Cervical assessment in pregnancy

Homeira Vafaei, MD

Subspecialist in Maternal _ Fetal Medicine

Head of perinatalogu division of Shiraz University of Medical Science

CERVICAL SONOGRAPHY FOR PREDICTION OF PRETERM BIRTH

- Preterm birth is the leading cause of perinatal morbidity and mortality, accounting for 85% of neonatal deaths.
- There are no accurate means of early diagnosis, prevention, or effective treatment of preterm birth
- Many interventions have been proposed to reduce the rate of prematurity, without success.

- **Yet, there is an incomplete understanding of the physiology and pathology of untimely cervical effacement and dilation during pregnancy**

- Cervical shortening (ie, effacement) is one of the first steps in the processes leading to labor and can precede labor by several weeks.
- A decrease in cervical length in the second trimester is predictive of spontaneous preterm birth,
- Often detected on ultrasound examination before it can be appreciated on physical examination.

How to assess cervical length?

- Digital examination
- Transabdominal ultrasoundn
- Transperineal ultrasound (TPS)
- TVS

Digital EXamination

- Provides the most comprehensive evaluation of the cervix, assessing dilatation, position, consistency and length
- **Subjective**
- ? its ability to establish accurately the cervical length
- Cannot detect reproducibly any changes at the internal cervical os and the upper portion

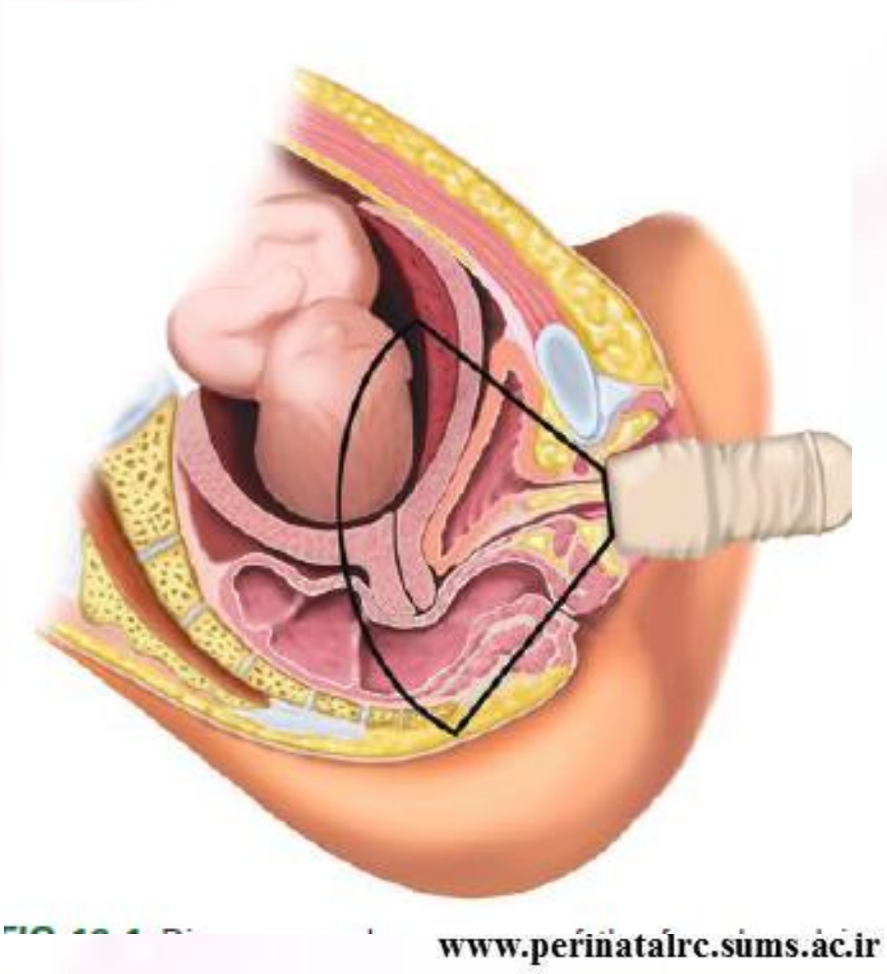
Sonographic evaluation

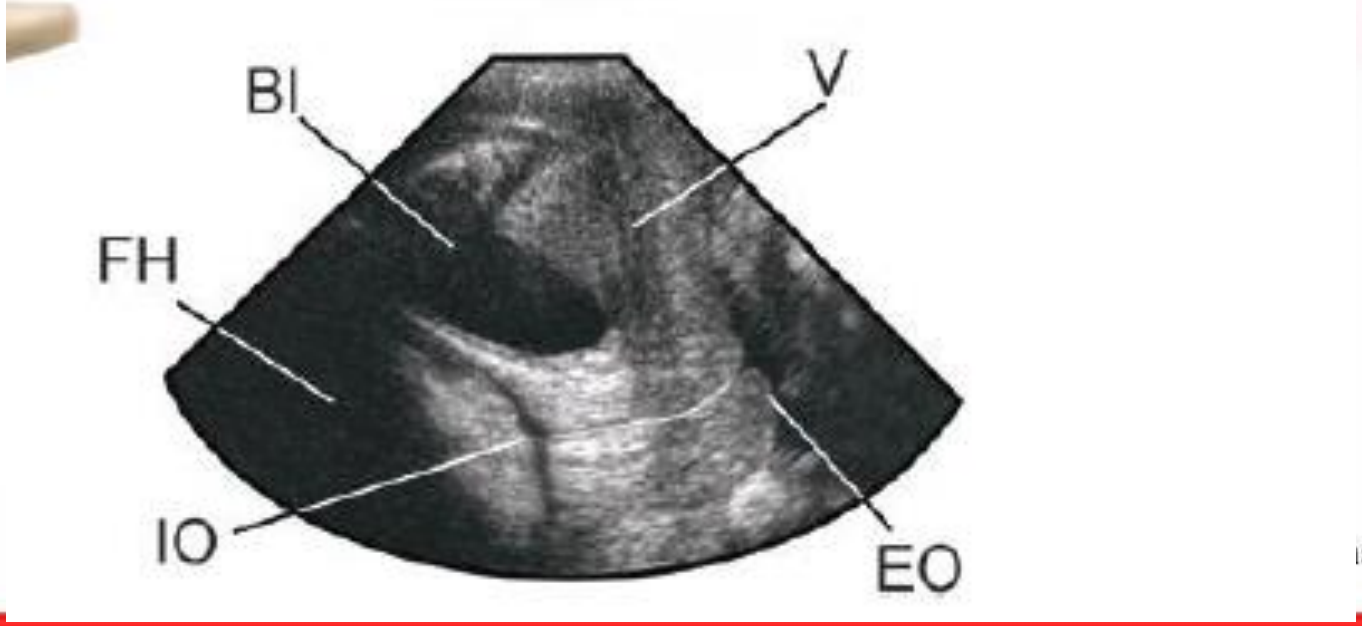
- The single most powerful predictor for preterm birth
- More informative than a history of previous preterm birth.
- Less invasive
- More precise
- Objective method

- Sonographic short cervix is a powerful predictor of spontaneous preterm birth.
- Asymptomatic patients
- Patients at high risk for preterm delivery and/or mid-trimester loss
- Patients presenting with preterm labor

TPS

- The transducer is placed on the perineum and rotated until the complete cervical canal and the internal and external ora can be identified.
- A reduction in the detail of image
- Difference between TVS and TPS measurements is within ± 5mm in 95%



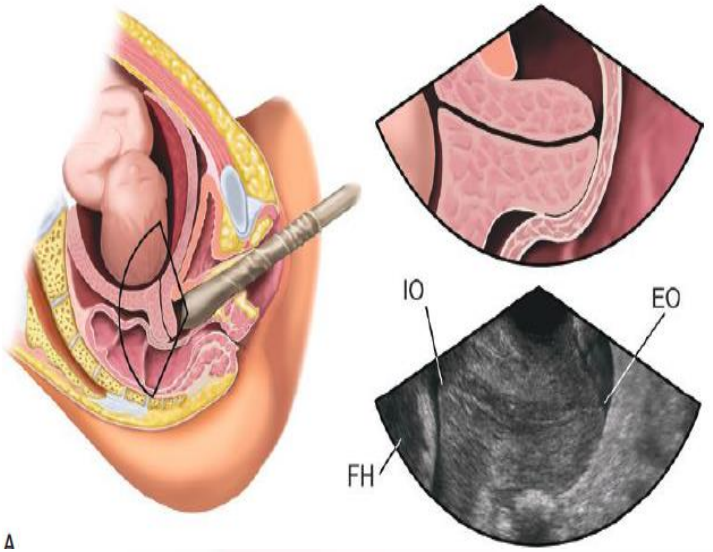


TAS

- Can be used as an initial evaluation
- Overestimate the true cervical length
- Proper risk assessment should be based on a TVS or TPS measurement

