

5 Surgical Approach and Occlusion of the Vasa

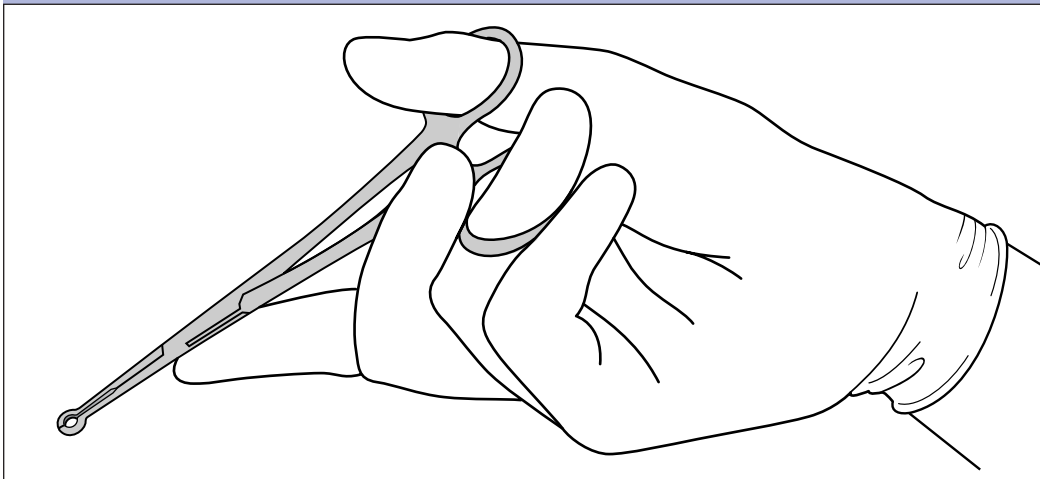
Although the no-scalpel technique is almost bloodless, an occasional superficial bleeder may be encountered. Ensure adequate hemostasis to help prevent the development of scrotal hematoma and subsequent risk of infection. Take all necessary precautions to avoid cross-contamination by strictly following the rules and guidelines for prevention of infection.

NOTE: The following instructions and accompanying illustrations are for a right-handed operator. Some left-handed operators report that they have found it helpful to use a mirror when viewing illustrations designed for right-handed operators.

Holding the Ringed Clamp

When holding the ringed clamp, it is important to remember three points. First, for the greatest control and accuracy, hold the ringed clamp with the palm facing up and the wrist extended (*Fig. 11*). Second, apply the clamp at a 90-degree angle perpendicular to

FIGURE 11. Holding the ringed clamp, with the palm up



the vas (*Fig. 12a*); the palm-up hand position helps make this easier to do. Third, hold the shaft of the ringed clamp in line with the axis of the vas—parallel to and directly over the vas (*Fig. 12c*).

PITFALL: If you fail to follow these three points, the clamp may not fix the vas completely (*Figs. 12b and 12d*), or it may grasp too much skin. The ringed clamp must encircle the entire vas.

Using the three-finger technique (as described on page 17 of the anesthesia chapter), tightly stretch the skin overlying the vas—where the needle entered for anesthesia infiltration. The skin should be as thin as possible. Apply the ringed clamp, as described earlier, with the shaft at a 90-degree angle perpendicular to the vas (*Fig. 12a*). Open the ringed clamp, and press the tips onto the skin immediately overlying the vas (*Fig. 13, page 28*). Apply upward pressure with the middle finger underneath the scrotum to resist the downward push of the ringed clamp and to press the vas from below into the ring. Slowly and gently close the clamp around the vas, up to the first click-stop.*

PITFALLS: Avoid two pitfalls when applying the ringed clamp. First, be sure to elevate the middle finger underneath the scrotum. Otherwise, the finger will give way under the downward pressure of the ringed clamp, and you will have difficulty stabilizing the vas. Second, do not grab too much skin with the ringed clamp. If you do, you will have difficulty dissecting and delivering the vas, and slight bleeding may occur. The skin should be stretched out over the vas just before the ring clamp is applied. If you grab too much skin, stabilize the vas with your left hand, then loosen the clamp slightly, without entirely

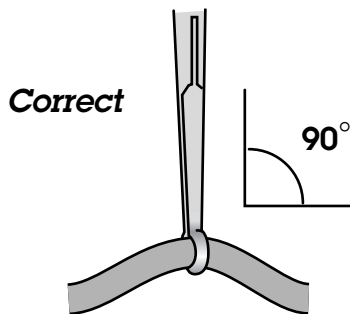
Applying the Ringed Clamp to the Scrotal Skin and Underlying Right Vas: The Tight-Skin Technique

*The cantilevered feature of the ringed clamp that is manufactured in China is specially designed to prevent damage to the scrotal skin even when the clamp is locked tightly.

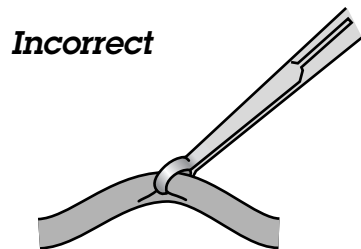
releasing it. Use the fingers of the left hand to ease some of the skin away from the clamp's hold, while retaining the clamp's grasp on the vas.

FIGURE 12. Grasping the vas with the ringed clamp, extracutaneously (scrotal skin not shown for clarity)

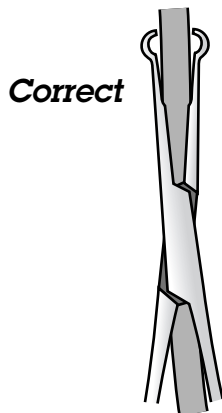
- a) Applying the ringed clamp at a 90-degree angle, perpendicular to the vas.



- b) If the ringed clamp does not grasp the vas at a 90-degree angle, the surgeon may grasp the vas incompletely.



- c) Holding the shaft of the ringed clamp in line with the axis of the vas (parallel to and directly over the vas).



- d) If the ringed clamp is not held parallel to the vas, the surgeon may grasp the vas incompletely.

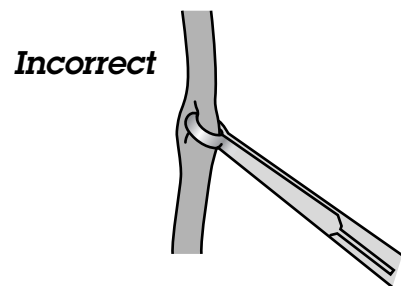
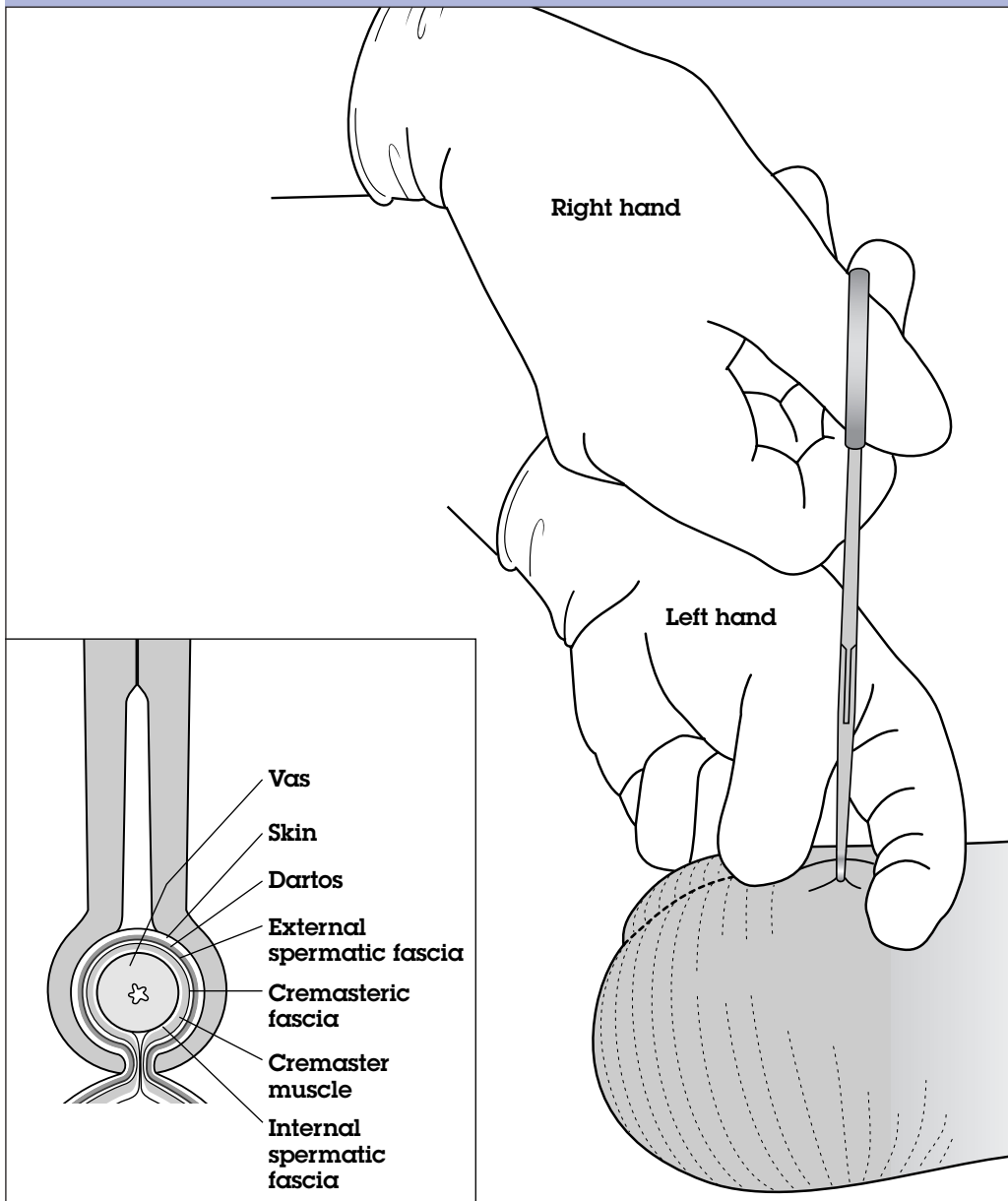


