

A Physiological Status of *Apana Vayu*

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ABSTRACT

Human need is infinite. As time increases, demand and needs of human also increases. Their first and foremost need is to live a long life. It is possible when we have a healthy lifestyle. *Ayurveda* a traditional Indian system of medicine, main aim is to maintain the health of healthy and cure the disease of diseased. That's why people all around the world are looking towards India since ancient times. In *Ayurveda* health is a state where the *Dosha*, *Agni*, *Dhaatu*, *Mala*, all the physiological process are in homeostatic state and soul, sense organ and mind are in a state of total wellbeing. A science of *Ayurveda* is based on *Tridosha* theory. *Vata* one among three *Doshas* play an important and major role in both health and diseased condition. *Vata* dosha has five divisions namely *Prana*, *Udana*, *Samana*, *Vyana* and *Apana*. *Vata Dosha* is the most important factor of *Tridosha* which is responsible for controlling all types of movements. After the digestion of food by *Agni* with the help of *Samana Vayu*, *Aahara* is converted into *Saara* and *Kitta* portion. *Kitta* portion of food is eliminated by *Apana Vayu* with the harmonization of another *Prana* and *Vyana Vayu*. *Apana Vayu* is located in *Pakvadhana* and traversed through *Sroni* (pelvis), *Basti* (urinary bladder), *Medhra* (external genital apparatus of each sex) and *uru* (thighs). It helps in elimination *Samirana* (flatus), *Sakrit* (faeces), *Mutra* (urine), *Sukra* (semen), *Garbha* (fetus), *Artava* (menstrual fluid). In this article an attempt has been made to correlate the physiological activity of *Apana Vayu* with modern medical science. For this study, the basic materials have been collected from the *Ayurvedic* classics with the available commentaries, as well as text books of contemporary modern medical science have been referred for better understanding of the concept and its comparison with contemporary science.

Keywords: *Ayurveda*, *Apana Vayu*, Autonomic Nervous System

INTRODUCTION

A physician can make a person healthy after in depth understanding of physiology of the body. The purpose of *Ayurveda* science is to maintain the health of the healthy and cure disease of diseased. *Ayurveda*, the science of life is based on the fundamental theory called the *Tridosha* theory. The *Tridosha* is derived from the Sanskrit word *tri* and *dosha* that means three pollutant or vitiated factors. These three doshas do their function at various levels such as cellular, single system, organization level. Out of these

three *Doshas*, *Vata* has the supremacy of all these three *Doshas* as it initiates and control all the functions. It is also responsible for all type of movement.¹ *Pitta*, *Kapha*, all *Dhatus* and *malas* are inactive like lame individual. It becomes mobile when *Vata* becomes active. The active *Vata* carried them away from its location just like the clouds being carried away by the wind.²

Vata is the causative factor of pleasure and courage, stimulates the digestive fire, and helps in the absorption of the *Doshas* and ejection of the excretory products. *Vata*

travels through all gross and subtle channels, gives the shape of embryo and is the indicator of continuity of life.³*Vata Dosha* has been divided into five types namely *Prana*, *Udana*, *Samana*, *Vyana*, *Apana*. Among these *Apana Vata* has an

important role in expulsion of *Samirana* (flatus), *Sakrit* (faeces), *Mutra* (urine), *Sukra* (semen), *Garbha* (fetus), *Artava* (menstrual fluid). It performs its function by the help of other three *Vayu*.

Site and Functions of *Apana Vayu* by Different *Acharya*:

	<i>Charak Samhita</i> ⁴	<i>Sushrut Samhita</i> ⁵	<i>Astanga Hridaya</i> ⁶	<i>Astanga Sangraha</i> ⁷
<i>Sthana</i> (Location)	<i>Vrishana</i> (testicles), <i>Vasti</i> (urinary bladder), <i>Medhra</i> (penis), <i>Nabhi</i> (umbilicus), <i>Uru</i> (thighs), <i>Vakshyana</i> (inguinal region) and <i>Guda</i> (anus)	<i>Pakvadhana</i> (Large intestine)	<i>Apana Desha</i> (perinealregion) and it traverses along <i>Sroni</i> (pelvis), <i>Vasti</i> (urinary bladder), <i>Medhra</i> (external genital apparatus of each sex) and <i>Uru</i> (thighs)	Rectum, moves along the urinary bladder, pelvis, penis, scrotum, and groin
<i>Karma</i> (Function)	Ejaculation, Micturition, defecation, expulsion of menstrual blood and fetus.	Elimination <i>Samirana</i> (flatus), <i>Sakrit</i> (faeces), <i>Mutra</i> (urine), <i>Sukra</i> (semen), <i>Garbha</i> (fetus), <i>Artava</i> (menstrual fluid)	Expulsion of <i>Sukra</i> (semen), <i>Artava</i> (menstrual blood), <i>Sakrit</i> (faeces), <i>Mutra</i> (urine), and <i>Garbha</i> (the product of conception that is fetus and placenta)	Elimination of faeces, urine, semen, menstrual fluid and foetus

