

# Modified One-Layer, Nonstented, Microsurgical Vasovasostomy

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**A**n estimated 750,000 to 1,000,000 vasectomies are done per year in the United States. For a variety of reasons, many of these patients may eventually present for vasectomy reversal.<sup>2</sup> Here at the Kaiser-Permanente Los Angeles Medical Center, we have developed a modified one-layer, nonstented, microsurgical vasovasostomy which we have been using routinely for vasectomy reversals since 1984. The technique is easy to learn and can be employed with a high degree of success.

## HISTORY

The original reports of vasectomy reversals were of those done macroscopically. Subsequent series employed optical loupes and, later, the operative microscope. While the results are similar (Table 1) and seem to be very much dependent upon operator skill and experience, it is apparent that microscopic techniques yield the highest patency rate.<sup>1</sup>

Several subtypes of microscopic vasovasostomy have been reported,<sup>2</sup> but all seem to yield similar results. The maximum theoretical pregnancy rate has been calculated at approximately 67%.<sup>3</sup>

## PATIENTS

To date, the author has performed 167 vasovasostomies using this technique on 162 consecutive, non-selected patients presenting for vasectomy reversal. The patients' ages range from 28 to 62 years, average 41. The interval between vasectomy and reversal ranged from 1 to 24 years, average 13. This het-

erogeneous population has included patients who have no history of prior fertility, elevated preoperative FSH, prior mumps orchitis, varicocele (unilateral, bilateral, some repaired, others not), and patients presenting for reversal because of chronic pain or because of new-found religious conviction rather than out of a desire for restoration of fertility. Fourteen patients had undergone prior vasovasostomy. While there has been no systematic evaluation of the female partners, several have been in their mid to late 40s. It is our policy to provide full informed consent but to proceed with surgery should the patient wish to do so.

## TECHNIQUE

The vasectomy reversals are done on an outpatient basis under general anesthesia (which is preferred for this population of young healthy patients), although regional and local anesthesia have been successfully employed. The technique employs standard microsurgical instruments. Currently, I use a

Zeiss "hand-plastic" operating microscope. A double-head configuration allows the surgeon and the assistant to sit opposite each other, on either side of the patient (Fig. 1).

In the supine position, symmetric, vertical, high scrotal/low inguinal incisions are made, and the testicles are delivered into the field. The vas is identified and the vasectomy site is isolated and excised. In order that the anastomosis can be performed in a tension-free manner, tissue surrounding each end of the vas is approximated using a single suture of a 3-0 (P.D.S.) which allows the anastomosis to be completed without use of specialized vasovasostomy clamps. Use of this suture also ensures that the anastomosis will be protected from traction in the postoperative period.

The prostatic end of the vas is serially dilated using lachrymal duct dilators from 3-0 to a No. 1. Normal saline is injected into the prostatic end of the vas using a plastic 22-gauge IV cannula. Free flow demonstrates patency of the inguinal and the pelvic vas along with the

**Table 1. (Adapted from Ref. 1) Vasovasostomy Technique Comparison**

Number of Series	Technique	Patency Rate (Mean)	Pregnancy Rate (Mean)
12	Macroscopic	77%	41%
10	Optical Loupe	83%	59%
9	Microscopic	88%	52%