FIGURE 13. Pressing the tips of the ringed clamp onto the scrotal skin overlying the right vas



ALTERNATIVE: Instead of the tight-skin technique described on page 26, some surgeons apply the ringed clamp in a different way when they are first learning no-scalpel vasectomy. With the ringed clamp in the right hand, the surgeon gently pinches the scrotal skin with the ringed clamp, intentionally encircling more skin than is grasped with the tight-skin technique. With the left hand, the surgeon then eases out excess tissue from the tips of the ringed clamp. The surgeon may wish to use this alternative if he or she is having difficulty isolating only the vas.

Elevating the Underlying Right Vas

While the ringed clamp is still grasping the scrotal skin and the underlying right vas, transfer the instrument to your left hand. Then lower the handles of the ringed clamp, causing a bend in the vas (*Fig. 14*). This motion elevates the vas. Continue to keep the shaft of the clamp in line with the longitudinal axis of the vas.

Puncturing the Scrotal Skin

The skin should be punctured in the previously anesthetized spot, midway between the top of the testes and the base of the penis (*Fig. 4, page 17*). With the left index finger, press downward lightly to tighten the scrotal skin just ahead of the tips of the ringed clamp and over the anesthetized area (*Fig. 15, page 30*).

FIGURE 14. Lowering the handles of the ringed clamp to elevate the vas

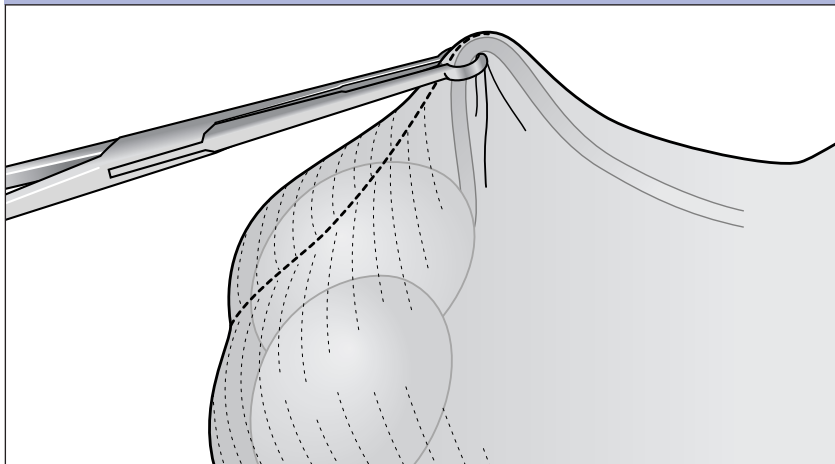
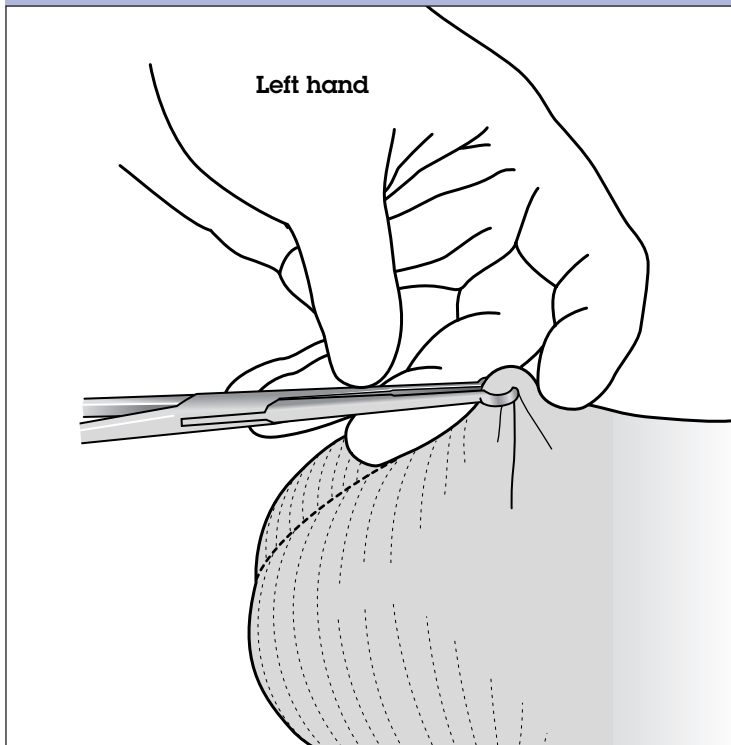
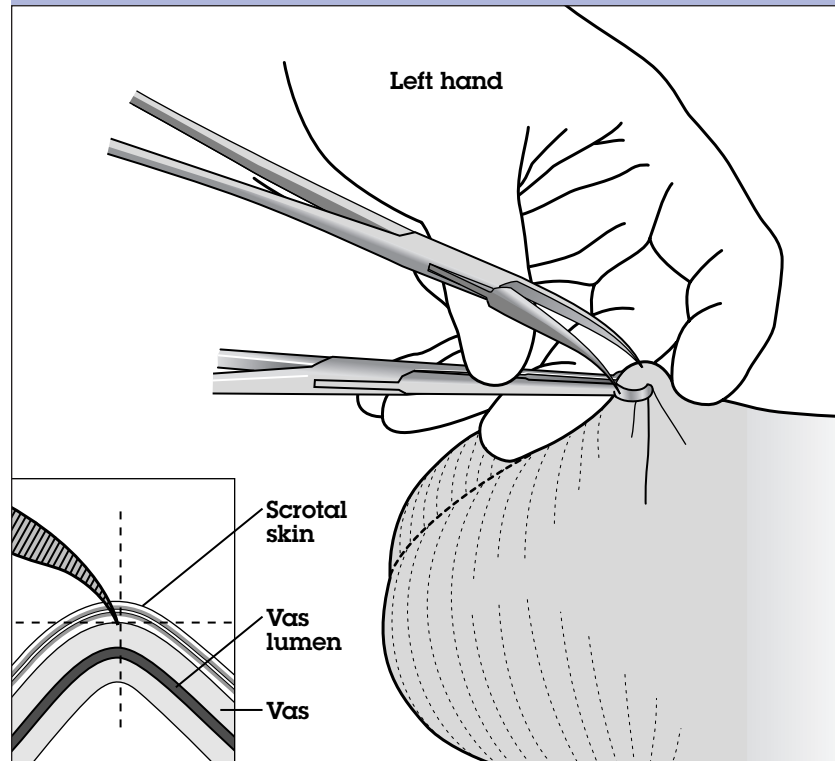


FIGURE 15. Pressing the index finger lightly downward to tighten the scrotal skin just ahead of the tips of the ringed clamp and over the anesthetized area



Hold the dissecting forceps in the right hand, points curved downward, in preparation for puncturing the vas. Hold the instrument so that there is a 45-degree angle between the closed tips of the forceps and the lumen. Then open the forceps; using only the medial blade (see box on page 32) of the forceps, pierce the scrotal skin **just superior to the upper edge of the ringed forceps**—where the vas is most prominent (*Fig. 16*). This piercing should result in a puncture of the midline of the vas, preferably at the point where the needle entered for anesthetic infiltration. When making the puncture, do not slowly push the dissecting forceps forward. Instead, use a quick, sharp, single movement to make a clear puncture of the skin down into the vas. Advance the medial blade of the forceps into the vas lumen.

FIGURE 16. Piercing the skin with the medial blade of the dissecting forceps



PITFALLS: Avoid three pitfalls when puncturing the scrotal skin. First, be sure to penetrate the anterior wall of the vas with the dissecting forceps. Otherwise, intact overlying fascia will prevent elevation of the vas out of the puncture wound. Second, if puncturing is too deep, transection of the vas might occur and the vas artery may be damaged, and bleeding will follow. Third, be sure to puncture the vas just superior to the upper edge of the ringed forceps; if the puncture is made in the tissue that is grasped by the ringed forceps, you will not be able to spread the tissues adequately (see next page).