Detail description function of the *Apana Vayu*

***Sukra Niskramana*:**

Ejaculation is a physiological process heavily controlled by the autonomic nervous system. It consists of two main phases: emission and expulsion. The main organs involved in ejaculation are the distal epididymis, the vas deferens, the seminal vesicle, the prostate, the prostatic urethra, and the bladder neck.

The male sexual act culminates in erection and ejaculation. *Sukra Niskraman* translates as sperm ejaculation. The initial response of male sexual arousal is erection. It is triggered by parasympathetic impulses that travel from the sacral area of the spinal cord to the penis via the pelvic nerve. The male sexual act results in ejaculation. When a sexual stimulation becomes highly powerful, the reflex centre of the spinal cord emits sympathetic impulses that exit the cord at T12 to L2 and travel to the genital organs via the hypogastric and pelvic sympathetic nerve plexuses to commence emission. The constriction of the vas deferens and the ampulla causes sperm ejection into the internal urethra. Prostatic and seminal fluid are expelled into the urethra when the prostate gland and seminal vesicles contract. All of this fluid is combined with mucus in the internal urethra to make semen. The filling of the internal

urethra with sperm produces sensory signals that are transferred to the sacral region of the spinal cord via the pudendal nerve. These sensory signals also induce ischiocavernosus and bulbocavernosus muscles to contract rhythmically, compressing the bases of penile erectile tissue.

These effects combine to enhance pressure in erectile tissue such as the penis, genital ducts, and urethra. It causes ejaculation of sperm to the outside.⁸

Mutra Niskramana

It refers to the act of micturition. Stretch reflex sets off the micturition reflex. When the bladder begins to fill with pee at a higher pressure, sensory stretch receptors in the bladder wall are excited, sending signals to the sacral portion of the cord via the pelvic nerve. Then it returns to the bladder via motor parasympathetic nerve fibres, causing micturition. It entails the coordination of the central, autonomic, and somatic nerve systems. The micturition reflex is an autonomic spinal cord response that can be suppressed or assisted by brain areas. It consists of the pons and many cerebral cortical areas. The smooth muscles of the bladder (detrusor) and trigone are innervated by both sympathetic and

parasympathetic nerve fibres from the lumbar spinal cord. Sympathetic fibre stimulation induces trigone muscle contraction and detrusor muscle relaxation. When the parasympathetic nervous system is stimulated, the detrusor muscle contracts and the trigone relaxes. The somatic pudendal nerve innervates the urethral sphincter. These neurons work together to aid in micturition.⁹

Mala Niskramana:

It refers to the act of defecating. When a mass action propels excrement into the rectum, the desire to defecate arises very immediately. There are two types of reflexes observed. The first is an intrinsic reflex mediated by local ENS in the rectal wall. When faeces enter the rectum, the rectal wall constricts. Sensory impulses are sent by the myentric plexus, causing peristalsis from the descending colon to the sigmoid and rectum. These waves cause the internal sphincter to relax. Defecation occurs simultaneously if the external anal sphincter is open. The other defecation reflex is initiated by parasympathetic nervous system. After faecal matter enters the rectum, nerve endings in the rectum are activated, and the signal is relayed to the spinal cord via an afferent nerve fibre. The descending colon, sigmoid, and rectum receive reflex signals via the pelvic nerve. These parasympathetic signals pass through the pelvic nerve, increasing peristalsis and relaxing the internal anal sphincter. Defecation occurs simultaneously if the external anal sphincter is intentionally relaxed. Sympathetic fibres from the superior rectal and hypogastric plexuses activate and maintain the contraction of the internal anal sphincter. Somatic pudendal nerve innervates the external anal sphincter.¹⁰

Artava Niskramana:

It refers to menstruation. The menstrual cycle refers to the cyclical occurrences that occur during a woman's reproductive period. If fertilisation happens after ovulation, the

ovum becomes a zygote and is placed on the uterine wall, resulting in pregnancy. Two days if the ovum is not fertilised Before the commencement of the sexual cycle, bleeding begins due to a significant decrease in the secretion of the ovary produces oestrogen and progesterone. A decrease in the levels of these two hormones results in abrupt Endometrium involution of the uterus It results in an endometrial thickness reduction of up to 65 percent of initial thickness. The convoluted blood arteries of the endometrium will contract over the next 24 hours suffer from severe constriction. It is due to three reasons.

