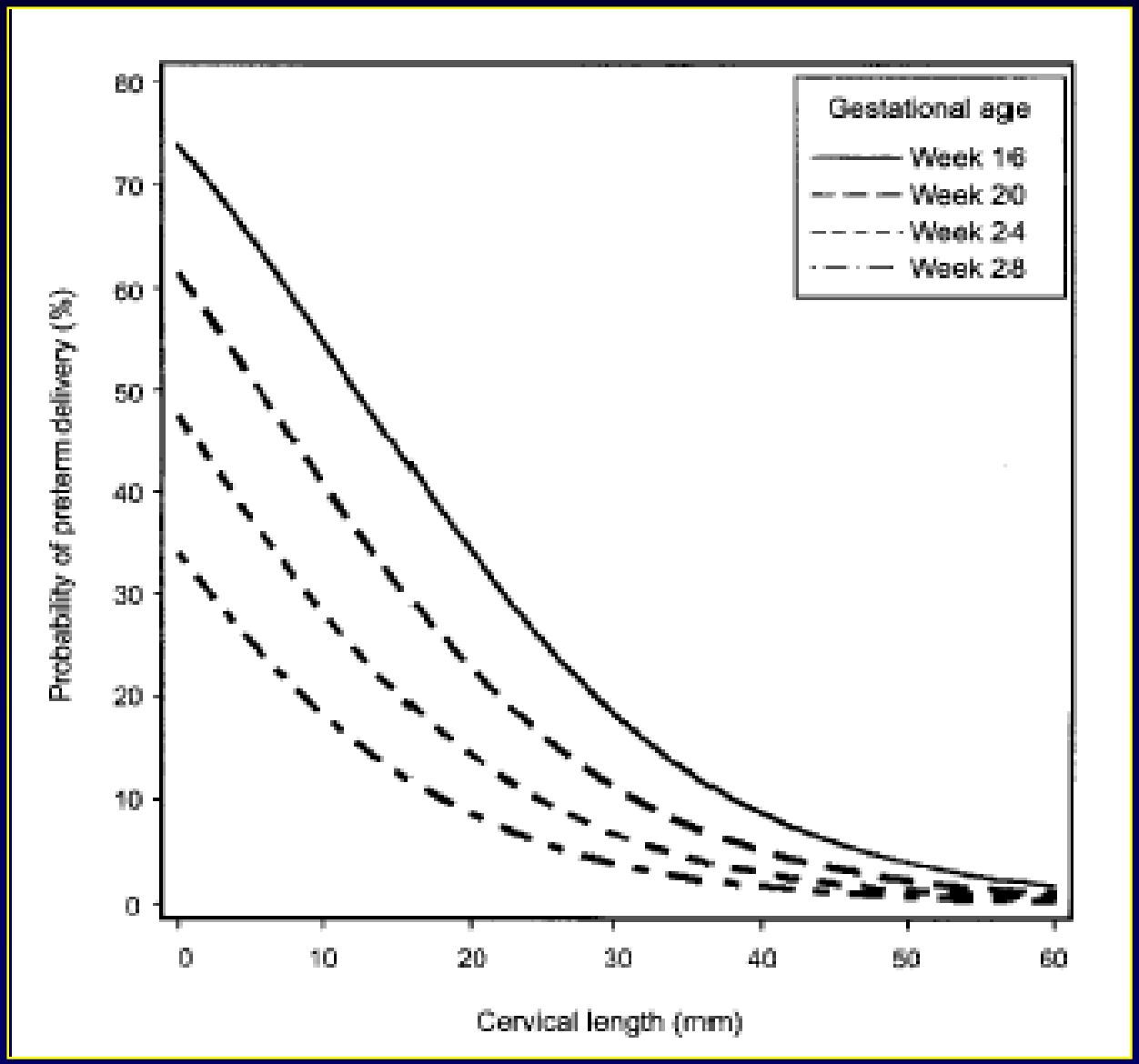
Rationale: GA at measurement and OBHx affect predictive value of TVUS cx length