After making the puncture, withdraw the medial blade of the dissecting forceps. Close the tips of the forceps. At the same 45-degree angle as before, insert both tips of the forceps in the same puncture hole, in the same line, and at the same depth as when you made the puncture with the single blade (*Fig. 17*).

The ringed clamp remains in place and locked while the skin is punctured.

(a) When puncturing the scrotal skin

If you are right-handed, the medial (inner) blade is the left blade. Conversely, if you are left-handed, the medial (inner) blade is the right blade. If you use the medial blade to pierce the scrotal skin, your hand will not obstruct your line of vision.

(b) When elevating the vas deferens

If you are right-handed, the lateral (outer) blade is the right blade. Conversely, if you are left-handed, the lateral (outer) blade is the left blade. If you use the lateral blade to pierce the wall of the vas deferens, you will easily be able to rotate the forceps and deliver the vas.

HINT: Right-handed operators should stand on the client's right side.

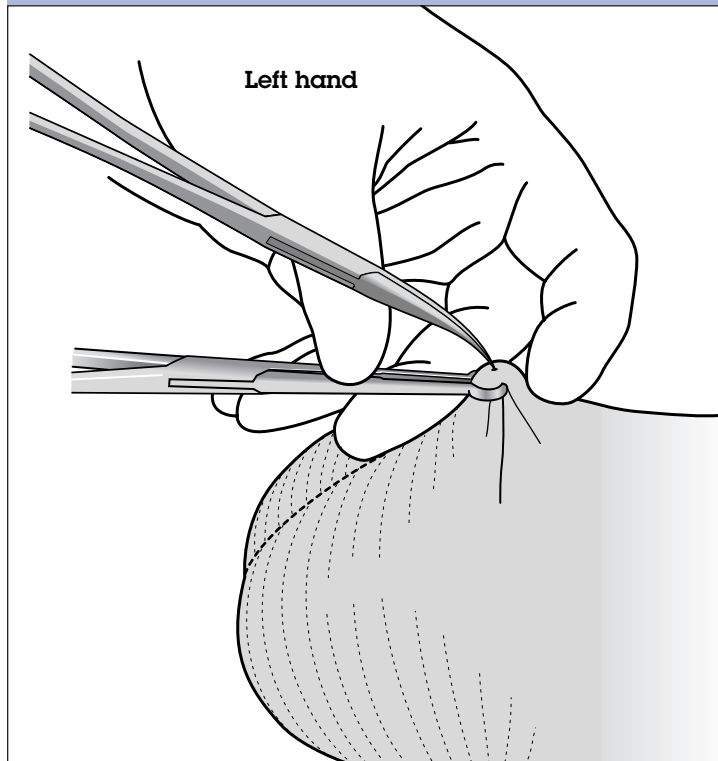
Conversely, left-handed operators should stand on the client's left side.

**Identifying
the Medial and
Lateral Blades
of the Dissecting
Forceps**

Gently open the tips of the dissecting forceps transversely across the vas, to create a skin opening twice the diameter of the vas (*Fig. 18, page 34*). In one motion, spread all layers of tissue from the skin to the vas deferens. The tips of the forceps should penetrate deeply enough to expose bare vas wall (see *Fig. 19, insert, page 35*). No harm is done if you enter the lumen. Be careful to keep the closed blades of the dissecting forceps parallel to the vas.

**Spreading
the Tissues**

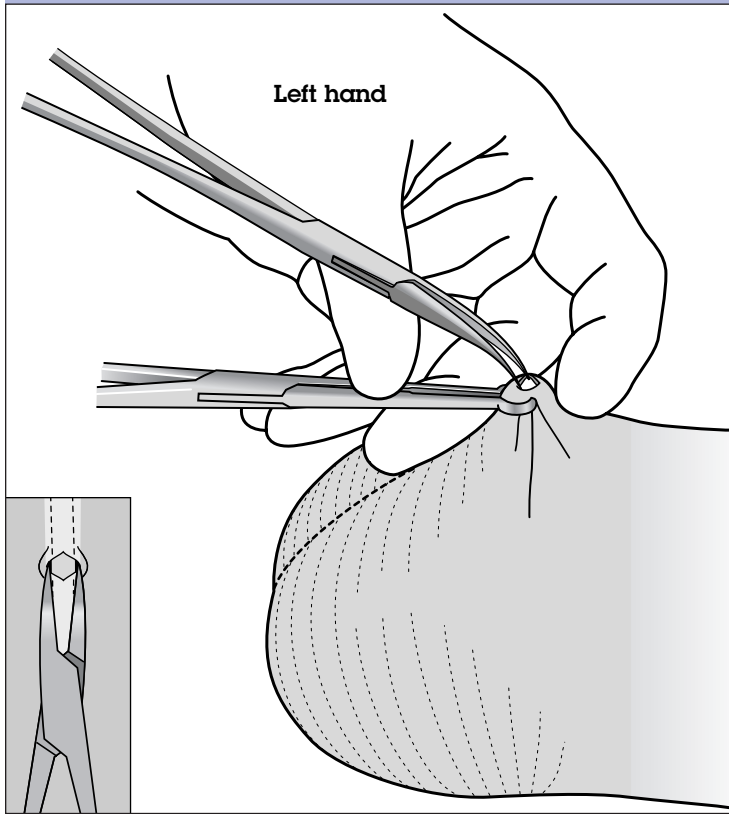
FIGURE 17. Inserting both tips of the dissecting forceps into the puncture site



The skin and vas sheath will remain stretched open after the tissues are spread. By contrast, the opening in the vas will close after spreading; as it closes, the puncture site in the vas may look like a longitudinal groove. The stretched opening in the skin and sheath, which should be twice the diameter of the vas, will enable you to lift out a loop of the vas.

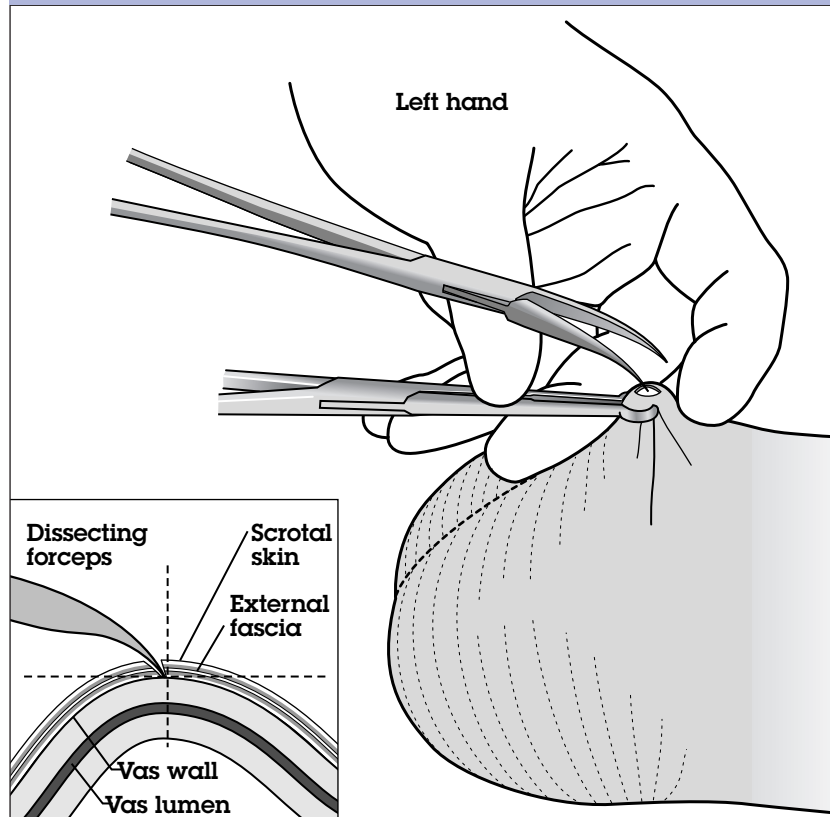
The ringed clamp remains in place and locked while the tissues are spread.

FIGURE 18. Spreading the tissues to make a skin opening twice the diameter of the vas



PITFALLS: Watch out for two pitfalls when spreading the tissues. First, if you fail to open the blades of the forceps transversely at a right angle to the vas, one blade could slip out of the puncture site. This could cause an unnecessary skin tear. Second, be sure to apply appropriate counterforce to prevent the dissecting forceps from slipping out of the puncture hole. Maintain depth of puncture, but do not push down further than the original puncture.

FIGURE 19. Piercing the wall of the vas with the tip of the lateral blade of the dissecting forceps



**Delivering
and Elevating
the Right Vas**

Remove the dissecting forceps from the puncture hole. With the tip of the lateral blade of the dissecting forceps facing downward, pierce the wall of the vas deferens at a 45-degree angle (*Fig. 19*). (See the box on page 32 for the definition of “lateral blade.”) Use of the lateral blade enables the operator to rotate his or her wrist more easily.

