

The male external genitalia include structures of the penis, scrotum, and testes (Fig 1).

The *dorsal* aspect or *dorsum* refers to the upper plane extending from the *penopubic junction* to the tip of the penis (Fig 2). The *ventral* aspect or *ventrum* refers to the lower plane from the *penoscrotal junction* to the tip of the penis. (Fig 3).

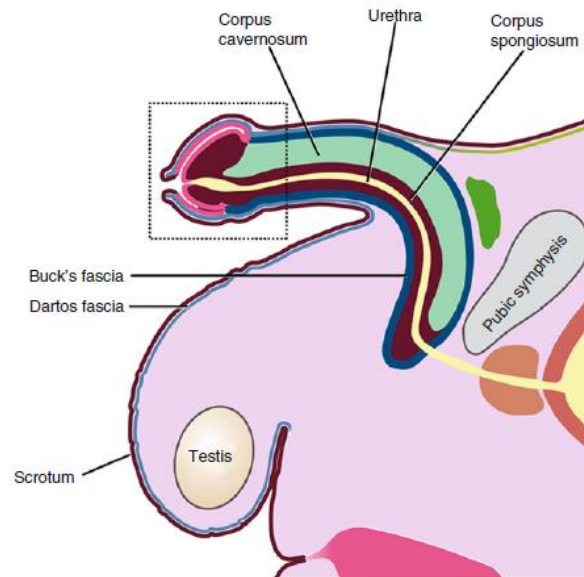


Fig 1: Male external genitalia (with kind permission from David A. Bolnick, Martin Koyle and Assaf Yosha. Surgical guide to circumcision ISBN 978-1-4471-2857-1 and © Springer-Verlag London 2012, davebo@uw.edu)



Fig 2: Dorsal Surface



Fig 3: Ventral surface

The Penis

The penis is anchored to the pubic bone, it courses outward along the pubic tubercle and emerges

below the pubic symphysis. The penis can be divided into three parts: the proximal root, the shaft/body, and the glans (which includes the prepuce or foreskin). The proximity of the pubic symphysis to the base of the penis is helpful when administering a dorsal penile nerve block or when describing the location of palpable undescended testes.

Corpus

The corpus or body of the penis is composed of three cylindrical bodies of erectile tissue (Fig 4). There are 2 *corpora cavernosa* dorsally which are bound together by a strong fibrous sheath to form one functional unit. Each corpus cavernosum at its base courses laterally to anchor with the respective ischiopubic ramus. The ventral *corpus spongiosum* encloses most of the *urethra* and terminates distally in a mushroom-shaped expansion called the *glans penis* (fig 5). The Urethra ends as a vertical slit opening at the tip of the glans – urethral meatus (fig 5).

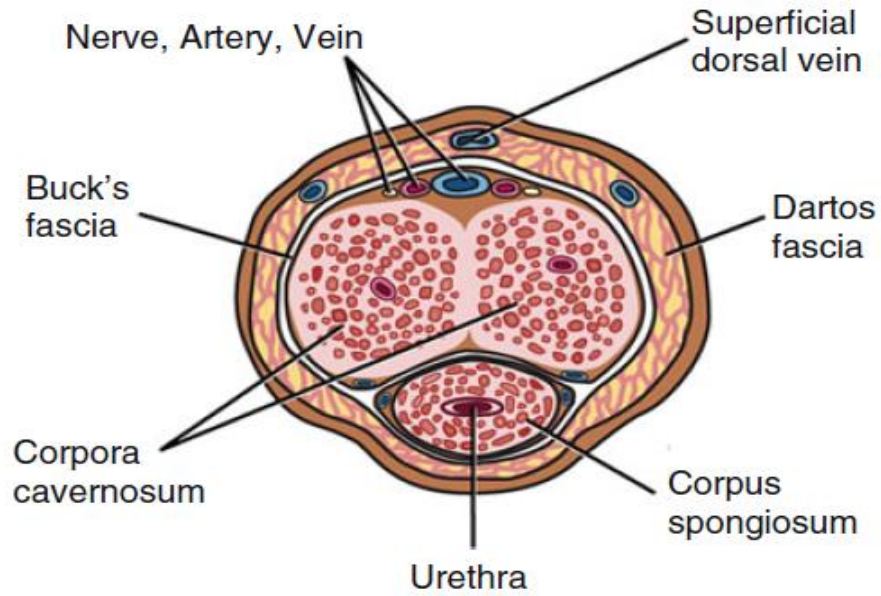


Fig 4. Cross section of Corpus (with kind permission from David A. Bolnick, Martin Koyle and Assaf Yosha. Surgical guide to circumcision ISBN 978-1-4471-2857-1 and © Springer-Verlag London 2012, davebo@uw.edu)

