

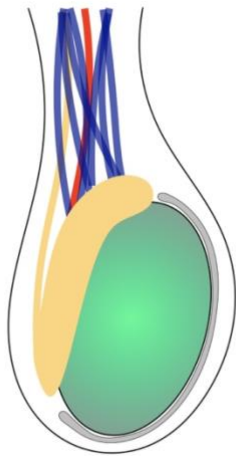
Orchidopexy and Orchiectomy for Testicular Torsion

Richard Davis, Leahcaren Oundoh, Jason Axt

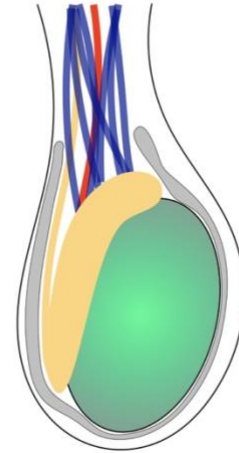
Introduction:

Testicular torsion is a true surgical emergency. Unfortunately, in locations where access to surgery is poor, it usually presents beyond 6 hours after onset, the time when intervention would have saved the testicle. The peak age group for testicular torsion to occur is between ages 12 and 18, although it can appear at any age including infancy and well into adulthood.

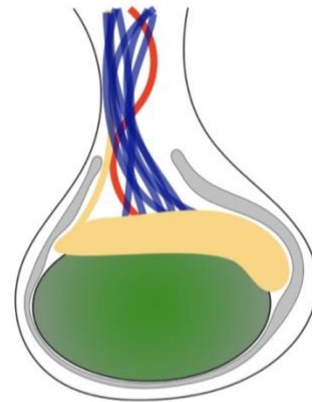
The anatomic condition that predisposes to testicular torsion is called the “bell clapper deformity.” With this condition, the testis can be thought of hanging within the scrotum the way a clapper hangs within a bell. It can then twist on itself. If the condition is recognized in time, the testicle can be untwisted and saved. This is variously known as “de-torsing” or “de-torting” the testicle and is usually accomplished through surgery. Since the problem is that the testicle can twist inside the scrotum, the solution is to tack the testicle to the walls of the scrotum with non-absorbable suture so that it cannot rotate inside the scrotum anymore. This is called orchidopexy, or orchiopexy. This is a different operation from [Orchidopexy for Undescended Testis](#).



Normal anatomy: The testis (Green) and epididymis (yellow) are supplied by the gonadal vessels, entering from above. The Tunica Vaginalis (grey) is a small fluid filled sac that does not occupy all of the scrotum. It is very difficult for the testis and epididymis to rotate on their blood supply. Courtesy of Craig Hacking, via <https://radiopaedia.org/cases/bell-clapper-deformity-diagram?lang=us>



Bell clapper deformity: The potential space of the Tunica Vaginalis extends up to where the blood vessels enter the scrotum. The testis and epididymis can rotate within the Tunica Vaginalis, though this has not occurred in this illustration. Courtesy of Craig Hacking, via <https://radiopaedia.org/cases/bell-clapper-deformity-diagram?lang=us>



Bell clapper deformity with torsion: the testis and scrotum have twisted within the Tunica Vaginalis and the blood supply is cut off. The testis rides higher, and transversely, in the scrotum. Courtesy of Craig Hacking, via <https://radiopaedia.org/cases/bell-clapper-deformity-diagram?lang=us>

It is important to keep in mind the anatomy of the Tunica Vaginalis: this is a fluid-filled space that surrounds the testis: it surrounds it only partially in normal anatomy, but it surrounds it completely when the “bell clapper” deformity is present. The surface of this space originated in the peritoneum and has the same shiny appearance. The part that is

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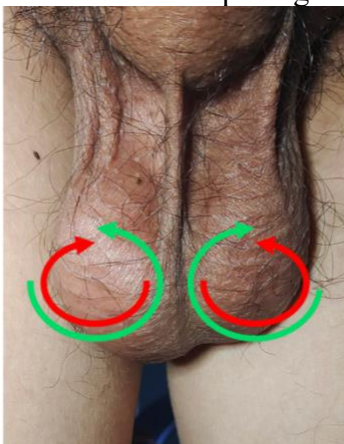
attached to the surface of the testis is called the visceral Tunica Vaginalis, and the part that is opposite it, that you must cut through to access the space, is called the parietal Tunica Vaginalis.

