

# Orchidectomy

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## Orchidectomy

**Primary Disciplinary Field(s):** Urology, Oncology, Endocrinology, Gender-affirming care, Reproductive Medicine.

### 1. Core Definition and Overview

Orchidectomy, often referred to interchangeably as orchiectomy, is a surgical procedure involving the complete or partial removal of one or both **testicles** (testes). This procedure is a fundamental intervention in various medical disciplines, addressing a spectrum of conditions ranging from oncological concerns to hormonal management and gender-affirming care. The term itself is derived from the Greek "orchis," meaning testicle, and "ektome," meaning excision, precisely delineating its nature as a surgical removal. While the fundamental act of removal is consistent, the specific techniques and implications vary significantly depending on the underlying indication and the extent of tissue removal.

Historically, procedures akin to orchidectomy have been performed for millennia, initially for purposes such as creating eunuchs in ancient societies, which had profound social and political implications, particularly in empires like the Byzantine and Ottoman. Over time, as medical understanding advanced, the procedure's application shifted dramatically towards therapeutic interventions. Modern orchidectomy is a highly specialized surgical procedure, performed under strict medical protocols, aimed at improving patient outcomes, managing disease progression, or facilitating a patient's gender transition. It represents a critical intervention with significant physiological, psychological, and quality-of-life considerations that require comprehensive pre-operative counseling and post-operative support.

### 2. Types of Orchidectomy

The approach to orchidectomy is tailored to the specific medical necessity, leading to several distinct types, each characterized by its surgical technique and the amount of tissue excised. The three primary classifications are **simple orchidectomy**, **subcapsular orchidectomy**, and **inguinal orchidectomy**, also known as radical inguinal orchiectomy. These distinctions are crucial for understanding the procedure's impact and its appropriateness for different clinical scenarios, as they dictate not only the surgical approach but also the subsequent medical management and potential outcomes for the patient.

A **simple orchidectomy** involves the direct removal of the entire testicle through an incision made directly in the scrotum. This method is typically employed when the primary goal is bilateral removal for hormonal suppression, such as in gender-affirming surgery for transgender women, or for palliative treatment of advanced prostate cancer where androgen deprivation is critical. The

procedure is generally straightforward, often taking approximately 30 minutes, and can be performed under either local or general anesthesia, depending on patient preference, surgeon's recommendation, and the clinical setting. The simplicity of this approach makes it a preferred method for non-malignant indications where preserving the external appearance of the scrotum is not a primary concern or is addressed through other means, such as testicular prostheses.

In contrast, a **subcapsular orchidectomy** is a more nuanced procedure, primarily performed for the treatment of prostate cancer. Instead of removing the entire testicle, this technique focuses on excising the glandular tissue responsible for testosterone production, leaving the outer testicular capsule intact. This preservation of the tunica albuginea allows for the maintenance of the scrotum's external appearance, which can be a significant psychological advantage for patients. The goal is still effective hormonal suppression by removing androgen-producing tissue, but with a cosmetic benefit. Like the simple orchidectomy, this procedure also typically takes around 30 minutes and can be performed under local or general anesthesia. Its utility lies in its ability to achieve medical objectives while minimizing the visible physical impact of the surgery.

The most extensive and diagnostically significant type is the **inguinal orchidectomy**, or **radical inguinal orchiectomy**. This procedure is the standard for suspected or confirmed testicular cancer. The surgical approach involves an incision made in the groin (inguinal region), through which the testicle and its entire spermatic cord are removed. This method is critical because it allows for the high ligation of the spermatic cord, preventing the potential spread of cancer cells into the lymphatic and vascular systems of the abdomen, which is a major concern with testicular malignancies. Due to its more complex nature and the necessity of ensuring complete removal of potentially cancerous tissue and associated structures, an inguinal orchidectomy may take around an hour and is almost always performed under general anesthesia. It serves both diagnostic and therapeutic purposes, as the removed tissue provides definitive pathological diagnosis and staging, while also being the primary treatment for localized testicular cancer.

### 3. Indications and Medical Applications

The indications for orchidectomy are diverse, spanning multiple medical specialties and addressing a variety of pathological and physiological conditions. Each application is driven by specific therapeutic goals, ranging from cancer control to hormonal manipulation and the facilitation of gender transition. Understanding these varied indications highlights the procedure's versatility and its critical role in modern medicine, underscoring why it remains a vital surgical option for carefully selected patients.