TVS

- Preferred method for measuring cervical length
- More reproducible
- More reliable
- More sensitive for prediction of preterm birth



CL measurement

- Cervical-length measurement using transvaginal sonography (TVS) is an essential part of assessing the risk of preterm delivery.
- At mid-gestation, provides a useful method to predict the likelihood of subsequent preterm birth in asymptomatic women
- can help to distinguish between ‘true’ and ‘false’ spontaneous preterm labor

Measurements

- Cervical Length the most reproducible and reliable measurement
- Funnel width
- Funnel length
- Endocervical canal dilatation,
- Elastography
- Cervical index (funnel length + 1/functional length)
-

NORMAL VERSUS ABNORMAL CERVICAL LENGTH

- There is no agreement as to what is a sonographic short cervix
- **S**election of the optimum threshold between 10 and 25 mm for diagnosis of, and subsequent intervention for, short cervical length must rely on imprecise data

- Cervical length ≤25 mm in the second trimester is consistently associated with an increased risk of spontaneous preterm birth
- < 25 mm : the best prediction for PTB obtained at 16 to 24 weeks
- CL < 15 mm has been used in most interventional studies
- The shorter the CL, the higher the risk of PTB

BEST GESTATIONAL AGE AND FREQUENCY OF EXAMINATIONS

- Almost all patients, even those at the highest risk, have a normal CL (i.e., ≥25 mm) in the first and early second trimesters.
- Before 14 weeks, measuring CL may be predictive only in very high-risk women
- After 30 weeks, the CL progressively shortens in preparation for term labor
- most common gestational age for short cervix or funneling to develop in women destined to deliver preterm is 18 to 22 weeks.

- ***low-risk women***: one TVS measurement of the cervix at approximately 18 to
- ***High Risk*** : 1- @14 and 18 weeks
- 2- @ 18 and 22 weeks
- ***Very High risk*** : TVU of the cervix every 2 weeks, at least between 14 and 24 weeks
- CL measures 25 to 29 mm: TVS weekly

CL at 11-14 weeks

- Cervical length at 11–13 WKs + maternal history:
  can detect about 50%of the pregnancies that result in preterm delivery before 34 weeks

BUT

- The difference between the median cervical length of the normal group and that of the preterm-birth group **was only 5mm** (32.5mm vs 27.5 mm)

Universal versus selective screening

- Selection of appropriate candidates for sonographic cervical length screening is controversial.
- In women with a singleton gestation and no prior preterm birth, the sensitivity of short cervix for subsequent preterm birth is approximately 35 to 45
- In women with a prior preterm birth, sensitivity increases to 70 percent and is highest in women with early and/or repeated preterm births

SMFM

- Recommendes routine transvaginal cervical length screening between 16 and 24 weeks of gestation for women with a singleton pregnancy and history of prior spontaneous preterm birth
- They consider screening reasonable for women with a singleton pregnancy and no history of prior spontaneous preterm birth but have not recommended routine screening for this population.
- They recommend **not** performing routine cervical length screening for women with a cervical cerclage

ACOG

- Neither mandated universal routine cervical length screening in women without a prior preterm birth nor recommended against such screening
- ACOG has recommended that the cervix be examined when technically feasible

SOGC

- A clinical guideline from the SOGC concluded that routine transvaginal cervical length assessment was not indicated in women at low risk

FMF

- Is infavor of universal screening

FIGO

- Recommends sonographic cervical length screening in all women 19+0 to 23+6 weeks of gestation using transvaginal ultrasound

- Restricting screening to women with historical risk factors for preterm birth would miss about 40 percent of women with a short cervix, and thus at risk for preterm birth

SO

Cervical length screening in all singleton pregnancies because an intervention (progesterone supplementation) is available that appears to reduce the risk of preterm delivery in women with a short

Clinical application

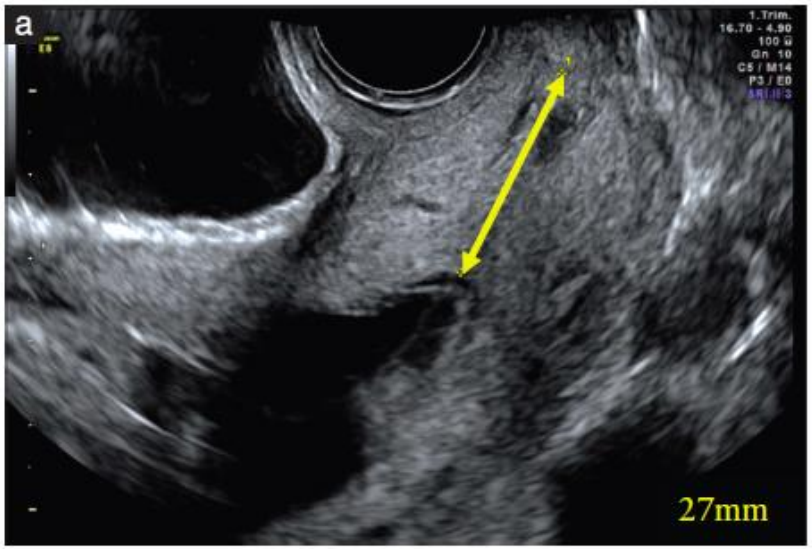
- Prediction of preterm delivery
- Prediction of the likelihood of delivery within the subsequent seven days in women presenting with threatened preterm labor.
- Polyhydramnios during the 2nd or early 3rd trimester
- Planned cesarean section measurement of cervical length at 37 weeks
- Pre-induction cervical length gives useful prediction of the induction-to-delivery interval, the likelihood of vaginal delivery within 24 hours and the likelihood of cesarean section.
- In prolonged pregnancies at 41 weeks

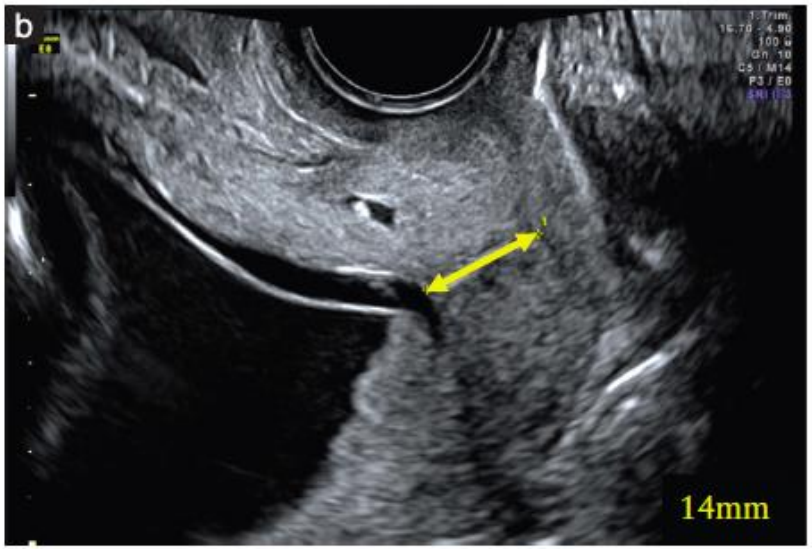
Technique

- Explain to the patient
- Get verbal consent
- Patient's privacy
- Empty bladder
- Lies in the supine position with flexed knees and hips
- covered with either a glove or an appropriate sheath
- There is no risk for microbial inoculation as a result of the use of the endovaginal probe.
- Gel is placed between the transducer and the cover as well as on the surface sheath.

