

## Sonographic Cervical Length for the Prediction of Preterm Birth

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## Learning Objectives

Upon completion of this activity, you should be able to:

- Visualize and measure the cervix in pregnant patients with transvaginal sonography
- Define and identify a short cervix in pregnant patients
- Manage patients with a short cervix
- Manage patients with threatened preterm labor

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## Preterm Birth is the Leading Cause of Infant Mortality



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## Preterm Birth Results in:

- Respiratory distress syndrome
- Chronic lung disease
- Bowel injury/inflammation
- Long-term mental disabilities
- Cerebral palsy

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## Magnitude of the Problem

- ~ 13 million preterm births worldwide
- 400,000 in the United States
- Highest rates - Africa and North America
- US Societal Burden
  - In excess of \$26 billion dollars

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United States, 2007-2016

PERCENTAGE OF LIVE BIRTHS



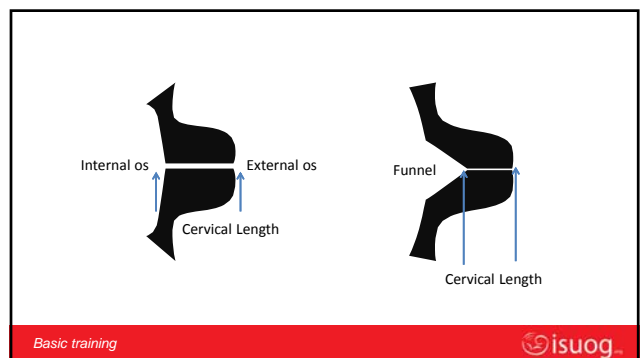
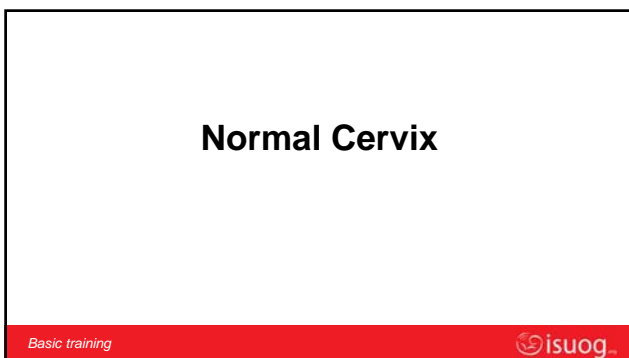
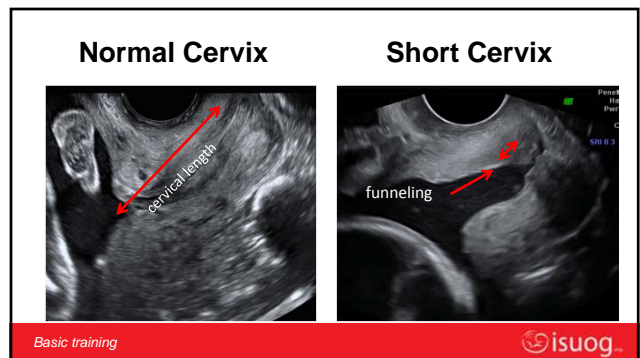
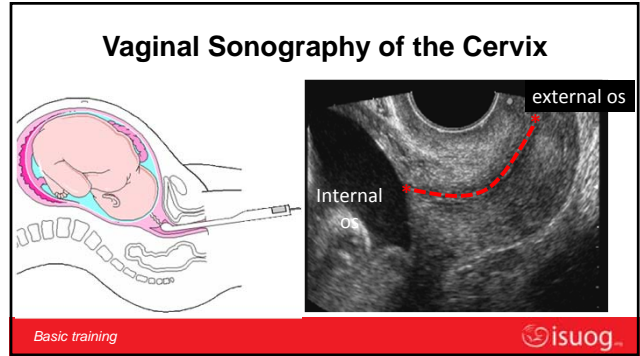
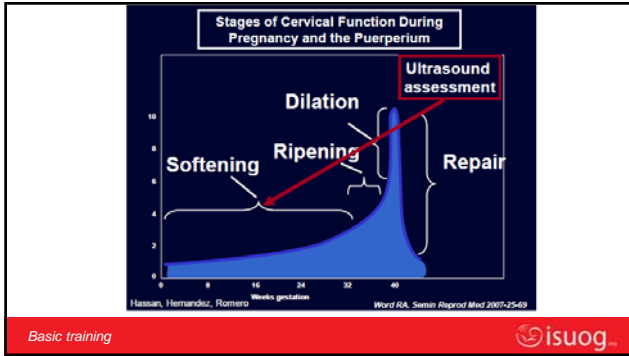
## Preterm Birth Rate in the US

- In 2016, there were 388,218 preterm births in the United States, representing 9.8% of live births.
- In 2016, 1 in 10 babies was born preterm in the United States.

