

The Bulbocavernosus Muscles as a Vaginal Sphincter Anatomical and Clinical Considerations

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ABSTRACT

The vaginal sphincter consists mainly of two bulbocavernosus muscles (BCMs). Despite its great importance, there is very little knowledge about these muscles even among health care providers. BCMs are perineal muscles located one on each side of the vaginal opening. Contraction of these muscles narrows the opening to form the vaginal sphincter. Moreover, contraction of BCMs compresses the greater vestibular glands resulting in lubrication of the vagina and thus facilitating sexual intercourse. The similar muscles in males do not separate on either side but come closer together on the lower

surface of the bulb of the penis, the contraction of which helps empty the last drops of urine when urinating or semen when ejaculating. BCMs are called love muscles as they have an important role in female sexual act. Narrowing of the vaginal opening caused by sexual stimulation during intercourse and the consequent pressure on the base of the erect penis can help maintain an erection and avoid premature ejaculation. This can be achieved by enhancing the sphincter role of the BCMs. This can be achieved by several methods. Surgical approximation of the posterior segments of BCMs can be proposed to treat vaginal laxity to improve sexual sensation and pleasure. This can also put pressure on the root of the penis at intercourse so that it can delay its venous return and keep the penis erect after insertion into the vagina.

Keywords: Love muscles; Preventing premature ejaculation; Maintenance of erection; Vaginal laxity treatment; Sexual act

INTRODUCTION

Anatomical knowledge is the gateway to medical practice [1]. Rereading this information is of great importance in the medical and surgical field [2]. Bulbocavernosus muscles (BCMs) also called bulbospongiosus muscles are dimorphic striated muscles that differ between the sexes. In males, the muscles surround the bulb of the penis and its corpus spongiosum so that their contraction helps empty the last drops of urine or semen [3]. However, in females, the BCMs are arranged as two muscles, one on each side of the vaginal opening, so the vaginal opening can be reduced when working together to create the vaginal sphincter. This means that two muscles are separated by the presence of vagina where each muscle covers the lateral aspect of the corresponding vestibular bulb. The muscle fibers extend backward into the perineal body where they blend with those of the external anal sphincter while the fibers pass anteriorly to reach the clitoris and inserted into corpora cavernosa of clitoris [Figure 1].

Through covering the vestibular bulb that extends backward into the greater vestibular “Bartholin” gland, BCMs contraction helps empty the glands upon sexual arousal, thus facilitating vaginal intercourse. Moreover, the contraction of the muscles not only narrows the vaginal opening but also compresses the dorsal vein of the clitoris causing it to contribute to erection [3,4].

BCMs are specific muscles for sexual pleasure. They are considered the

pacemakers of the pelvic floor muscles and are therefore called love muscles. Tension and thus stimulation of these muscles by the erect penis during intercourse causes other pelvic muscles to contract [5]. Reflexive contraction of the BCMs in females during copulation helps maintain penile erection within the vagina by impeding penile venous drainage [6]. Moreover, the reflex contraction of BCMs at the base of the erect penis also has an important role in preventing premature ejaculation. On the other hand, rapid venous drainage of the penis leads to premature ejaculation and impotence causing the male partner to have a passive sexual need with lack of interest and insufficient sexual activity

Vaginal laxity (VL) is a very common medical complaint characterized by a sensation of loss of ideal vaginal tightness during intercourse with decreased or loss of sexual satisfaction. It is usually associated with pregnancy, vaginal childbirth and aging [7-9]. VL differs from pelvic organ prolapse in that the prolapse involves one or more organs hanging from a normal position while VL focuses on the sensation of vaginal looseness [7]. Does the cesarean section preserve the muscles of the perineum in the female, unlike what happens during natural vaginal childbirth? The answer of the question, from our point of view, has no great effect, because the engagement of the fetal head in the mother’s pelvis occurring in the last month of pregnancy is the main factor in this. This pressure does not occur in animals because their anatomical position differs from that of humans. The animals walk on four limbs, belly

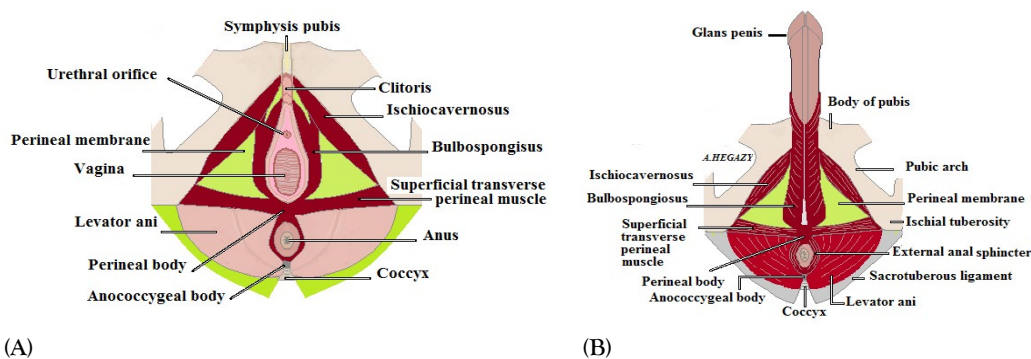


Figure: 1 Superficial muscles of perineum showing bulbospongiosus muscles: in females (A) and in males (B).

