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MICROSURGICAL VASECTOMY REVERSAL

In order to understand the microsurgical treatment of male infertility, it is helpful to understand some facts pertaining to vasectomy reversal procedures. It is true that men who have had a vasectomy are infertile by choice, which is quite different from the situation of the individual who is involuntarily infertile. However, a significant part of our knowledge of the altered function of the testicle and epididymis, due to a blockage of the sperm transport system, has resulted from studies of vasectomy reversal patients. Also, many of the surgical techniques used for vasectomy reversal are applied to certain men who are infertile. One must first understand the basic anatomy of the male reproductive system.

Sperm are produced in the testicle and then are transported through a system of tubes through the epididymis and the vas deferens, which is commonly referred to as the vas.

Figure I.

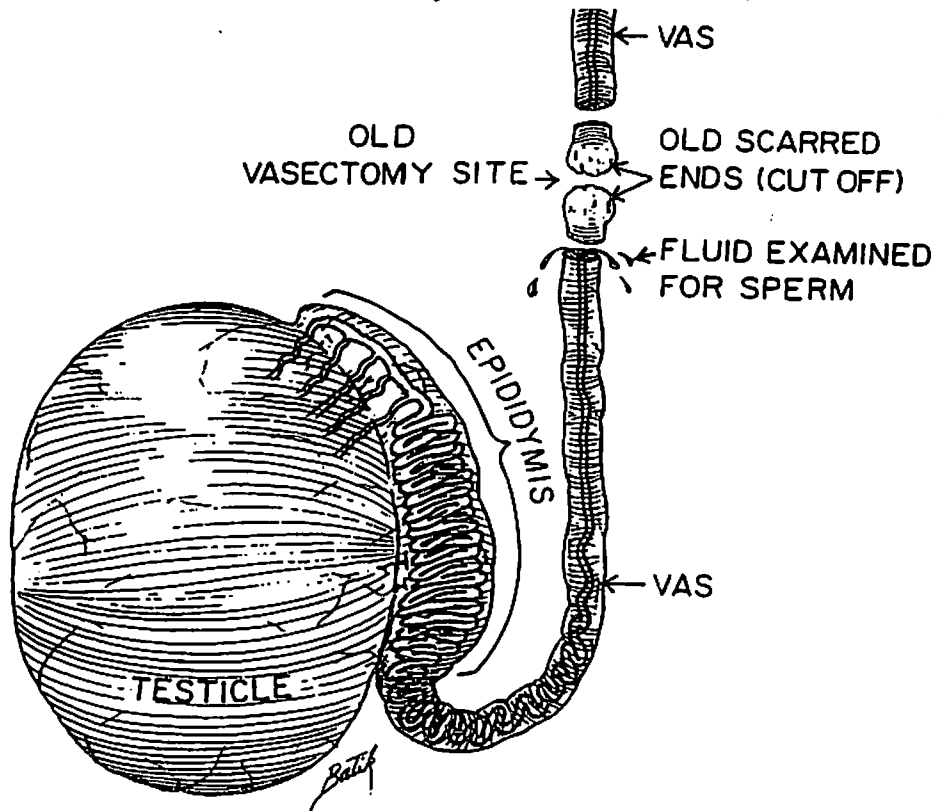


Figure 1. Sperm passed from the testicle, where they are produced through 4-9 tubes, which drain into a coiled continuous single tube in the epididymis, then pass into the vas deferens (commonly called the vas). The scarred ends (resulting from the vasectomy) of the vas are cut away, and fluid from the lower end (the end connected to the testicle) is examined immediately for sperm. If sperm are present in the vas fluid, the fresh ends of the vas are reconnected with sutures (stitches) by one of the methods shown in Figure II or Figure III to perform a vasectomy reversal procedure or microsurgical vasovasostomy.

Figure II.

