

# Evidence-based Approach for Preventing Preterm Birth: Cervical Stitch (Cerclage) vs Role of Arabin Pessary for Cervical Insufficiency

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Preterm birth causes significant neonatal morbidity and mortality, as well as long-term disability. Therefore, strategies for preventing preterm birth are important. Both prophylactic cervical cerclage and prophylactic vaginal progesterone<sup>1</sup> are effective in preventing or delaying preterm birth in women with a short cervix and a history of spontaneous preterm birth (up to 34<sup>+</sup><sub>0</sub> weeks of pregnancy) or mid-trimester loss (from 16<sup>+</sup><sub>0</sub> weeks of pregnancy onward). Cervical insufficiency, previously known as cervical incompetence, is a term used to describe an underlying cervical structural defect that contributes to early delivery of an otherwise healthy pregnancy. A classical diagnosis of cervical insufficiency is made based on historical information in which cervical dilatation occurs without contractions in one or more pregnancies. In most cases, this leads to delivery in the second trimester of pregnancy. The biggest obstacle in this area of research is the accurate diagnosis of cervical insufficiency. The controversy comes from many studies and routine practice often including patients without a clear diagnosis who likely do not have true cervical insufficiency.<sup>1,2</sup>

## ULTRASOUND CRITERIA

According to American College of Obstetricians and Gynecologists (ACOG), there is no reason to perform ultrasound screening for cervical insufficiency in women with a history of first-trimester pregnancy losses. Serial ultrasound assessments of the cervix in low-risk women have demonstrated low sensitivity and low positive predictive values (Fig. 1).

Cervical cerclage is a surgical procedures in which sutures or synthetic tape is used to reinforce the cervix. The purpose of cervical cerclage is to increase the mechanical strength of the cervix, thereby preventing painless passive dilatation and premature delivery prior to viability.

New guidance from the ACOG outlines which women may be candidates for cervical cerclage to lower the risk for preterm birth.

Cervical cerclage is categorized according to ACOG guidelines 2011:

- History indicated
- Ultrasound indicated
- Rescue cerclage.

The procedure may be indicated in the second trimester in women with singleton pregnancies who:

- Have a history of second-trimester pregnancy loss associated with painless cervical dilatation without labor or placental abruption.

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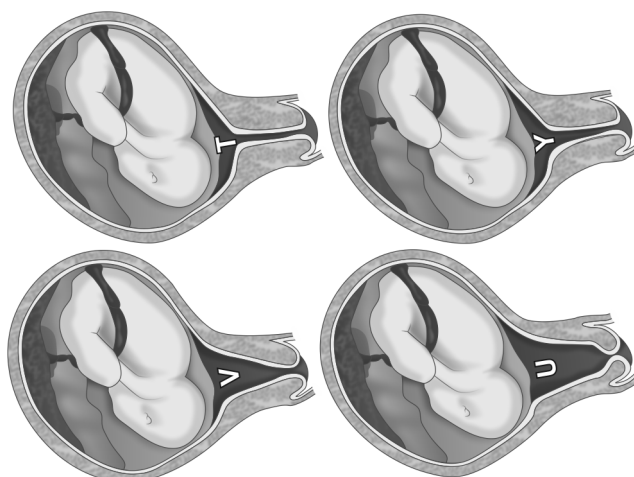
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- Have had cerclage in a previous pregnancy due to painless dilation.
- Currently have painless cervical dilation.
- Previously had a spontaneous preterm birth before 34 weeks and, in the current pregnancy, have a cervical length under 25 mm before 24 weeks' gestation.



**Fig. 1:** Ultrasonographic criteria of cervical incompetence

However, cerclage is not recommended for women with short cervical length in the second trimester without a history of preterm birth.

### Timings

The optimal time to place a cerclage should be between 16 weeks and 18 weeks when the vast majority of spontaneous pregnancy losses have already occurred and where ultrasound anatomical evaluation of the fetus can exclude pregnancies with major congenital abnormalities incompatible with life. No literature indicates early cerclage is advantageous over placement at 16 weeks.

