

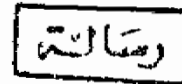
UPDATING OF VASCULOGEIC IMPOTENCE

ESSAY

SUBMITTED FOR PARTIAL FULLFILMENT
MASTER DEGREE IN GENERAL SURGERY

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CONTENTS

	Page
Introduction.....	1
Surgical anatomy of the penis.....	2
Physiology of erection.....	15
Aetiology of male impotence.....	24
Diagnosis of male impotence.....	34
Treatment of male impotence.....	62
Prevention of vasculogenic Impotence.....	85
Summary.....	88
References.....	92
Arbic Summary.....	



Acknowledgement

INTRODUCTION

The diagnosis and treatment of the vasculogenic impotence have developed draamatically over the last 20 years.

This development stems from a better understanding of the anatomy of the penis and the pathophysiology of erection, an increased interest from vascular surgeons to this subjet, public awareness and appreciation of treatment successes and the evolution of newer diagnostic and therapeutie modalities.

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Surgical Anatomy of the Penis



ANATOMY OF PENIS

Embryology:

The penis is derived from the male phallus of embryo, a surface elevation called the genital tubercle appears in the cranial end of the cloacal membrane and lengthens to form male phallus. within it is a longitudinal endodermal mass called urethral plate which grows forward from the wall of the cloaca toward tip of the organ, lower aspect of this plate is in contact with the ectoderm lining the primary urethral groove.

The raised margins of the groove are the genital folds. The disintegration of the cells of urethral plate and contiguous ectoderm occurs resulting in "definitive urethral groove".

The 2 genital swellings appear on each side of the base of the phallus and extend caudally, each genital swelling meets the other from behind forwards enclosing the phallic part of the urogenital sinus to form the bulb of the urethra, also enclosing the definitive urethral groove to the front to form most of the spongy urethra.

Thus as the phallus lengthens the urogenital orifice is carried onward till it reaches the glans.

At the tip of the glans an ingrowth of the surface epithelium occurs to meet the anterior extremity of the urethral plate and disintegration of this gives rise to ectodermal groove which forms the urethral part contained within the glans.

The glans and shaft of penis are recognized at the third month of intrauterine life.

Anatomy: (fig.1)

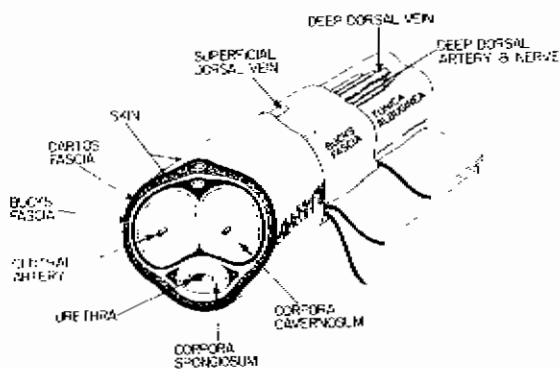
Penis is the male organ of copulation, it consists of an attached portion termed the radix or root which is situated in the perineum and a free portion which is pendulous and termed corpus or body this part is covered by penile skin.

Radix (Root):

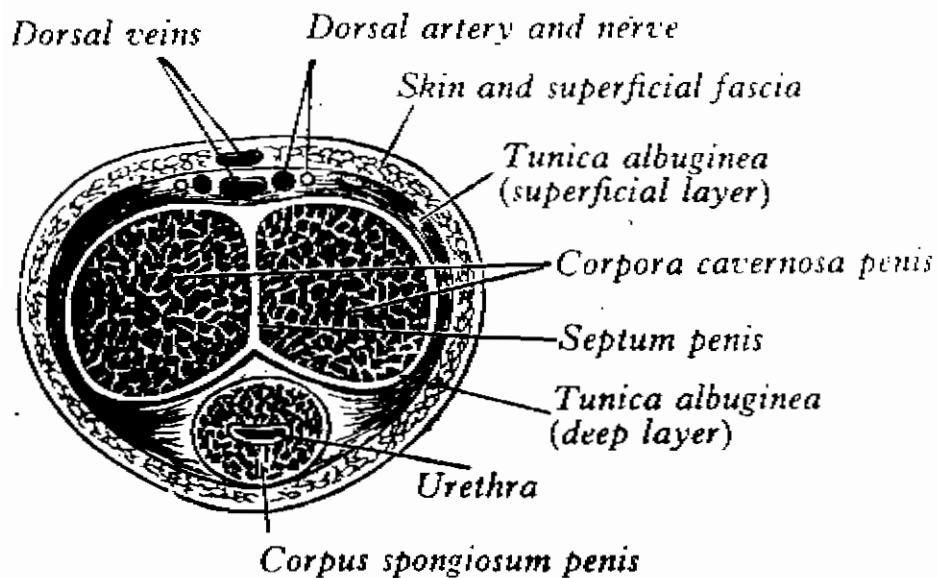
Radix comprises the three masses of erectile tissue lie in the urogenital triangle of the perineum called the two crura and one bulb of penis.