**Table 2. Success Rates vs. Obstructive Interval**

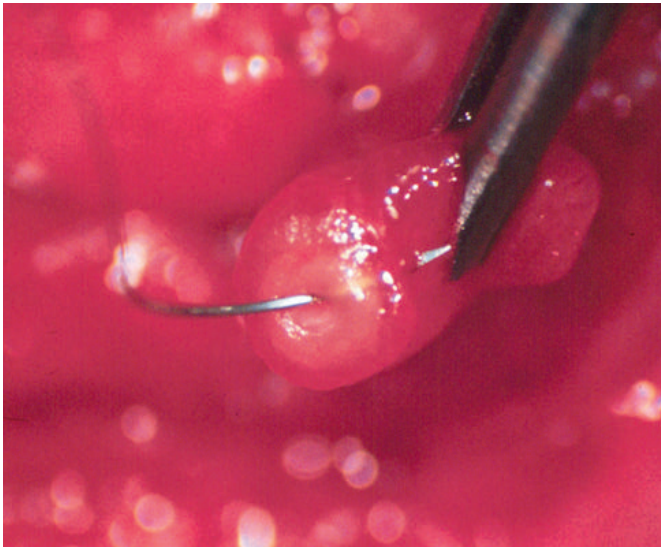
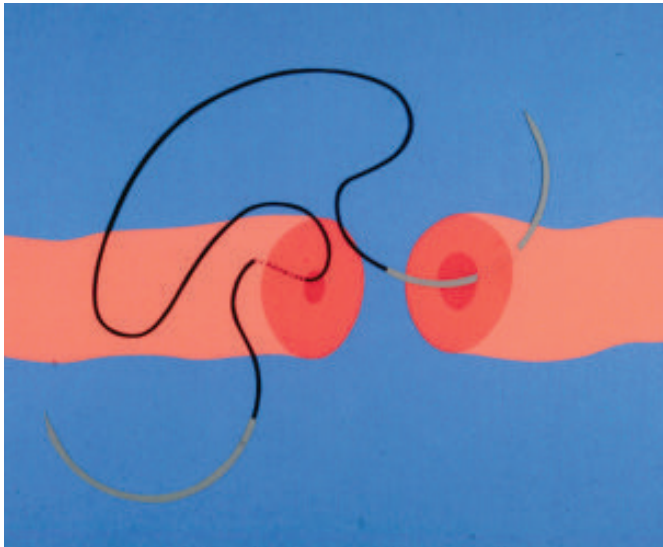
V to VV Interval	Number	Surgical Success Rate	Functional Success Rate
1 - 5 years	30	94%	48%
5 - 10	64	83%	55%
11 - 15	44	80%	39%
over 15	29	69%	22%
<b>TOTAL</b>	<b>167</b>	<b>82%</b>	<b>45%</b>



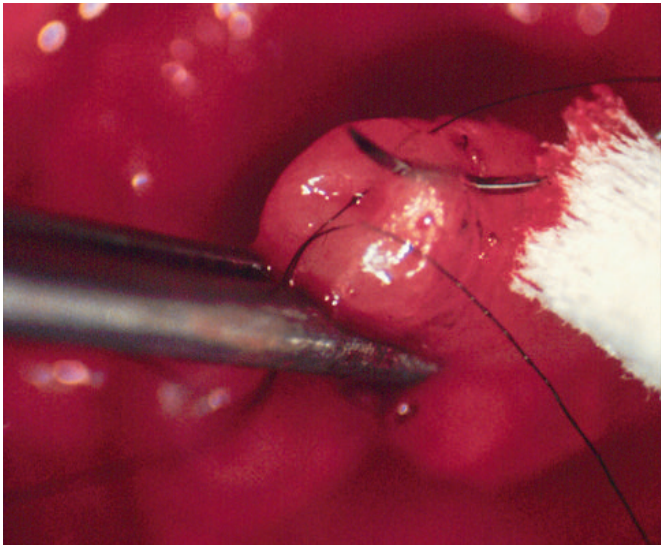
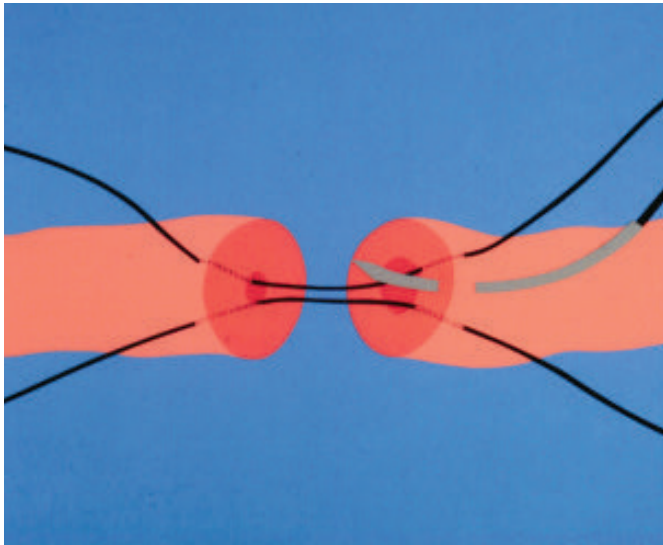
Figure 1. Double-headed operating microscope in position.

