

# A Novel Technique for Essure Reversal

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## ABSTRACT

**Background and Objectives:** An increasing number of women are seeking removal of the Essure sterilization device due to symptoms including pelvic pain, abnormal bleeding, and allergic reaction. A fraction of these women also desire a future pregnancy and request sterilization reversal at the time of device removal. We present a novel technique for Essure reversal in addition to our experience with three cases.

**Methods:** Simultaneous laparoscopy and hysteroscopy is used to remove the device followed by laparoscopic re-implantation of the distal fallopian tube to the uterine fundus. A video of our method is included and the outcomes of three patients reported.

**Results:** Three women underwent laparoscopic Essure reversal for device-attributed symptoms and desire to restore fertility between 2017 and 2018. All procedures were uncomplicated with restoration of tubal patency in one or both fallopian tubes on follow-up hysterosalpingogram. Over a period of 4 to 10 months of followup, no pregnancies have been reported.

**Conclusion:** Essure reversal is a feasible technique for removing the device and restoring tubal patency; however, more data are needed on pregnancy outcomes following this novel procedure.

**Key Words:** Essure removal, Sterilization reversal, Tubo-uterine anastomosis.

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## INTRODUCTION

An estimated 1.1% to 4.3% of women who have undergone Essure sterilization experience long-term adverse effects including pelvic pain, abnormal bleeding, allergic reaction, and other reported symptoms.<sup>1,2</sup> An increasing number of women are now seeking removal of the device, with some also desiring to restore their fertility. Sterilization reversal is uniquely challenging following the Essure procedure as up to 4 cm of the proximal fallopian tube, including the interstitial segment, is permanently scarred by the device. Prior authors report performing Essure reversal using an open transfundal incision or cornual wedge resection similar to historical methods for treating proximal tubal occlusion.<sup>3</sup>

We report a technique for Essure reversal using a minimally invasive approach that does not require a large abdominal or uterine incision. The method uses simultaneous laparoscopy and hysteroscopy to remove the device and reimplant the distal fallopian tube to a new site on the uterine fundus. We present a description and video of the technique and report our experience with three cases.

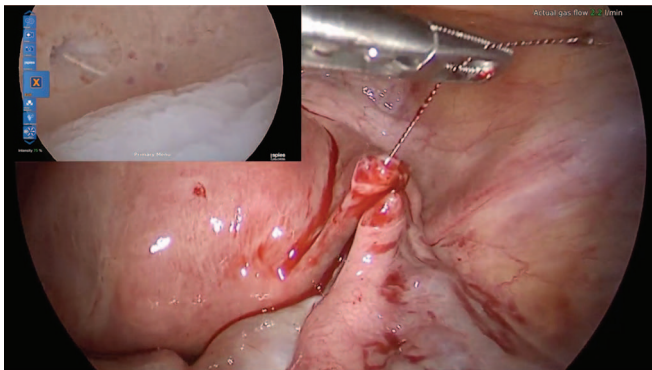
## MATERIALS AND METHODS

The procedure begins by identifying the location of the Essure microinserts in the fallopian tube. The microinserts can often be seen with close inspection of the fallopian tube, though palpation and gentle manipulation of the tube can also help to reveal the device's position. Once the distal end of the device is located, laparoscopic scissors are used to partially transect the fallopian tube at the device end. Electrosurgery is avoided and care is taken to preserve as much distal fallopian tube as possible (**Figure 1**).

Once the distal end of the device emerges from the incision, it is grasped laparoscopically and pulled out from the fallopian tube. The device uncoils and elongates as it is removed and can easily become fractured. Pulling the device in the same direction as the fallopian tube and intermittently regripping the device near to its exit from the tube can help to minimize device fragmentation. Simultaneous hysteroscopic guidance ensures that the intracavitary portion of the device is completely removed.



**Figure 1.** Partial transection of the fallopian tube at the distal end of the microinsert using laparoscopic scissors.

