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Review Article

CRITICAL ANALYSIS OF APANA VATA IN TERMS OF SHAREERA KRIYA

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ABSTRACT

There are five types of *Vata* namely *Prana, Udana, Vyana, Samana, Apana.* The *Visesha Sthana* of *Apana Vata* is said to *Apana Pradesha* and also said to move in *Shroni, Basthi, Medra, Uru*. The functions of *Apana Vata* is said to be *Niskramana of Shukra(*semen*), Arthava(*menstrual fluid*), Shakrit(*feces*), Mutra(*urine*), Garbha(*fetus*).*

Upon sexual stimulation parasympathetic fibers from the sacral portion of the spinal cord initiate and maintain an erection, the enlargement and stiffening of the penis. Ejaculation, the powerful release of semen from the urethra to the exterior, is a sympathetic reflex coordinated by the lumbar portion of the spinal cord. The physiology behind errection and ejaculation can be related to the *Shukra Niskramana Karma* of *Apana Vata.* Menstrual flow from the uterus consists of 50–150 mL of blood, tissue fluid, mucus, and epithelial cells shed from the endometrium. This discharge occurs because the declining levels of progesterone and estrogens stimulate release of prostaglandins that cause the uterine spiral arterioles to constrict. Eventually, the entire stratum functionalis sloughs off. The physiology behind menstruation can be related to the *Artava Niskramana Karma* of *Apana Vata.* In response to distension of the rectal wall, the receptors send sensory nerve impulses to the sacral spinal cord. Motor impulses from the cord travel along parasympathetic nerves back to the descending colon, sigmoid colon, rectum, and anus. The resulting contraction of the longitudinal rectal muscles shortens the rectum, thereby increasing the pressure within it. This pressure, along with voluntary contractions of the diaphragm and abdominal muscles, plus parasympathetic stimulation, opens the internal anal sphincter. The external anal sphincter is voluntarily controlled. If it is voluntarily relaxed, defecation occurs and the feces are expelled through the anus. The physiology behind defecation can be related to the *Shakrit Niskramana Karma* of *Apana Vata.* The micturition reflex discharges urine from the urinary bladder via parasympathetic impulses that cause contraction of the detrusor muscle and relaxation of the internal urethral sphincter muscle and via inhibition of impulses in somatic motor neurons to the external urethral sphincter. The physiology behind micturation can be related to the *Mutra Niskramana Karma* of *Apana Vata.* Labor is the process by which the fetus is expelled from the uterus through the vagina to the outside. True labor involves dilation of the cervix, expulsion of the fetus, and delivery of the placenta. Oxytocin stimulates uterine contractions via a positive feedback cycle. The physiology behind partuarition can be related to the *Garbha Niskramana Karma* of *Apana Vata.*

Keywords: *Apana, Vata, Shareera, Kriya,* Reflexes, Ejaculation, Parturition, Menstruation.

INTRODUCTION

The individual is an epitome of the universe. All the material & spiritual phenomenon of the universe are present in the individual. Similarly all those resent in the individual are also contained in the universe[1].

Originating in cosmic consciousness, this wisdom was intuitively received in the hearts of the ancient scholars. They perceived that consciousness was energy manifested into the five basic principles or elements. Man is microcosm of the nature and so the five basic elements present in all matter also exists within each individual. Thus out of the womb of the five elements, all matter is born. The five basic elements exist in all matter. Water provides the classic example: - the solids of iced water are manifestation of the *Prithvi Mahabhuta* (earth principle). Latent heat in the ice (*Agni*) liquefies it, manifesting into *Jala Mahabhuta* (water principle). And then eventually it turns into steam expressing the *Vayu Mahabhuta* (air principle) the steam disappears into *Akasha* or space[2]. *Bhuta* is that which is not born out of something, but out of which something is born. It is the material cause of substances in the world. When we say *Bhuta* we mean that subtle level of

existence, where as *Mahabhuta* refers to gross level of existence[3]. *Panchikarana* is the process through which invisible *Bhutas* combine with each other and form the visible *Mahabhutas* in such a way that all *Bhutas* are present together in each *Drisya Bhuta* in varying degrees of predominance. Thus in the physical world everything is a combination of *Pancha Mahabhutas* & we cannot see them independently[4].

