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### Title

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### Permalink

<https://escholarship.org/uc/item/5qv2h5s5>

### Journal

Contraception, 103(4)

### ISSN

0010-7824

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### Publication Date

2021-04-01

### DOI

10.1016/j.contraception.2020.10.016

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Peer reviewed

## Case Report

# Mechanical dilation to remove incarcerated laminaria during a second trimester abortion

 The corrections made in this section will be reviewed and approved by a journal production editor.

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## Abstract

Cervical preparation with laminaria reduces complications with 2nd trimester dilation and evacuation. During a surgical abortion at 22 weeks, we could not remove laminaria manually or with ring forceps due to laminaria “dumbbelling”.<sup>[1]</sup> Without pushing laminaria into the uterus, we mechanically dilated the cervix and removed the incarcerated laminaria.

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**Keywords:** Laminaria; Osmotic dilator; Dilation and evacuation; Laminaria fragmentation; Laminaria incarceration; Cervical dilation; Second trimester abortion

## 1 Introduction

Laminaria osmotic dilators provide cervical preparation for second trimester dilation and evacuation (D&E) to reduce risk of cervical laceration and uterine perforation <sup>[1–3]</sup>. This case report describes successful removal of incarcerated laminaria without displacement of laminaria into the uterine cavity. The patient consented to case publication.

## 2 Case

A 21-year-old primigravid woman at 22 weeks and 0 days presented for a second trimester surgical abortion. Our initial attempt at placing 12 laminaria per our standardized clinic protocol (see [appendix](#)) following cervical anesthesia with 1% lidocaine was unsuccessful due to a tight nulliparous cervix. After mechanically dilating her cervix to 43 French, we placed ten laminaria (4 mm × 70 mm) and administered mifepristone 200 mg PO<sup>2</sup>.<sup>[2]</sup>

Approximately 20 hours later, we brought her to the operative room for her procedure under propofol anesthesia with a natural airway. Attempts at manual and ring forceps removal of laminaria yielded strings and laminaria fragments only. Transabdominal ultrasound showed an incarcerated mass of laminaria in the cervix, with the mass widest at its superior end within the lower uterine segment. No laminaria were observed in the uterus. We proceeded to mechanically dilate the cervix further: (1) between the cervical wall and the laminaria mass starting with a 13 French Pratt dilator and advancing to 23 French, being careful not to dissect into the cervical stroma; and then (2) between laminaria, starting at 13 French and advancing to 27 French. We performed all mechanical dilation under ultrasound guidance to ensure that laminaria were not pushed into the uterus. After dilation, we were able to remove the incarcerated laminaria with ring forceps. Examination of the “dumbbelled” laminaria (flared ends, narrow center, see [Fig. 1](#)) indicated that we had completely removed the laminaria.



Fragmented “dumbbelled” laminaria removed 20 hours following insertion and mifepristone 200 mg PO administration. The inferior aspects of these laminaria were presenting at the external os.

Our patient had traveled over one hour to our facility and purchased accommodations in town to have her procedure be completed within two days. In addition, like many institutions, we have system barriers to postponing her D&E to the next day, such as limited operating room nurses, technicians and anesthetists willing to participate in abortion care. Therefore, our team developed a new plan to ensure the patient’s abortion could be safely completed the same day. Since cervical dilation at this point was insufficient for a safe D&E, we placed eight Dilapan-S (4 mm × 65 mm) osmotic dilators and administered misoprostol 400 mcg 3 hours buccally [2] prior to a second attempt for D&E later that day.

Eight hours after Dilapan-S placement, we manually removed her dilators, mechanically dilated her cervix to 79 French, and performed the D&E. At the end of the procedure, a 2 cm partial thickness cervical laceration at 8 o’clock along the endocervical canal required repair with 0-Vicryl and Monsels solution to be hemostatic. We identified no laminaria in the products of conception. The patient had a quantified blood loss of 145 mL. An ultrasound one hour after procedure showed an empty uterus with a 7.1 mm endometrial stripe. The patient was discharged home the same day, with no further complications.

### 3 Comment

Previous reports have discussed complications associated with laminaria including fragmentation, incarceration in the cervical os, and infection from retained fragments [3]. A popular alternative to laminaria is Dilapan-S, an osmotic dilator made of an anisotropic xerogel [4] that many abortion providers commonly used [1,2] until the United States Food and Drug Administration (FDA) approved its use for labor induction [5], leading to a steep increase in its price [MPM Medical Supply, personal communication, June 10, 2020]. This increase has led many abortion providers to switch to the more cost-effective laminaria [Family Planning Community Listserv, personal communication, June 8th, 2020]. Following our case, we elicited anecdotal recommendations to prevent laminaria incarceration from abortion providers more familiar with laminaria, including using fewer laminaria so that the last one placed is still mobile and to extend cervical preparation time to allow for more uniform laminaria expansion [Family Planning Community Listserv, personal communication, July 31st, 2020].