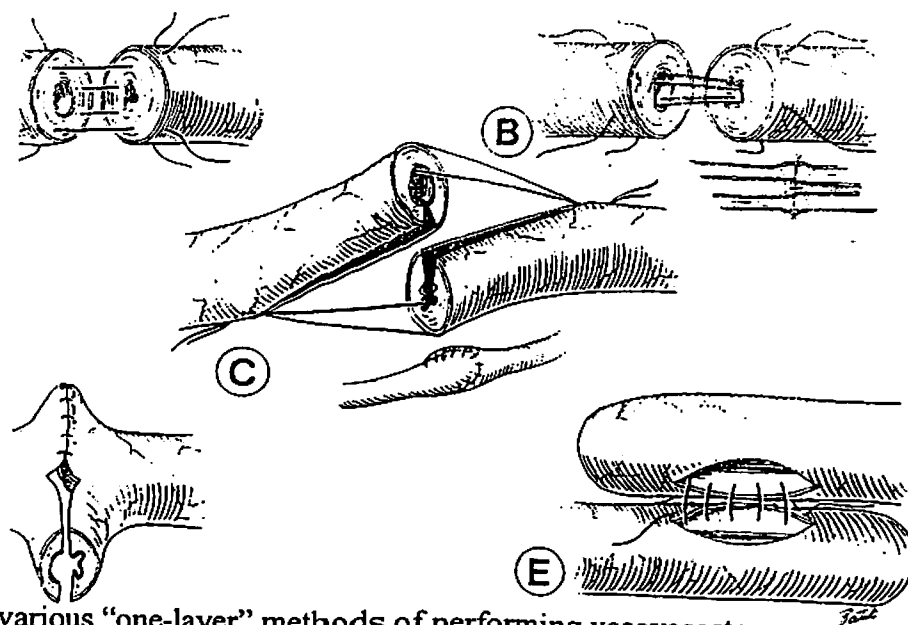


Figure II. These are various "one-layer" methods of performing vasovasostomy (stitching the ends of the vas). Only a single layer of stitches is used. The stitches may include only a partial thickness of the vas, as shown, in (A), or they may include the full thickness of the vas, as shown in (B). Methods shown in (C), (D) and (E) may be performed with either partial thickness or full thickness stitches. (Reprinted with permission from Belker, A.M.: Vasovasostomy. In Current Trends in Urology, Vol. I, Resnick, M.I. (Ed), Williams and Williams, Baltimore, 1981 pp. 20-41.)

Figure III.

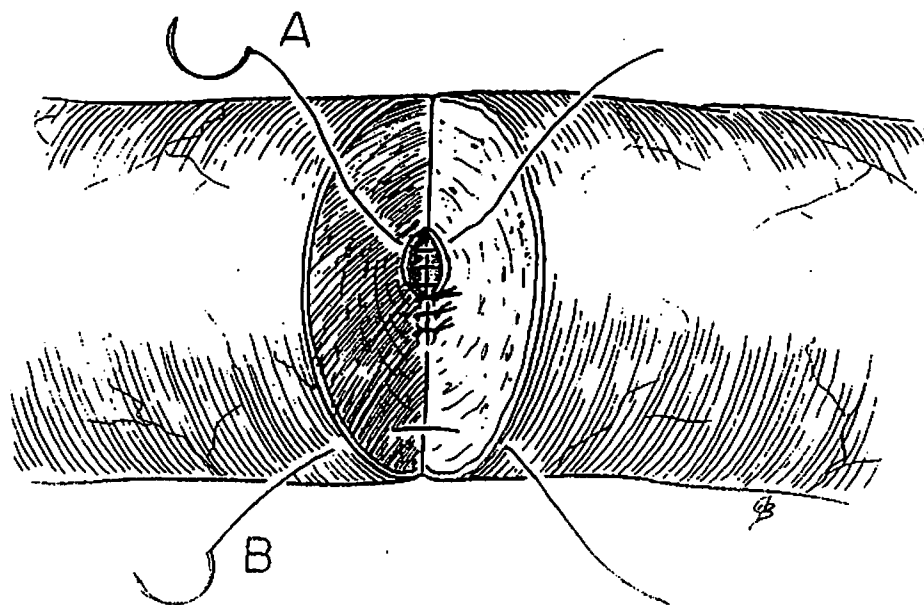
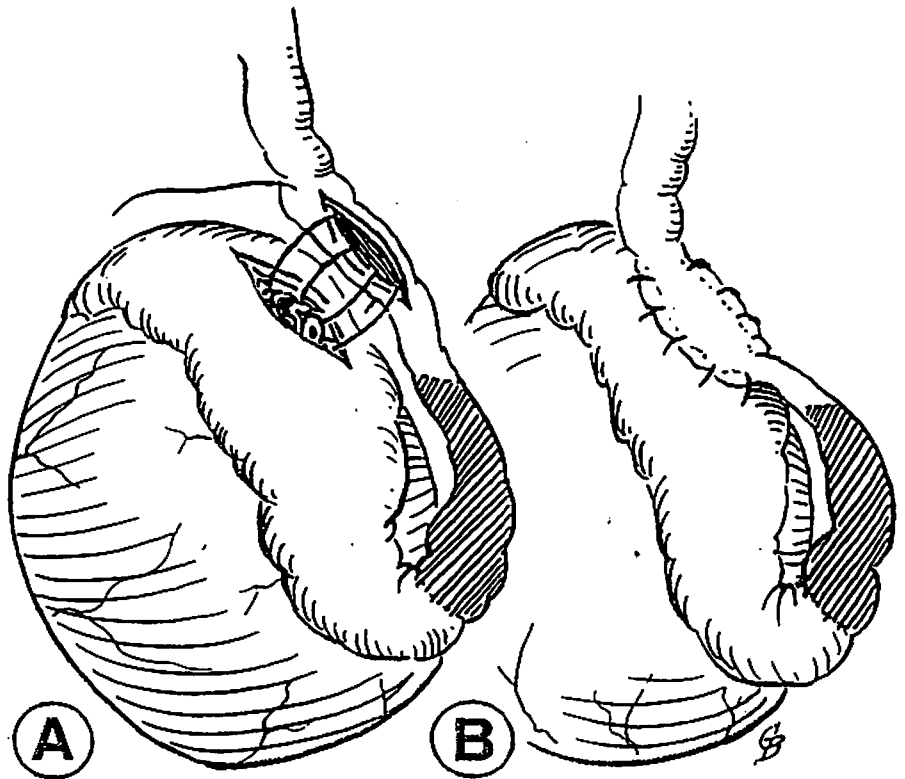