With the lateral blade skewering the vas and the ringed clamp still grasping the scrotal skin, rotate the handle of the dissecting forceps clockwise 180 degrees so the tips face upward, to deliver a loop of the vas deferens (*Figs. 20 and 21*). As you rotate the

FIGURE 20. Rotation of the dissecting forceps, Part 1

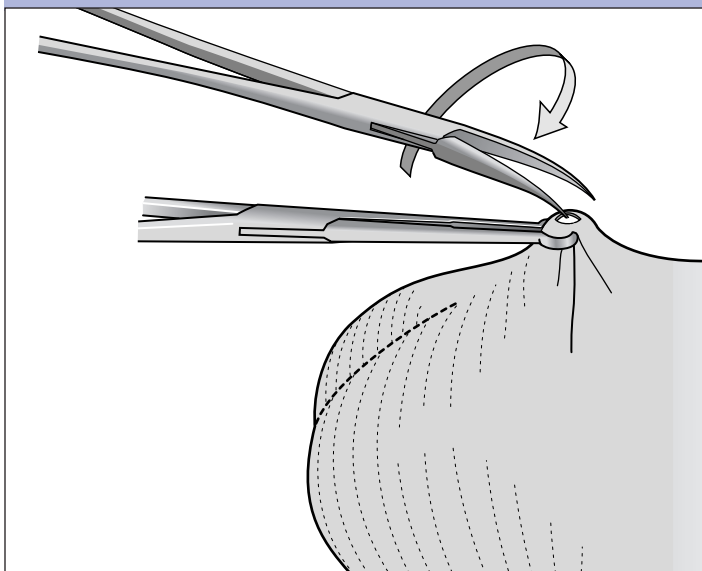
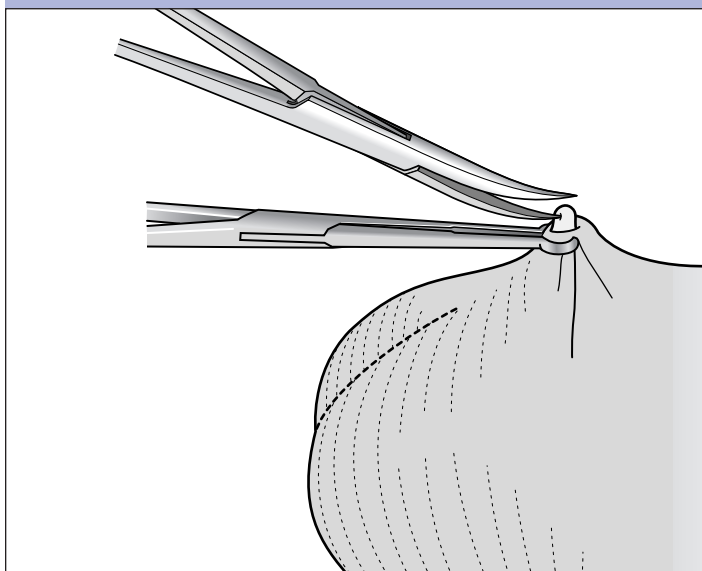


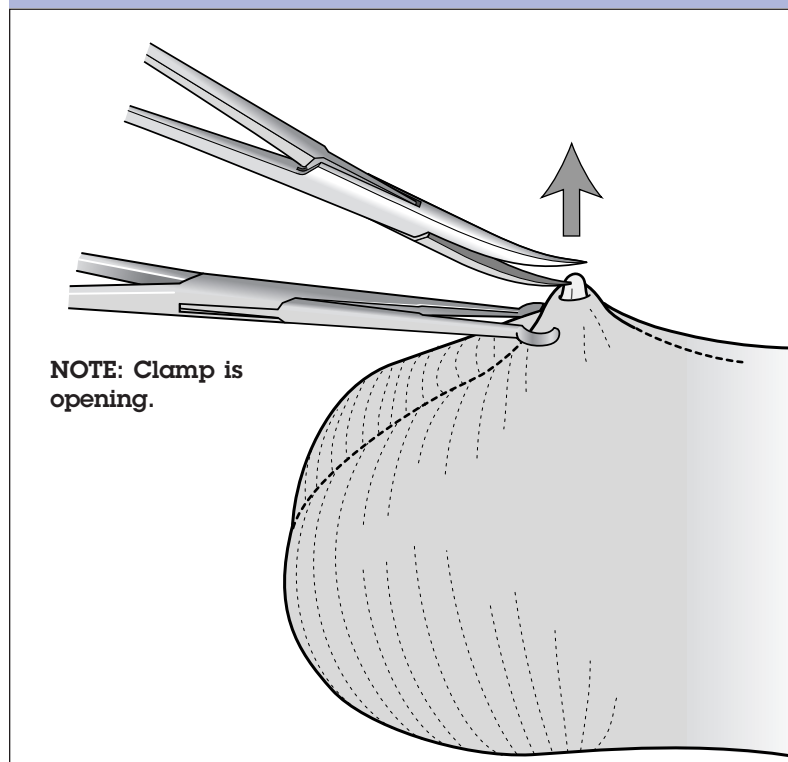
FIGURE 21. Rotation of the dissecting forceps, Part 2



dissecting forceps with the right hand, slowly release the ringed clamp with the left hand, thus allowing the forceps to elevate the vas through the puncture hole (*Fig. 22*). This simultaneous rotation with one hand and release of the ringed clamp with the other hand requires practice and coordination. At the beginning of the rotation, your hand will be palm-side down; after rotation, it will be palm-side up.

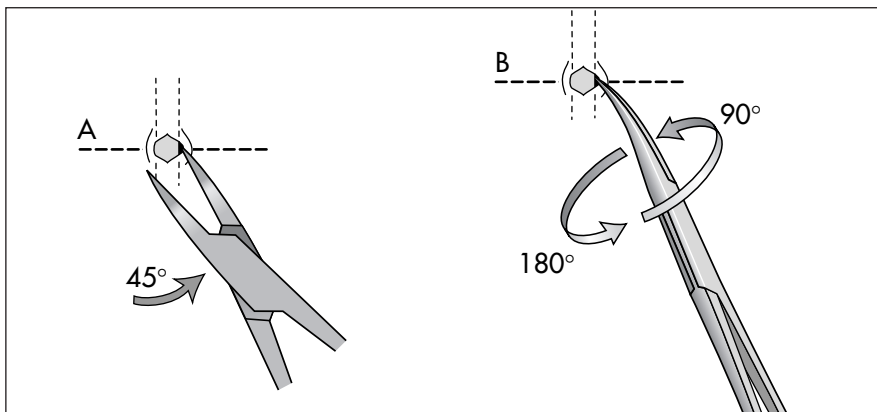
If the vas is difficult to deliver, more extensive spreading of the sheath may be required.

FIGURE 22. Releasing the ringed clamp before elevating the vas with the dissecting forceps—ringed clamp open, but still in place



ALTERNATIVE: There is an alternative way to deliver and elevate the vas; instead of skewering the vas with the dissecting forceps, the surgeon uses the forceps to grasp the bare vas directly. The following description is for the right-handed surgeon. The doctor begins by spreading the tissue as described on pages 32 to 34. But after stretching the opening in the skin and sheath, the surgeon does not remove the dissecting forceps from the puncture hole. Instead, the surgeon gradually withdraws the forceps, holding them in line with the longitudinal axis of the vas, until he or she can see the tips (facing downward) at the sides of the bare exposed vas.

The doctor then moves the right hand, which is holding the dissecting forceps, and the right elbow toward the right, away from his or her side, until the dissecting forceps are at about a 45-degree angle to the longitudinal axis of the vas (see A, below). This movement causes the medial blade to slip out of the wound, while the tip of the lateral blade continues to touch the right side of the vas.



Next, the doctor gently closes the tips of the forceps, grasping the right half of the bare vas, with the tips of the forceps facing to the side. The surgeon then starts to rotate the dissecting forceps in a clockwise direction about 90 degrees (see B, above); he or she stops rotating and checks to be sure that no fascia are between the tips of the forceps. The surgeon then further rotates the forceps, completing a 180-degree turn. After the rotation, the curved tips of the forceps are facing up. The rotational movement slightly elevates the vas out of the wound.