### Types of Cerclage

- McDonald cerclage, described in 1957, is the most common and is essentially a purse string stitch used to cinch the cervix shut; the cervix stitching involves a band of suture at the upper part of the cervix while the lower part has already started to efface.<sup>3</sup> This cerclage is usually placed between 16 and 18 weeks of pregnancy. The stitch is generally removed around the 37th week of gestation or earlier if needed.<sup>4</sup> This procedure was developed by the Australian gynecologist and obstetrician, McDonald (Fig. 2).<sup>5</sup>
- Shirodkar cerclage is very similar, but the sutures pass through the walls of the cervix so that they are not exposed.<sup>3</sup> This procedure sometimes involves a permanent stitch around the cervix which will not be removed, and therefore, a cesarean section will be necessary to deliver the baby. The Shirodkar technique was first described by Shirodkar in Mumbai in 1955.<sup>6</sup>
- Abdominal cerclage, the least common type, is permanent and involves placing a band at the very top and outside of the cervix, inside the abdomen. This is usually only done if the cervix is too short to attempt a standard cerclage or if a vaginal cerclage has failed or is not possible. A cesarean section is required for women giving birth with a transabdominal cerclage (TAC). A TAC can also

be placed pre-pregnancy if a patient has been diagnosed with an incompetent cervix.<sup>3</sup>

### Five Principles of Effective Cerclage

- Place the cerclage as high as possible
- Place the cerclage adjacent to the cervical stroma
- Take three encircling cervical “bites”
- Place the knot at 6 o’clock
- Place a figure of 8 around the cerclage knot.

### Stepwise Surgical Technique

- Use a weighted speculum to retract the posterior-inferior vaginal wall. Have an assistant hold one or two right-angle retractors to retract the other aspects of the vaginal wall, including the bladder anteriorly, as needed.
- Clamp the anterior and posterior lips of the cervix and tug them lightly at all times—in an outward direction.
- Retract and release the bladder several times using a right-angle retractor for more accurate identification of the cervicovesical fold (Figs 3 and 4). Note the distance from the external os to the cervicovesical fold; it should be 2 cm or farther. (If it is less than 2 cm, another type of cerclage may be preferable.)
- Identify the roof of the posterior fornix (Figs 3 and 5).
- Using Allis clamps bilaterally, clamp the soft tissue covering the cervical core (stroma), between the cervicovesical junction anteriorly and the superior point of the posterior fornix posteriorly. This is a cardinal step because it separates the core from the mucosal/submucosal elements. (Helpful hint: To achieve optimal placement of the lateral Allis clamps, place the open clamp ever so slightly to one side of the middle of the cervix. As you close the instrument, let the clamp slide off the cervical core until it is locked adjacent to it. This takes the soft tissue and supporting blood vessels out of the operative field.)