Goal: estimate the risk of SPTB by TVUS and gestational age at which cervical length was measured

Method:

- retrospective n= 750
- measurements from 16-28w
- singleton
- cerclage excluded
- inclusion criteria:
  - Hx PTB
  - cone biopsy
  - uterine anomaly
  - >2 D&E

Risk of PTB < 32 per week of gestation and mm of cervix



Risk PTB

↓ 5.5% per week

↓ 6.0% per mm

Table 2. Predicted Probability of Preterm Delivery Before Week 35, by Cervical Length (mm) and Time of Measurement (Week of Pregnancy)

Cervical Length (mm)	Week of Pregnancy													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
0	69.8	68.7	67.5	66.3	65.2	64.0	62.7	61.5	60.2	59.0	57.7	56.4	55.1	53.8
5	62.5	61.3	60.0	58.7	57.5	56.2	54.9	53.6	52.2	50.9	49.6	48.3	47.0	45.7
10	54.6	53.3	52.0	50.7	49.4	48.1	46.7	45.4	44.1	42.8	41.6	40.3	39.0	37.8
15	46.5	45.2	43.9	42.6	41.3	40.1	38.8	37.6	36.3	35.1	33.9	32.8	31.6	30.5
20	38.6	37.3	36.1	34.9	33.7	32.5	31.4	30.3	29.2	28.1	27.0	26.0	25.0	24.0
25	31.2	30.1	29.0	27.9	26.9	25.8	24.8	23.9	22.9	22.0	21.1	20.3	19.4	18.6
30	24.7	23.7	22.8	21.8	21.0	20.1	19.3	18.5	17.7	16.9	16.2	15.5	14.8	14.2
35	19.1	18.3	17.5	16.8	16.1	15.4	14.7	14.1	13.4	12.8	12.2	11.7	11.2	10.6
40	14.6	13.9	13.3	12.7	12.1	11.6	11.1	10.6	10.1	9.6	9.2	8.7	8.3	7.9
45	11.0	10.5	10.0	9.6	9.1	8.7	8.3	7.9	7.5	7.2	6.8	6.5	6.2	5.9
50	8.2	7.8	7.4	7.1	6.7	6.4	6.1	5.8	5.5	5.2	5.0	4.7	4.5	4.3
55	6.0	5.7	5.5	5.2	4.9	4.7	4.5	4.3	4.0	3.8	3.7	3.5	3.3	3.1
60	4.4	4.2	4.0	3.8	3.6	3.4	3.3	3.1	3.0	2.8	2.7	2.5	2.4	2.3

* Risk of recurrent SPTB varies with: GA at measure
Total length of cx

* Not affected by: # or GA of prior PTB
* >28w GA - cx shortens- this is not correlated with SPTB

Berghella et al, Obstet Gynecol; 2007.
Drnwal et el, AJOG, 2005; Seaward and Whittle (unpublished)

Cervical Length and Maternal Characteristics

Goal: to create a model to calculate specific PTB risk based on combining maternal factors and cervical length

Methods: TVUS cervical length at 22-24^{+6}w
maternal demographics:
- age
- ethnicity
- BMI
- smoking
- Hx cx surgery
- OB Hx

n= 39 284 pregnancies

Results: #1 predictor cervical length
improved by OB Hx, maternal characteristics

Cervical Length and Maternal Characteristics

Model Prediction of PTB <32w:

Set with a 5% false + rate

Factors	Detection Rate
Maternal Factors (age + OBHx)	29%
Cervical Length	48%
Combination of both	57%

Cervical length can be used in combination with maternal factors to better predict risk of PTB

To et al, Ultrasound Obstet Gynecol (2006)

SPTB: Effect of symptoms and cx length

Singleton Symptomatic Patient
PTB < 34 weeks
Very little data

@ 20-24 weeks gestation: (2 studies- only 30 mm cutoff)

< 30 mm LR was 1.98
> 30 mm neg LR was 0.28

Honest et al, Ultrasound Obstet Gynecol (2003)

@ 24-28 weeks gestation: <25 mm

<35w LR 2.05 PPV 24 NPV 94
<7d LR 2.25 PPV 36 NPV 94

Schmitz et al, AJOG (2003)

Cx Length and Fetal Fibronectin

Rationale:

- 23% of symptomatic patients with a + FFN delivered within 7d of the test compared with 2% with a - FFN

Question: Does the combination of short cervix and + FNN provide better prediction than each test alone

In both asymptomatic and symptomatic (PTL) positive FFN did not improve the predictive value of the cx length measurement alone

WHY ?