If you are able to operate before testicular ischemia becomes irreversible, detorse and perform orchidopexy on the affected testicle and then perform orchidopexy on the contralateral one. Classically this will be within 6 hours or less of the onset of acute pain, although it is possible to preserve the testis even farther out. The following table estimates your chances of testicular salvage based on time since onset of symptoms:

<u>Duration of Torsion</u>	<u>Salvage Rate</u>
<6 hours	85-97%
6-12 hours	55-85%
12-24 hours	20-80%
>24 hours	<10%

If the ischemia is irreversible, perform orchiectomy on that side and then orchidopexy on the contralateral side to prevent the same from happening on that side. This operation is shown here.

Rarely, before edema has set in, the testicle can be de-torsed by external rotation. Remember in this case that the testicle should be twisted with its axis moving away from the body's midline- a useful memory trick is to think of "opening a book."



Testicular torsion occurs in the direction shown by the Red arrows, like the closing of a book. When de-torsing the testicles, either before or during surgery, remember to rotate them in the direction shown by the Green arrows, as if opening a book. Source: [https://commons.wikimedia.org/wiki/File:Human_scroto_tum\(human_genitalia\).jpg](https://commons.wikimedia.org/wiki/File:Human_scroto_tum(human_genitalia).jpg)

Scrotal ultrasound is often performed in this setting, sometimes before the surgeon is called; it will show diminished or absent blood flow within the testis. We feel this modality is somewhat useful, although in a patient with characteristic history of acute onset scrotal pain, and a high-riding, tender and swollen scrotum, we would not defer operation, especially if it is possible to do so within 6 hours of onset. Certainly the operation **should not** be delayed while waiting for the ultrasound; it is better to explore than to miss the diagnosis within the 6 hour window. The main differential diagnosis, acute epididymo-orchitis, has a more gradual onset of pain. The ultrasound, in this case, will show hyperemia of the testicle and increased vascular flow. Other items on the differential diagnosis include testicular rupture due to trauma and testicular tumor. As always, a careful history is helpful: of all of these entities, only testicular torsion will have a history of sudden onset pain without trauma.

There is a related clinical entity, usually occurring in neonates, called extravaginal torsion: this occurs when the testicle and spermatic cord twist, within the scrotal skin, at a site that is proximal to the tunica vaginalis. This is due to lack of attachment of the tunica vaginalis to the scrotal skin itself. This occurs usually in utero before the tunica vaginalis is fixed to the scrotal wall, or soon after birth in the neonatal period- the boy is born with one, possibly two infarcted testes. For this reason, an acutely red and tender scrotum in a neonate should be explored without delay.

Scrotal exploration, orchiectomy and orchidopexy occur in the following steps.

- Exploration of the affected testis
- Orchidopexy or orchiectomy as appropriate
- Exploration of the contralateral testis and orchidopexy
- Fascia, then skin closure

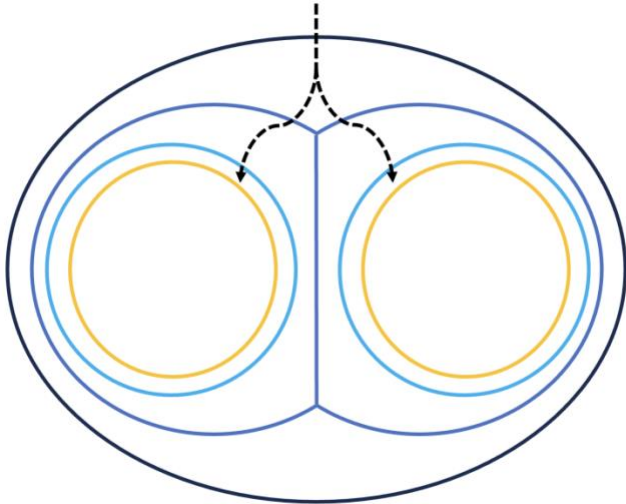
Steps:

1. The patient or his parents should be consented for unilateral orchiectomy if a necrotic and dead testis is found. The surgeon should be prepared to explore and affix the contralateral side if this is the case.