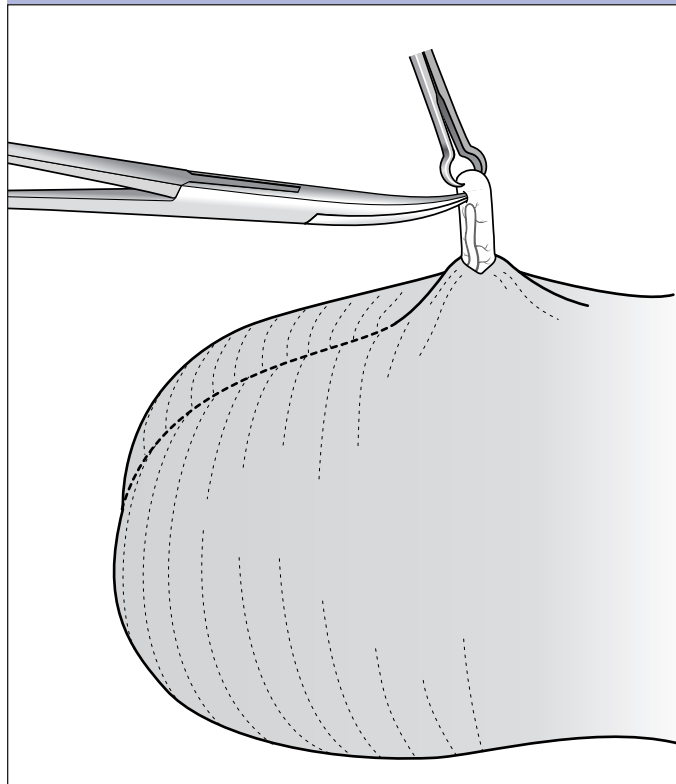
PITFALLS: With either technique described above, watch out for two pitfalls while delivering the vas. First, do not attempt to

deliver the vas while the ringed clamp is still locked; if you do, the vas may be severed. Second, if fascial tissue is caught between the tips of the dissecting forceps, you will not be able to rotate and elevate the vas.

**Grasping
the Vas
with the
Ringed Clamp**

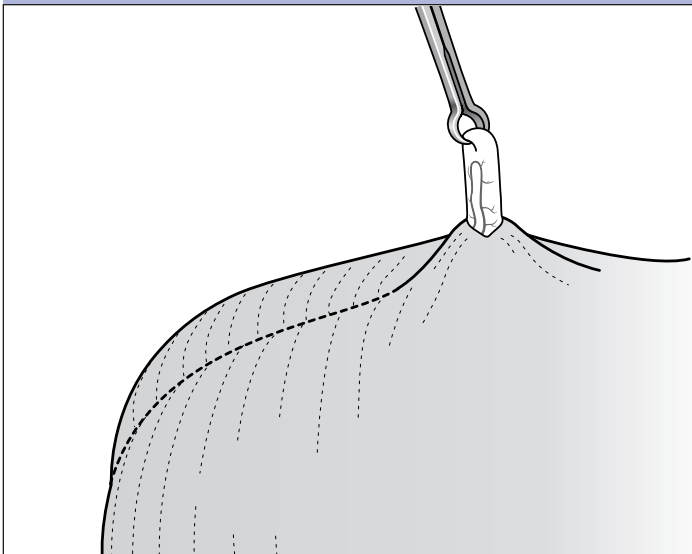
Once a loop of the vas has been delivered, gently close the dissecting forceps on the vas to prevent its slipping back into the scrotum while the ringed clamp is removed from the skin. Grasp a partial thickness of the loop of the vas with the ringed clamp. Sometimes you will see a groove on the vas—created when the vas was punctured (*Fig. 23*). After you have grasped a partial thickness of the vas, release the dissecting forceps.

FIGURE 23. Grasping a partial thickness of the elevated vas



PITFALLS: Watch out for three pitfalls when grasping the vas with the ringed clamp. First, be careful not to release the dissecting forceps until you have grasped a portion of the loop of the vas with the ringed clamp (*Fig. 23*). This will prevent the vas from slipping back into the scrotum. Second, to avoid damaging the vas artery, be sure to grasp the vas at the crest of the loop (*Fig. 24*). Grasping elsewhere leads to asymmetrical stripping of the sheath from the vas. Third, grasp only a partial thickness of the vas. If the ringed clamp is placed around the entire circumference of the vas, the vas could slip back into the scrotum when it is divided.

FIGURE 24. Grasping a partial thickness of the elevated vas at the crest of the loop, with only the ringed clamp attached



Puncturing and Stripping the Sheath

With one tip of the dissecting forceps (tips facing up), gently puncture the vas sheath just below the vas, taking care not to injure the vas artery (*Fig. 25*). Then remove the tip.

Close the tips of the dissecting forceps. Insert both tips (tips facing to the side) into the punctured sheath (*Fig. 26, page 42*).

Gently open the dissecting forceps (*Fig. 27, page 42*). Strip the sheath and surrounding tissues downward for at least a 1 cm length of vas. This is a longitudinal, not a transverse, motion.

Be careful to avoid blood vessels. Clamp or cauterize bleeders immediately. When checking for bleeding, pay particular attention to the abdominal segment of the vas, which is where bleeding from the vas artery could occur (a common reason for hematoma formation).

FIGURE 25. Puncturing the sheath with one tip of the dissecting forceps

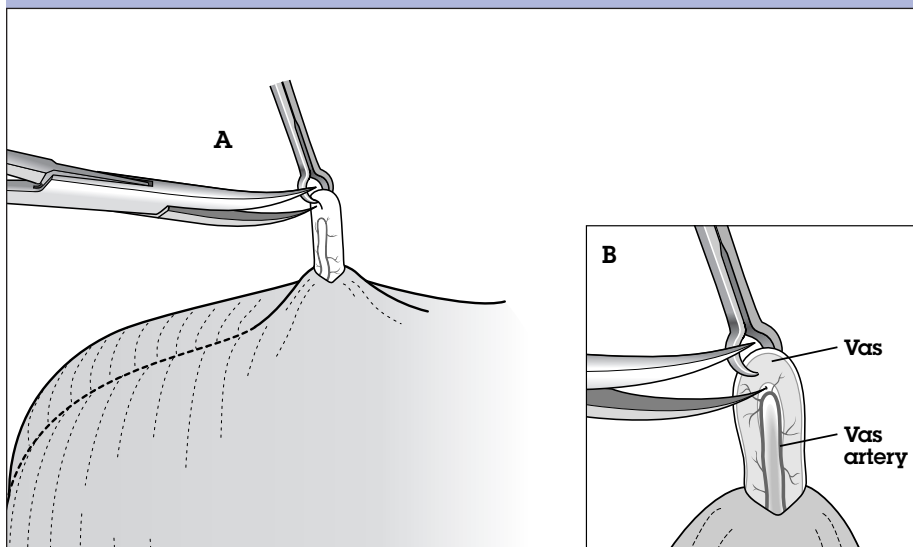


FIGURE 26. Inserting both tips of the dissecting forceps into the punctured sheath (tips facing to the side)

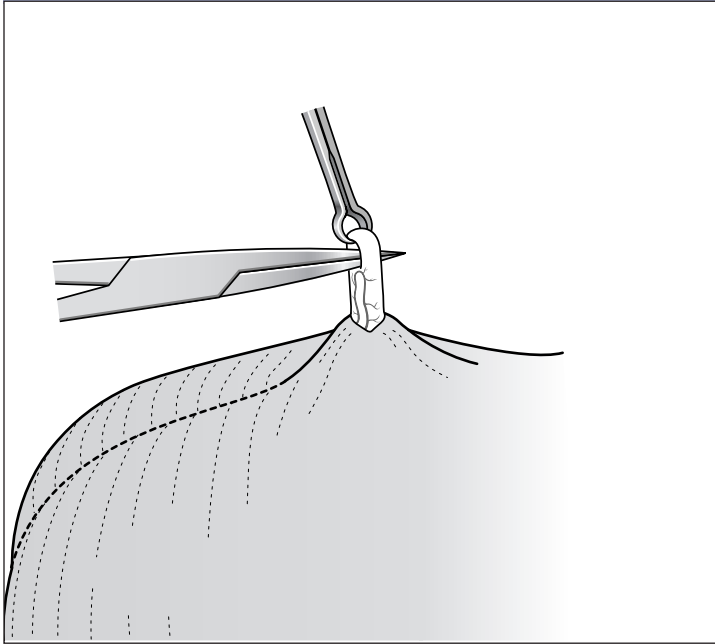
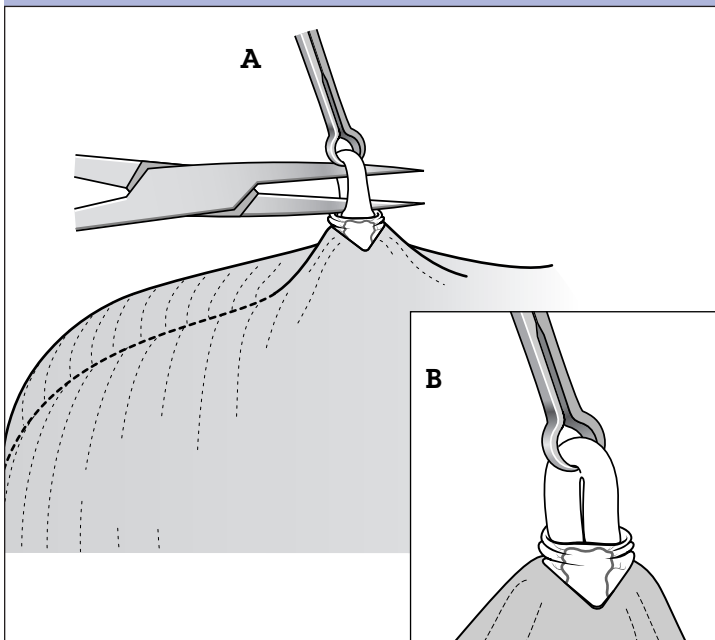


FIGURE 27. Opening the dissecting forceps to strip the sheath



Occluding the Right Vas

Now occlude the right vas. Remember, no-scalpel vasectomy is a **surgical approach for isolating and delivering the vas that uses conventional methods of vas occlusion**. Two recommended methods—ligation with excision and fascial interposition, and cautery—are described below.