Maternal bladder should be essentially empty

- Increase artificially the cervical length (4 mm)
- Obscure the presence of cervical funneling





- The operator introduces the vaginal probe into the anterior fornix until a midline sagittal view of the cervix and lower uterine segment are seen.
- The internal os, external os, cervical canal, and endocervical mucosa

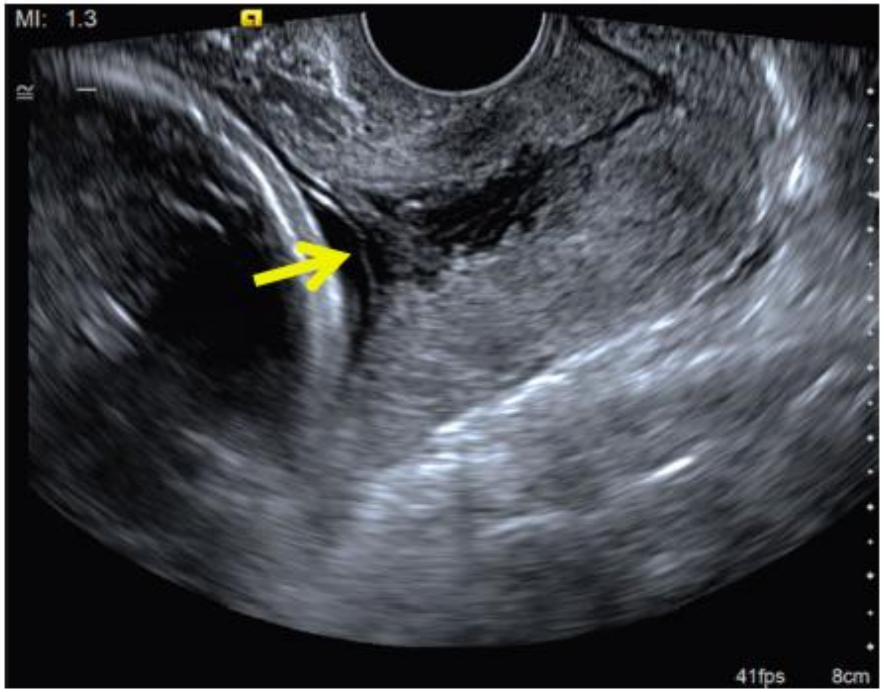
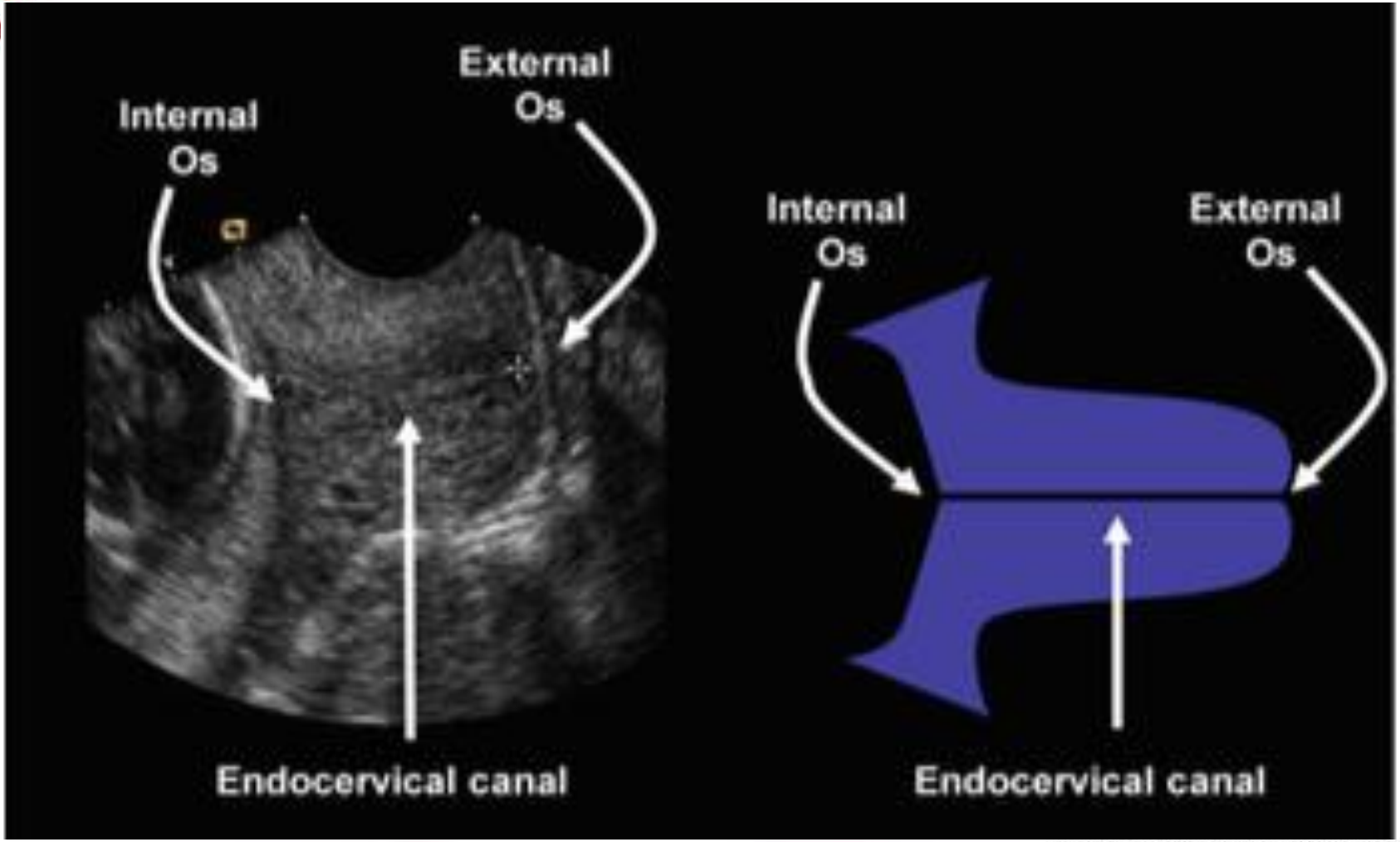


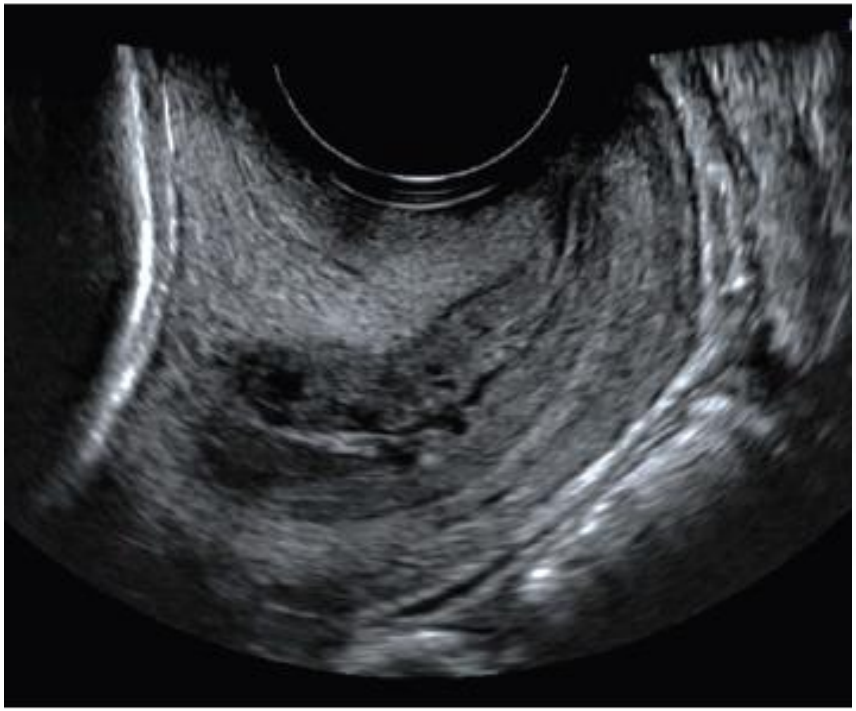
Figure 3 Transvaginal ultrasound image of a cervix with accumulation of mucus. Amniotic membranes are indicated (arrow), showing that funneling is not present.

The cervical canal and surrounding cervical mucosa need to be identified

- To avoid inclusion of the isthmus into the cervical-length measurement, care must be taken to identify the internal and the external oras.
- The external os is identified as the point at which the anterior and posterior lips of the cervix come together.
- Identification of the internal os : the cervical mucosa must be identified.