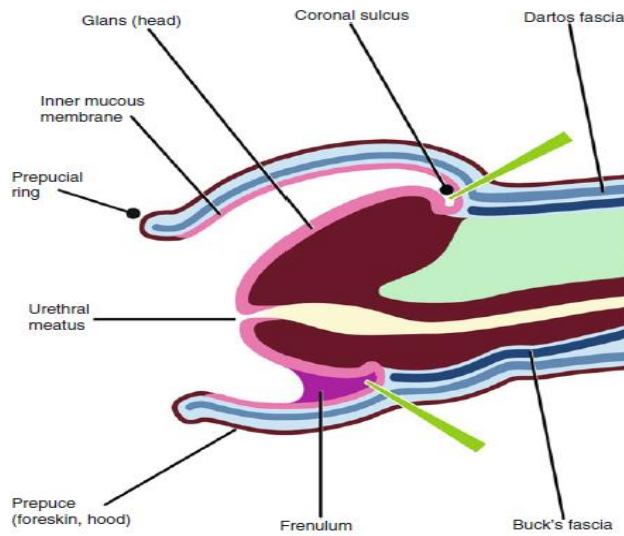


Fig 5. Distal phallus and Glans Penis (with kind permission from David A. Bolnick, Martin Koyle and Assaf Yosha. Surgical guide to circumcision ISBN 978-1-4471-2857-1 and © Springer-Verlag London 2012, davebo@uw.edu)

The three corpora are bound together from their root to the *coronal sulcus* by the Buck's fascia which is a loose mesh of connective tissue which contains a network of small vessels, the deep dorsal vein, the dorsal arteries and the dorsal nerves. The dorsal penile nerve block is most effective if placed just outside Buck's fascia in the subpubic space, where the penis begins its downward course under the pubic symphysis.

Surrounding the Buck's fascia is a smooth muscle meshwork that extends from the scrotum called *dartos fascia* which continues into the prepuce (Fig.5). Within the dartos fascia lies the superficial dorsal vein which must be ligated in freehand circumcision to avoid haematoma formation (Fig 4).

Coronal Sulcus

The groove that delineates the glans from the penile shaft is called the *coronal sulcus* (Fig 5). The coronal sulcus can be made out through the foreskin and is where the foreskin is excised to in circumcision.

Prepuce

The *prepuce, foreskin, or hood*, is the sheath of skin that normally surrounds and extends distally

beyond the glans tapering down to the *preputial ring* or meatus (Fig 5). The prepuce has 2 layers; an outer part which is continuous with the penile skin and an inner side which is a mucous membrane (Fig 5). At birth, the mucous membrane surface of the glans is adherent to the mucous membrane of the prepuce which gradually separates between birth and puberty.

The prepuce is tethered along the ventral raphe of the glans by a thin layer of mucous membrane which contains a network of vessels and fibrous bands called the *frenulum* (Fig 5). If the frenulum is tethered too tightly, it may cause a downward curvature of the glans called chordee. In hypospadias the ventral prepuce and the frenulum are absent while in epispadias the dorsal prepuce is

absent. In circumcision the prepuce and part or all of the frenulum are removed: the preputial space is created by blunt dissection, separating the mucous membrane of the prepuce from that of the glans. Attention must be given to avoid leaving part of the inner mucous membrane by dissecting close to the glans and also avoid injury to the frenulum which can cause bleeding.

Engorgement of the corpora (cavernosum and spongiosum) leads to erection which can occur from birth often before urination. Avoid doing a circumcision on an erect penis as it distorts the layout of the penile skin.

Urethra

The urethra starts from the bladder and goes through the corpus spongiosum near its base, through the glans and terminates at the tip of the glans as the *urethral meatus* (Fig. 1,5). It is subcutaneous in its course on the penile shaft. Disruption of this pathway during development can result in an improperly fused urethra. During pre-circumcision assessment, the entire course from the scrotum to the meatus must be carefully examined for abnormal openings, translucent appearing tissue, or areas of mucous membrane.

Care must be given during separation of mucosa layers of the glans and prepuce to avoid injury to the urethra and frenulum which could result in a urethrocutaneous fistula.