The crus penis is the posterior part of the corpus cavernosum, it commences posteriorly as blunt rounded process which is attached to hip bone immediately anterior to the ischial tuberosity. The crus is an elongated structure firmly adherent to everted border of pubic and ischeal rami and covered by ischio cavernosus muscle. Near the inferior border of the pubic symphysis the 2 crura bend down and forward to form the 2 corpora cavernosa. (Sharlip, 1984).

The bulb of penis occupies the interval between the two crura, it is firmly attached to the inferior aspect of the perineal membrane. The bulb is oval in section and narrows anterior to form corpus spongiosum, its convex external surface is covered by bulbo-spongiosus muscle and its flattened internal surface is pierced above its centre by the urethra. In it the urethra forms the interbulbar urethra. (Tangho, 1986).



(Fig.1) Anatomy of the penis.



(Fig.2) A cut section in the human penis.

Corpus (Body):

Corpus is composed of the three elongated masses of erectile tissue which are capable of considerable enlargement when engorged with blood during erection. The 3 masses are 2 corpora cavernosa and 1 corpus spongiosum. (Fig, 2)

The corpus is cylindrical in cut section when the penis is flaccid but when erected it is triangular prism with rounded angles. The postero-superior surface during erection is called the dorsum of the penis and the opposite surface is called the urethral or ventral surface.

The corpus cavernosum penis is the continuation of the crus penis. along its length it is closely attached to the other corpus cavernosum and both are surrounded by a common fibrous envelope and separated only by median fibrous septum called the septum penis.

On the urethral surface of corpora cavernosa. there is a wide groove adjoining the corpus spongiosum. also on the dorsal surface there is a narrow groove containing the deep dorsal vein of penis.

The 2 corpora cavernosa do not reach the end of penis but terminate within hollow internal aspect of glans penis. (Wanger 1981).

The corpora cavernosa are surrounded by strong fibrous envelope called "tunica albuginea" composed of superficial and deep fibres. the superficial fibres are longitudinal and form single tube enclosing both corpora while the deep fibres are

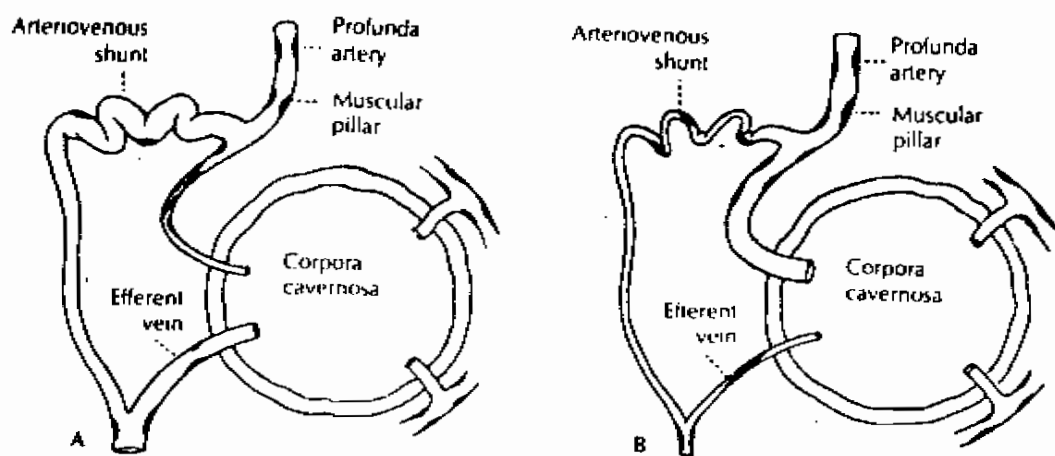


Fig.(13):(A) Flaccid state. The arteriovenous shunt is open allowing blood to bypass the corpora cavernosa. (B) Erect state. The shunt is closed and the arterial system is open, allowing blood to enter the corpora cavernosa while the efferent veins are closed. This enables the patient to have an erection.
(After Winter C. C., 1963).



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Newman and Tchertkoff (1980), reported the absence of the cushions in new-borne penile vessels and stated that they are acting as passive resistance to blood flow and not representing a significant anatomic structure for erection.

Robertson (1960), related them to the aging process.

Dock (1964), reported their presence in the epicardial arteries and postulated that an increase in length in systole and decrease in diastole act as stimulus for their formation. Similarly the penile vessels are subjected to changes in length.

Arterio-Venous Shunt:

This concept depends on the synergism between arteries and veins of penis, as the arteriovenous shunt is closed in evoking erection and opened during detumescence. (Fig. 11)

Conti (1952), postulated that erection is mediated by synergetic contraction of the branches of internal pudendal artery and vein outside and within the penis together with the helicine arteries openings into corpus cavernosum spaces which act as arterio-venous shunts.

Wagner (1982), described shunt arteries between deep arteries of corpora cavernosa and the vessels of corpus spongiosum during flaccidity these shunt arteries allow blood to pass to corpus spongiosum veins, during erection contraction of these arteries divert blood to helicine arteries to cavernosal spaces.