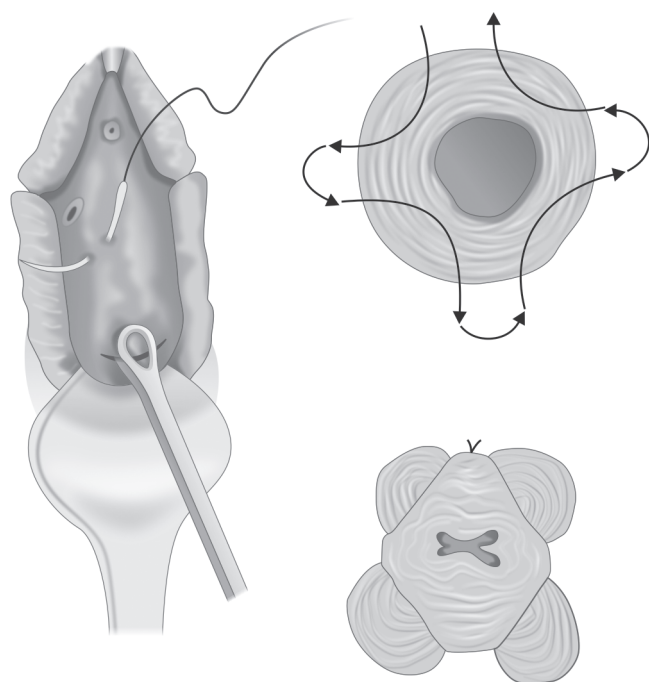


Fig. 2: McDonald's cervical stitch

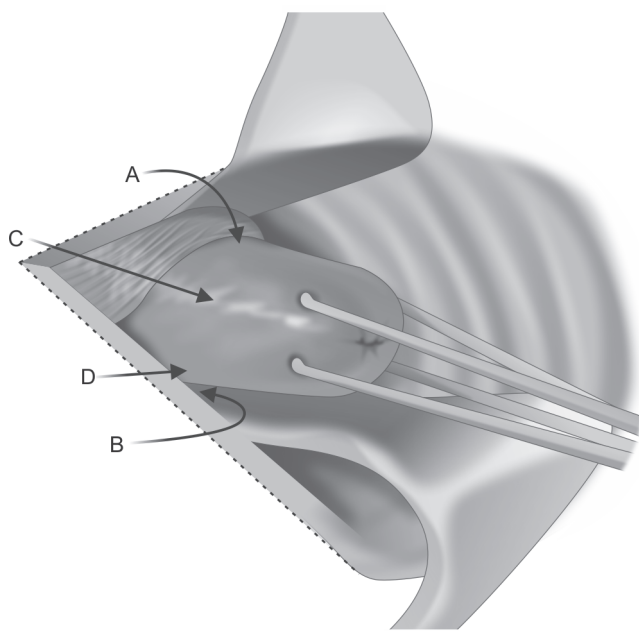


Fig. 3: Anatomic landmarks: Cerclage is facilitated by orientation to the following landmarks: (A) Cervicovesical fold; (B) Posterior fornix; (C) Cervical stroma; (D) Cervical mucosa



Fig. 4: Cervicovesical fold depicted by the black line



Fig. 5: Roof of posterior fornix depicted by the black line

- Take three bites, 1 mm in depth, through the cervical core using a 5-mm Mersilene tape and a blunt tipped needle (RS21; Ethicon). One bite should encompass 12:30 to 11:30 anteriorly. Another bite should go in at 3 o'clock and out at 5 o'clock, and another bite should go in at 9 o'clock and out at 7 o'clock (Figs 3 and 4). (Helpful hint: Ensure that the direction of the pull always is a direct extension of the passage through tissue in small steps and not an outward direction toward the operator. An instrument such as a curved Mayo clamp should be placed at the point of the needle's exit to reduce the risk of injury. At the conclusion of the three bites, the Mersilene tape should be the same length on each side.)
- Once the tape is of equal length on both sides, closely encircling three sides of the cervical core, empty the bladder with a catheter to ensure the presence of clear urine. Bloody urine could be an indication for cystoscopy to rule out bladder injury.
- Cut the needles off of the tape and tie the cerclage in three ties, the first one being a surgical tie. After tying the first tie, ensure proper tension by pressing gently with the index finger up and down on the knot; if it is properly tensioned, it will not be displaced by this movement. (Helpful hint: There is no clear indication of how tight a cerclage should be tied. We suggest making the first tie as close as possible to the cervical core to create a visible, and palpable, depression in the soft tissue at the area of the knot.
- Trim the ends of the tape to 3 cm to facilitate easy identification and manipulation at the time of removal. Place a figure of 8, using bright blue Prolene #1 (Ethicon), around the knot, securing it to the posterior surface of the cervical core. The tape should encircle the firm part of the cervix near the internal os, as shown by transvaginal ultrasonography. (Helpful hint: Place surgical gauze under pressure around the cervix to support hemostasis after removal of the clamps. Remove the gauze approximately 30 minutes after the procedure.)