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facing down. Therefore, we suggest that VL can be attributed to aging and pregnancy irrespective the method used for delivery.

There are several methods suggested for treating VL. They include non-surgical or surgical methods. Non-surgical options combine behaviors such as Kegel exercises and drug therapies including hormones, skin-tightening creams and sprays. Although these methods are non-invasive, they have limited effectiveness. Therefore, many women resort to various surgeries that promise a much better end result at the cost of the associated risks. The surgery aims to reduce the size of the vagina so that it becomes taut during sexual intercourse. This vaginal tightness may give a sense of sexual satisfaction to both partners. However, surgical procedures that involve cutting and realigning vaginal tissues may lead to decreased sensation due to the potential for scarring after surgery and damage to nerve endings. To avoid the risks of surgery, a new laser treatment where the laser is used instead of surgical scalpel has been proposed for vaginal tightening. This laser method is suggested to be effective and safe method [8]. However, this method is still a relatively aggressive process with a long, painful recovery period. Furthermore, there is a lack of scientific evidence for the effectiveness of laser therapy [1].

The above surgical and non-surgical procedures are still experimental without consensus of physicians and without satisfactory results for all patients. Any procedure to tighten the vagina for cosmetic satisfaction or sexual pleasure without an understanding of normal anatomical symmetry and physiological function is not up to standard due to severe fibrosis associated with rigidity and loss of elasticity. Therefore, the involvement of traction of BCMs without resection of part of the mucosa, skin, or even muscle has been investigated in a clinical trial to restore cosmetic and good sexual function. This method respects women's rights to sexual pleasure. The technique is very simple. The success rate with sexual pleasure for both partners has been noted in all cases involved. The procedure is based on slightly narrowing the vaginal entrance by approximating and fixing the posterior ends of the BCM on both sides using reversed 0/3 Vicryl sutures [10].

VL is the feeling of a loss of vaginal tightness during intercourse associated with reduced friction and thus a decrease or loss of sexual pleasure [8]. Loss of vaginal tightness may cause the erect penis to slip out of the vagina during intercourse, resulting in failure of complete sexual intercourse. This can be attributed to laxity of the vaginal sphincter rather than the vaginal canal itself. The vaginal canal which extends from the vulva upwards to the cervix of uterus for about 8 cm is a potential space with folded mucosal lining. This means that the vagina is a compatible organ; it expands according to the size of any object inside its cavity and can adapt to this object no matter how small it is. The vaginal canal that extends from the vestibule of the vulva to the uterine cervix for a length of about 8 cm is a potential space with a folded mucous lining. The folded mucosa enables the vaginal canal to accommodate the fetal head during labor without tearing. In addition to its function in copulation, the vagina forms the duct of birth and for uterine discharge especially in menstruation.

The vaginal mucosa is highly vascular and rich in nerve plexuses. The vagina is supplied by the vaginal artery arising from internal iliac artery. Its upper part receives additional blood supply from uterine artery and its lower part from middle rectal and internal pudendal arteries. There is an anastomosis between the branches of the vaginal arteries giving potential collateral circulation [11]. Regarding the nerves supply, its upper part is supplied by branches from the pelvic plexus like the uterus, while the lower part is supplied by branches from the pudendal nerve that carries pain sensations. It has been stated that although all regions of the mucosa have a profound nerve supply, there are some regional differences in innervation. For example, the distal parts and the anterior wall of the vagina have more nerve fibers compared to the proximal areas and the posterior wall, respectively [12].

The methods commonly used to tighten the vagina disrupt normal anatomical and physiological contractile function; It may turn the vagina into a hard tube and deprive the woman of her right to sexual pleasure. Any surgical dissection and mucosal excision used to tighten the lax vagina can

disrupt its blood vessels, nerve plexus, and muscle elasticity. This is due to the resulting scarring associated with diminished vasculature and innervation. Also, the procedure of injecting adipose tissue or hyaluronic acid (plumping agents) with its intra-injection complications reduces the elasticity of blood vessels and nerve plexus through stiffness of the muscularis mucosa [13]. Moreover, in laser technology, the mechanism of vaginal tightening occurs through shrinkage of the mucous membrane and smooth muscles.

CONCLUSION

All procedures used to treat VL have complications of scarring and fibrosis of the mucosa and smooth muscle but to varying degrees. On the same time, BCMs play a critical role in the female sexual act. This can be achieved by enhancing the sphincter role of the BCMs. Slight narrowing of the vaginal opening by approximating the posterior ends of BCMs can be suggested as a minimally invasive method to tighten sagging vagina. It can give satisfactory results to both partners in terms of cosmetic and sexual pleasure. It is recommended to be investigated in future studies.

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