ejaculatory duct on each side. The character of the fluid emanating from the testicular end of the vas is noted, and this fluid is examined for the presence or absence of sperm. If no sperm are present but the fluid output is copious, the vasovasostomy is performed at that level. If there is no fluid, then examination of the more proximal vas and the epididymis may be undertaken to identify an additional site of blockage. A vaso-epididymostomy may be necessary.

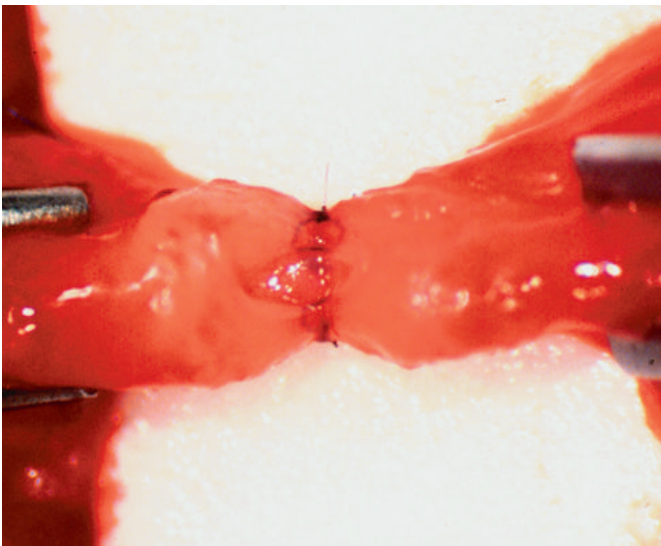
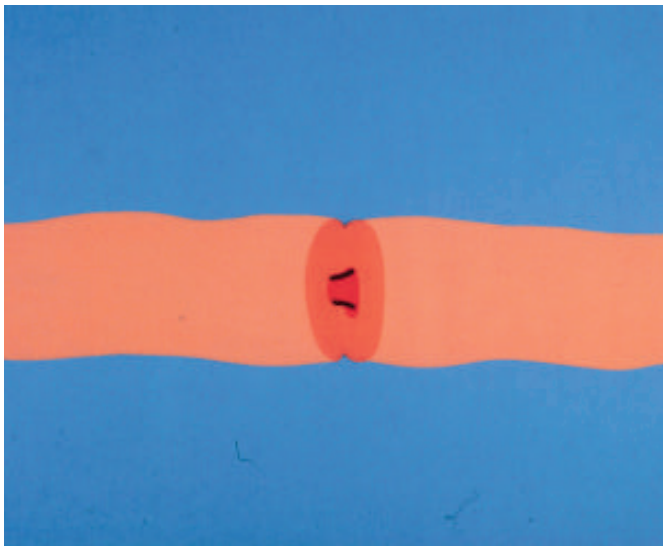
The vasovasostomy is made using double-armed suture material of 9-0 nylon (Ethilon, 12 in) on a small cutting needle (TG 140-6) (Special order No. D7985, Ethicon, Inc., Somerville, N.J.). All needle passes are made from inside to outside to avoid damage to the back wall of the vas (Figs. 2a, 2b). The anastomosis is begun by placing two sutures of 9-0 nylon 60° apart at the eleven and one o'clock positions. A seromuscular suture of 7-0 nylon is placed between these two 9-0s (Figs. 3a, 3b). The 7-0 is tied. The 9-0s are then tied. The vas is rotated 180° and is placed on a rubber dam made from the backing of the suture material to facilitate exposure (Figs. 4a, 4b). A rubber shod clamp is attached to the 7-0 nylon to aid in manipulation of the vas. Four more sutures of 9-0 nylon are placed sequentially, 60° apart again using the inside-to-out technique (Figs. 5a, 5b). The interior of the vas is irrigated using the plastic angio catheter, and the 9-0 nylons are subsequently tied in standard microsurgical fashion using a surgeon's knot for the first throw, with five subsequent square knots. Seromuscular sutures of 7-0 nylon are then placed