Ligation with excision and fascial interposition. When used with ligation and excision, fascial interposition improves the effectiveness of vasectomy. Fascial interposition places a tissue barrier between the two cut ends of the vas, as a result of the operator's suturing (or securing with a clip) the thin layer of tissue that surrounds the vas (the fascial sheath) over one end of the vas. The stump of the prostatic (proximal) end is outside the fascial sheath and, when the vasectomy is completed, the stump of the testicular (distal) end is inside the fascial sheath.

Ligating and Excising the Right Vas

Before beginning ligation, make certain that all sheath and vasal vessels have been stripped away from the segment of vas to be occluded (*Fig. 28a, page 44*). Ligate the isolated vas at two points about 1.5 cm or more apart using two separate ligatures, first ligating the prostatic end of the vas and then the testicular end. After ligating the prostatic end, cut one end of the ligature, leaving a single uncut end of about 5 to 7 cm in length (*Fig. 28b*). **This will identify the prostatic end. The single uncut end of the ligature will be used to retrieve the vas, to facilitate fascial interposition.** Next, ligate the testicular end and leave both ends of the ligature about 5 to 7 cm in length (*Fig. 28c*).

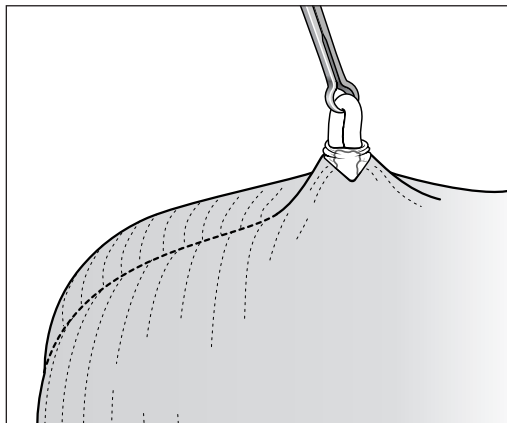
HINT: When excising the section of vas, leave an adequate stump at each end of the vas (approximately 3 mm), to ensure that the ligature does not slip off later.

Some operators use absorbable suture material such as chromic catgut; others prefer nonabsorbable silk or cotton. There have been no studies done to determine the best material for ligating the vas.

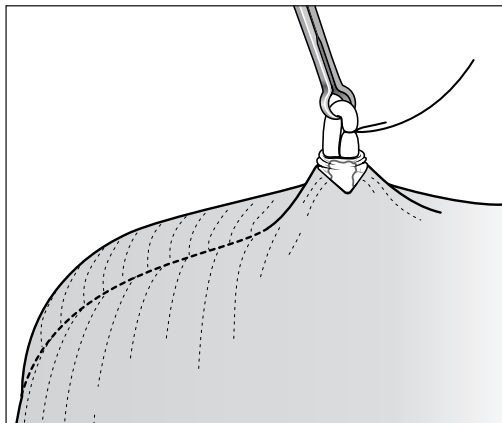
Excise up to 1 cm of the vas (*Fig. 28d*). When excision is completed, assure that both stumps are not

FIGURE 28. Steps in performing vasectomy by ligation with excision

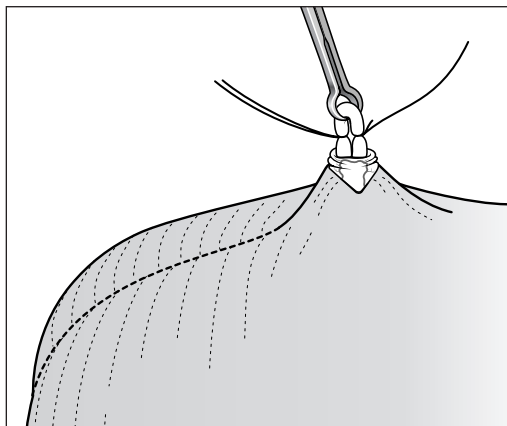
(a) Sheath and vasal vessels are stripped away from the part of the vas being occluded



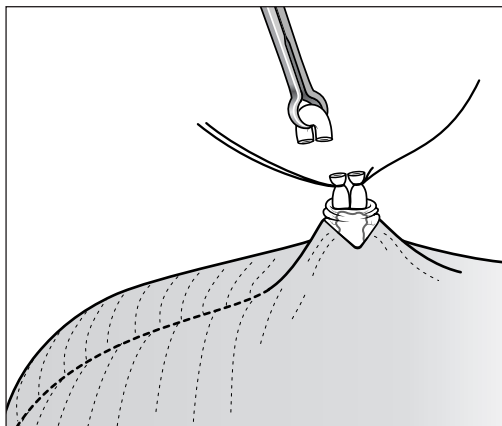
(b) The prostatic end of the vas is ligated, and one end of the ligature is cut



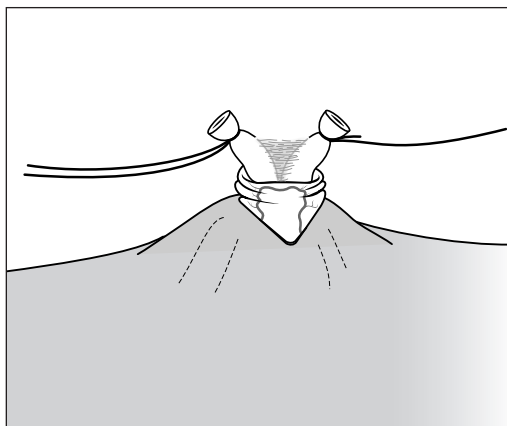
(c) The testicular end of the vas is ligated



(d) Up to 1 cm of the vas is excised



(e) Both stumps are separated by at least 1 cm



(f) The ligature at the testicular end is cut

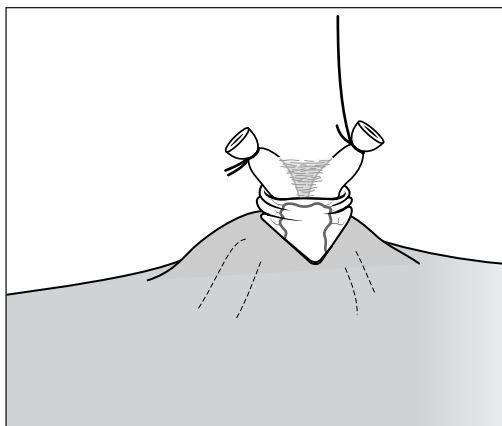
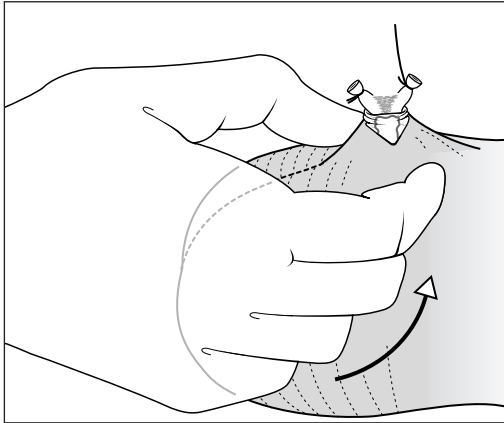
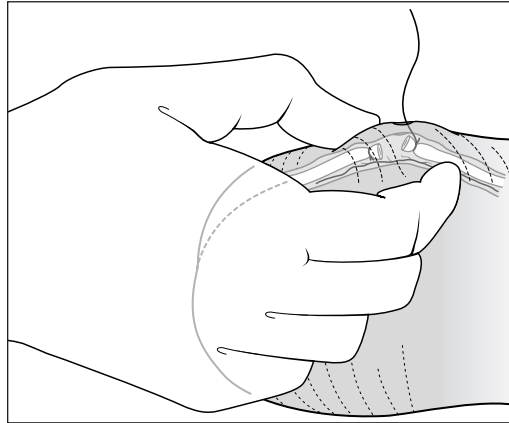


FIGURE 29. Steps in completing vasectomy by fascial interposition

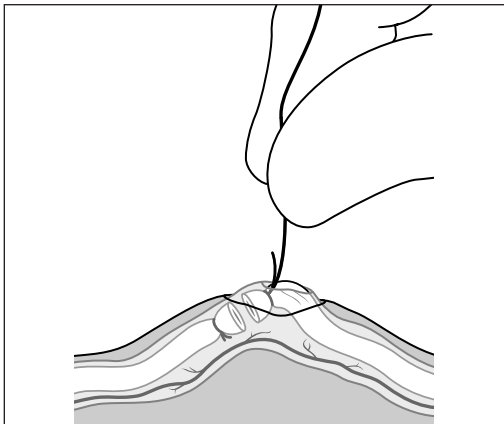
(a) The operator gently pinches and pulls up on the scrotum with the thumb and index finger



