Background:

Penile fracture, or the tearing of the tunica albuginea of one or both corpus cavernosa, is a clinical diagnosis that requires prompt surgical intervention. This injury typically occurs due to excessive bending of an erect penis. The diagnosis is most often based on patient history and physical exam. Patients often describe a "pop" or "snap" in the penis, followed by severe pain and immediate loss of erection, accompanied by rapid skin discoloration and swelling of the penis. Patients may also describe the injury occurring as a result of the penis slipping out of the vagina or anus and colliding with a partner's pubic symphysis or perineum. A history of rapid detumescence and inability to regain an erection following the injury is pathognomonic.

On physical exam, patients with a penile fracture present with asymmetric penile swelling and bruising, known as an "Eggplant Deformity." This pattern of swelling and bruising is caused by extravasation of blood from the tunica disruption into the soft tissue of the penis. When Buck's fascia remains intact, the swelling and ecchymosis is confined to the penile shaft. If Buck's fascia is also injured, bruising may extend into the scrotum, perineum or mons pubis. Penile fractures almost always occur during an erection with the site of the tear distal to the suspensory ligament. Injuries are typically ventral or lateral, where tunica albuginea is thinnest, and the fracture line in the tunica albuginea can sometimes be palpated.

Concomitant urethral injuries occur in 10-20% of cases. These associated urethral tears almost always occur at the same level as the corporal injury. Urethral injuries are more common for ventral fractures and bilateral corporal ruptures. Urethral injury in the setting of a penile fracture usually presents with blood at the meatus and difficulty voiding. Hematuria, dysuria, and urinary retention are also common, but urethral injury may present without any additional signs or symptoms. Urethral injuries can be evaluated at the time of penile exploration by direct inspection given their proximity to the corporal tear.

Other conditions that may present with penile swelling and ecchymosis, similar to penile fractures, are rupture of dorsal penile artery, rupture of penile veins, and rupture of suspensory ligament of penis. The absence of rapid detumescence and inability to regain an erection differentiate these less severe conditions. For equivocal case scenarios without access to advanced imaging, patients with concern for penile fracture should undergo surgical exploration for definitive diagnosis.

Penile fractures require prompt surgical exploration and repair of the corporal bodies within a few days of the injury. Early repair is recommended, but surgical delays of up to 7 days after injury have not been shown to adversely affect results of repairs. Failure to repair a penile fracture increases the risk of erectile dysfunction and Peyronie's disease, although repair does not eliminate these long-term complications.



Subtle example of eggplant deformity with overlying bruising. History was equivocal for penile fracture, but ultrasound demonstrated a small 7mm injury to left tunica at the shaft.



Pronounced eggplant deformity with clear disfiguring of phallus due to fracture.

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Lateral view of eggplant deformity characteristic of penile fracture, with evident ecchymosis. Photo courtesy of Judith Hagedorn, MD.



Frontal view of same patient with pronounced eggplant deformity and evidence of ecchymosis. Photo courtesy of Judith Hagedorn, MD.

Resource-Rich Settings

Retrograde Urethroscopy and Cystoscopy

• Can be used to evaluate the urethra preoperatively when there is concern for urethral injury.

Penile Ultrasound and MRI

• Can be used to adjudicate borderline cases when the history and physical exam are equivocal.

Anatomy

"Corpus," Latin for "body" is singular, and "Corpora," the plural form, means "bodies." Penile anatomy includes the urethra within the corpus spongiosum, located on the ventral aspect, and corpora cavernosa, of which there are two in a dorsolateral position. Tunica albuginea surrounds each corpus and is injured in penile fracture. The superficial and deep dorsal veins course midline on the dorsal aspect, with the arteries and nerves coursing lateral to the vein, making up the neurovascular bundle. Injury to the neurovascular bundle during degloving can lead to skin necrosis or erectile dysfunction. Finally, Buck's fascia envelops the corpus spongiosum, corpora, and neurovascular bundle. Buck's fascia may or may not be injured in penile fracture.



Cross-sectional view of penile anatomy, showing the paired corpora cavernosa dorsolateral to the corpus spongiosum and the neurovascular bundle





Sagittal view of penile anatomy. The corpus spongiosum surrounds the urethra. One corpus cavernosum (Red dot) lying dorsolateral to the corpus spongiosum, is shown here.



Structures of the penis, including the dorsal neurovascular bundle, the Dartos fascia, and the relation of the Tunica Albuginea to the corpora cavernosa. Source: https://doi.org/10.36348/merjmb.2025.v05i02.001

Principles of Penile Exploration:

Hemostatic control

Placing a tourniquet at the outset of a case or following degloving can facilitate exposure and tunica examination.

Incision and degloving

The gold standard diagnosis for a penile fracture is intraoperative identification. Therefore exquisite surgical exposure and hemostasis is paramount for this operation. A ventral penile incision can provide wide exposure with improved cosmesis and potentially less post-operative penile swelling. However, for the widest possible exposure, penile degloving is preferred, so this incision is recommended for those performing this operation for the first time. Both approaches are shown here.

Rule out urethral injury

Direct inspection of the urethra is straightforward during degloving. A catheter can be helpful to aid intraoperative examination.