Figure III. This is the "two-layer" method of performing vasovasostomy. In (A), the inner lining layer of the vas is approximated with tiny micro sutures (stitches). In (B), the outer muscular layer of the vas is approximated with similar stitches.

Regarding the technical performance of these operations, microscope magnification from five to forty times actual size allows the surgeon to use stitches smaller in a diameter than an eyelash. Microsurgical operations may require two and a half to five and a half hours to perform. Almost all patients undergoing microsurgical reversal procedures are managed as outpatients.

Some urologists who use microsurgery perform vasovasostomy using one of the full-thickness "one-layer" stitching techniques shown in Figure II. With any of these "one-layer" methods, only a single layer of stitches is placed.

Figure IV



Vasoepididymostomy (the bypass operation) may be required both in certain cases of vasectomy reversal and in cases of blockage of the epididymis due to congenital abnormalities or acquired diseases. Before the use of microsurgery, vasoepididymostomy was performed as shown in Figure IV, but successful results were infrequent. Using microsurgery, a "two-layer" connection of the vas to the epididymal tube may be performed as shown in Figure V. For those patients who have not had a vasectomy, but who have a congenital or acquired blockage in the epididymis, the vas is divided at its lowest end rather than at the old vasectomy site to accomplish bypass vasoepididymostomy.