1. The involution of endometrium
2. The action of vasoconstrictor substance like prostaglandin released from tissues of involved endometrium.
3. Sudden lack of oestrogen and progesterone.

Vasoconstriction causes hypoxia, which leads to endometrial necrosis. The necrosis caused the Endometrium blood vessels rupture and blood flows out. The necrotic Endometrium is detached and expelled with the blood. The procedure is repeated for around 24-36 hours. The endometrium's surface layers are entirely desquamated 48 hours after oestrogen and progesterone levels are reduced. The blood and desquamated tissues in the contraction of the uterus is initiated by the endometrial cavity. Uterine contractions force the blood out of the uterus desquamated uterine tissues to the outside via vagina.¹¹

Garbha Nishkramana:

The term *Garbha Nishkramana* is meant for parturition which means birth of baby. In the end of pregnancy, the uterus develops strong rhythmic contraction that the baby is expelled. There are two factors that cause uterine contraction.

- A. Hormonal factor
- B. Mechanical factor.

The enhanced uterine contractility is caused in part by an increase in the oestrogen to progesterone ratio at the conclusion of the pregnancy. Stimulation of the hypothalamic

paraventricular nuclei induces the neurohypophysis to produce oxytocin hormone, which promotes uterine contraction. The pituitary gland of the foetus secretes oxytocin, which is vital in uterine stimulation. Adrenal gland of the foetus secretes a considerable amount of cortisol, which aids in uterine stimulation. Prostaglandins are released by the foetal membrane, which increases the intensity of uterine contraction. Smooth muscle organs' contractility rises when they are stretched. Smooth muscle contraction can occur as a result of intermittent stretch caused by foetal movement. Stretching or irritation of the nerves in the uterine cervix induces a reflex to the uterine body, resulting in uterine contraction. As the pregnancy progresses, uterine contractions grow more intense. It promotes cervical stretching, which propels the baby into the birth canal, resulting in parturition. After the baby is born, the uterus continues to contract to a smaller size, prompting removal of the placenta from the uterine walls and separation of the placenta from its implantation site.¹²

Samirana Niskramana:

It refers to the discharge of flatus through the anus. Flatus can enter the gastrointestinal tract through three routes: 1. sucked air 2. Gases produced in the intestine as a result of bacterial action. 3. Gases that diffuse from the circulation into the gastrointestinal system. Colon bacilli are bacteria found in the absorbent colon. Every day, 7-10 lit of gases enter the large intestine, whereas 0.6 lit are evacuated through anus. The remainder is absorbed by the intestinal mucosa into the blood and exhaled through the lungs. Bacterial activity produces vitamin K, vitamin B12, thiamine, riboflavin, and different gases such as carbon dioxide, hydrogen gas, and methane, all of which contribute to flatus.¹³

Excess gas expulsion is caused by large intestine irritation, which encourages rapid peristaltic expulsion of gases through anus before they can be absorbed. Flatus is evacuated by anus due to gastric motility.

This gastrointestinal motility is aided by the myentric plexus, which is significantly activated by the sympathetic and parasympathetic neural systems.¹⁴

The odour in flatus is caused by the presence of gases such as indole, skatole, mercaptans, and hydrogen sulphide.

DISCUSSION

Ejaculation is followed by an erection. It is the distal second set of male sexual acts, which is achieved by the sympathetic discharge from thoracolumbar outflow after intense parasympathetic action. *Sukra Nishkramana* is one of the functions of *Apana Vayu* and this function is under the control of synchronized action of both parasympathetic sympathetic actions. Parasympathetic stimulation causes excretion of the genital organ, and sympathetic stimulation causes ejaculation. Without an erection, ejaculation is not possible. During intense sexual stimulation means at the peak level of parasympathetic stimulation, sympathetic stimulation begins to discharge sympathetic outflow, and outflow is terminated after ejaculation. So mainly sympathetic part of the autonomic nervous system is responsible for ejaculation and may be compared with the function of *Apana Vayu*. *Artava Nishkramana* is one of the functions of *Apana Vayu*. *Artava Nishkramana* or menstruation occurs due to decreased level of oestrogen and progesterone. Involution of corpus luteum ceases the secretion of oestrogen and progesterone. Decreased level of hormone prevents the stimulation of endometrial cells causes a reduction of the endometrial vessel. Prostaglandin helps in the constriction of vessels of the endometrium. Uterine constriction is executed by *Vyan Vayu*. *Artava Nishkramana* function of *Apana Vayu* may be compared with the sudden reduction of oestrogen and progesterone due to the involution of corpus luteum. The desquamated tissue and the blood in the endometrial cavity are expelled out by the gravitational force. *Mutra Niskramana* and