Evacuate hematoma and identify tunical tears

Hematomas may obscure or even plug injuries and should be removed to facilitate tunical examination. "Leak-testing" with saline injected into the cavernosal body can aid in identification.

Primary repair of defect in tunica albuginea

The tunical defect should be repaired in a single layer of absorbable suture until watertight.

Leak-Testing

Leak testing at the end of the case should produce an erection without significant leakage from the corporal body.

Steps:

- 1. The patient should be consented for examination under anesthesia, repair of penile fracture, possible repair of urethra.
- 2. Position the patient supine.
- 3. Place a urethral catheter.
- 4. Incise the penile skin sharply through either a generous ventral penile incision or a circumferential circumcising incision (1 cm proximal to the glans) and dissect through the dartos fascia down to Buck's fascia.

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5. Expose the entire penis into the field by bluntly separating the skin and dartos from Buck's fascia in this avascular plane.



For degloving, sharply incise circumferentially 1cm below the edge of the glans. Photo demonstrates degloved penis with circumcising incision dissected down to Buck's fascia. Expose the entire penis to best identify injuries and defects.

6. If available, apply a fixed retractor to maintain exposure.



Alternatively, make a generous ventral incision along the shaft of the penis sharply. Here, a ventral incision has been made with fixed retractor in place to expose the injury.



If using a ventral incision, a penrose drain or vessel loop are helpful to lift the corporal bodies for inspection and identification of injury.

- 7. Evacuate the hematoma and inspect Buck's fascia. If there is no violation of Buck's fascia, incise the fascia over the presumed site of the injury, marked by the worst hematoma.
- 8. While incising Buck's fascia, avoid the neurovascular bundle on the dorsal aspect of the penis.
- 9. With a combination of blunt and sharp dissection, separate Buck's fascia from the tunica albuginea circumferentially around the injury. This makes closing Buck's fascia much easier.
- 10. Inspect the tunica albuginea of the corpus cavernosum to identify site(s) of injury. At this point, a leak test with a butterfly needle and saline can be helpful to ensure identification of all injuries.



Deglove penis and dissect down to Buck's fascia to evaluate for injuries. Here, a fixed retractor is being used to maintain exposure. Artificial erection is being performed with butterfly needle placed in right corpus cavernosum with saline injected to identify leaks and injuries.

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- 11. Judiciously debride the tunical injuries to create clean edges for closure.
- 12. Repair all tunical defects with 2-0 or 3-0 absorbable suture in a running fashion. Synthetic, longer-lasting absorbable suture is preferred.



Image depicts bilateral corporal defect. The urethra here is mobilized, but not injured. Photo courtesy of Judith Hagedorn, MD.



Debride the tunical injuries to create clean edges for closure and repair the defect using absorbable suture in a running fashion. Photo courtesy of Judith Hagedorn, MD.

- 13. Perform another artificial erection test to ensure a watertight closure.
- 14. Once all injuries are repaired, reapproximate Buck's fascia over the injury using 4-0 absorbable suture in a running fashion.
- 15. Ensure urethral integrity. There should be no bleeding from the corpus spongiosum. Palpating the catheter can aid in direct urethral inspection. If there is concern for a urethral injury, a leak test by instilling water or saline via the urethral meatus can also test for injury.
- 16. Urethral injuries in this setting can often be repaired primarily over the catheter. Ensure a watertight closure of the urethral mucosa with absorbable suture before moving to the spongiosum. Upon successful closure of the corpus spongiosum, the urethra should be hemostatic.
- 17. Close the incision in layers. Reapproximate the dartos and then skin using absorbable suture.
- 18. The penile dressing should be supportive with minor compression to help decrease swelling but still allow ample blood flow to the penis. Patients should remove and reapply this dressing every day for 5 days.



At conclusion, place a penile dressing that is slightly compressive to help decrease swelling, but not so tight as to restrict blood flow. If the tip of the penis starts to turn purple, blanch, or the patient says it's very painful, the dressing should be removed.

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Pitfalls:

- Missed diagnosis: if there is question of whether the penis is fractured, the best option is to explore. If there is a fracture that is left untreated, it can lead to long-term erectile dysfunction, penile pain, penile fibrosis, and penile curvature.
- Untreated urethral injuries can lead to severe skin and soft tissue infections, fistulae, and urethral stricture.
- Avoid significant debridement of viable tissue. Blunt injury may cause significant ecchymosis, but penile fractures rarely lead to significant tissue ischemia.

Patient Follow-Up:

Patient should avoid sexual intercourse for at least 4-6 weeks after repair. If a urethral repair was required, catheter should remain in place for 3-4 weeks and the patient should be treated with broadspectrum antibiotics for several days around the time of catheter removal.

Patients who recover well do not necessarily need to be followed long term. However, they should be made aware that their injury may have long term consequences including erectile dysfunction or penile curvature (Peyronie's disease). If the patient starts to demonstrate symptoms of erectile dysfunction or has bothersome penile curvature they should be followed and treated accordingly.

Patients who subsequently develop lower urinary tract symptoms – especially obstructive symptoms, such as poor urine flow, pain with urination, or recurrent urinary tract infections – should be evaluated for urethral stricture. It is possible that there was a missed urethral injury, and stricture may be present.

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