FFN positivity increases as cervical length decreases

Heath et al, BJOG; 2000
Tsoi et al, Ultrasound Obstet Gynecol; 2006.

Selective use of fetal fibronectin detection after cervical length measurement to predict spontaneous preterm delivery in women with preterm labor

Schmitz et al, AJOG; 2006.

Goal: to determine whether selective use of FFN after TVUS cervical length predicts SPTB in symptomatic patients better than either indicator alone

Method: TVUS then FFN for all women
n=359

Results: 13.4% PTB <35w
6.3% PTB within 7d

Table II Predictive values for preterm birth of cervical length, fetal fibronectin, and selective use of fetal fibronectin in ultrasonography-selected patients (n = 359)

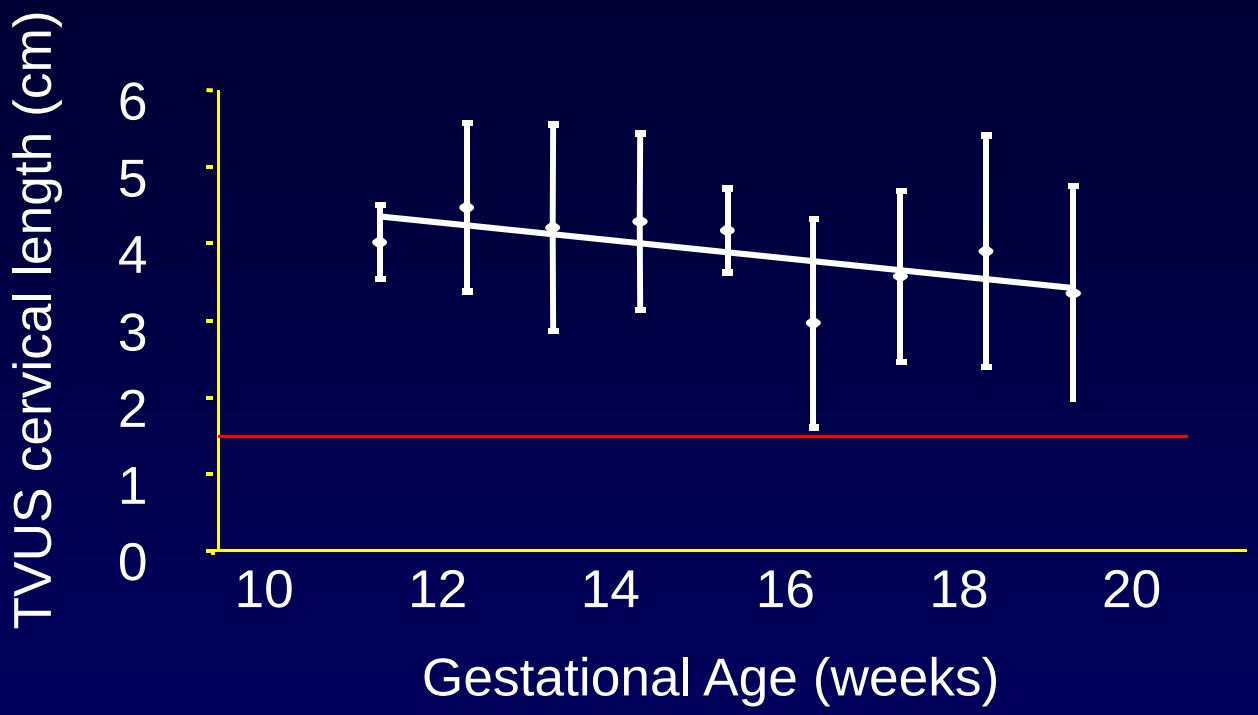
Predictors	Se (%) (95% CI)	Sp (%) (95% CI)	PPV (%) (95% CI)	NPV (%) (95% CI)	LR+ (95% CI)	LR− (95% CI)
Delivery <35 wk*						
CL ≤25 mm	75 (60-86)	63 (58-69)	24 (17-32)	94 (90-97)	2.05 (1.64-2.55)	0.40 (0.24-0.65)
fFn ≥50 ng/mL	63‡ (47-76)	81** (76-85)	33 (24-44)	93 (90-96)	3.24 (2.36-4.44)	0.46 (0.32-0.67)
Selective test	67§ (52-80)	81** (77-86)	36 (26-46)	94 (91-97)	3.57 (2.63-4.86)	0.41 (0.27-0.61)
Delivery <7 d†						
CL ≤25 mm	87 (66-97)	61 (56-67)	13 (8-20)	99 (96-100)	2.25 (1.83-2.77)	0.21 (0.07-0.61)
fFn ≥50 ng/mL	83¶ (61-95)	79** (74-83)	21 (13-31)	99 (96-100)	3.91 (2.96-5.17)	0.22 (0.09-0.54)
Selective test	83¶ (61-95)	79** (74-83)	21 (13-31)	99 (96-100)	3.91 (2.96-5.17)	0.22 (0.09-0.54)