Figure V

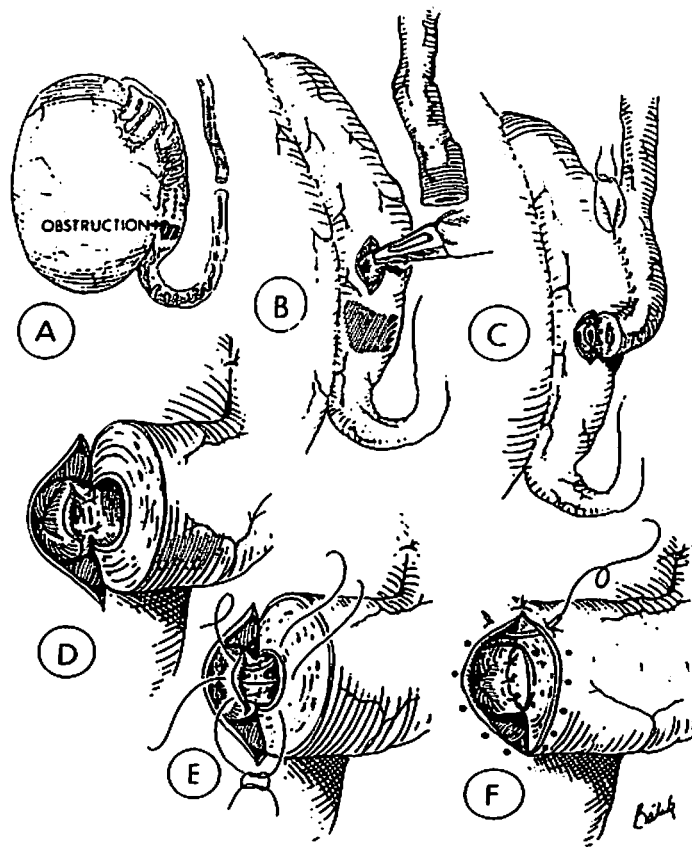


Figure V. Vasoepididymostomy performed by a microsurgical method. I (B), an incision is made into the epididymal tube above the level of obstruction. If sperm are present in the fluid at this level, a two-layer connection of the vas to the epididymis is performed. The outer muscular layer of the vas is connected to the vas to the epididymis is performed. The outer muscular layer of the vas is connected to the outer capsule of the epididymis as in (C) and (F), while the edges of the inner lining layer of the vas are connected to the edges of the tube in the epididymis as in (D) and (E). Microsurgery is required for performance of this method of vasoepididymostomy. Because of the extremely tiny size of the tube in the epididymis (0.2 to 0.3 millimeters, or about $2/25^{\text{th}}$ to $3/25^{\text{th}}$ of an inch in diameter), the details of the tube cannot be seen without considerable magnification. (Reprinted with permission from Craig T.F., Jr.: Reproductive and urogenital microsurgery. *Clinic in Plastic Surgery* 10:1555, 1983.)

Most urologists performing "two-layer" microsurgical vasovasostomy report preoperative pregnancies in the wives of 55% to 65% of patients.