One of the most common and historically significant indications for orchidectomy is in the management of **prostate cancer**. Since prostate cancer growth is often androgen-dependent, reducing testosterone levels in the body is a cornerstone of treatment. Bilateral orchidectomy

(surgical castration) provides immediate and sustained androgen deprivation, which can be a highly effective palliative measure for advanced prostate cancer, alleviating symptoms such as bone pain and slowing disease progression. Both simple and subcapsular orchidectomies are employed for this purpose, with the subcapsular approach offering cosmetic benefits while achieving the same hormonal effect by removing androgen-producing glandular tissue. This surgical approach remains a viable alternative to pharmacological androgen deprivation therapy, particularly in settings where medication adherence or cost is a concern, offering a definitive and irreversible reduction in testosterone.

Another critical application is in the treatment and diagnosis of **testicular cancer**. When testicular cancer is suspected based on clinical examination, imaging (such as ultrasound), and tumor markers, an inguinal orchidectomy is the definitive diagnostic and primary therapeutic intervention. The radical nature of the inguinal approach, involving the removal of the testicle and the spermatic cord, is essential to prevent the intraoperative seeding of cancer cells into the scrotum or systemic circulation. This procedure not only removes the primary tumor but also provides tissue for pathological analysis, which is crucial for accurate staging and guiding subsequent treatment decisions, such as surveillance, chemotherapy, or radiation therapy. Early diagnosis and timely radical orchidectomy are paramount for achieving high cure rates in testicular cancer.

Furthermore, orchidectomy plays a pivotal role in **gender-affirming surgery** for transgender women. For individuals assigned male at birth who identify as female, bilateral simple orchidectomy is a key component of feminizing genital surgery. This procedure significantly contributes to the psychological well-being and gender congruence of trans women by removing masculine primary sex characteristics. It also serves a practical purpose by drastically reducing the body's natural testosterone production, thereby facilitating the effectiveness of feminizing hormone therapy and potentially reducing the dosage of anti-androgens required. This aspect of gender-affirming care is a deeply personal and medically significant step in aligning a person's physical presentation with their gender identity, requiring extensive psychological evaluation and informed consent.

Beyond these primary indications, orchidectomy may also be necessary in other, less common scenarios. These include severe **testicular trauma** that results in irreparable damage or necrosis of the testicle, chronic and intractable **testicular pain** unresponsive to conservative treatments, severe and recurrent **infections** (e.g., orchitis or epididymitis) that lead to abscess formation or tissue destruction, and certain cases of **cryptorchidism** (undescended testicle) where the testicle is atrophied or deemed to have a high risk of malignancy and cannot be brought into the scrotum or surgically repaired. In rare instances, orchidectomy may also be considered for benign but symptomatic conditions such as large hydroceles or spermatoceles that are causing significant discomfort or cosmetic issues and cannot be managed by less invasive means.

## 4. Surgical Procedure and Post-operative Care

The surgical procedure for orchidectomy, while varying in incision site and extent, generally follows standard surgical principles, emphasizing sterility, precision, and patient safety. The choice of anesthesia--local, regional, or general--is determined by the type of orchidectomy, the anticipated duration, the patient's overall health, and their preferences, following a thorough discussion with the anesthesiologist and surgical team. Regardless of the specific technique, meticulous surgical planning and execution are crucial to minimize complications and ensure optimal patient outcomes.

For a **simple orchidectomy** or **subcapsular orchidectomy**, the patient is typically positioned supine, and an incision is made directly on the anterior aspect of the scrotum. The testicle is then carefully dissected free from its surrounding tissues. In a simple orchidectomy, the entire testicle and a segment of the spermatic cord are ligated and removed. For a subcapsular orchidectomy, the tunica albuginea (outer capsule) is incised, and the internal glandular tissue is carefully scooped out, leaving the capsule intact to preserve scrotal volume. Once the testicle or its contents are removed, the blood vessels are carefully ligated, and the incision is closed with dissolvable sutures. This often results in a relatively quick procedure, typically under 30 minutes, allowing for local anesthesia in some cases, particularly for bilateral simple orchidectomies for gender affirmation.