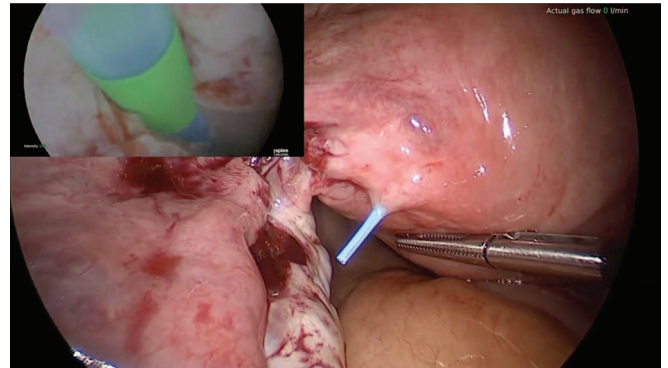


**Figure 2.** Grasping and pulling the microinsert from the fallopian tube under hysteroscopic guidance.

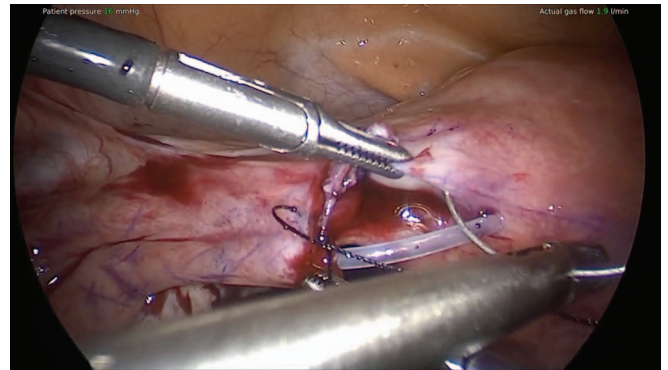
We have found that a fractured device may appear to be completely removed laparoscopically when in fact a small portion of the proximal microinsert remains visible hysteroscopically (**Figure 2**).

Once both Essure microinserts are removed, semirigid stents are inserted into the tubal ostia hysteroscopically. In the attached video, 5-French 210-cm Contour™ ERCP canula catheters (Boston Scientific, Marlborough, MA, USA) are inserted through the operative channel of a 5-mm hysteroscope. Despite insertion of the stents in the tubal ostia, the stents do not emerge from the proximal fallopian tubes due to intraluminal fibrosis caused by the Essure. In our experience, the device instead perforates the uterine fundus slightly posterior and medial to the tubouterine junction. Penetrating the fibrotic tubal ostia and myometrium can be somewhat difficult; therefore, a more rigid stent or guidewire may be preferred (**Figure 3**).

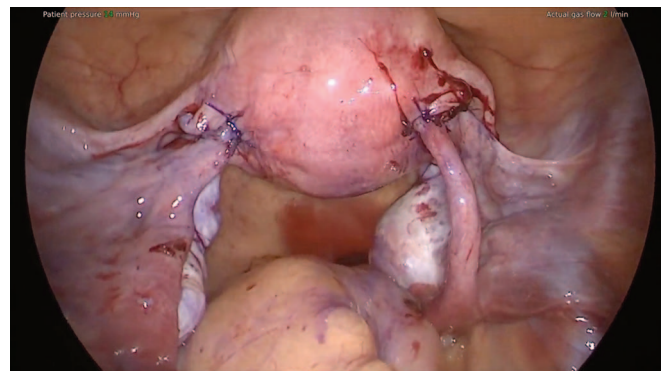
Once the stents emerge, they are cannulated into the distal fallopian tube segment laparoscopically. The distal tubal ends are then brought toward the uterus along the stents



**Figure 3.** Semirigid stent inserted hysteroscopically emerging from the uterine fundus posterior and medial to the tubouterine junction.



**Figure 4.** Laparoscopic tubouterine anastomosis.



**Figure 5.** Completed procedure.

to guide the tubouterine anastomosis. Interrupted stitches of 4-0 Vicryl are placed circumferentially around the new tubouterine junctions, with knots tied intracorporeally. Stitches are placed until the fallopian tubes are well approximated to the uterus and the stents are no longer visible. The stents are removed upon completion of the anastomosis to minimize the risk of infection, though a longer duration of stent placement may be considered to improve the chances of long-term tubal patency. Chro-

mopertubation is performed to assess for immediate tubal patency and an adhesion barrier is placed over the fundus to complete the procedure (Figures 4 and 5).

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**RESULTS**

We have performed a total of three laparoscopic Essure reversal procedures between 2017 and 2018 using this technique. Patients ranged between 24 to 26 years of age when they had the Essure sterilization performed and 27 to 35 years of age at the time of Essure removal. All patients had a history of spontaneous pregnancies prior to sterilization. Two of the three patients were experiencing symptoms potentially related to the Essure device (pelvic pain and irregular bleeding) and desired device removal in addition to restoration of fertility. One patient desired pregnancy and was referred for Essure removal as the coils were protruding into the cavity and could potentially impair in vitro fertilization or a future pregnancy.