Strategies described in case reports in the 1970s to 1990s to manage incarcerated laminaria often resulted in failure or laminaria entering the uterine cavity and causing infection. In 1975, Gusdon and May [6] published two cases of laminaria incarceration and fragmentation with one requiring hysterotomy to extract incarcerated laminaria and one with severe infection following laminaria being pushed into the uterus to facilitate removal. The approach of pushing laminaria into the uterus may increase the risk of retained fragments and subsequent infection, since laminaria are not radiopaque and fragments may be difficult to identify on ultrasound.

Our case discusses removal of incarcerated laminaria with mechanical dilation without pushing laminaria into the uterine cavity. Wellman described a similar method in 1973[7], yielding “ballooned” laminaria. The Dilapan-S FDA

package insert also suggests using mechanical dilation to remove “ballooned” Dilapan-S.[4] We caution providers to be fully aware of the risks of mechanically dilating with osmotic dilators in place, including creating false passages, dissection and laceration of the cervix, and introducing foreign material that may be difficult to retrieve and can incite infection.

As laminaria use increases, providers should be prepared to manage complications such as incarceration. In this case of incarcerated laminaria due to “dumbbelled” laminaria, mechanical dilation of the cervix resulted in successful removal without the risk of retained fragments. Although more time for dilator expansion may have alleviated the laminaria incarceration and avoided a cervical laceration, we offer this option to providers in healthcare systems that may have patient or institutional barriers to providing this additional time.


## Appendix: Clinic protocol for pre-operative cervical preparation with laminaria, mifepristone, and misoprostol at University of California, Davis at the time of this case

 The table layout displayed in this section is not how it will appear in the final version. The representation below is solely purposed for providing corrections to the table. To preview the actual presentation of the table, please view the Proof.

GA (Weeks)	Target number of laminaria	No need for additional treatment if placed at least	Provide adjunctive mifepristone 200 mg PO for 24 hrs if only placed	Provide adjunctive misoprostol 400 mcg buccally in pre-op if only placed	Use second set of dilators if only placed
12–13+	2–3	1 laminaria	–	–	–
14–15+	4–5	3 laminaria	–	–	–
16–17+	6–7	5 laminaria	–	1–2 laminaria	–
18–19+	8–9	7 laminaria	6 laminaria	1–4 laminaria	5 laminaria
20–20+	10	9 laminaria	8 laminaria	*	7 laminaria
21–21+	11	10 laminaria	9 laminaria	*	<a href="#">[1–7]</a> 8 laminaria
22–23+	12–13	11 laminaria	10 laminaria <a href="#">[3]</a>	*	9 laminaria

\*As needed per [clinician](#)-[\[Instruction: Delete "MD", should say "clinician"\]](#)~~MD~~[clinician](#); GA, gestational age.

## References [\[1–7\]](#)

 The corrections made in this section will be reviewed and approved by a journal production editor. The newly added/removed references and its citations will be reordered and rearranged by the production team.

[1] Fox M.C., Krajewski C.M. Cervical dilation for second-trimester surgical abortion prior to 20 weeks’ gestation. *Contraception* 2013;89(2):75–84. doi:10.1016/j.contraception.2013.11.001.

[2] Diedrich J.T., Drey E.A., Newmann S.J. Society of Family Planning clinical recommendations: cervical preparation for dilation and evacuation at 20 to 24 weeks’ gestation. *Contraception* 2020;101(5):286–292. doi:10.1016/j.contraception.2020.01.002.

[3] Lichtenberg E.S. Complications of osmotic dilators. *Obstet Gynecol Surv* 2004;59(7):528–536. doi:10.1097/00006254-200407000-00022.

[4] Instructions for use: Dilapan-S. MEDICEM Technology Section C, Insert 15107, [http://dilapan.wpengine.com/wp-content/uploads/2019/06/DSPIen-RevF-07\\_2017-12\\_Excerpton\\_WEB\\_s.pdf](http://dilapan.wpengine.com/wp-content/uploads/2019/06/DSPIen-RevF-07_2017-12_Excerpton_WEB_s.pdf); 1992 [accessed 16 August 2020].

[5] “Discover a new approach in labor induction.” Dilapan, [www.dilapan.com/](http://www.dilapan.com/); 2020 [accessed 18 August 2020].

[6] Gusdon J.P., May W.J. Complications caused by difficult removal of laminaria tents. *Am J Obstet Gynecol* 1975;121(2):286–287. doi:10.1016/0002-9378(75)90663-8.

[7] ~~L. Wellman Cervical migration of laminaria tents Am J Obstet Gynecol 115 6 1973 870 1~~  
[https://www.ajog.org/article/0002-9378\(73\)90546-2/pdf](https://www.ajog.org/article/0002-9378(73)90546-2/pdf). Wellman L. Cervical migration of laminaria tents. *Am J Obstet Gynecol* 1973;115(6):870–871. [https://www.ajog.org/article/0002-9378\(73\)90546-2/pdf](https://www.ajog.org/article/0002-9378(73)90546-2/pdf).

## Footnotes

### Article Footnotes

[☆] Source of Funding: None.

[☆☆] Conflict of interest: All above authors deny any conflicts of interest regarding this work.

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