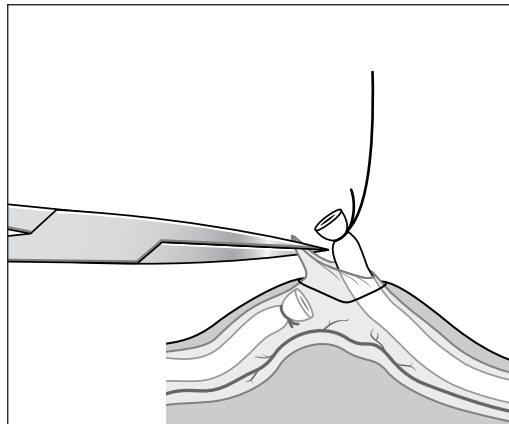
(b) The prostatic end of the vas passes between the fingers into the scrotum



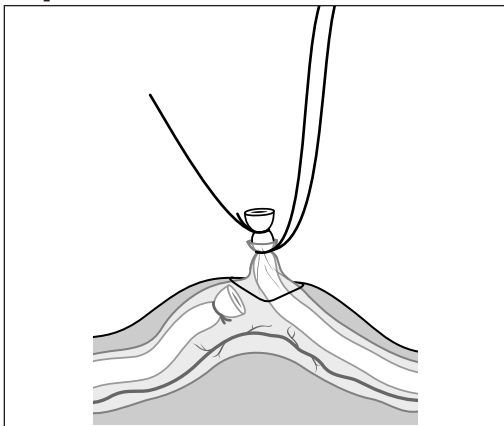
(c) The uncut ligature at the prostatic end is pulled through the puncture wound



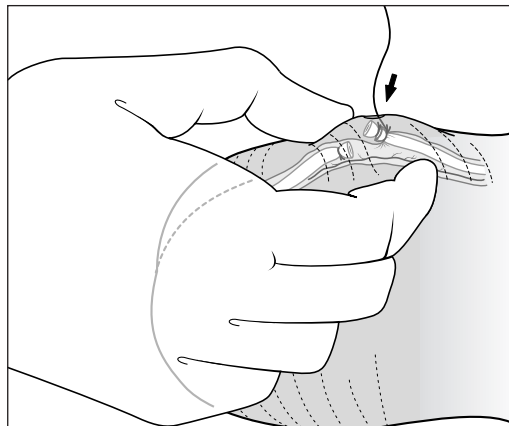
(d) With the tip of the dissecting forceps, the fascial sheath is grasped and held



(e) The fascial membrane is tied about 2 to 3 mm below the tie at the prostatic end



(f) The stump at the prostatic end is allowed to slip back into the scrotum



too close by pulling both ligatures. Separate both stumps by at least 1 cm (*Fig. 28e*). Inspect for bleeding and control it when it is present. **Before the ligature of the testicular end is trimmed, hemostasis must be assured.** After assuring that both stumps are separated, cut the ligature at the testicular end (*Fig. 28f*).

Allow both ends of the vas to drop back into the scrotum by gently pinching and pulling up on the scrotum with the thumb and index finger (*Fig. 29a*) until the prostatic end is felt passing through the fingers (*Fig. 29b*).

Start the fascial interposition technique by very gently pulling the uncut ligature of the prostatic end through the puncture wound (*Fig. 29c*). As the vas appears, it should be covered with the fascial sheath, which is seen as a translucent membrane covering the stump of the cut vas. If the translucent membrane (the fascial sheath) is not seen covering the vas, the vas should be dropped back into the scrotum and pulled out again, more gently.

Carefully grasp and hold tight the fascial membrane, using the tip of the dissecting forceps (*Fig. 29d*), tie the fascial membrane about 2 or 3 mm below the previous tie of the prostatic end (*Fig. 29e*), and cut both ends of the ligature. Allow the stump of the prostatic end to drop back into the scrotum by gently pinching the scrotum so that the stump falls back to its original position (*Fig. 29f*).

After assuring by palpation with the thumb and middle finger that the prostatic end is in the correct position, pull the single ligature just enough to see the stump of the prostatic end, then cut the single ligature and once again allow it to drop back into the scrotum. When fascial interposition is complete, the stump of the prostatic end should be outside the fascial sheath, and the stump of the testicular end should be inside the fascial sheath (*Fig. 30*).

PITFALL: Make sure not to tie the fascia with the vas while ligating to occlude the vas. If the fascia are tied with the vas during ligation, then fascial interposition will be difficult and may not be possible to perform.

Creating Fascial Interposition

FIGURE 30. The completed fascial interposition, with the stump of the prostatic end outside the fascial sheath and the stump of the testicular end inside the fascial sheath



Cautery. Another popular occlusion technique is cautery—electrosurgical (electrical coagulation) or thermal. This is done by inserting a needle electrode or cautery device into the vas lumen and desiccating the luminal mucosa of the vas to create a firm scar that will occlude the vas. With this method, only the inner layer of the vas (the mucosa) is sealed closed; the muscle wall of the vas remains intact.

There are many variations in the cautery technique, depending on the equipment used and the operator's preferences. For example, when a sharp-needle electrode is used, the operator pierces the vas wall with the needle and directs it into the lumen (*Fig. 31, page 48*). When a blunt cautery unit is used, however, the vas is first hemitransected, to permit the cautery tip to enter the lumen. If the vas is only partially transected at this stage, it cannot slip back into the scrotum (*Fig. 32, page 48*).

To achieve a graded desiccation of only the mucosal layer, the operator inserts 1.0 to 1.5 cm of the cold cautery tip into the lumen. Current is then applied, and the tip is slowly withdrawn. Depending on the equipment and the electrical current or strength of the battery, the time needed to cauterize the mucosal layer will vary. Doctors who are experienced with cautery usually note changes in the vas that indicate the mucosa has been desiccated. (For example, the mucosa blanches, and a small amount of smoke escapes from the tissue.) After cauterizing in one

FIGURE 31. Cautery with a sharp needle electrode (done in each direction)

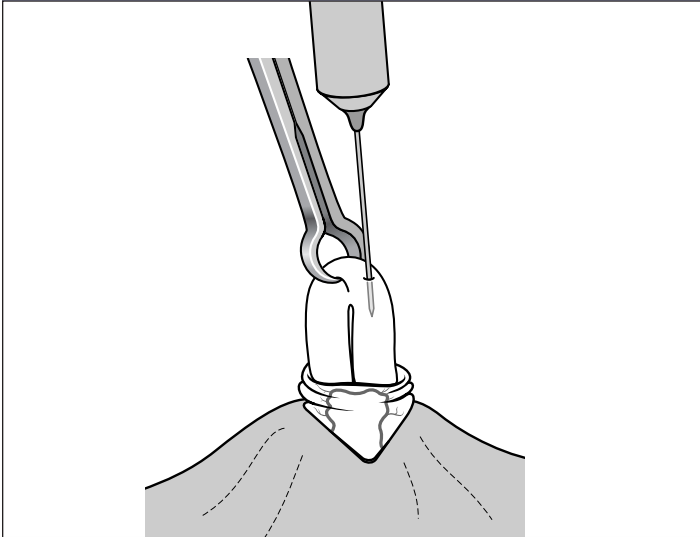


FIGURE 32. Cautery with a blunt wire inserted into the hemitranssected vas (done in each direction)

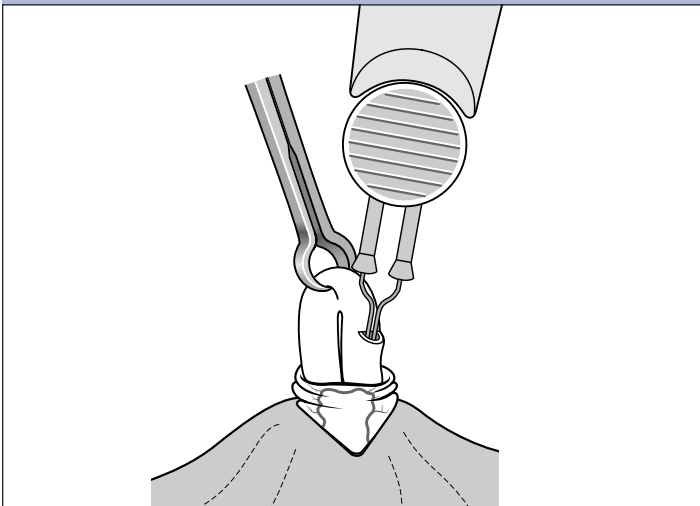
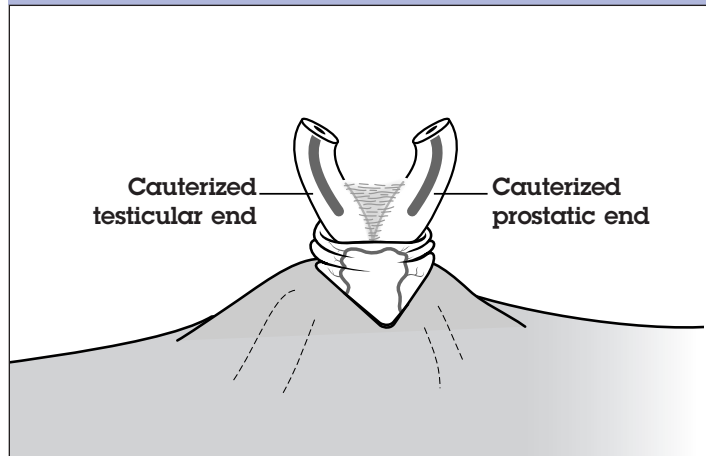