An **inguinal orchidectomy**, being a radical procedure for suspected malignancy, requires a different approach. An incision is made in the groin, overlying the inguinal canal. The spermatic cord is then isolated and carefully dissected, followed by ligation and division of the cord structures (vas deferens, testicular artery, veins, lymphatics) at a high point within the inguinal canal, close to the internal inguinal ring. This "high ligation" is critical to prevent the dissemination of potential cancer cells. The testicle is then delivered through the inguinal incision, and the entire specimen, including the testicle and a portion of the spermatic cord, is removed en bloc. The inguinal incision is then closed in layers. This procedure is more involved, typically taking around an hour, and almost always necessitates general anesthesia due to the deeper dissection and potential for greater discomfort.

Post-operative care is crucial for recovery and includes managing pain, preventing infection, and monitoring for complications. Patients are typically prescribed oral pain medication to manage discomfort, which is usually mild to moderate. Ice packs applied to the scrotum can help reduce swelling and bruising. Patients are advised to limit strenuous activities, heavy lifting, and sexual activity for several weeks to allow the surgical site to heal. Wound care instructions, including keeping the incision clean and dry, are provided to prevent infection. Potential complications include bleeding, hematoma formation, wound infection, persistent pain, and, rarely, damage to adjacent structures. In the long term, unilateral orchidectomy generally leaves the remaining testicle to continue producing hormones, but bilateral orchidectomy necessitates consideration of

hormone replacement therapy to mitigate the effects of androgen deficiency.

## 5. Hormonal and Physiological Impact

The removal of one or both testicles has profound hormonal and physiological consequences, as the testes are the primary sites of androgen production, predominantly testosterone, and also play a crucial role in spermatogenesis. The extent of these impacts depends significantly on whether a unilateral (one testicle) or bilateral (both testicles) orchidectomy is performed, and the patient's pre-operative hormonal status. Understanding these changes is essential for comprehensive patient counseling and for planning appropriate post-operative medical management, especially hormone replacement therapy.

Following a **unilateral orchidectomy**, such as for testicular cancer, the remaining healthy testicle often compensates by increasing its testosterone production. In most cases, this compensatory mechanism is sufficient to maintain normal or near-normal testosterone levels, preventing symptoms of hypogonadism. Fertility may be reduced, but it is often preserved, particularly if the remaining testicle is healthy and spermatogenesis is functional. However, patients should be counseled on potential impacts on sperm count and quality, and options such as sperm banking may be discussed before surgery, especially for those who anticipate needing chemotherapy or radiation after orchidectomy. Regular monitoring of testosterone levels may be advised, though clinical symptoms are often the primary indicator of androgen deficiency.

In contrast, a **bilateral orchidectomy**, performed for advanced prostate cancer, gender-affirming surgery, or bilateral testicular cancer, results in a dramatic and permanent reduction in systemic testosterone levels to castrate levels. This cessation of androgen production is the therapeutic goal in prostate cancer, starving the cancer cells of growth-promoting hormones. For transgender women, it is a crucial step in feminization, reducing masculine traits and supporting the effects of estrogen therapy. However, for other individuals, this lack of testosterone leads to a state of profound hypogonadism, which manifests with a wide range of symptoms. These can include a significant decrease in libido, erectile dysfunction, hot flashes, fatigue, muscle weakness, decrease in bone density (leading to osteoporosis), mood changes, and loss of body hair.

For patients undergoing bilateral orchidectomy not as part of gender affirmation (e.g., for prostate cancer where quality of life issues are prioritized, or for non-cancerous indications), **androgen replacement therapy (ART)** is often considered to mitigate the adverse effects of hypogonadism. ART, typically administered via injections, gels, or patches, aims to restore physiological testosterone levels, thereby improving libido, erectile function, mood, energy levels, and bone density. However, ART is contraindicated in patients with active prostate cancer or those for whom androgen deprivation is the primary treatment goal. Therefore, a careful risk-benefit analysis is performed, taking into account the patient's underlying condition, prognosis, and personal

preferences regarding quality of life versus cancer control. Additionally, counseling on potential long-term risks associated with severe hypogonadism, even with ART, such as cardiovascular implications, is part of comprehensive post-operative care.

## 6. Psychological and Quality of Life Considerations

Beyond the physical and hormonal consequences, orchidectomy carries significant psychological and quality-of-life implications for patients. The testicles are not only endocrine organs but also symbols of masculinity, fertility, and sexual identity. Therefore, their removal can impact a patient's body image, self-esteem, sexual function, and overall mental well-being. Addressing these psychosocial aspects is as crucial as managing the physical recovery, requiring a holistic approach to patient care.