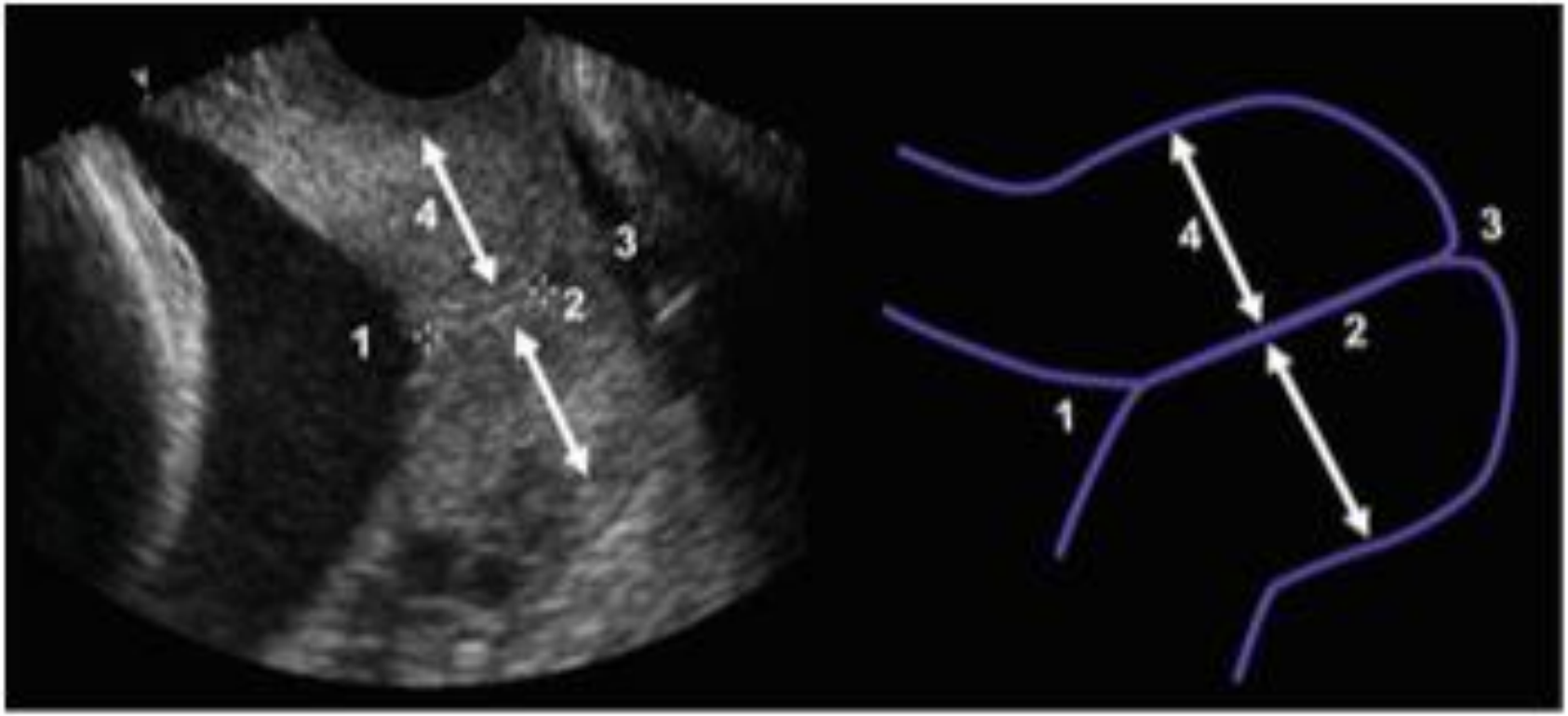
Magnification of the ultrasound image

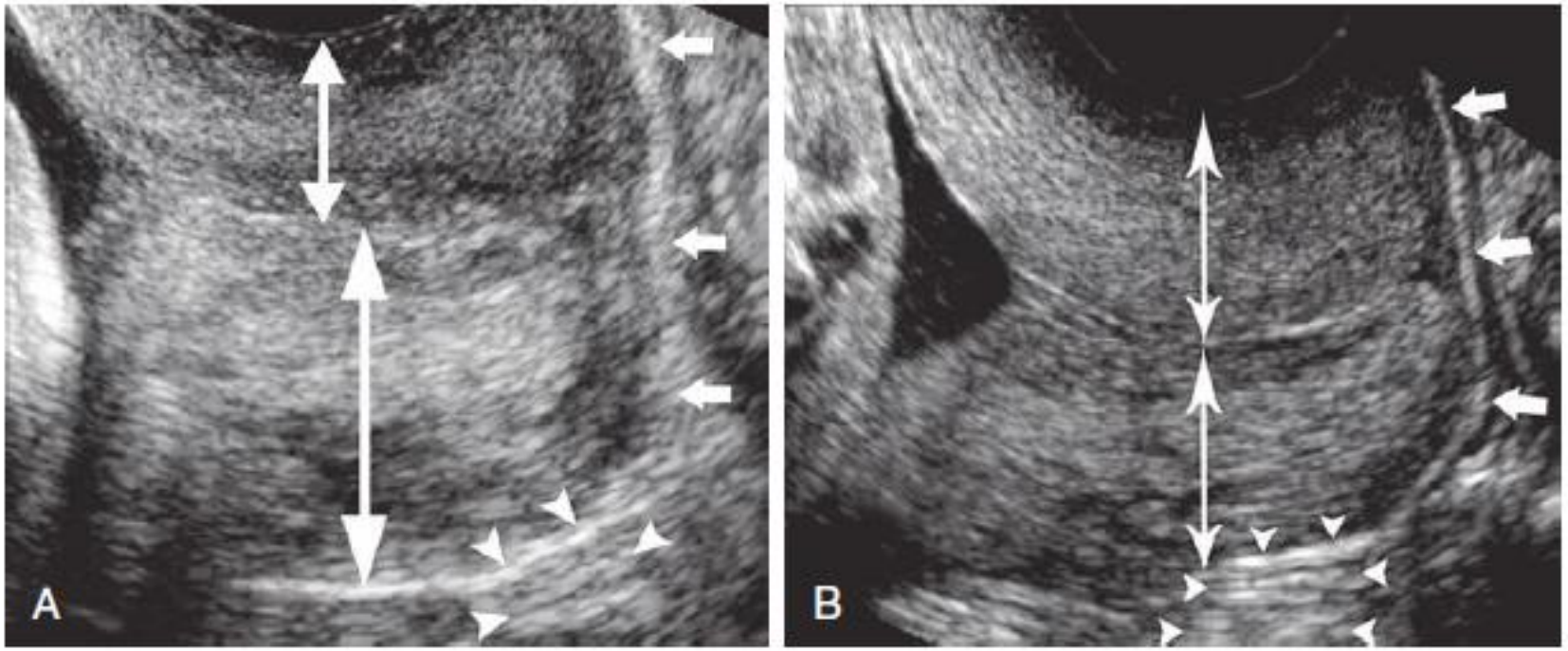


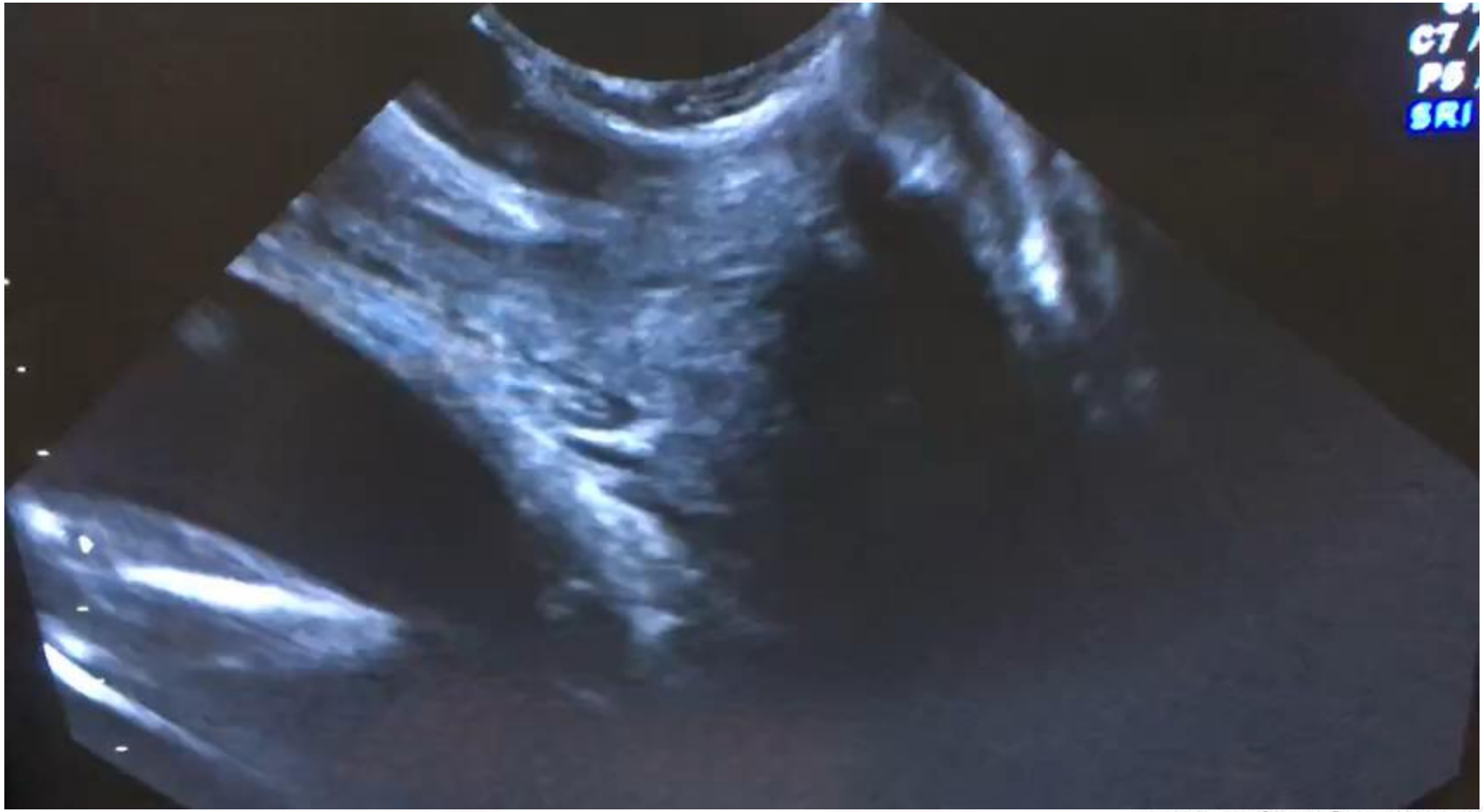
4 Transvaginal ultrasound image of a cervix, showing
l mucosa as a homogeneous and hypoechoic structure
red to the surrounding stroma.