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2. Anesthesia can be general or spinal. It would be difficult to perform this operation under local anesthetic.
3. The approach will be trans-scrotal, with a single skin incision and two separate incisions through the Dartos fascia, as shown below.



In this picture, the scrotal skin is Black and the Dartos fascia is Dark Blue. The Dartos Fascia covers each testicle separately and has a septum between the two testicles. The parietal (outer layer) Tunica Vaginalis is Light Blue and the testicle, covered by the visceral layer of the Tunica vaginalis, is Yellow. The incision is shown by the Dotted line.

4. Make a skin incision through the midline of the scrotum, where there is often a raised “raphe” of skin. The incision should be generous, to allow complete visualization and safe performance of the orchidopexy.



Make a generous incision in the midline of the scrotum, using the “cut” mode on the diathermy to avoid bleeding.

5. Open the affected side first, by squeezing the affected testicle into the skin incision with your non-dominant hand and opening over its surface using the diathermy. When you enter the Tunica Vaginalis, there will be a rush of fluid, blood-stained if the testicle is ischemic.



As you incise through layers of the Dartos fascia surrounding the Tunica Vaginalis, the testis will become more clear. In this case, the dark red color of the ischemic tissue is seen. Continue until you enter the thin fluid filled space between the parietal (outer) and visceral (inner) Tunica Vaginalis lining the testis.

6. Insert a hemostat into the Tunica Vaginalis space and use it and diathermy to enter the full length of the Tunica Vaginalis.



Once you have entered the space around the testis, the shiny surface of the visceral Tunica Vaginalis confirms your location. Insert a hemostat clamp into this space and divide the parietal Tunica Vaginalis over it with diathermy. In this photo, the shiny

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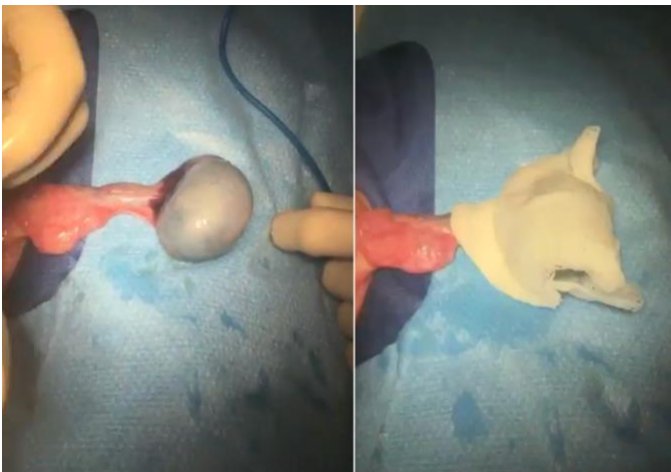
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surface of the visceral Tunica Vaginalis is black because of the ischemic testicle underneath.

7. If the testis is dark but not clearly necrotic, try to untwist it in the direction shown above, as “opening a book.” If there is any possibility it is viable, wrap it in a warm moist gauze and turn your attention to the other hemiscrotum, giving it time to declare itself.



In this case, the testis is dark Red and even Black in some locations, clearly beyond salvage



In this case, the testis is only dusky and actually appears to have some return of color (Left). It should be wrapped in a moist warm gauze (Right) and inspected again after inspection and pexy of the contralateral testis.