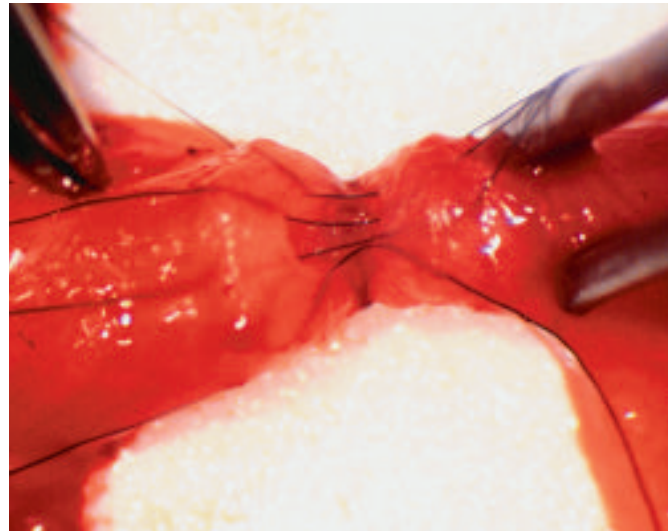
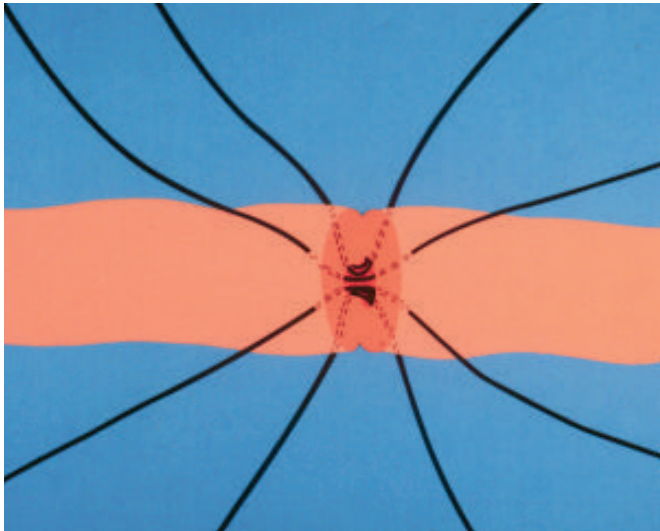
Figures 2a (left), 2b (right). Double-armed sutures allow all needle passes to be made "inside to outside."



Figures 3a (left), 3b (right). Seromuscular 7-0 suture through the wall of the vas.



Figures 4a (left), 4b (right). Use of styrofoam dam (from the suture backing) facilitates visualization of the lumen.



Figures 5a (left), 5b (right). Four more full thickness sutures of 9-0 nylon are placed.