For many individuals, particularly those undergoing orchidectomy for cancer or trauma, the loss of one or both testicles can lead to feelings of grief, loss, and even emasculation. Body image concerns are common, and some patients may experience anxiety, depression, or distress related to changes in their physical appearance or perceived sexual function. The impact on sexual identity and self-perception can be profound, regardless of whether fertility is affected or hormonal balance is maintained. Open discussions with healthcare providers about these potential psychological sequelae, coupled with access to psychological counseling or support groups, can significantly aid in adjustment and coping. Testicular prostheses, which are implants designed to mimic the feel and appearance of natural testicles, can be offered to help alleviate body image concerns and improve patient confidence, though their availability and suitability vary.

In the context of **gender-affirming surgery** for transgender women, the psychological impact of orchidectomy is generally positive and affirming. For these individuals, the removal of the testicles aligns their physical anatomy with their internal gender identity, reducing gender dysphoria and enhancing their sense of authenticity. This procedure is a crucial step in their transition journey, contributing significantly to mental health and overall well-being. However, even within this context, robust psychological assessment and support are essential to ensure the patient is fully prepared for the irreversible nature of the surgery and its long-term implications. The decision-making process is often protracted and involves extensive counseling to ensure informed consent and readiness.

Furthermore, the impact on **sexual function** and libido can vary. While hormone replacement therapy can address the physiological basis of reduced libido and erectile dysfunction following bilateral orchidectomy, psychological factors also play a significant role. Perceptions of attractiveness, self-confidence in sexual situations, and relationship dynamics can all be affected. Comprehensive sexual health counseling, involving partners where appropriate, can help patients navigate these changes and maintain a fulfilling sexual life. The overall quality of life post-

orchidectomy is a complex interplay of physical recovery, hormonal balance, psychological adjustment, and social support, all of which need to be considered in a personalized care plan.

## 7. Ethical Considerations and Patient Autonomy

Orchidectomy, being an irreversible procedure with significant lifelong consequences, is subject to stringent ethical considerations, particularly concerning patient autonomy and informed consent. The decision to undergo such a surgery must be made by a fully informed individual, free from coercion, and with a clear understanding of the risks, benefits, and alternatives. This ethical framework is paramount across all indications but becomes especially critical in cases involving non-life-threatening conditions or gender-affirming care.

**Informed consent** is the cornerstone of ethical practice in orchidectomy. This process involves a thorough discussion between the surgeon and the patient, covering the rationale for the surgery, the specific type of orchidectomy proposed, the details of the surgical procedure, potential intraoperative and post-operative risks (e.g., bleeding, infection, pain, hormonal changes, infertility), expected outcomes, and available alternatives (e.g., pharmacological androgen deprivation, watchful waiting, alternative cancer treatments). Patients must be given ample opportunity to ask questions and process the information before making a decision. For elective procedures, such as gender-affirming surgery, this process is often multidisciplinary, involving mental health professionals to ensure psychological readiness and capacity for decision-making.

The principle of **patient autonomy** dictates that individuals have the right to make decisions about their own medical care, even if those decisions differ from medical recommendations, provided they have the capacity to do so. In the context of orchidectomy, this means respecting a patient's choice to undergo or decline the procedure after being fully informed. Special considerations arise in cases of minors or individuals with impaired decision-making capacity, where surrogate decision-makers and ethical review boards may become involved to ensure the patient's best interests are upheld. For instance, in cases of suspected testicular malignancy in a minor, decisions must balance the immediate need for cancer treatment with the long-term impact on the child's development and future autonomy, typically requiring parental consent and, when appropriate, assent from the child.

Furthermore, the long-term implications of orchidectomy, particularly for fertility and hormonal balance, necessitate ongoing ethical consideration. Patients must be adequately counseled on options such as sperm banking prior to bilateral orchidectomy if future fertility is a concern. The ethical imperative extends to ensuring equitable access to comprehensive post-operative care, including hormone replacement therapy and psychological support, regardless of the indication for surgery. The role of the healthcare provider is not merely to perform the surgery but to act as an advocate for the patient's holistic well-being throughout their journey, respecting their choices and

supporting their recovery and adaptation to life post-orchidectomy.

## Further Reading

[Orchiectomy - Wikipedia](#)

[Orchiectomy - Mayo Clinic](#)

[Testicular Cancer Treatment - National Cancer Institute](#)

[Hormone Therapy for Prostate Cancer - American Cancer Society](#)

[Standards of Care for the Health of Transgender and Gender Diverse People, Version 8 - WPATH](#)

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