Same case as above, after pexy of the contralateral testis. The questionable testis is inspected and a small incision is made in the visceral Tunica Vaginalis. As bleeding is seen, the decision is made to preserve this testis and it is pexied as well, as described below.

8. If it is clearly necrotic, dissect the intra-scrotal spermatic cord away from the surrounding tissue at the superior aspect of the testis. Apply a right angle clamp to where the vessels enter. Amputate the testicle and suture-ligate the vessels, being careful to ligate them well to avoid a post-operative scrotal hematoma.



The intra-scrotal spermatic cord has been dissected proximally so that it can be safely ligated. If this maneuver is neglected, the ligature encircles an excessive amount of swollen tissue, and can slip off later leading to hemorrhage and a scrotal hematoma.

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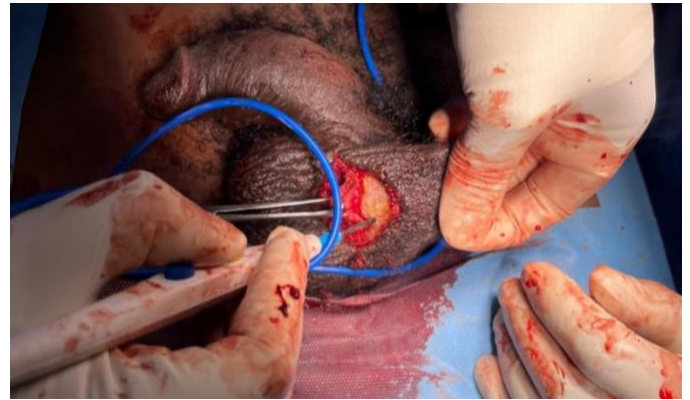
9. If the testicle is inflamed but not torsed, and the “bell clapper” deformity is not present, the diagnosis is acute epididymo-orchitis. Abandon the operation and close the Dartos fascia and the skin as described below.



Epididymo-orchitis results in a swollen, hyperemic testicle as seen here. There may be patches of necrosis or abscesses within the testicle. In extreme cases, epididymo-orchitis can lead to necrosis of the entire testicle but there will be no torsion of the vascular pedicle. Consider also tuberculosis as a cause of epididymo-orchitis, especially if there is pus but it is not foul-smelling.

Source: <https://doi.org/10.1177/11795476221146900>

10. Go now to the other side, squeezing the testicle gently with your nondominant hand and making another vertical incision in the Dartos fascia adjacent to your previous one, until you enter the Tunica Vaginalis, where there will be a rush of (hopefully non-bloody) fluid. Use a hemostat and diathermy again to extend the incision until all of the testicle is seen.



Make an incision with the diathermy over the contralateral testis, dissecting through the tissue until the shiny surface of the visceral Tunica Vaginalis on the surface of the testis indicates that you have entered the space around the testis.



Here, the surgeon has not yet reached the surface of the testis with its characteristic shiny appearance.



When the surgeon cuts through the parietal Tunica Vaginalis, reaching the space around the testis, there is a rush of clear fluid through a small hole. Insert the hemostat into this hole and elevate the parietal Tunica Vaginalis, allowing full entry into the space surrounding the testis.

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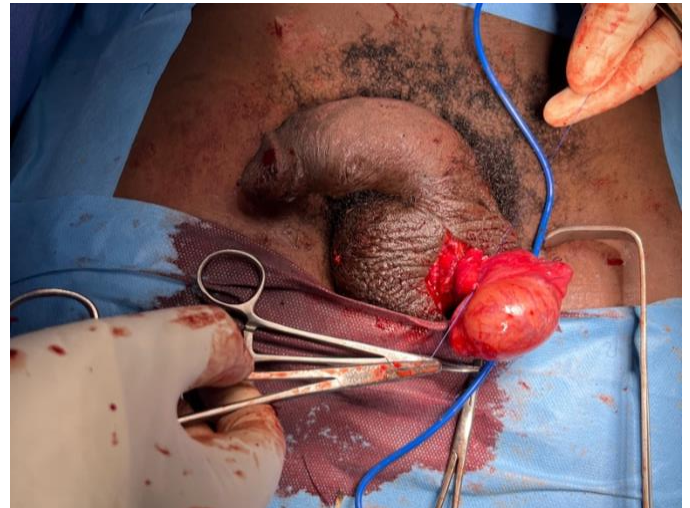
11. Be sure that the testicle is not torsed and then use non-absorbable monofilament suture to tack it to the wall of the Tunica Vaginalis in three separate places, preventing torsion in the future.