Dosha, Dathu, Mala together form the basis of the body[5]. The balance of these entities represents the healthy state and imbalance will cause various diseases[6]. In normalcy, *Dosha* will be performing their own functions and individual *Dosha* will be having their own specific site. By mentioning the various *Sthana* of the each *Dosha* the different function performed by individual *Dosha* in different sites has been emphasised. The sub-types of *Dosha,* its location and function have also been mentioned[7].

Regarding the *Sthana* of various *Dosha* authors have different opinion. Later authors have added some more *Sthana* of *Dosha*. For example, ears among the location of *Vata*; umbilicus, eyes and skin among the location of *Pitta*; *Kloma*, nose, tongue among the location of *Kapha*[8].

There are five types of *Vata* namely *Prana, Udana, Vyana, Samana, Apana.* The *Visesha Sthana* of *Apana Vata* is said to *Apana Pradesha* and also said to move in *Shroni, Basthi, Medra, Uru*. The functions of *Apana Vata* is said to be *Niskramana of Shukra(*semen*), Arthava(*menstrual fluid*), Shakrit(*feces*), Mutra(*urine*), Garbha(*fetus*)*[9].

Brief Physio- anatomical understanding of the ejaculation, menstruation, defecation & micturation reflex, parturition is necessary to understand physiology of *Apana Vata*.

Upon sexual stimulation (visual, tactile, auditory, olfactory, or imagined), parasympathetic fibers from the sacral portion of the spinal cord initiate and maintain an erection, the enlargement and stiffening of the penis. The parasympathetic fibers release and cause local production of nitric oxide (NO). The NO causes smooth muscle in the walls of arterioles supplying erectile tissue to relax, which allows these blood vessels to dilate. This in turn causes large amounts of blood to enter the erectile tissue of the penis. NO also causes the smooth muscle within the erectile tissue to relax, resulting in widening of the blood sinuses. The combination of increased blood flow and widening of the blood sinuses results in an erection. Expansion of the blood sinuses also compresses the veins that drain the penis; the slowing of blood outflow helps to maintain the erection.

Ejaculation, the powerful release of semen from the urethra to the exterior, is a sympathetic reflex coordinated by the lumbar portion of the spinal cord. As part of the reflex, the smooth muscle sphincter at the base of the urinary bladder closes, preventing urine from being expelled during ejaculation, and semen from entering the urinary bladder. Even before ejaculation occurs, peristaltic contractions in the epididymis, ductus (vas) deferens, seminal vesicles, ejaculatory ducts, and prostate propel semen into the penile portion of the urethra (spongy urethra). Typically, this leads to emission, the discharge of a small volume of semen before ejaculation. Emission may also occur during sleep (nocturnal emission). The musculature of the penis (bulbospongiosus, ischiocavernosus, and superficial transverse perineus muscles), which is supplied by the pudendal nerve, also contracts at ejaculation. Once sexual stimulation of the penis has ended, the arterioles supplying the erectile tissue of the penis constrict and the smooth muscle within erectile tissue contracts, making the blood sinuses smaller. This relieves pressure on the veins supplying the penis and allows the blood to drain through them. Consequently, the penis returns to its flaccid (relaxed) state[10].

The menstrual phase, also called menstruation or menses), lasts for roughly the first 5 days of the cycle. (By convention, the first day of menstruation is day one of a new cycle. Under the influence of FSH, several primordial follicles develop into primary follicles and then into secondary follicles. This developmental process may take several months to occur. Therefore, a follicle that begins to develop at the beginning of a particular menstrual cycle may not reach maturity and ovulate until several menstrual cycles later.

Menstrual flow from the uterus consists of 50–150 mL of blood, tissue fluid, mucus, and epithelial cells shed from the endometrium. This discharge occurs because the declining levels of progesterone and estrogens stimulate release of prostaglandins that cause the uterine spiral arterioles to constrict. As a result, the cells they supply become oxygen-deprived and start to die. Eventually, the entire stratum functionalis sloughs off. At this time the endometrium is very thin, about 2–5 mm, because only the stratum basalis remains. The menstrual flow passes from the uterine cavity through the cervix and vagina to the exterior[11].