PeriStats, March of Dimes, 2018

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### Methods of Measuring Cervical Length

- Transabdominal
- Transperineal
- Transvaginal

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### Transabdominal

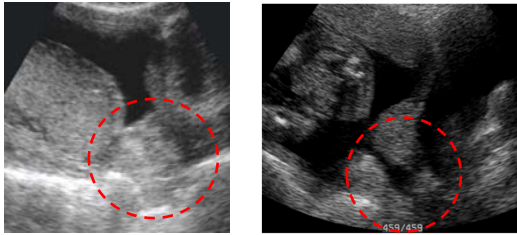
- Requires full bladder
- Usually longer than transvaginal cervical length
  - Mean difference 5.2 mm (+/-14.3, p<0.001)

J Clin Ultrasound 1999

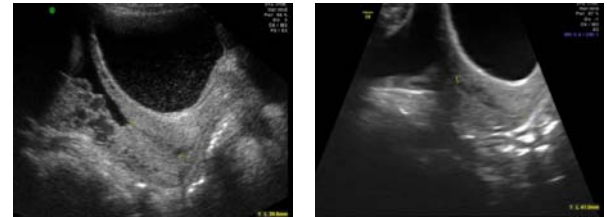
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### Transabdominal Visualization of Cervix



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### Transperineal

- Can be difficult to interpret
  - Failed image in 1/3 of patient in second trimester
- Can be obscured by bowel gas
- Correlates well with transvaginal length

Ultra Obstet Gynecol 2008

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### Transvaginal

- Objective
- Reproducible
- Reliable
- Minimal patient discomfort

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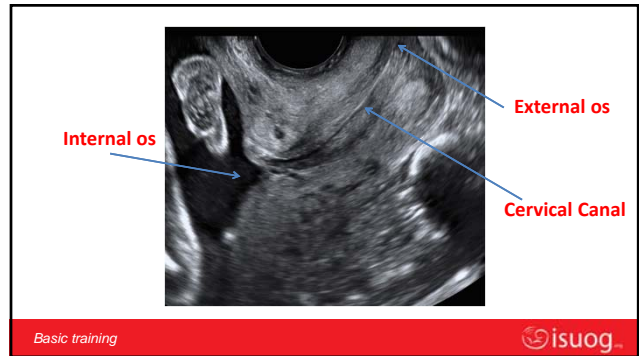
### Measurement of Cervical Length

- Empty bladder
- Patient in lithotomy position
- Vaginal probe  $\geq 5$  MHz in a lubricated disposable sheath
- Gently place the probe in the anterior vaginal fornix to ensure a sagittal view of the cervix is obtained
- Enlarge the image ( $> 75\%$  of screen)
- Identify the internal os, external os and cervical canal

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The Fetal Medicine Foundation



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### Quality Imaging

1. Flat internal os
2. Observe entire length of canal
3. Symmetric imaging of external os
4. Equal size of the anterior and posterior lips of the cervix



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### Quality Imaging

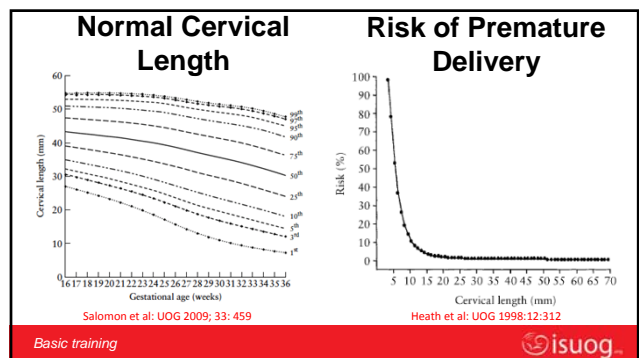
- Take three measurements
  - Record the shortest
- Examine for minimum of 3 minutes

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### What is a Short Cervix?