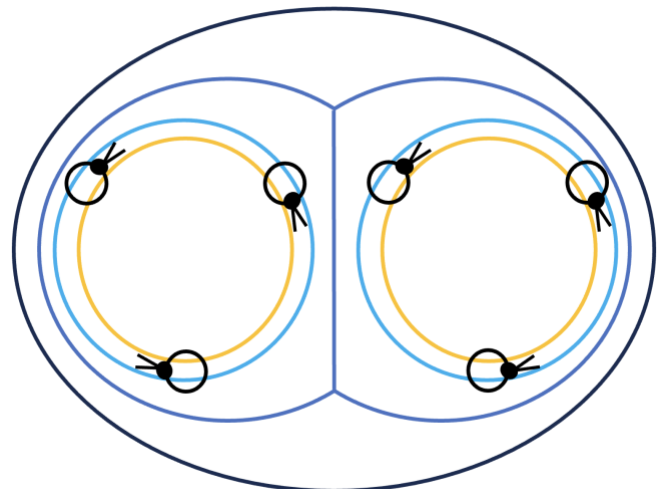
Place the posterior-most pexy stitch first, passing a 3-0 non-absorbable suture into space where the testis will reside



Finish the posterior pexy by passing the same suture through the posterior surface of the testis. Tie this suture to lay the testis within the Tunica Vaginalis space.



Place two more sutures with the same material, attaching the visceral to the parietal Tunica Vaginalis on either side, leaving space for the Dartos Fascia to close and cover the testis.



Schematic of a completed orchidopexy. Suture between the visceral Tunica Vaginalis (Yellow) and the parietal Tunica Vaginalis (Blue) prevents the testes from rotating within this space.

12. Apply Allis clamps to both ends of the Dartos fascia and have an assistant pull the clamps gently. Close the Dartos fascia of both sides simultaneously by approximating them to the midline fascia, as shown below, using absorbable suture.

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Allis clamps pulling the superior and inferior ends of both Dartos fascia incisions allows you to close both fascial incisions at the same time using a running absorbable suture.

13. Close the skin in a simple running configuration using running monofilament absorbable suture.



The appearance of the scrotum after closure of the skin layer.

14. Wrap the testicle gently and not tightly with elastic bandage.

Pitfalls

- Missed diagnosis: The consequences of not operating when the patient needs an operation are usually far greater than the consequences of operating and finding some other, non-surgical condition. If there is any possibility that the diagnosis is testicular torsion, especially in a child or young man, do not hesitate to explore

and do not place much weight on any doppler ultrasound findings.

- The danger of leaving a dead testis, if one is found during a late exploration, continues to be debated. The concern for anti-sperm antibodies seems not to be as great as once thought. Nevertheless, as of this writing the most common recommendation is to completely remove a dead testis, especially in an adult. (In resource-rich settings, a prosthetic testis can be placed to give the scrotum a normal appearance.) The patient may be concerned that he will be infertile or impotent with only one testis, but he should be reassured that one is enough.
- Be sure to dissect the cord contents free of surrounding tissue before ligating them and be sure that the ligature is well placed and tied. Bleeding from the gonadal vessels, especially the artery, will continue unopposed until the entire scrotum is full of blood and a tense scrotal hematoma is present. These usually require re-exploration, as they can burst the wound or even endanger the scrotal skin itself if the pressure becomes very high.
- Be sure that the testis is completely detorsed before performing orchidopexy. Remember that it rotates like the opening pages of a book.

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November 2023

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