Pressure from the probe on the cervix should be as little as possible

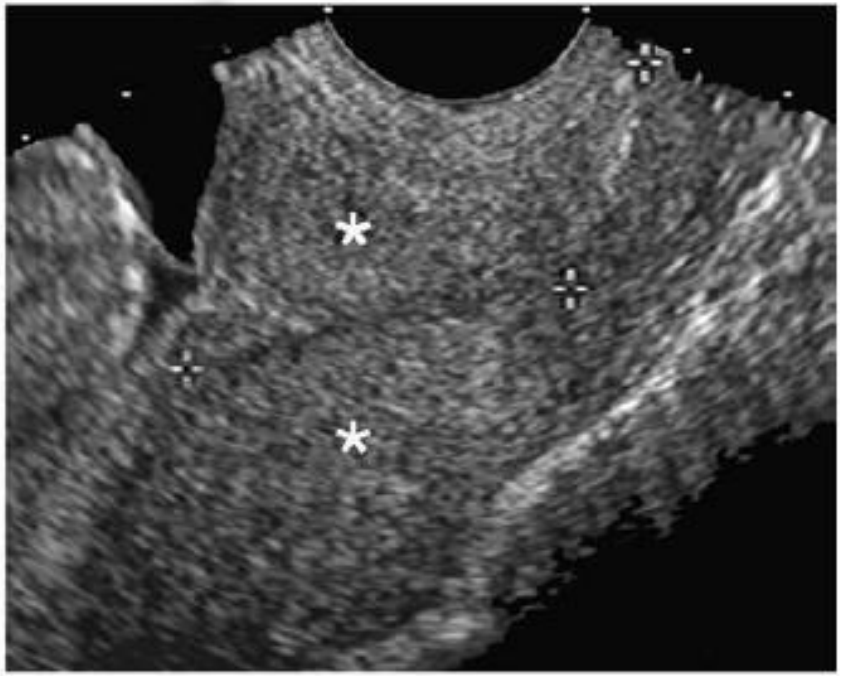
- Cervix appears artificially longer
- The presence of a funnel will be obscured
- put some pressure on the cervix initially and reduce the pressure subsequently to the minimum that is required in order to view the cervix adequately