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### Definition of a Short Cervix

<b>Low Risk</b>	<b>&lt;20mm</b>
<b>High Risk</b>	<b>&lt;25mm</b>
<b>Twins</b>	<b>&lt;25mm</b>
<b>Triplets</b>	<b>&lt;25mm</b>

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Cervical length = 11mm

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Cervical length = 22mm

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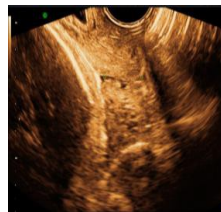
### Avoid Full Bladder

Full Bladder



CL = 35mm

Empty Bladder



CL = 17mm

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### Avoid Excess Pressure



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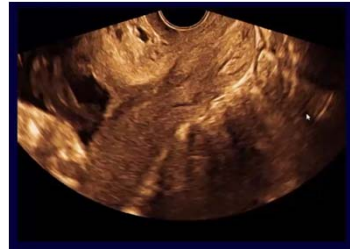
### Avoid Unequal Distance of the Anterior and Posterior Cervix



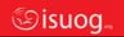
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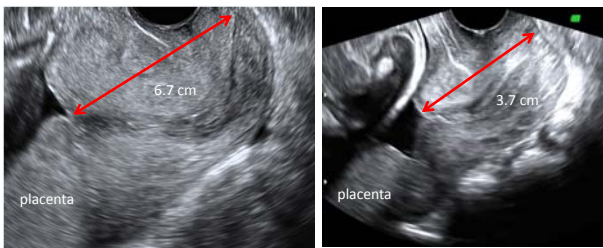
### Measure Closed Cervical Canal



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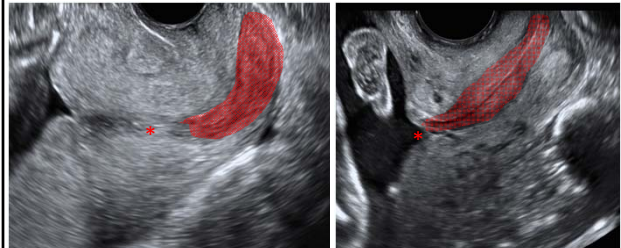
### Segmental Thickening of the Lower Uterus



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### Visualizing the Cervical Mucosa



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### Treatment for a Sonographically Short Cervix

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### Interventions

- Progesterone
- Cerclage
- Pessary



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ORIGINAL ARTICLE

### Progesterone and the Risk of Preterm Birth among Women with a Short Cervix

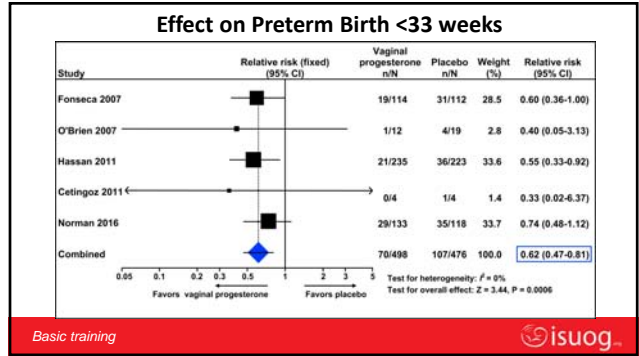
EdUARDO B. FONSECA, M.D., ELISA CAGID, M.D., MAURO FERRE, M.D., MANOJ SINGH, M.D., and KAPILA H. BHATTACHARJEE, M.D., for the First Trimester Evaluation Second Trimester Screening Group\*

Vaginal progesterone decreases preterm birth  $\leq$  34 weeks of gestation in women with a singleton pregnancy and a short cervix: an updated meta-analysis including data from the OPPTIMUM study

REPORTS OF MAJOR IMPACT


Vaginal progesterone in women with an asymptomatic sonographic short cervix in the midtrimester decreases preterm delivery and neonatal morbidity: a systematic review and metaanalysis of individual patient data

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### CONCLUSION

- Vaginal progesterone reduced the risk of preterm birth in women with a short cervix
- Vaginal progesterone improves perinatal outcomes in women with a short cervix
  - respiratory distress syndrome, composite neonatal morbidity and mortality, birthweight <1500 and <2500g and admission to the neonatal intensive care unit were decreased (RR from 0.47-0.82).
- Vaginal progesterone is safe for use in pregnancy
  - Maternal adverse events, congenital anomalies, and adverse neurodevelopmental and health outcomes at 2 years of age did not differ between groups.