### Contraindications

Both absolute and relative contraindications to cerclage exist. Absolute contraindications include the following:

- Active labor
- Active vaginal bleeding
- Abruptio placenta

- Premature rupture of membranes
- Chorioamnionitis.

Relative contraindications include the following:

- Prolapsed membranes
- Vaginal spotting.

Patients with relative contraindications should be observed from several hours to a day to ensure that no evidence of absolute contraindication exists prior to placement of a cerclage.

### Complications

While cerclage is generally a safe procedure, there are a number of potential complications that may arise during or after surgery. Complications at the time of elective cerclage are uncommon and occur in less than 10% of procedures. The commonest complication is rupture of membranes that has been reported in up to 58% of nonelective procedures.

The new ACOG practice bulletin #120 gives a figure of 33% for chorioamnionitis and others have reported a rate between 5% and 80% for emergent cerclage.<sup>7,8</sup> Cervical dystocia or cervical trauma in labor have been reported in fewer than 5% of patients. Excessive bleeding, maternal sepsis, and fistula formation are rare.

Other potential complications that may arise during or after surgery are as follows:

- Premature labor
- Premature rupture of membranes
- Infection of the cervix
- Infection of the amniotic sac (chorioamnionitis)
- Cervical rupture (may occur if the stitch is not removed before onset of labor)
- Injury to the cervix or bladder
- Bleeding
- Cervical dystocia with failure to dilate requiring cesarean section
- Displacement of the cervix.

### Cerclage Removal

The cerclage is usually removed at 36–37 weeks of gestation or with the onset of premature labor to avoid cervical laceration or uterine rupture. Whether to remove the cerclage in the setting of preterm premature rupture of membrane (PPROM) is controversial.

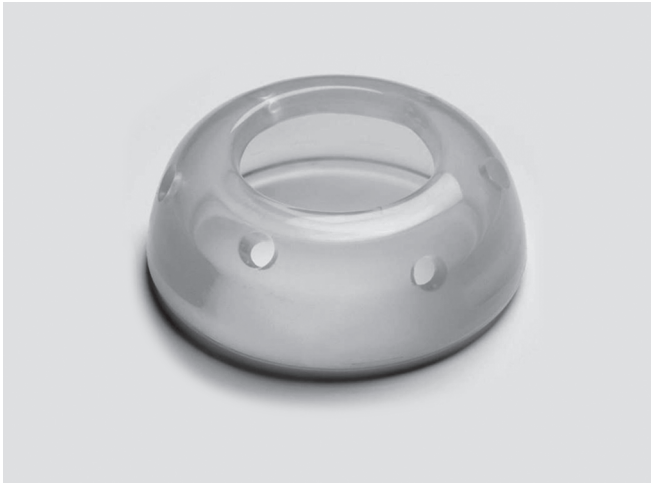


Fig. 6: Silicon perforated cervical pessary ring

### Alternative to Cervical Cerclage: Arabin Pessary

The cervical pessary is designed for the treatment of pregnant women, to support the cervix mainly in patients with additional complaints of prolapse (painful “downwards” pressure during standing and walking), pregnant women who are exposed to physical strain (e.g., standing for a long time), increased intrauterine pressure, e.g., multiple pregnancies or ultrasound signs of an incompetent cervix. The pessary treatment should start before the cervix might be effaced at an early stage of cervical shortening diagnosed by transvaginal sonography. In patients with U-shaped funneling, a wider upper diameter (35 mm) might prevent unnecessary prostaglandin release. The pessary is not meant to close the cervix completely but rather to support it and to shift

the cervix toward the sacrum. In case of increased cervical/vaginal discharge perforated pessaries allow a better passage of fluids (Fig. 6).

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