Figure VI

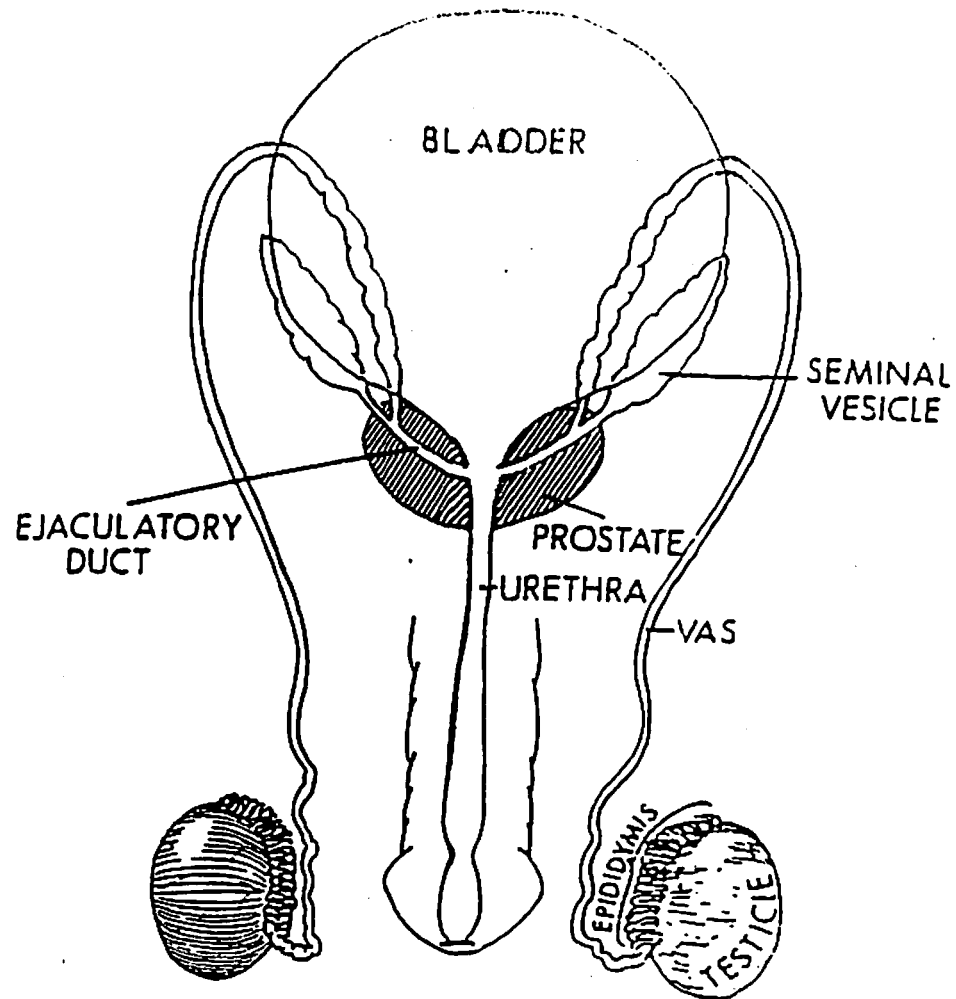


Figure VI. The ejaculatory ducts drain fluid from the vas and from the seminal vesicle into the urethra (urinary canal) at the time of ejaculation.

Men who have no sperm in the semen and who have extremely small semen volumes may have either congenital absence of the vas and the seminal vesicles or may have obstruction of the ejaculatory duct on both sides (see Figure VI). A blockage of the ejaculatory duct often can be treated with a procedure performed through a cystoscope, which is inserted through the penis (no outside incision required). Men who have congenital absence of the vas and seminal vesicles may be candidates for a special procedure of microsurgical operative retrieval of sperm from the epididymis combines with in-vitro fertilization of the wife's eggs.

Before a man has surgery to correct his infertility, his wife should be examined by a gynecologist to be certain her fertility is normal. It seems pointless for the husband to have surgery if his wife has developed some serious fertility problem or has some finding on examination which prompts the gynecologist to advise that pregnancy would be dangerous to her. Even if the wife previously has become pregnant easily, a simple gynecological exam helps assure that her fertility has no changes. If the wife is near or beyond 35 years of age, she should ask the gynecologist about the slight increase in the percentage of abnormal children resulting from pregnancy beyond a maternal age of 35 years.

This discussion has not contained certain specialized topics pertaining to a small percent of infertile patients who have no sperm in their semen. However, it should give all infertile patients who do not have sperm in the semen due to a blockage a better understanding of the possible causes and treatment of their infertility.

MICROSURGICAL VASECTOMY REVERSAL

Instructions to be followed prior to surgery:

It is asked that you **DO NOT** take aspirin or non-steroidal anti-inflammatories (e.g. Motrin, Aleve, Advil, ibuprofen, etc.) for ten days prior to your surgical procedure. These substances may thin your blood and result in excessive bleeding.

On the day of the procedure, you are instructed to arrive at the hospital one and a half hours prior to the time of the procedure.

You should have **NOTHING TO EAT OR DRINK AFTER MIDNIGHT OF THE NIGHT BEFORE YOUR PROCEDURE.**

Instructions to be followed after surgery:

1. After leaving the hospital, plan to spend three to seven days resting at home. Call my office the day you leave the hospital in order to schedule an appointment with me for seven to ten days following your procedure. If you're postoperative care is to be with an out-of-town physician, call his or her office before you come to Fairfax to arrange for an appointment for the same interval after surgery.
2. Keep incisions dry (no bath or shower) until one to two days after your procedure.

The dressing may be removed at the time that you shower, and can be replaced if necessary on a daily basis.

3. You will be sent home wearing an athletic supporter (jockstrap). Wear it continuously day and night for one week. It should be removed only when you shower, and then only briefly.
4. Do not have intercourse or ejaculate for four weeks following your procedure. This advice is based on the known rate of the healing of the tissues.

The muscular contraction that occurs along the vas during ejaculation (climax) can be harmful before healing of the reconnected ends has begun. Of course nocturnal emissions (wet dreams) may occur during the first month after your procedure and cannot be prevented.

5. Do not drive for one week after your procedure. While you may fly or be driven home after surgery, I prefer that you remain resting at home for as much as possible during the first seven to ten days following your procedure.
6. Avoid heavy physical activity for one month after surgery. If your work involves heavy physical activity and you cannot return to a lighter work status for a few weeks, please discuss with me the earliest date at which you may return to heavy work (in no case should this be before two weeks after your surgery).