359 patients presented ⟶ 159 patients Cx < 30 mm

- FFN added to Cx length no better than FFN alone

- FFN after Cx length decreased # FFN tests by 200 (55%)

The Rate of Change of Cervical Length



High risk patients based on OBHx with stable cervical length and proceeded to a mean GA 37±3 w

Iqbal and Whittle, SOGC; 2007

Naim et al (2002): Unselected women (n=193)

- If decreased 10 mm/month - OR for PTB <32w 6.8

Owen et al (2001): In high risk women

- Term patients shortened cx by 1.0 mm /wk
- PTB patients shortened cx by 2.5 mm /wk
- if cx shortening & length <2.5cm: RR of 4.5

Early rate of change may be a better predictor of PTB as compared with a single cx length measurement

Effect of shortening observed up to 28 w

Multiple Gestation and Cervical Length

Twin Gestation:

@ 22w gestation:

Both length < 25 mm and presence of funneling predict PTB

@ 27w gestation

Length < 25 mm predicts PTB

** Likelihood Ratio of PTB for cx length < 25 mm: 5.4

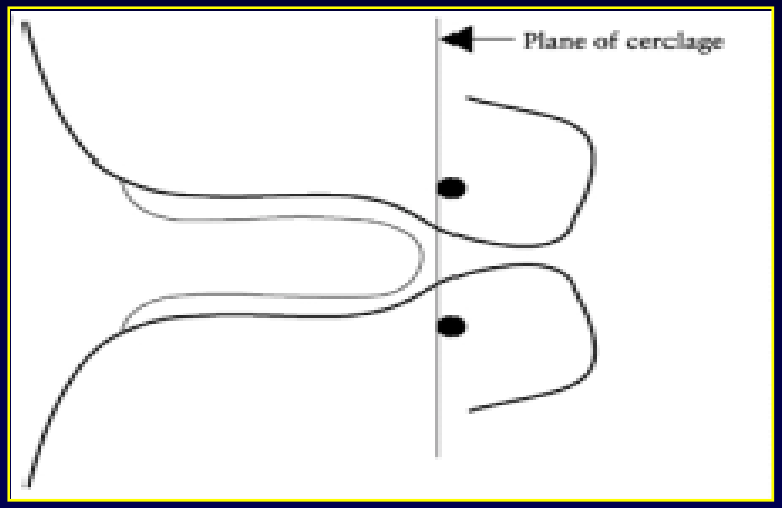
** > 30 mm: rate of PTB 4%

Triplet Gestation:

Length < 25 mm @ 14-20 w gestation had PPV 83% for PTB

Maslovitz et al, J Ultrasound Med (2005); Vayssiere et al, Ultrasound Obstet Gynecol (2005)
Vayssiere et al, Am J Obstet Gynecol (2002); Guzman et al, Am J Obstet Gynecol (2000)
Yang et al, Ultrasound Obstet Gynecol (2000)

Cervical Length Post Cerclage



- the residual cx length after cerclage placement:
  - <1.5 cm 70% SPTB < 32w

- “funneling to stitch” was present:
  - 65% SPTB <32w
  - regardless of indication for stitch placement

Seaward and Whittle (unpublished)
Fried et al, SMFM (2007)
O’Brien et al, Ultrasound Obstet Gynecol (2002)

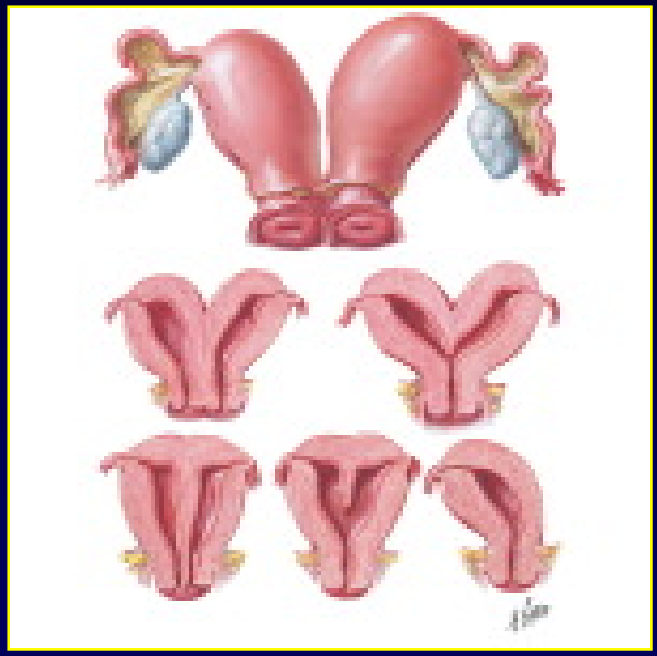
Cervical Length and Uterine Anomalies

- @ 14-23 w of gestation
  cx < 25 mm: risk of PTB was 50%

- unicornuate uterus: shortest Cx and the highest rate PTB

- septate uterus: longest Cx and lowest rate of PTB

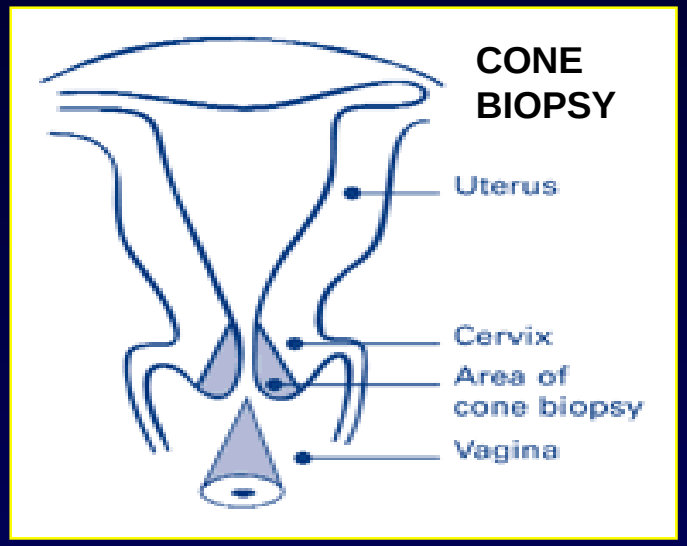
- PTB usually >30w GA

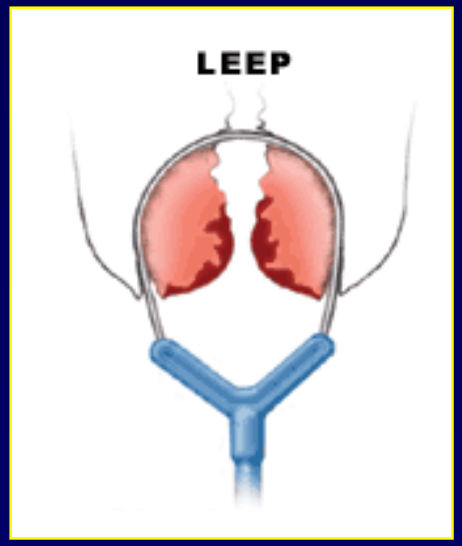


Overall; short cervical length has a 13-fold risk of PTB

Airoldi et al, Obstet Gynecol; 2005

Cervical Length and Cervical Surgery





1. Patients with previous Cx Sx have shorter cx length compared with controls

2. LEEP & Cone were associated with PTB - OR 3.45

3. Cx length < 30 mm
   PPV 58.3%
   NPV 97%

Crane et al, Obstet Gynecol (2006)

Cervical Length and PPROM

- No relation b/w chorioamnionitis, neonatal sepsis