FIGURE 33. Sometimes a segment of the vas is removed following cauterization



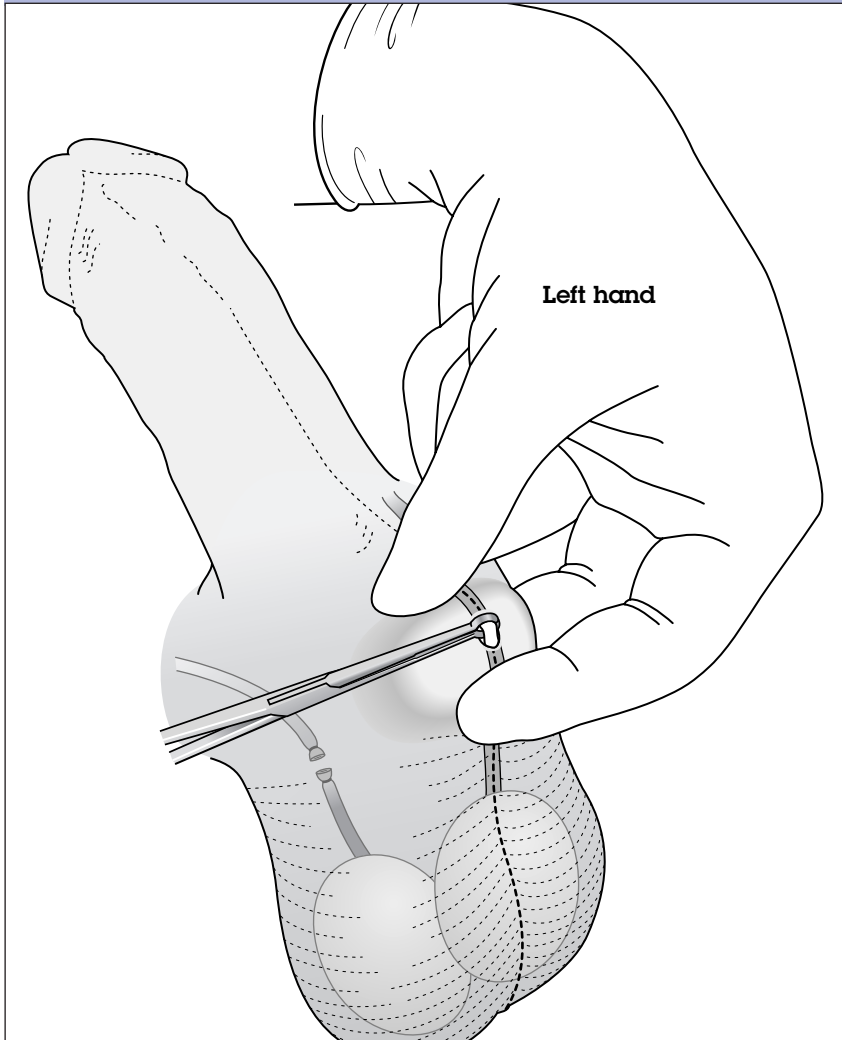
direction, the operator turns off the cautery unit to allow the tip to cool before cauterizing the vas in the other direction.

The vas is then divided. Some doctors remove a segment of the vas (*Fig. 33*) and others do not. Fascial interposition may also be used after the vas is occluded by cautery; however, there is no evidence that fascial interposition leads to a more rapid decrease in sperm counts than cautery alone.

The same procedure is followed for the second (that is, the left) vas.

PITFALL: When using cautery, avoid damaging the muscle of the vas; muscle damage can lead to necrosis, with subsequent sperm leakage, granuloma, and recanalization.

FIGURE 34. Isolating the left vas before occlusion



Adjust the left hand to grasp the left vas deferens, using the three-finger technique (*Fig. 34*). As described on page 21 of the anesthesia chapter, place the middle finger below the scrotum, with the thumb and index fingers above the scrotum; position the vas directly under the previously opened puncture site.

This position may be awkward at first, but with practice the right-handed operator will be able to isolate the left vas as smoothly as the right. Holding the vas with the left hand frees the right hand to handle the instruments (vice versa for the left-handed operator).

**Isolating
the Left Vas
before Occlusion**

**Applying
the Ringed
Clamp to the
Scrotal Skin
and Underlying
Left Vas**

Still using the three-finger technique, tightly stretch the skin overlying the vas so that it is as thin as possible. Open the ringed clamp, and press the tips onto the vas through the puncture site. Lock the clamp around the vas and overlying sheath (*Fig. 34*). As with the right vas, use the “palm-up” approach to ensure that the instrument is applied perpendicular to the vas (90 degrees) (*Fig. 11, page 25*).

Occasionally, the sheath and underlying vas cannot be fixed with the clamp because of local edema. Insertion of the clamp into the scrotal tissue may increase the risk of both trauma and infection. However, if the vas is directly under the puncture hole, inserting the clamp into the scrotal tissue probably will not contribute to trauma and infection. If the operator probes for the vas with the ringed clamp inside the scrotum, the risk of trauma and infection probably increases.

Grasping the left vas and sheath directly with the ringed clamp can make vasectomy easier to perform, particularly when the scrotal skin is thick.

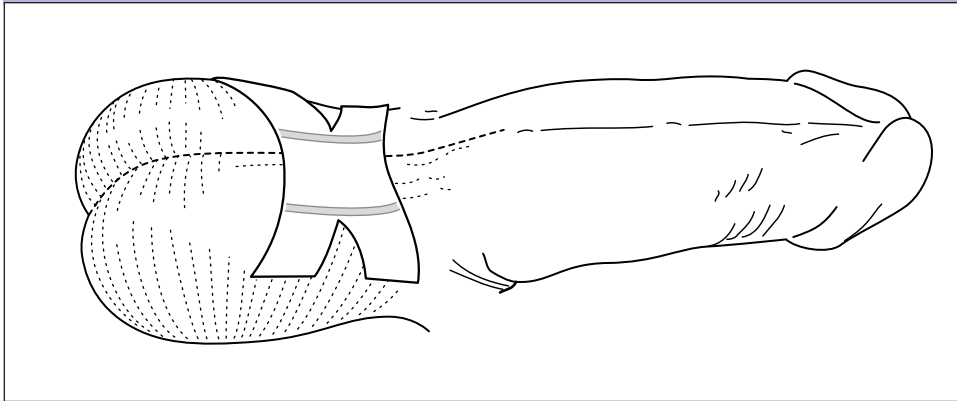
**Delivering, Elevating,
and Occluding
the Left Vas**

Follow the steps on pages 35 to 49 for delivering, elevating, and occluding the vas.

**Dressing
the Wound**

After both vasa have been occluded and returned to the scrotum, pinch the puncture site tightly for a minute, or ask the client to hold the gauze and apply pressure himself. Inspect for bleeding. If bleeding is present, hemostasis must be achieved. No skin sutures are necessary. Wash the small wound by swabbing with an antiseptic solution. A sterile gauze dressing can be held in place with a scrotal supporter or tape, or a Band-Aid can be used to cover the small wound. In *Figure 35 (page 52)*, note that the width of each end of the tape has been divided in half, allowing the tape to fit better on the round scrotum.

FIGURE 35. Dressing the wound



Men who have undergone vasectomy may leave the health facility after resting 30 minutes. If sedation has been used, monitor the client's vital signs every 15 minutes after surgery until they are stable.

Postoperative Care and Instructions

Explain to the client in simple language how to care for the wound, what side effects to expect, what to do if complications occur, where to go for emergency care, and when and where to return for a follow-up visit. Tell him that minor pain and bruising are to be expected and do not require medical attention. The man should seek medical attention if he has fever, if blood or pus oozes from the puncture site, or if he experiences excessive pain or swelling. Give the man a brief, simply written summary of the instructions.

It is essential that the client be informed of the low likelihood (but the possibility nonetheless) of vasectomy failure. He may resume normal activities and sexual intercourse with temporary contraception within two to three days, if he feels comfortable. The client or his partners will need to use another method of contraception during the first 12 weeks following vasectomy to avoid an unplanned pregnancy. Every client should be offered the opportunity to have a semen analysis. Ideally, one or two sperm-free semen specimens should be obtained from the client after vasectomy to be reasonably sure that the operation has been a success.