4
3
2
1
4
3
2
1

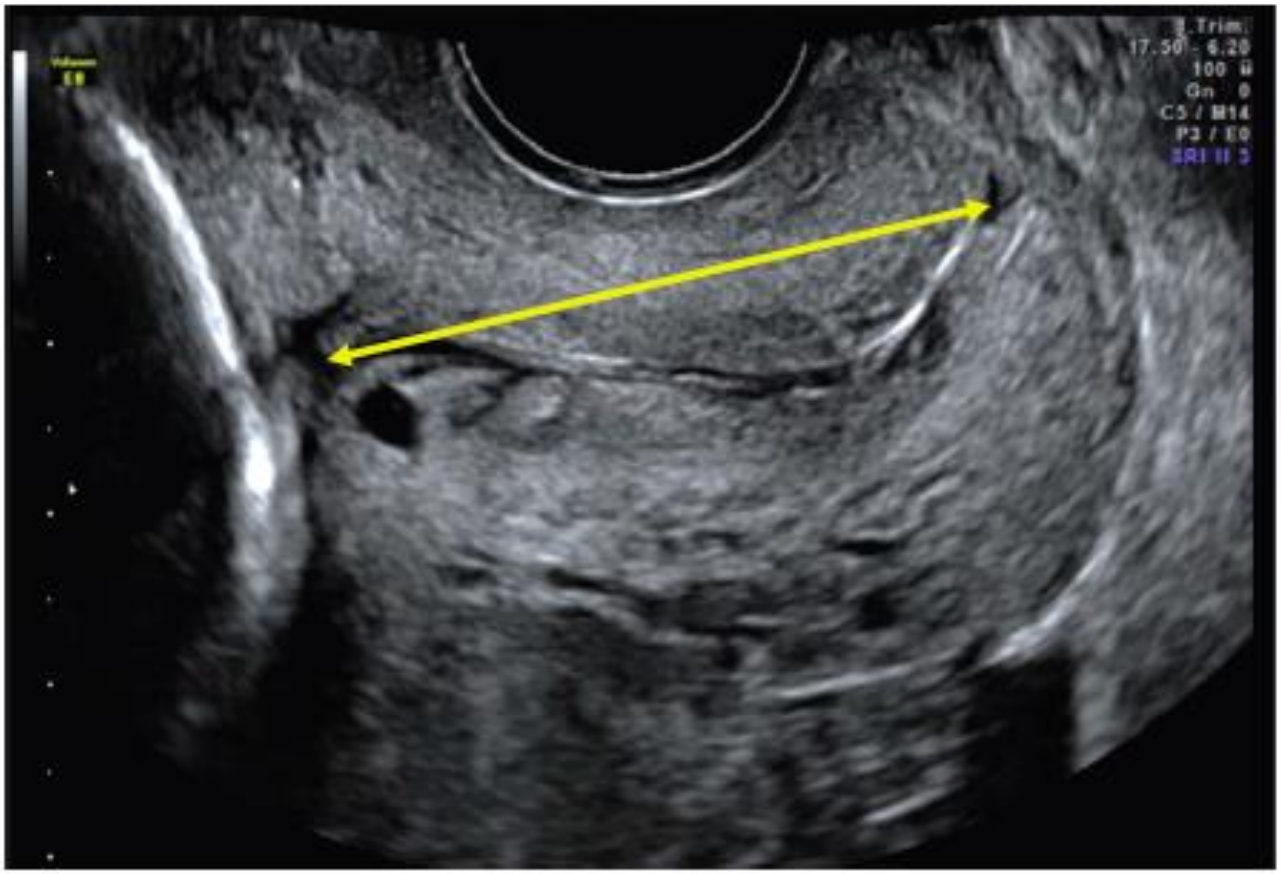




Duration of the examination should be 3–5 min



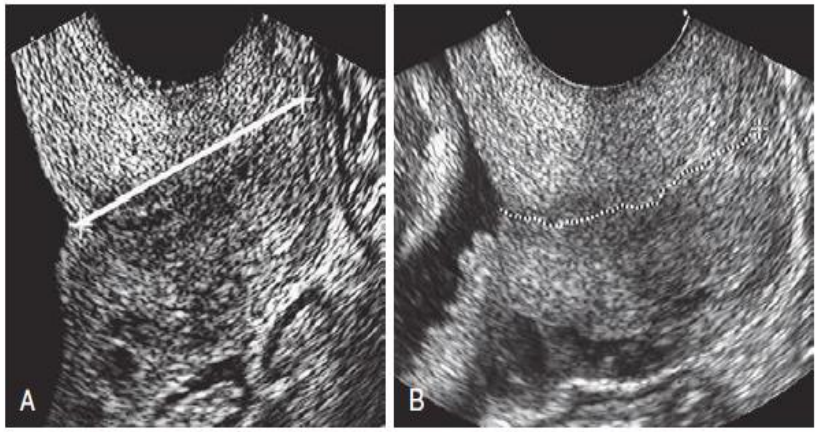
Calipers should be placed correctly

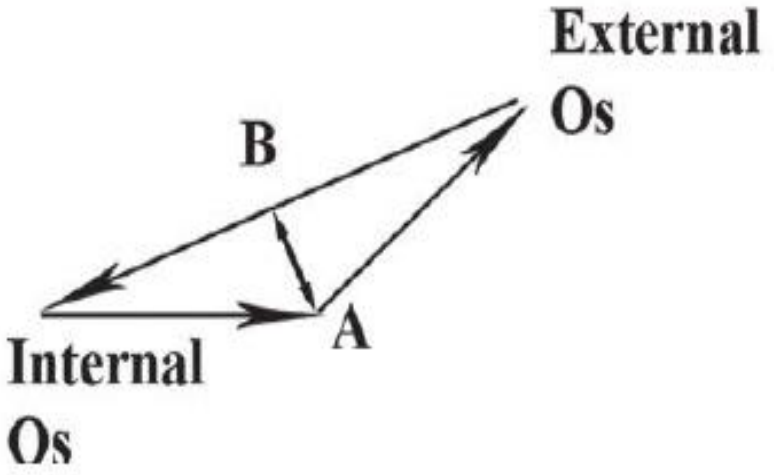


Cureved

The length of a single, straight line from the internal to external os can be measured.

The sum of two separate, straight lines joined at an angle along the curved length of cervix is determined: this sum is used for the cervical length if the distance between the angle and a straight line from the internal to external os is >5 mm

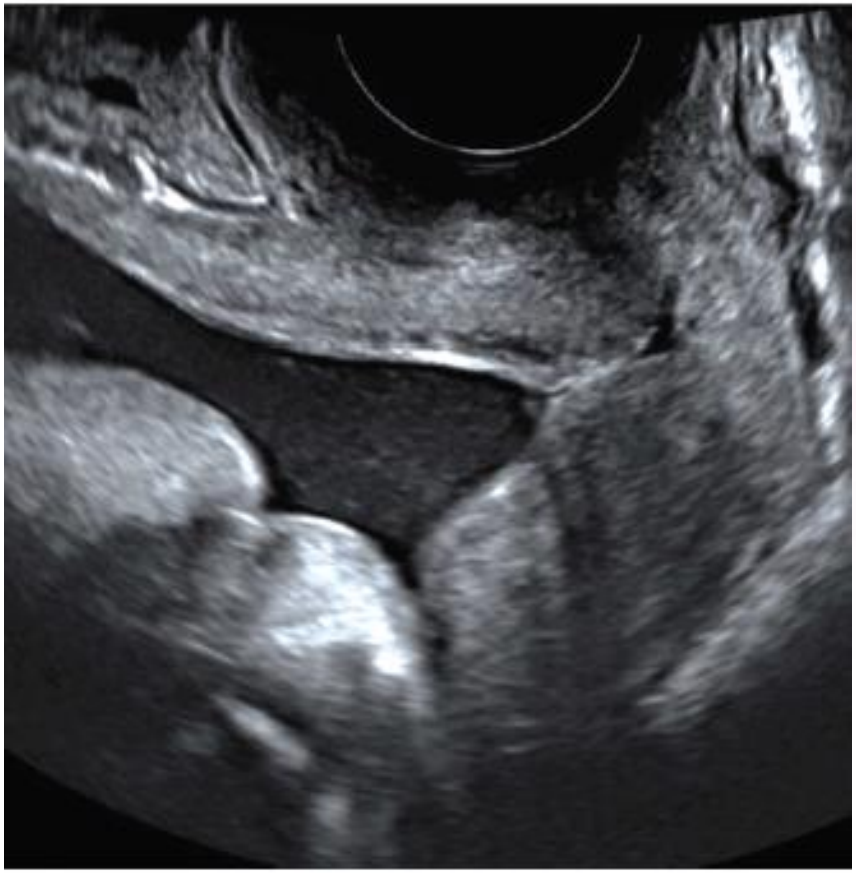


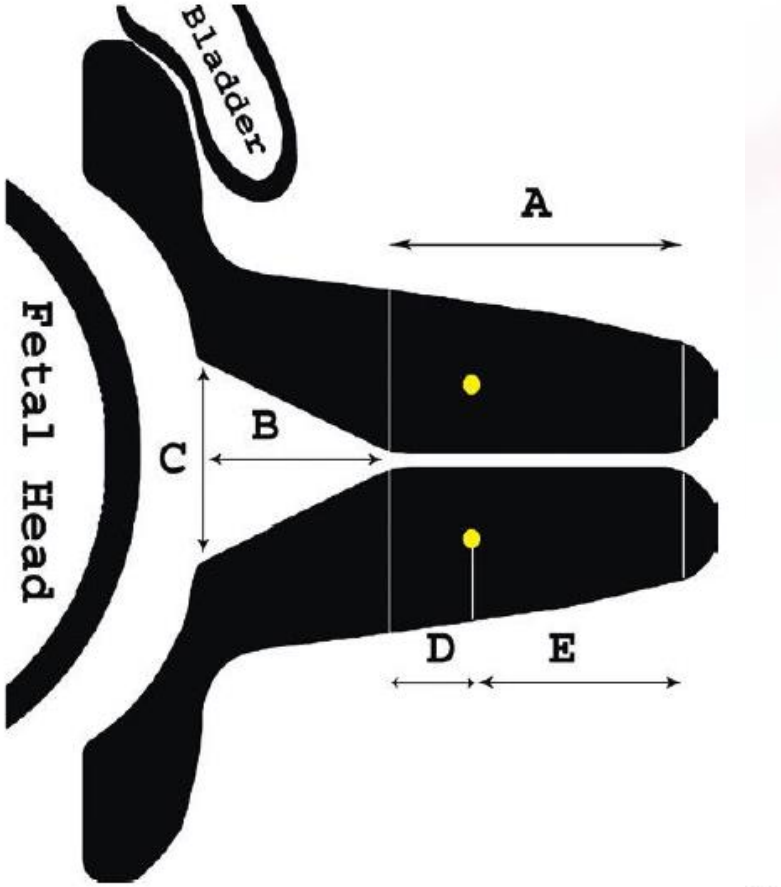


Funneling

- A funnel is defined as dilation of the upper portion of the cervical canal and protrusion of no less than 3 mm of amniotic membranes into the internal os
- The longer the funnel, the shorter the remaining cervical length
- Most favor cervical length measurement because it is more reproducible than the assessment of funneling
- Women with a long cervix and funneling are not at increased risk of preterm delivery