- After PPROM: cx length <2.0 cm predicted latency <48h (68%)

? Can cx length predict PPROM

Screening criterion	n	*Sensitivity (%)*	*Specificity (%)*	*PPV (%)*	*NPV (%)*	*Odds ratio*	*95% CI*
Cervical length							
< 20 mm	18	67	43	43	67	1.5	0.5–4.1
< 15 mm	12	44	74	52	69	2.3	0.8–6.3
< 10 mm	9	33	90	69	68	4.8	1.3–17.5
< 5 mm	7	26	95	78	67	7.0	1.3–36.8
Cervical funneling							
> 25%	23	85	31	44	77	2.6	0.7–8.9
> 50%	13	48	67	48	67	1.9	0.6–5.0
> 75%	9	33	93	75	68	6.5	1.6–26.9
100%	6	22	95	75	66	5.7	1.1–30.8
Cervical length and funneling							
< 10 mm + > 75%	9	33	90	69	68	4.8	1.3–17.5

Odibo et al, Ultrasound Obstet Gynecol (2001); Gire et al, Ultrasound Obstet Gynecol (2002)

Cervical Length and Fetal Therapies

- Cx length < 30 mm at time of MPR (3 to 2) predicts PTB
  - PPV 67% for delivery < 33w

- TTTS treated by laser, cx length before treatment <30 mm significantly associated with PTB independent of:
  - parity
  - intrauterine death of one fetus
  - disease severity
  - volume of amnioreduction

Fait et al, J Clin Ultrasound (2005)
Robyr et al Ultrasound Obstet Gynecol (2005)
Rebarber etal, Am J Obstet Gynecol (2001)

Cervical Length and Polyhydramnious

Goal: To determine if cx length is related to severity of poly & GA @ delivery

Method: prospective cohort
n=92
AFI >20

Results: Mean cx length 3.7 cm
Gradual shortening with GA

No association with severity of AFV

Cut off <1.5 cm – lower GA @delivery (n=5)