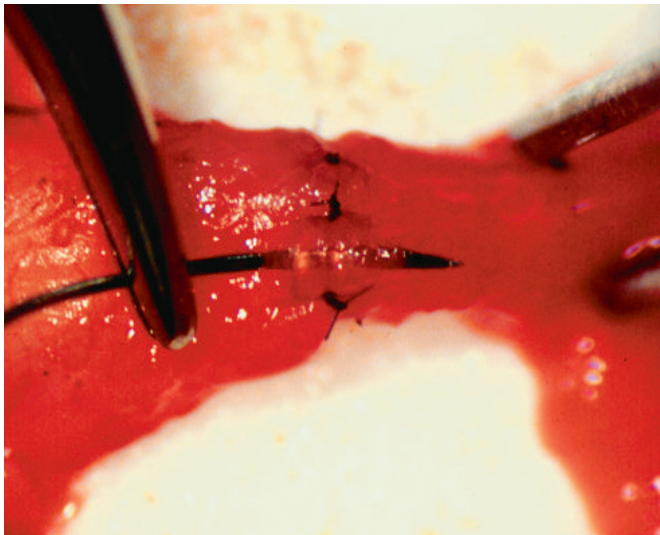


Figure 6a. Secondary seromuscular stitch.

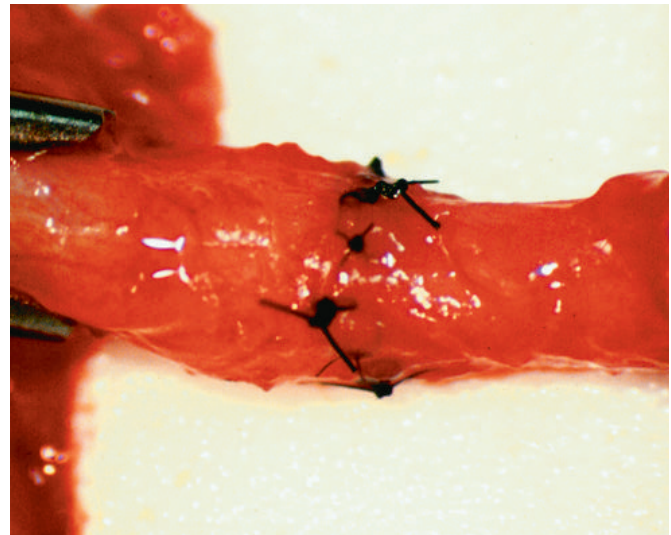


Figure 6b. The completed anastomosis.

between each 9-0 to complete a watertight, tension-free, mucosa-to-mucosa anastomosis (Figs. 6a, 6b). The scrotum is closed in layers and a scrotal support is applied. The average operating time is 2½ to 3 hours. There have been no significant complications.

#### RESULTS

The patients are evaluated by obtaining semen analysis at one month, three months, six months, and one year following the reversal. If pregnancy has not occurred by that point, additional semen analysis, as required, is also obtained. One hundred fifty-five patients have been followed for greater than one year, or to pregnancy. The time from reversal to pregnancy ranges from 2 to 58 months and averages 13 months.

Table 2 shows the "Surgical Success"

(sperm present) rate and the "Functional Success" (pregnancy) rate, according to the interval between vasectomy (V) and vasovasostomy (VV). The pregnancy rate is reported as the percentage of patients followed for one year, or to pregnancy.

#### DISCUSSION

As has been found in previously reported large series,<sup>2</sup> the optimum surgical results are obtained with shorter intervals between the vasectomy and the vasovasostomy. In the present series, in the selected population of those patients with an obstructive interval of five years or less, the described technique has yielded a patency rate of 94%. This technique is relatively easy to learn and is amenable to anastomoses done in the convoluted portion of the vas.

The important technical features of

this procedure that should be emphasized are the following: (1) the use of the P.D.S. suture to approximate the perivasal tissues, which precludes the need for specialized vas clamps, and to ensure that the anastomosis heals without tension; and (2) the use of double-armed suture material to allow all needle passes to be made inside to out, thus preventing inadvertent damage to the back wall of the vas lumen. **STI**

#### REFERENCES

1. Yarbo E, Howards S. Vasovasostomy. *Urol Clin North Am* 1987;14:515-526.
2. Belker A, et al. Results of 1469 microsurgical vasectomy reversals by the Vasovasostomy Study Group. *J Urol* 1991; 145:505-511.
3. Sharlip ID. What is the best pregnancy rate that may be expected from vasectomy reversal? *J Urol* 1993; 149:1469-1471.