Mass peristaltic movements push fecal material from the sigmoid colon into the rectum. The resulting distension of the rectal wall stimulates stretch receptors, which initiates a defecation reflex that empties the rectum. The defecation reflex occurs as follows: In response to distension of the rectal wall, the receptors send sensory nerve impulses to the sacral spinal cord. Motor impulses from the cord travel along parasympathetic nerves back to the descending colon, sigmoid colon, rectum, and anus. The resulting contraction of the longitudinal rectal muscles shortens the rectum, thereby increasing the pressure within it. This pressure, along with voluntary contractions of the diaphragm and abdominal muscles, plus parasympathetic stimulation, opens the internal anal sphincter. The external anal sphincter is voluntarily controlled. If it is voluntarily relaxed, defecation occurs and the feces are expelled through the anus; if it is voluntarily constricted, defecation can be postponed. Voluntary contractions of the diaphragm and abdominal muscles aid defecation by increasing the pressure within the abdomen, which pushes the walls of the sigmoid colon and rectum inward. If defecation does not occur, the feces back up into the sigmoid colon until the next wave of mass peristalsis stimulates the stretch receptors, again creating the urge to defecate[12].

Discharge of urine from the urinary bladder, called micturition,is also known as urination or voiding. Micturition occurs via a combination of involuntary and voluntary muscle contractions. When the volume of urine in the urinary bladder exceeds 200–400 mL, pressure within the bladder increases considerably, and stretch receptors in its wall transmit nerve impulses into the spinal cord. These impulses propagate to the

micturition center in sacral spinal cord segments S2 and S3 and trigger a spinal reflex called the micturition reflex. In this reflex arc, parasympathetic impulses from the micturition center propagate to the urinary bladder wall and internal urethral sphincter. The nerve impulses cause contraction of the detrusor muscle and relaxation of the internal urethral sphincter muscle. Simultaneously, the micturition center inhibits somatic motor neurons that innervate skeletal muscle in the external urethral sphincter. Upon contraction of the urinary bladder wall and relaxation of the sphincters, urination takes place. Urinary bladder filling causes a sensation of fullness that initiates a conscious desire to urinate before the micturition reflex actually occurs. Although emptying of the urinary bladder is a reflex, in early childhood we learn to initiate it and stop it voluntarily. Through learned control of the external urethral sphincter muscle and certain muscles of the pelvic floor, the cerebral cortex can initiate micturition or delay its occurrence for a limited period[13].

Labor is the process by which the fetus is expelled from the uterus through the vagina, also referred to as giving birth. A synonym for labor is parturition. The onset of labor is determined by complex interactions of several placental and fetal hormones. Because progesterone inhibits uterine contractions, labor cannot take place until its effects are diminished. Toward the end of gestation, the levels of estrogens in the mother's blood rise sharply, producing changes that overcome the inhibiting effects of progesterone. The rise in estrogens results from increasing secretion by the placenta of corticotropin-releasing hormone, which stimulates the anterior pituitary gland of the fetus to secrete ACTH (adrenocorticotropic hormone). In turn, ACTH stimulates the fetal adrenal gland to secrete cortisol and dehydroepiandrosterone (DHEA), the major adrenal androgen. The placenta then converts DHEA into an estrogen. High levels of estrogens cause the number of receptors for oxytocin on uterine muscle fibers to increase, and cause uterine muscle fibers to form gap junctions with one another. Oxytocin released by the posterior pituitary stimulates uterine contractions, and relaxin from the placenta assists by increasing the flexibility of the pubic symphysis and helping dilate the uterine cervix. Estrogen also stimulates the placenta to release prostaglandins, which induce production of enzymes that digest collagen fibers in the cervix, causing it to soften. Control of labor contractions during parturition occurs via a positive feedback cycle. Contractions of the uterine myometrium force the baby's head or body into the cervix, distending (stretching) the cervix. Stretch receptors in the cervix send nerve impulses to neurosecretory cells in the hypothalamus, causing them to release oxytocin into blood capillaries of the posterior pituitary gland. Oxytocin then is carried by the blood to the uterus, where it stimulates the myometrium to contract more forcefully. As the contractions intensify, the baby's body stretches the cervix still more, and the resulting nerve impulses stimulate the secretion of yet more oxytocin. With birth of the infant, the positive feedback cycle is broken because cervical distension suddenly lessens. Uterine contractions occur in waves (quite similar to the peristaltic waves of the gastrointestinal tract) that start at the top of the uterus and move downward, eventually expelling the fetus. True labor begins when uterine contractions occur at regular intervals, usually producing pain. As the interval between contractions shortens, the contractions intensify. Another symptom of true labor in some women is localization of pain in the back that is intensified by walking. The most reliable indicator of true labor is dilation of the cervix and the "show," a discharge of a blood-containing mucus into the cervical canal. In false labor, pain is felt in the abdomen at irregular intervals, but it does not intensify and walking does not alter it significantly. There is no "show" and no cervical dilation[14].