A new concept described by Hauri, Spycher and Burhlmann (1983), which denoted that the contraction of trabecular muscles in corpora cavernosa leads to relative enlargement of the cavernosal spaces and allows rapid filling by the arterial blood flow. With the filling the pressure increases in the cavernous tissue and the venous outflow is reduced.

The Closure Mechanism of Corpora Cavernosa During Erection:

The venous outlet of the corpus cavernosum is at the distal third of the ventral surface of penis through the emissary veins must be closed perfectly by the tight tunica albuginea for firm lasting erection.

Tudoriu and Baurmer (1983), defined the three phases that occur in the time of erection. The first phase is the vasomotor or active and releasing phase in which dilatation of arteries and contraction of the veins occur.

The fascial or passive phase is the second phase which is the self regulation closure of the erectile bodies by compression under Buck's fascia and compression of the emissary veins between the enlarged erectile bodies (corpora cavernosa and corpus spongiosum) in the distal third.

The albugineal phase only occurs in corpus cavernosum which also a self regulating mechanism by means of the shearing mechanism of thick tunica albuginea with aids of its 2 layers closing the veins that runs through it. This third phase is necessary for the true, complete erection (rigidity and not only tumescence).

Neuro-Physiology of Erection:

The haemodynamics and vascular mechanisms of erection is under nervous control, the nervous share in erection consists of the spinal reflex and the higher center control.

The Spinal Reflex:-

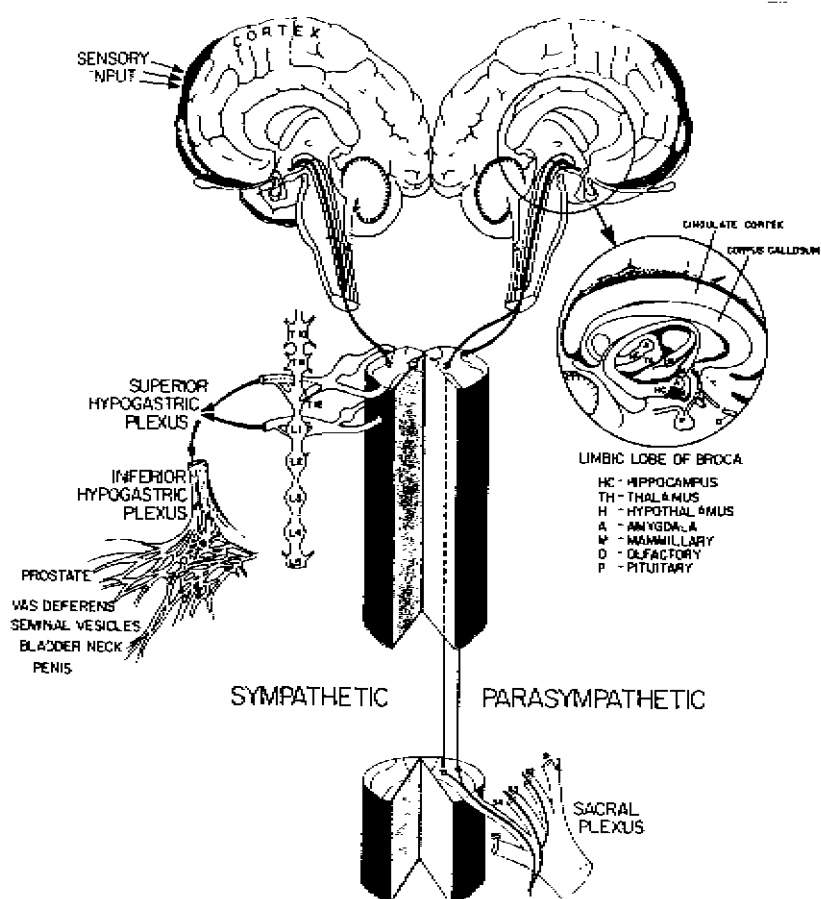
The local stimulation of the penis will lead to stimulation of nerve endings in penile skin and glans, also the pacinian corpuscles in the deeper layer of penile skin.

The afferent neurone is presented by the pudendal sensory nerve, the centre of the erection reflex in the sacral 2,3,4 spinal segments, and the efferent neurone is in the sacral nerve which emerges from the anterior roots of sacral segments.

Higher Centers:

Siroky and Krane (1969), stated that the higher centres interacting in formation of the penile erections are the pre-optic hypothalamic region, the median forebrain bundle and the substantia nigra of the mid-brain.

The auditory, visual and olfactory stimuli can induce penile erection through stimulation of these centres without local stimulation of penis, these centres when stimulated they send impulses through the ventro-lateral pons to pass in the lateral column of the spinal cord, these impulses may pass either via thoraco-lumbar sympathetic trunk or via sacral parasympathetic nerves. (Fig.12).



(Fig.12) Cerebral, sympathetic, and parasympathetic innervation for male sexual function.