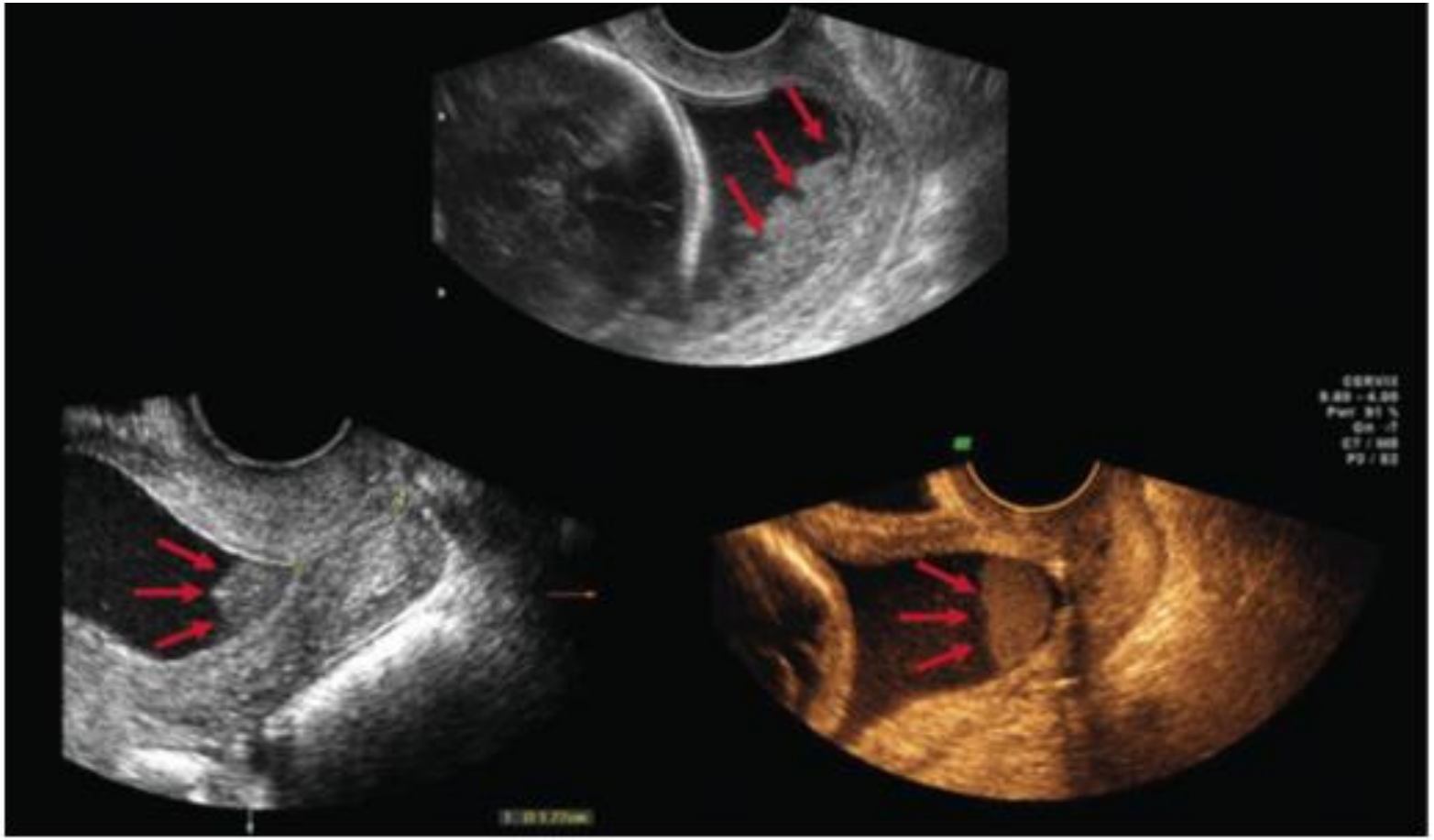
- Funneling does not provide any additional diagnostic information over that provided by cervical length in the prediction of preterm birth.

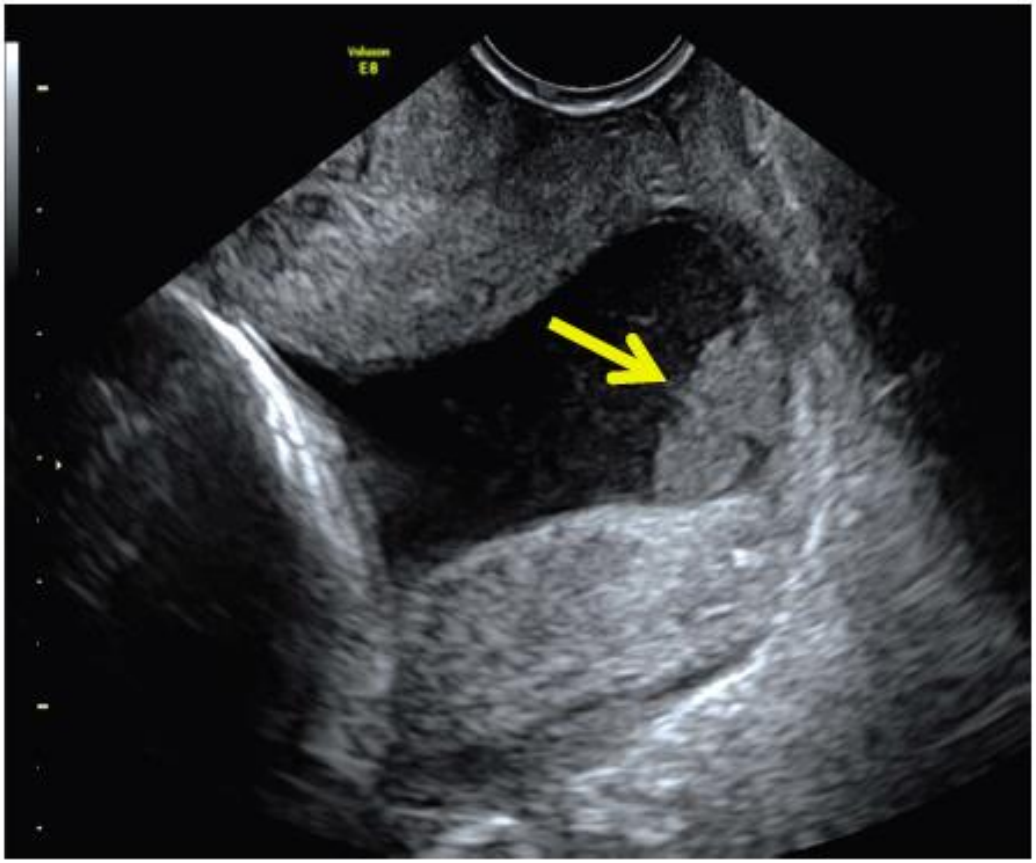



Bladder
A
Fetal Head
B
C
D
E
www.perinatalrc.sums.ac.ir

Amniotic Fluid "Sludge"

- Defined as particulate matter seen in proximity of the internal cervical os during a transvaginal sonography, and occurs in 1 -4% of pregnancies
- Is associated with delivery within 14 days of ultrasound and preterm delivery at less than 32 and less than 34 weeks
- "pus-like" appearance and the Gram stain showed gram-positive bacteria
- culture was positive for *Streptococcus mutans*, *Mycoplasma hominis*, and *Aspergillus flavus*

