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An Overview of Male Feline Urethral Anatomy for Successful Perineal Urethrostomy

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★ Key message

- Surgical success depends on precise knowledge of feline urethral anatomy, allowing creation of a wide urethral opening while preserving normal urinary continence.
- Perineal urethrostomy is a life-saving procedure that bypasses recurrent urethral obstruction and improves long-term quality of life without altering the cat's gender.

Abstract

Perineal urethrostomy (PU) is a critical salvage surgery for male cats facing recurrent urethral obstructions or severe trauma from Feline Lower Urinary Tract Disease (FLUTD). A precise, three-dimensional understanding of regional anatomy is essential for surgical success and minimising complications like strictures or hemorrhage. Topographically, the male feline urethra narrows drastically from a 4 mm pelvic lumen to a mere 1 mm penile lumen caudal to the bulbourethral glands. This abrupt bottleneck makes the distal penile urethra the primary site for obstructive plugs and uroliths. PU is a functional, life-saving diversion rather than a gender-reassignment surgery, successfully restoring long-term quality of life.

Introduction

Perineal urethrostomy (PU) in male cats is a critical salvage surgical procedure performed to create a new, permanently widened urinary opening when the distal urethra suffers from recurrent obstructions or irreparable trauma. The procedure is most commonly performed in male cats suffering from refractory Feline Lower Urinary Tract Disease (FLUTD), recurrent urethral obstructions, trauma or neoplasia. Perineal urethrostomy, the most frequently performed technique, involves removing the narrow penile urethra and suturing the wider pelvic urethra to the skin in the perineal region, thereby reducing the risk of future obstructions. A thorough understanding of the male feline urethral anatomy is essential for

successful surgery and to minimise complications such as hemorrhage, wound dehiscence and urinary tract infections. Overall, urethrostomy can significantly improve the quality of life of affected cats when appropriate surgical technique and postoperative care are provided.

Anatomical Features of Male Urinary System in Cats

The male urethra is a tube that carries urine from the urinary bladder to the exterior and is divided into several anatomical parts. Detailed knowledge of the anatomy of these segments is crucial for the successful planning and execution of perineal urethrostomy in male cats.

1. Preprostatic Urethra

Preprostatic urethra is also called intramural urethra. It extends from the neck of the urinary bladder to the prostate gland. In male cats it is relatively short and serves as a passage for urine from the bladder toward the more distal portions of the urethra. This segment is surrounded by smooth muscle fibres that contribute to regulation of urine flow. The preprostatic urethra is located within the pelvic cavity and is lined by transitional epithelium.

2. Prostatic Urethra

The prostatic urethra is the portion of the urethra that passes through the prostate gland. In male cats the prostate is a small bilobed gland situated near the neck of the urinary bladder. The prostatic urethra receives secretions from the prostate which contribute to the seminal fluid during ejaculation. This region serves as a common passage for both urine and reproductive secretions and is lined by transitional to pseudostratified epithelium.

3. Postprostatic Urethra

The postprostatic urethra is the part that extends between prostate gland and bulbourethral gland. It forms part of the pelvic urethra and serves as a conduit for urine and semen. This segment is surrounded by striated muscles including the urethralis muscle, which assist in voluntary control of urination. The postprostatic urethra is wider than the distal penile urethra and is an important anatomical landmark in feline urinary surgery.

4. Penile Urethra

The penile urethra is the distal portion of the urethra that runs through the penis and opens externally at the urethral orifice. In male cats, this segment is narrow and has a relatively small diameter, making it the most common site for urethral obstruction. The penile urethra carries both urine and semen and is lined predominantly by stratified or pseudostratified epithelium. Its narrow lumen is of particular clinical significance in feline lower urinary tract diseases (FLUTD) and is a key consideration during procedures of perineal urethrostomy.