7. You should expect:

- a) Black and blue discoloration of the penis and scrotum.
- b) Spots of blood from the incisions for up to ten days.
- c) Aching in the testicles and groin region for up to two to four weeks.
- d) Spots of yellow drainage fluid from the incisions, and perhaps very slight separation of the edges of the incisions for approximately three weeks following your procedure.
- e) Some swelling deep inside the scrotum.
- f) The outer stitches will dissolve and do not require removal. It may take three to six weeks until the last stitch has dissolved.
- g) You will be given a prescription for a pain medication. Use this for more severe pain, and then use Tylenol for lesser pain.
- h) Call me or your local physician if your temperature is over 101.5 degrees or your pain is not relieved by the prescribed medication.
- i) Sperm count should be obtained approximately every two to three months following your procedure (according to the factors in your particular case) until a normal sperm count has been reached, and then every four to six months until a pregnancy occurs. If your sperm counts are obtained elsewhere, please request that a copy of each report be sent to my office. Also, please notify me during office hours whenever a pregnancy has been confirmed.

8. Reminders:

It usually takes four to eight months after simple vasectomy reversal until normal sperm counts occur, but it may take six to twelve months after a vasopididymostomy (the bypass procedure) until sperm first appear in the semen.

Information Regarding Vasectomy Reversals

During a 9-year period, 1,469 men who underwent microsurgical vasectomy reversal procedures were studied at 5 institutions. Of 1,247 men who had first-time procedures sperm were present in the semen, in 865 of 1,012 men (86%) who had postoperative semen analyses, and pregnancy occurred in 421 of 210 couples (52%) for whom information regarding conception was available. Rates of potency (return of sperm to the semen) and pregnancy varied depending on the interval from the vasectomy until its reversal. If the interval had been less than 3 years potency was 97% and pregnancy 76%, 3 to 8 years 88% and 53%, 9 to 14 years 79% and 44% and 15 years or more 71% and 30%. The potency and pregnancy rates were no better after 2-layer microsurgical vasovasostomy than after modified 1-layer microsurgical procedures and they were statistically the same for all patients regardless of the surgeon. When sperm were absent from the intra-operative vas fluid bilaterally and the patient underwent bilateral vasovasostomy rather than vasoepididymostomy, potency occurred in 50 to 83 patients (60%) and pregnancy in 20 to 65 couples (31%) Neither presence nor absence of a sperm granuloma at the vasectomy site nor type of anesthesia affected results. Repeat microsurgical reversal procedures were less successful. A total of 222 repeat operations produced potency in 150 and pregnancy in 199 patients (75%) who had semen analyses and pregnancy was reported in 52 out of 120 couples (43%).

Vasectomy Reversal after Obstructive Intervals

Objective: To determine the outcomes for vasectomy reversal performed after at least 10 years of obstruction.

Methods: 74 vasectomy reversal procedures were performed in 70 patients after obstructive intervals of 10 to 24 years (means, 14.5 years). These patients were retrospectively reviewed for patency and pregnancy rates.

Results: The overall pregnancy rate was 37%. Patency rates for an obstructive interval of 10 to 15 years, 16 to 19 years, and >20 years were 74%, 87%, and 75%, respectively. Pregnancy rates for these same periods were 40%, 36%, and 27%, respectively. Assuming a live delivery rate per cycle of 25% for intratoplasmic sperm injection (ICSI), the delivery rate for vasectomy reversal would not be exceeded until an obstructive interval of at least 20 years.

Conclusions: The authors believe that even after prolonged obstructed intervals, vasectomy reversal offers better or comparable success rates to ICSI. Depending on their success rates at various medical centers, a threshold obstructive interval probably exists at which ICSI surpasses vasectomy reversal.

Reviewer's Comments: This is, in my opinion, a clinically worthwhile paper. It clearly shows the pregnancy and delivery rates in patients who have under-gone vasectomy reversal surpass the historical success rates of ICSI even after prolonged obstructive intervals. In addition, vasectomy reversal avoids the complication associated with multiple births, which is commonly seen after ICSI and is cheaper. In summary, even in patients with prolonged obstructive intervals after vasectomy, vasectomy reversal is probably more effective, cheaper, and less complicated than is ICSI.

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Article Reviewed: Kolettis PN, Sabanegh ES, et al. Outcomes for Vasectomy Reversal Performed After Obstructive Intervals of at Least 10 Years. *Urology* 2002; 60 (November): 885-888