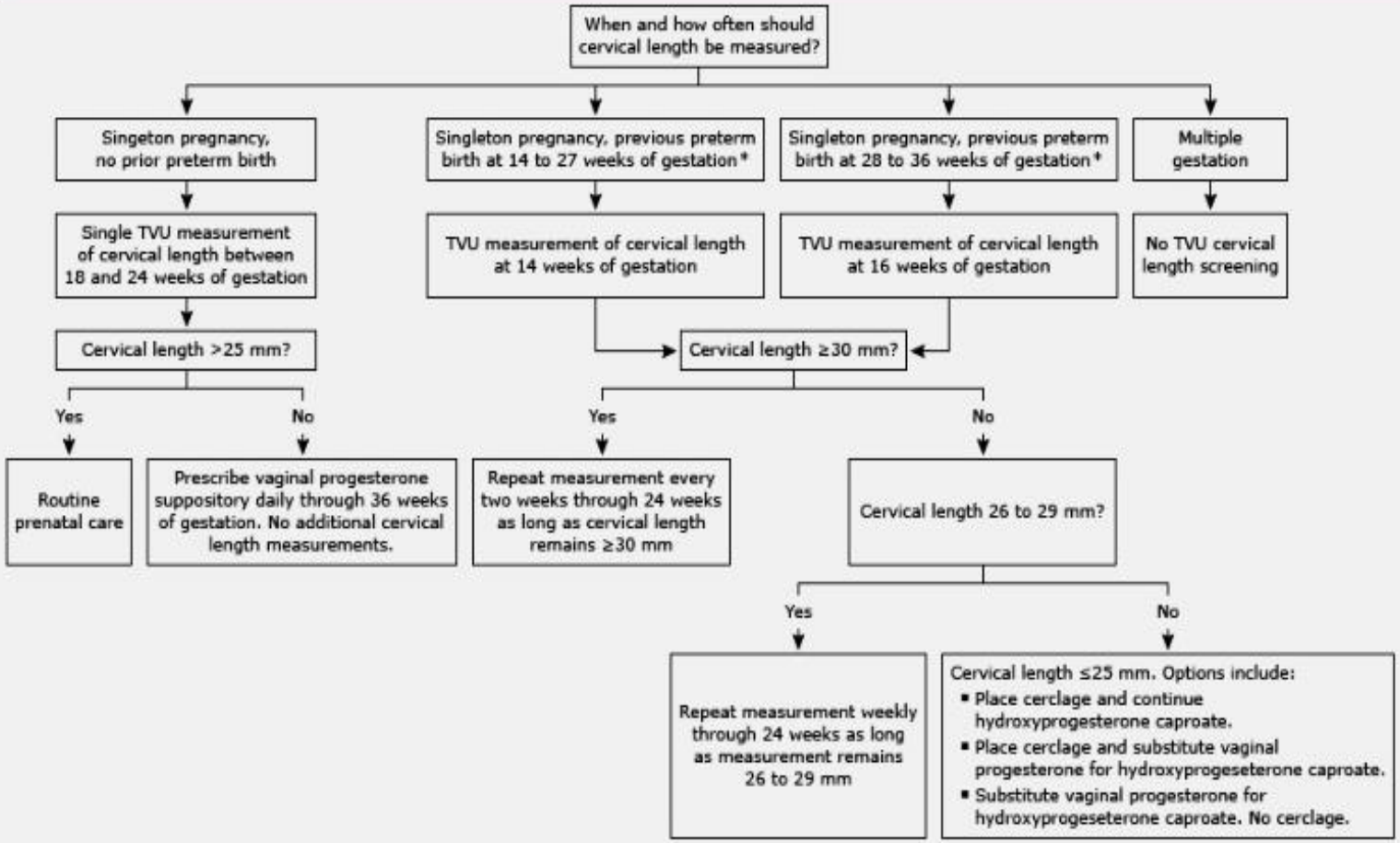




IS THERE AN EFFECTIVE TREATMENT FOR A SONOGRAPHIC SHORT CERVIX?

- Cervical cerclage in women with a sonographic short cervix (15 mm or less) and a low risk for preterm delivery (by history) does not reduce the rate of spontaneous preterm birth
- **Cervical cerclage** reduces the risk of delivery before 34 weeks in high risk group by about 25%.

Approach to sonographic screening of cervical length in pregnancy and management of pregnant women with a short cervix



Many thanks for your attention

- **Progesterone** given from 20 to 34 weeks reduces the risk of delivery before 34 weeks by about 25%.
- can be given as a vaginal pessary of the natural product (200 mg) every night or as an intramuscular injection of the synthetic 17 alpha-hydroxyprogesterone carporate (250 mg).
- Natural progesterone is preferable because of lack of undesirable side effects, such as sleepiness, fatigue and headaches.
- Additionally, there is some concern that injections of 17-OHP-C may increase fetal death.

Women with previous preterm birth

- No benefit from bed rest, prophylactic tocolytics or lifestyle interventions
- Progesterone vaginal pessary every night from 20 to 34 weeks reduces preterm delivery rate by 25%
- Measurement of cervical length every 2 weeks between 14 and 24 weeks and cervical cerclage if the cervix becomes less than 25 mm reduces preterm delivery rate by 25%

Prevention in women with inflammation or infection

- **In women with a positive fetal fibronectin test:** the risk of preterm delivery is increased but this is not reduced by the prophylactic use of antibiotics.
- **Bacterial vaginosis**. Antibiotic treatment can eradicate bacterial vaginosis in pregnancy but does not reduce the risk of spontaneous preterm delivery.
- **In women with asymptomatic bacteriuria:** Antibiotic treatment reduces the risk of pyelonephritis but does

Women with no previous preterm birth but positive screening test

Short cervix at 20-24 weeks:

- Cervical cerclage may reduce the risk of preterm delivery by 15%.
- Progesterone vaginal pessary every night from 20 to 34 weeks reduces the risk by about 45%

Prevention in twin pregnancies

- Bed rest is associated with a significant increase, rather than decrease, in the rate of early preterm birth.
- Cervical cerclage in those with a short cervix (less than 25 mm) doubles the risk of early preterm birth.
- Prophylactic administration of progesterone does not reduce the risk of early preterm birth

Threatened preterm labor Management

- The majority of women (more than 80%) presenting to the labor ward with painful and regular uterine contractions at 24–36 weeks of gestation are not in true labor and do not deliver within the subsequent seven days.

Threatened preterm labor

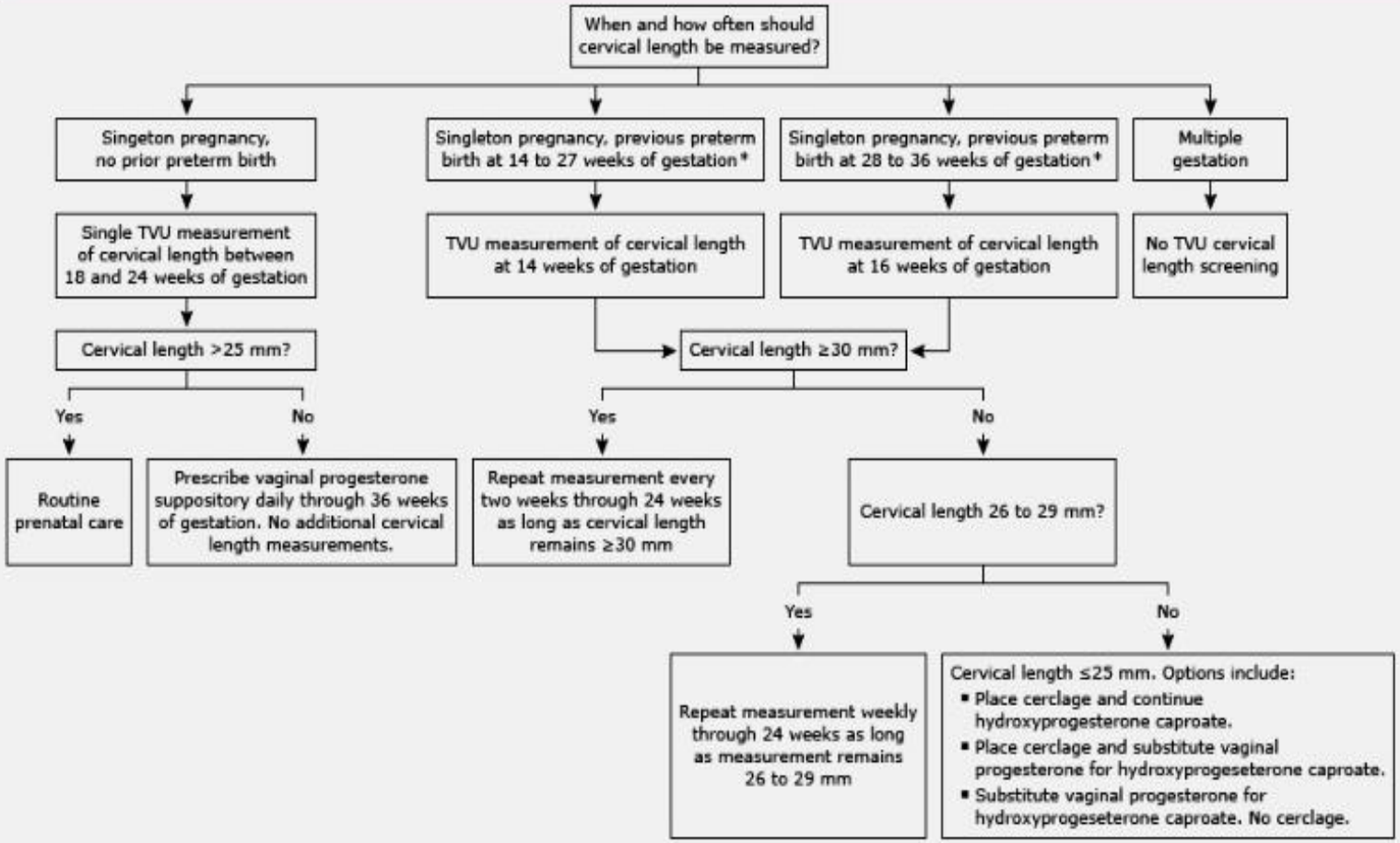
1- Distinguish between true and false labor

- Cervical length
- Cervicovaginal fetal fibronectin

2- In those with true labor

- Hospitalization
- Tocolytics to delay delivery
- Steroids to mature fetal lungs

Approach to sonographic screening of cervical length in pregnancy and management of pregnant women with a short cervix



Many Thanks for your attention

Eram Garden Shiraz