AIMS & OBJECTIVES

To critically analyze the *Apana Vata*

MATERIALS AND METHODS

The *Bruhat Trayi* were scrutinised regarding the references for the *Guna* and *Karma* of the *Apana Vata*. Later, physiologico-anatomical aspects of ejaculation, menstruation, defecation & micturation reflex, parturition were studied from modern physiology books. Later, supportive correlation was done between *Ayurvedic* and modern views to build valid and reliable hypothesis regarding *Apana Vata* in relation to the various anatomical and physiological aspects of the central nervous system.

DISCUSSION

Dosha, Dathu, Mala together form the basis of the body. The balance of these entities represents the healthy state and imbalance will cause various diseases. In normalcy, *Dosha* will be performing their own functions and individual *Dosha* will be having their own specific site.

There are five types of *Vata* namely *Prana, Udana, Vyana, Samana, Apana.* The *Visesha Sthana* of *Apana Vata* is said to *Apana Pradesha* and also said to move in *Shroni, Basthi, Medra, Uru*. The functions of *Apana Vata* is said to be *Niskramana of Shukra(*semen*), Arthava (*menstrual fluid*), Shakrit(*feces*), Mutra(*urine*), Garbha (*fetus*).*

Upon sexual stimulation (visual, tactile, auditory, olfactory, or imagined), parasympathetic fibers from the sacral portion of the spinal cord initiate and maintain an erection, the enlargement and stiffening of the penis. Ejaculation, the powerful release of semen from the urethra to the exterior, is a sympathetic reflex coordinated by the lumbar portion of the spinal cord. The physiology behind errection and ejaculation can be related to the *Shukra Niskramana Karma* of *Apana Vata.*

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In response to distension of the rectal wall, the receptors send sensory nerve impulses to the sacral spinal cord. Motor

impulses from the cord travel along parasympathetic nerves back to the descending colon, sigmoid colon, rectum, and anus. The resulting contraction of the longitudinal rectal muscles shortens the rectum, thereby increasing the pressure within it. This pressure, along with voluntary contractions of the diaphragm and abdominal muscles, plus parasympathetic stimulation, opens the internal anal sphincter. The external anal sphincter is voluntarily controlled. If it is voluntarily relaxed, defecation occurs and the feces are expelled through the anus. The physiology behind defecation can be related to the *Shakrit Niskramana Karma* of *Apana Vata.*

The micturition reflex discharges urine from the urinary bladder via parasympathetic impulses that cause contraction of the detrusor muscle and relaxation of the internal urethral sphincter muscle and via inhibition of impulses in somatic motor neurons to the external urethral sphincter. The physiology behind micturation can be related to the *Mutra Niskramana Karma* of *Apana Vata.*

Labor is the process by which the fetus is expelled from the uterus through the vagina to the outside. True labor involves dilation of the cervix, expulsion of the fetus, and delivery of the placenta. Oxytocin stimulates uterine contractions via a positive feedback cycle. The physiology behind partuarition can be related to the *Garbha Niskramana Karma* of *Apana Vata.*

CONCLUSION

The functions of *Apana Vata* is said to be *Niskramana of Shukra(*semen*), Arthava(*menstrual fluid*), Shakrit(*feces*), Mutra(*urine*), Garbha(*fetus*).*

Upon sexual stimulation parasympathetic fibers from the sacral portion of the spinal cord initiate and maintain erection of penis. Ejaculation, the powerful release of semen from the urethra to the exterior, is a sympathetic reflex coordinated by the lumbar portion of the spinal cord. The physiology behind errection and ejaculation can be related to the *Shukra Niskramana Karma* of *Apana Vata.* The menstrual discharge occurs because of declining levels of progesterone and estrogens which stimulate release of prostaglandins that cause the uterine spiral arterioles to constrict and the entire stratum functionalis sloughs off. The physiological process involved behind menstruation can be related to the *Artava Niskramana Karma* of *Apana Vata.*