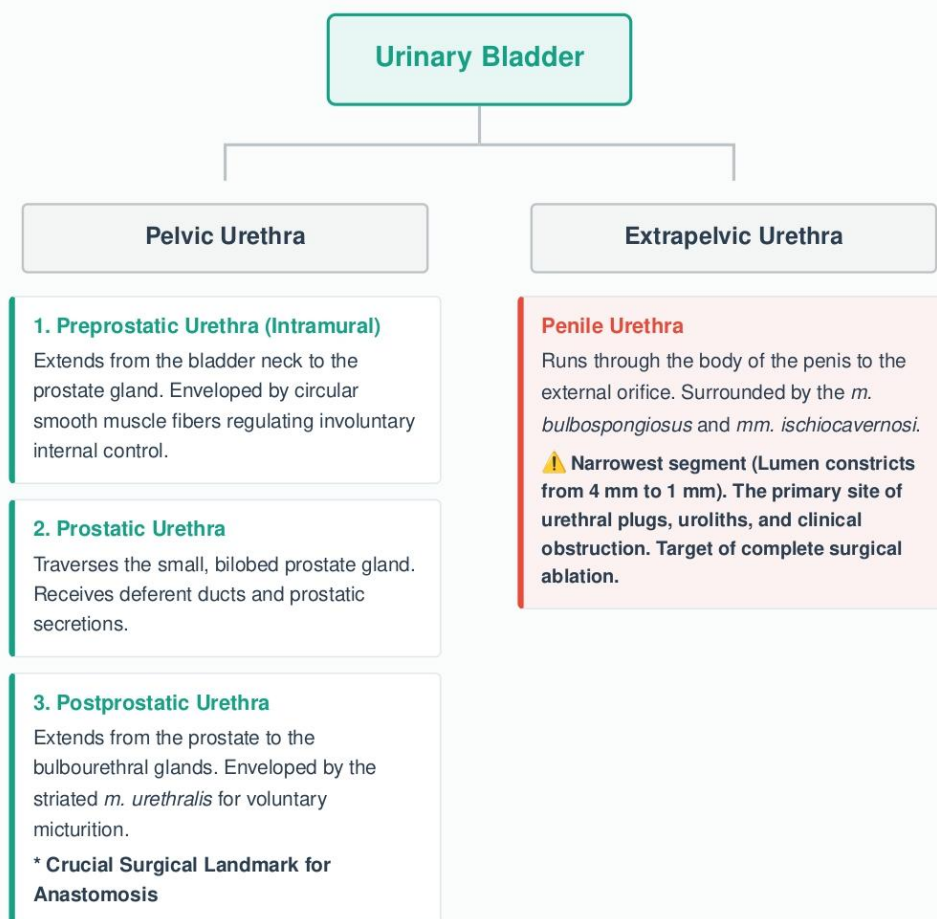
This penile urethra is also surrounded by ischiocavernosus and bulbospongiosus muscles (striated muscles). These muscles help in reproductive functions and also to expel the last drops of urine and semen. However, the prominent urethralis muscle, which provides

voluntary control of urination, is mainly associated with the pelvic urethra. Therefore cats retain voluntary control of micturition after a successful PU surgery and remain continent.

They can still consciously initiate and stop urination.

Topographical Flowchart of the Male Feline Urethra

A Schematic Reference for Perineal Urethrostomy (PU) Surgery



Pathophysiology and Sites of Obstruction

Urethral blockages are highly localised phenomena in male cats due to specific anatomical constrictions.

- **The Critical Bottleneck:** The urethral lumen narrows drastically from an average diameter of 4 mm within the pelvic cavity down to a mere 1 mm as it passes caudal to the bulbourethral glands into the penile urethra.
- **Urethral Plugs:** This abrupt 4:1 diameter reduction makes the distal penile urethra the ultimate lodging site for urethral plugs—amorphous matrices composed of mucoproteins, inflammatory cells, and crystalline debris (typically struvite).
- **Uroliths and Debris:** Small vesical calculi (struvite or calcium oxalate) that easily pass through the wide pelvic urethra frequently become impacted at this distal narrow site.

- Inflammatory Occlusion: Secondary mural edema and localized vasospasm induced by severe cystitis or trauma further compromise this already minuscule lumen, precipitating complete functional and mechanical anuria.

Surgical Procedure of Urethrostomy

First of all, the cat is placed under general anaesthesia, and the area around the scrotum and penis is shaved, prepped and sterilized. Then the procedure begins with a castration. But castration is not technically a part of perineal urethrostomy. Castration is performed immediately before PU because it improves surgical access and facilitates stoma placement. Therefore the scrotum and penis are dissected away from the surrounding tissue, exposing the penile urethra.

Then the penis and the narrow distal segment of the urethra are amputated. The wider, muscular urethra at the level of the bulbourethral gland is opened and sutured (anastomosed) to the skin, creating a new permanently widened opening to the outside. The skin is closed around the new wider urethral opening, often resulting in an appearance similar to a female cat's anatomy.

Conclusion: Dispelling Misconceptions

A common misconception among cat owners is that perineal urethrostomy is a sex-changing surgery because the penis is amputated and a new urinary opening is created in the perineal region. However, PU is not a sex-changing procedure. Its primary purpose is to treat recurrent or life-threatening urethral obstruction by bypassing the narrow penile urethra. The cat remains anatomically and genetically male, and the surgery only modifies the pathway for urine excretion.

The significance of PU is that by creating a wider urinary outlet from the pelvic urethra, PU reduces the risk of future obstructions, improves urine flow, relieves pain and discomfort and can be life saving in severe cases. The procedure significantly enhances the long-term quality of life of affected cats while preserving their ability to voluntarily control urination in most cases.

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