Clinical Utility of Identified Short Cervix

Asymptomatic Women
Low / High Risk

↓

Increased monitoring

Rationale use of cerclage

Rescue cerclage

Progesterone Rx

Education

Symptomatic Women

↓

Antenatal steroids

Tocolysis

In utero transfer to 3^{o} care

Education

↘ ↙

Improved Neonatal Outcome

A. The Use of Cerclage

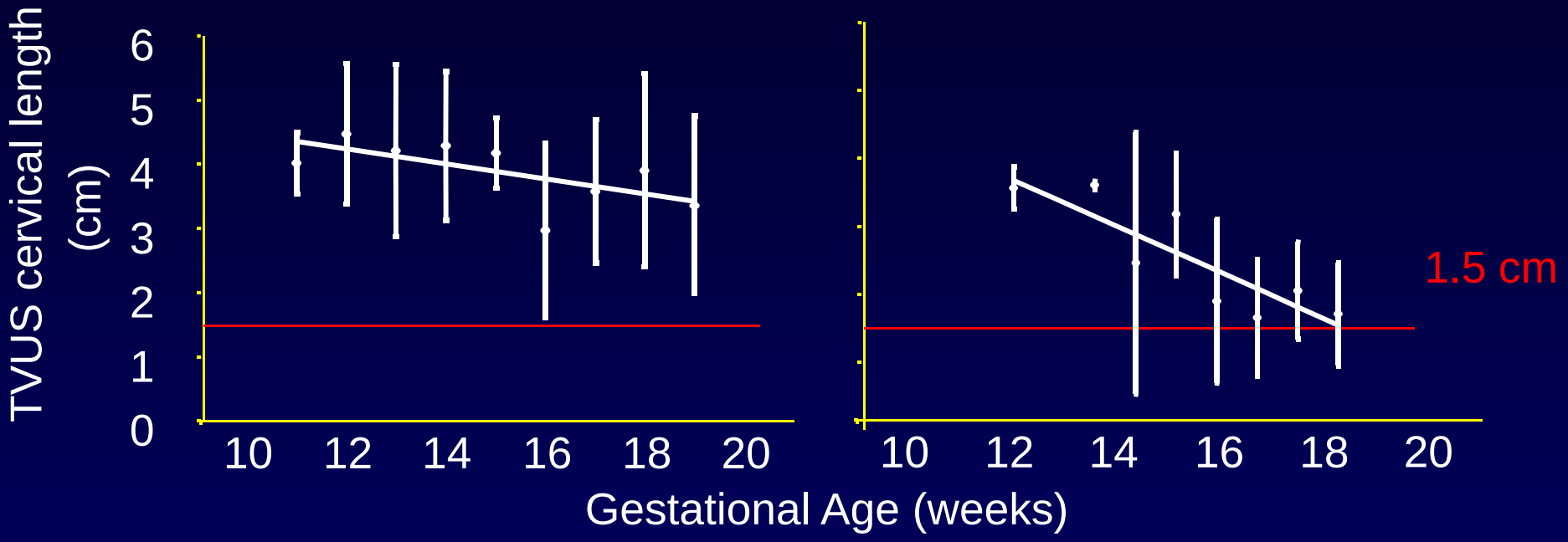
1) Cx < 1.5 cm & at low risk for PTB (by history):
no benefit

2) Cx < 1.5 cm & at high risk for PTB (by history):
effect controversial

3) Cx <1.5 cm and membranes exposed/prolapsed
"rescue" cerclage beneficial

4) High risk patients with serial TVUS of the cervix length followed by cerclage in those who shortened the cervix:
reasonable alternative
(*uncontrolled studies, our clinic data*)

Indicated cervical cerclage (n=75)



No intervention

Mean GA 36.8 ±2.7 weeks

Mac Donald cerclage

Mean GA 35.3 ±4.9 weeks

No difference in baseline cx length, RF, neonatal outcome

Iqbal and Whittle, SOGC; 2007

B. Antibiotics

- asymptomatic women, cx<2.5cm: *no benefit*

C. Prophylactic Tocolysis:

- indomethacin
- progesterone

Short cervix on ultrasound: does indomethacin prevent preterm birth

Berghella et , AJOG; 2006

- rationale: short cervix = uterine activity
- individual data from control group of cerclage RCT

PTB rate: 29.3% indo vrs 42.5% no indo

decreased rate <24w

Progesterone and the risk of preterm birth among women with a short cervix

Fonseca et al, NEJM; 2007.