Distension of the rectal wall activate the receptors and send sensory nerve impulses to the sacral spinal cord. Motor impulses from the cord travel along parasympathetic nerves back resulting in contraction of the longitudinal rectal muscles shortens the rectum, thereby increasing the pressure within it. This pressure, along with voluntary contractions of the diaphragm and abdominal muscles, plus parasympathetic stimulation, opens the internal anal sphincter. The physiology behind defecation can be related to the *Shakrit Niskramana Karma* of *Apana Vata.* The micturition reflex discharges urine from the urinary bladder via parasympathetic impulses that cause contraction of the detrusor muscle and relaxation of the internal urethral sphincter muscle and via inhibition of impulses in somatic motor neurons to the external urethral sphincter. The physiological process behind micturation can be related to the *Mutra Niskramana Karma* of *Apana Vata.* Labor involves dilation of the cervix, expulsion of the fetus, and delivery of the placenta. Oxytocin stimulates uterine contractions via a positive feedback cycle. The physiology behind parturition can be related to the *Garbha Niskramana Karma* of *Apana Vata.*

REFERENCES

1. Acharya JT. Charaka Samhita with Ayurveda Dipika commentary of Chakrapani Datta. Reprint ed. Varanasi (India): Chaukambha Orientalia; 2007. p. 325.
2. Acharya JT. Charaka Samhita with Ayurveda Dipika commentary of Chakrapani Datta. Reprint ed. Varanasi (India): Chaukambha Orientalia; 2007. p. 326.
3. Acharya JT. Charaka Samhita with Ayurveda Dipika commentary of Chakrapani Datta. Reprint ed. Varanasi (India): Chaukambha Orientalia; 2007. p. 325.
4. Acharya JT. Charaka Samhita with Ayurveda Dipika commentary of Chakrapani Datta. Reprint ed. Varanasi (India): Chaukambha Orientalia; 2007. p. 326.
5. Acharya JT, editor, Reprint ed. Susrutha Samhita with Nibandhasangraha commentary of Dalhana, sootrasthana; Dosha datu mala ksaya vridhi vignaniyam adhyayam: chapter 15, verse 3. Varanasi (India): Chaukambha Orientalia,2010;67.
6. Acharya JT, editor, Reprint ed. Charaka Samhita with Ayurveda Dipika commentary of Chakrapani Datta, sootrasthana; kuddaka chatuspadam adyayam: chapter 9, verse 4. Varanasi (India): Chaukambha Prakashan, 2007; 62.
7. Paradakara HSS, editor, 9th ed. Ashtanga Hrudaya with Sarvangasundara commentary of Arunadatta and Ayurvedarasayana commentary of Hemadri. sootrasthana; dosadivignaniyam adhyayam:chapter 11,verse 4-18. Varanasi (India): Chaukambha Orientalia; 2005; 192.
8. Paradakara HSS, editor, 9th ed. Ashtanga Hrudaya with Sarvangasundara commentary of Arunadatta and Ayurvedarasayana commentary of Hemadri. sootrasthana; dosadivignaniyam adhyayam:chapter 11,verse 1-3. Varanasi (India): Chaukambha Orientalia; 2005; 192.
9. Paradakara HSS, editor, 9th ed. Ashtanga Hrudaya with Sarvangasundara commentary of Arunadatta and Ayurveda rasayana commentary of Hemadri. sootrasthana; dosabediya vignaniyam adhyayam: chapter 12,verse 7-8. Varanasi (India): Chaukambha Orientalia; 2005; 192.
10. Toratora GJ, Derickson B. Principles of anatomy and physiology.11th edi. United States of America: John wiley & sons.Inc; 2007: 1095.
11. Toratora GJ, Derickson B. Principles of anatomy and physiology.11th edi. United States of America: John wiley & sons.Inc; 2007: 1113.

12. Toratora GJ, Derickson B. Principles of anatomy and physiology.11th edi. United States of America: John wiley & sons.Inc; 2007: 963.
13. Toratora GJ, Derickson B. Principles of anatomy and physiology.11th edi. United States of America: John wiley & sons.Inc; 2007: 1050.
14. Toratora GJ, Derickson B. Principles of anatomy and physiology.11th edi. United States of America: John wiley & sons.Inc; 2007: 1158.

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