Blood supply

The penis is supplied by the dorsal and deep arteries of the penis (Fig 6) both branches of the internal pudendal artery.

The dorsal artery runs on each side of the deep dorsal vein in the groove between the corpora cavernosa. The deep artery runs distally near the center of the corpora cavernosa (Fig 6). Arteries of the bulb of the penis, superficial and deep branches of the external pudendal also supply the penis.

Venous drainage is by (Fig 6);

1. Deep dorsal vein of the penis which drains into the prostatic venous plexus.

2. The superficial dorsal vein which drains into the superficial external pudendal vein.

Nerve supply

Derived from S2 -S4 spinal cord segments and the spinal ganglia through the pelvic splanchnic nerves and pudendal nerve. Sensory and sympathetic innervation is by the dorsal nerve of the penis, a terminal branch of the pudendal nerve.

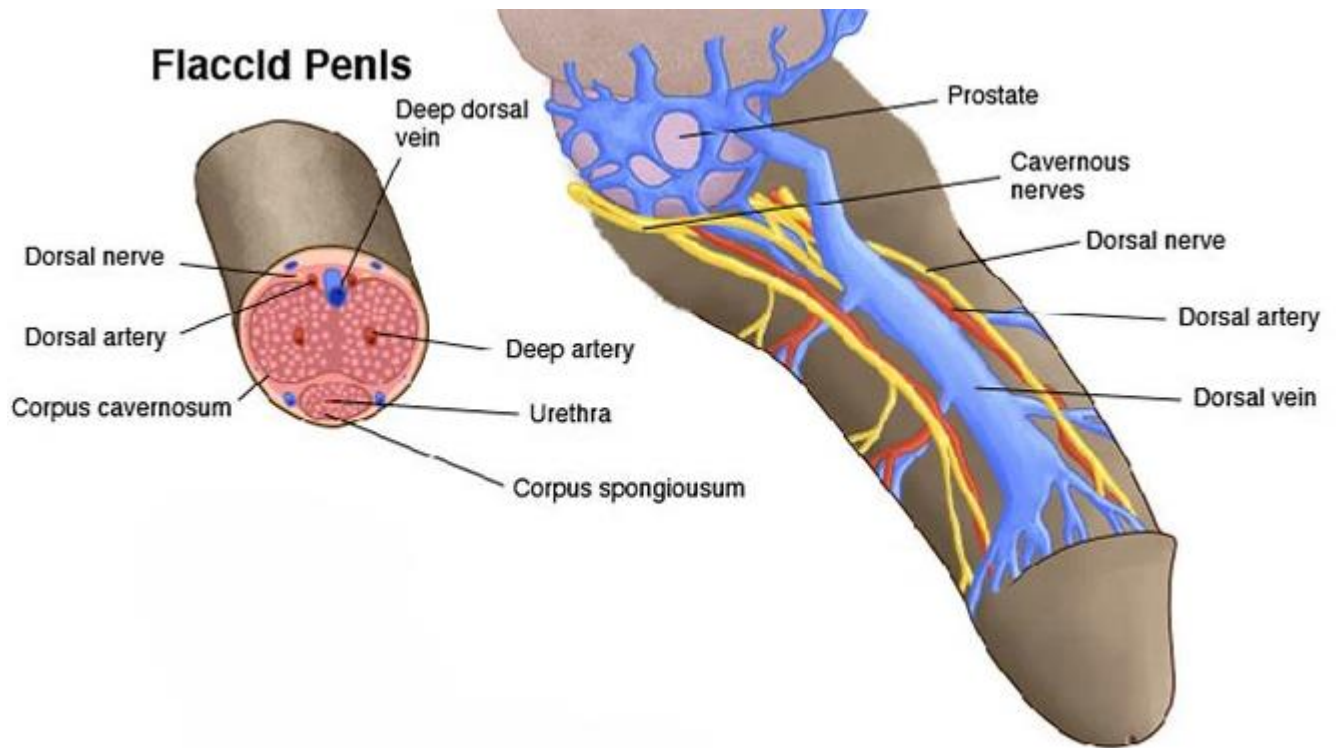


Fig 6: Neurovascular supply of the penis (with kind permission from David A. Bolnick, Martin Koyle and Assaf Yosha. Surgical guide to circumcision ISBN 978-1-4471-2857-1 and © Springer-Verlag London 2012, davebo@uw.edu)