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### History of Preterm Birth and Short Cervix

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REPORTS OF MAJOR IMPACT [www.AIOG.org](http://www.AIOG.org)

### Vaginal progesterone vs cervical cerclage for the prevention of preterm birth in women with a sonographic short cervix, previous preterm birth, and singleton gestation: a systematic review and indirect comparison metaanalysis

Agencia Conde Aguado, MD, MPH, Roberto Romero, MD, PhD, Kyrros Nikodemis, MD, Emmanouil Chalkias, MD, John M. O'Brien, MD, Elias Cefalopulos, MD, Eduardo da Fonseca, MD, George Creato, MD, Petros Soma Pflizer, MD, Madjid Forouzi, MD, Carlos Cam, MD, Zorica Adilovic, MD, Susana A. Hassan, MD


**Vaginal progesterone:**

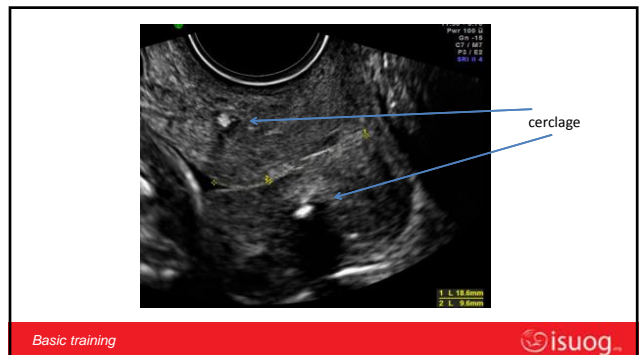
- significant 53% reduction in the risk of preterm birth at <32 weeks
- 57% decrease in the risk of composite perinatal morbidity and mortality

**Cervical cerclage:**

- significant 34% reduction in the risk of preterm birth at <32 weeks
- 36% decrease in the risk of composite perinatal morbidity and mortality

Vaginal progesterone and cervical cerclage both effective

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## Pessary and Short Cervix



Evidence for the effectiveness of pessary in prevention of preterm birth in singleton or twin pregnancy with a short cervix is inconclusive.

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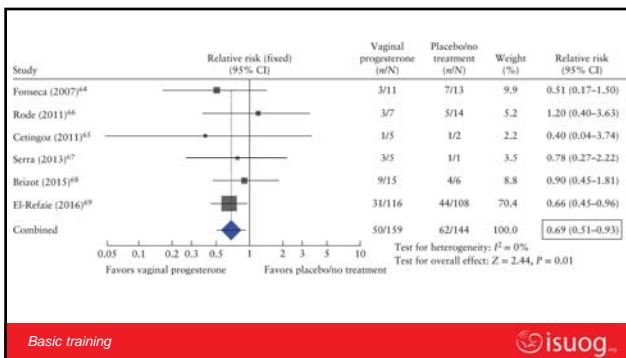


Ultrasound Obstet Gynecol 2017; 49: 303–314  
 Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/ulog.17397. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

## Vaginal progesterone decreases preterm birth and neonatal morbidity and mortality in women with a twin gestation and a short cervix: an updated meta-analysis of individual patient data

R. ROMERO<sup>1,2,3,4</sup>, A. CONDE-AGUDELO<sup>1,5</sup>, W. EL-REFAIE<sup>6</sup>, L. RODE<sup>7,8</sup>, M. L. BRIZOT<sup>9</sup>, E. CETINGOZ<sup>10</sup>, V. SERRA<sup>11,12</sup>, E. DA FONSECA<sup>13</sup>, M. S. ABDELHAFEZ<sup>2</sup>, A. TABOR<sup>14</sup>, A. PERALES<sup>15</sup>, S. S. HASSAN<sup>15</sup> and K. H. NICOLAIDES<sup>6</sup>

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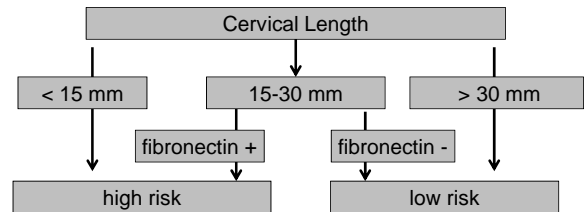


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## Threatened Preterm Labor

Audibert: J Obstet Gynaecol Can. 2010 32:307-12.



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## Conclusion

- Sonographic cervical length is the most powerful predictive tool for preterm birth.
- The definition of short cervix varies by patient history.
- The technique for assessing the cervical length with vaginal ultrasound and potential pitfalls has been described.
  - Correct technique is essential.
- Cervical measurement is particularly useful:
  - to assess the risk of preterm delivery in asymptomatic patients, both high and low risk;
  - in the management of patients with threatened preterm labor

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## Conclusion

- In women with a short cervical length:
  - Vaginal progesterone decreases preterm birth and neonatal morbidity
  - Cerclage reduces preterm birth in women with a history of preterm birth
  - Pessary benefit has been inconclusive

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