Goal: To determine progesterone decreases the risk of PTB in women with short cx midgestation

Method: 250 unselected women
20-25w TVUS Cx <1.5 cm
double blind: placebo v progesterone

Results: Significant reduction in SPTB <34w
19.2% v 34.4%

Issues: neonatal outcome
subpopulations: parity, gestation number, OBHx

Maternal Characteristic	Total No. of Patients	No. Delivering Spontaneously at <34 Wk	P Value for Homogeneity
All patients	250	67	
Cervical length			0.25
<12 mm	125	44	
12–15 mm	125	23	
Age			0.93
≥35 yr	46	18	
<35 yr	204	49	
Body-mass index			0.75
≥30.0	37	12	
20.0–29.9	187	49	
<20.0	26	6	
Race			0.65
White	95	33	
Black	137	28	
Other	18	6	
Obstetrical history			0.87
Parous with ≥1 previous preterm birth	38	16	
Parous with no previous preterm birth	72	13	
Nulliparous	140	38	
No. of gestations			0.69
Twin	24	11	
Singleton	226	56	

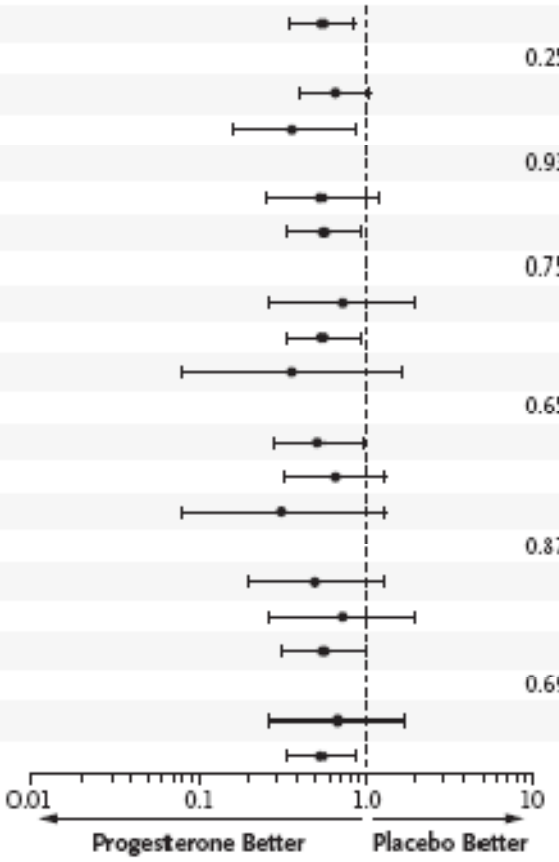


Figure 3. Relative Risk of Spontaneous Birth before 34 Weeks Associated with Progesterone Use in Relation to Maternal Characteristics at the Time of Randomization.

Filled circles indicate the relative risks, and bars the 95% confidence intervals. The Mantel–Haenszel test was used to test for homogeneity. The body-mass index is the weight in kilograms divided by the square of the height in meters.

Prevention
SPTB
Clinic
Protocol

At Risk Patient

Speculum: texture, dilatation
Swab: cervicovaginal x 2
q 4w urine c/s
Placentation testing

Screening TVUS
@14-16w

TVUS q 1-2 w intervals
until 28w

<2.5 cm
? Cerclage

≥2.5 cm
Repeat TVUS

Repeat Speculum @24w
Consider steroids

Shortening cx
Cerclage
+/- tocolysis

Stable cx
Ext Mx

Prevention
SPTB
Clinic
Protocol

Low Risk Patient: Cervix < 2.5 cm

Speculum: texture, dilatation
Swab: cervicovaginal x 2
q 4w urine c/s
Placentation testing

Repeat TVUS x 1w

TVUS q 1-2 w intervals
until 28w

<u>Shortening cx</u>
Cerclage
? Progesterone

<u>Stable cx</u>
Ext Mx

MOUNT SINAI HOSPITAL

UNIVERSITY OF TORONTO

Current Status and Clinical Utility of Cervical Assessment

Wendy L. Whittle *MD, PhD, FRCSC*

Prevention of Preterm Birth Clinic
Fetal Medicine Unit
Department of Obstetrics and Gynecology
Mount Sinai Hospital; University of Toronto