Operative time ranged from 87 to 142 minutes and estimated blood loss was minimal at 20 to 75 mL. All procedures were uncomplicated and patients were discharged home on the same day as surgery. A follow-up hysterosalpingogram was performed 1 to 3 months following the procedure and demonstrated bilateral patency in one case and unilateral patency in the other 2 cases. Over a period of 4 to 10 months of followup, no pregnancies have been reported. The women were not queried long term regarding other symptoms that prompted Essure removal; however, prior work in patients having Essure removed for device-attributed symptoms has shown that 75% of women report improvement in their quality of life and 53% report improvement in their pelvic pain following device removal [Clark] (Table 1).

**DISCUSSION**

We demonstrate a novel procedure for removing Essure and restoring tubal patency in women seeking device removal and restoration of fertility. It is a feasible tech-

**Table 1.**  
**Patient and Procedure Characteristics**

	Subject 1	Subject 2	Subject 3
<b>Patient Characteristics</b>			
Age (years)	31	27	35
Body mass index (kg/m <sup>2</sup> )	29.3	23.4	24.3
Gravidity	2	3	2
Parity	2	3	2
Duration of Essure (years)	6	3	9
Indication for procedure	Pelvic pain, desired fertility	Pelvic pain, irregular bleeding, desired fertility	Desired fertility, coils protruding into cavity
<b>Procedure Characteristics</b>			
Additional procedure(s)	None	Lysis of adhesions	None
Operative time (minutes)	113	142	87
Estimated blood loss (mL)	75	50	20
<b>Outcomes</b>			
Length of stay (days)	0	0	0
Complications	None	None	None
Follow-up hysterosalpingogram	Bilateral tubal patency	Unilateral tubal patency	Unilateral tubal patency
Time since procedure (months)	10	7	4
Pregnancies since procedure	None	None	None



nique that uses simultaneous laparoscopy and hysteroscopy to perforate the tubal ostia and fundus, creating a new site for tubouterine anastomosis. While the obstetric outcomes of this procedure are unknown, tubal patency was achieved bilaterally or unilaterally in the three cases we have performed.

Prior literature on Essure reversal is limited to a single case series of 70 patients by Monteith et al.<sup>4</sup> The authors describe using a 5–10-cm laparotomy and transfundal posterior uterine incision or cornual wedge resection to remove the microinserts and reimplant the distal fallopian tubes to the uterine cornu at the level of the tubal ostia. This method of tubouterine anastomosis is similar to a historic procedure for treating proximal tubal occlusion unrelated to sterilization.<sup>5–7</sup> In their case series, Monteith et al<sup>4</sup> reported that 36% of women conceived spontaneously within 12 months of the procedure, 95% of whom went on to deliver a live birth by cesarean section. There were no ectopics in their initial case series. A more up-to-date analysis on Dr. Monteith's Web site<sup>8</sup> followed 282 women who underwent Essure reversal over 9 years, 38% of whom reported becoming pregnant without in vitro fertilization. Of the reported pregnancies, 5% were ectopic pregnancies and 4% resulted in uterine rupture.<sup>8</sup>

The risk of ectopic pregnancy and uterine rupture in pregnancy are important considerations following Essure reversal. Tubal anastomosis to reverse other methods of sterilization results in an ectopic pregnancy rate ranging from 2 to 10%, and it is likely that our procedure also carries a significant risk of ectopic pregnancy.<sup>9,10</sup> Uterine rupture is less commonly described following traditional methods of tubal anastomosis to reverse other methods of sterilization, though case reports have been published.<sup>11,12</sup> Theoretically, the risk of uterine rupture may be less than the 4% uterine rupture rate described by Monteith et al as our technique does not require a cornual excision or fundal hysterotomy.<sup>8</sup>

An alternative to surgical Essure reversal is in vitro fertilization with the device in situ.<sup>13,14</sup> In vitro fertilization may be preferred for certain women desiring pregnancy after Essure, especially older women or those with underlying fertility concerns. For younger women, however, tubal reversal surgery has been shown to offer greater cumulative efficacy and reduced costs compared to in vitro fertilization.<sup>15,16</sup> Insufficient evidence exists to know if this relationship holds true for Essure reversal, a procedure that salvages a shorter segment of fallopian tube and may be less effective than reversing other methods of tubal ligation. Regardless, the opportunity to remove a symp-

tomatic device may prompt women with adverse effects to choose Essure reversal despite modest success rates.

## CONCLUSION

Essure reversal is a feasible procedure for removing the device and restoring tubal patency. Our approach offers the benefits of minimally invasive surgery and has the theoretical advantage of reducing obstetric risks posed by a uterine incision. More data are needed on pregnancy outcomes following this novel technique for Essure reversal.

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