Sakrit Niskramana like functions are performed by the collaboration of *Samana Vayu*, *Prana Vayu*, *Vyana Vayu* and *Apana Vayu*. *Mutra* and *Mala* are separated by *Samana Vayu* and excreted out by the coordinative function of *Prana* (pontine center for Micturation) *Vyana* (Autonomic function of *Vyan Vayu*) and *Apana Vayu* (parasympathetic action originating from the sacral region). The sensory information for micturition is sent to the brain stem and cortex through ascending tract which is the function of *Vayu Sarvendrinamudhyojaka* and *Sarvendriyanamabhivodha*. *Vyan Vayu* performs its functions by the contraction of the muscle for the movement of waste material and finally, *Apana Vayu* eliminates the feces, urine. Micturition and defecation reflex is performed by the central interacting center in the sacral spinal cord. The influence of higher centers like the brain stem and cortex can be considered as the function of *Prana Vayu*. Parasympathetic action from the sacral region may be compared with *Mutra Nishkrimana* and *Sakrit Niskramana* function of *Apana Vayu*. Parturition is performed by the coordinative function of *Prana*, *Apana Vayu*. Oxytocin hormone which is secreted from the posterior pituitary is under the control of *Prana Vayu* which causes contraction of the uterus is executed by *Vyan Vayu*. When the oestrogen and progesterone ratio is increased towards the end of pregnancy *Apana Vayu* executes its functions and helps in the elimination of the fetus and placenta. Oxytocin and increased oestrogen to progesterone ratio during the last trimester may be compared with the function of *Apana Vayu*. About 7 -10 liters of gases are formed in 24 hours and about 600 ml of flatus elimination is carried out by *Apana Vayu* with the coordination of *Saman* and *Vyan Vayu*. Excess gas causes irritation of the large intestine which promotes rapid peristaltic expulsion of gases. Gastrointestinal motility is caused by the contraction of a muscle under the influence of the mycentric plexus. The contraction and relaxation of the muscle are executed by

Vyan Vayu. The flatus elimination is coordinatively performed by *Apana*, *Prana*, *Samana*, and *Vyan Vayu*. Irritation of the large intestine and stimulation of the mycentric plexus may be compared with the *Samirana Nishkramana* function of *Apana Vayu*.

CONCLUSION

Vata Dosha is involved in all types of systemic activity among five *Vata Dosha*. *Apana Vayu* is responsible for the elimination of waste products as well as the fetus. Excretion is the process by which all waste products are eliminated. It is very important in our life as it helps to promote homeostasis. These functions are regulated mainly by *Apana Vayu* with the coordination of *Samana*, *Prana*, and *Vyan Vayu*. It can be concluded that *Apana Vayu* may be correlated with the sympathetic part of the autonomic nervous system, reduction in the secretion of oestrogen and progesterone due to involution of corpus luteum. Parasympathetic action from the sacral region, oxytocin hormone, increased oestrogen to progesterone ratio during last trimester, irritation of large intestine, and stimulation of mycentric plexus. There is a need for further research to evaluate in detail all other *Vata Dosha*, *Kshaya*, *Vridhhi*, and *Avarana* for the betterment of mankind.

Conflict of Interest: None

REFERENCES

1. Pritam Moharana & Rakesh Roushan: (2018). "A Critical Review of Prana Vayu in the Modern Perspective, 1(9), 446-457.
2. Tripathy B.N: Kaladikakhyana- Shariram, Purva Khanda, Sarngadhara Samhita, Varanasi, India: Chaukhamba Surabharati Prakashana.2011: 65
3. Pritam Moharana & Rakesh Roushan: Effect of Prana And Vyana Vayu In Ncds W.S.R. to Cardiovascular System. International Ayurvedic Medical Journal {online} 2018 {cited May, 2018}.
4. Pandey K, Chaturvedi G, eds. Vatavyadhi Chikitsa Adhyaya, Charaka Samhita.

- Varanasi, India: Chaukambha Bharati Academy; 2015: 775 Reprint.
5. Shastri A.D. eds, Vatavyadhi Nidana Adhyaya, Ayurveda Tatwa Sandipika Hindi Commentary, Susruta Samhita, Varanasi (India): Chaukhamba Sanskrit Sansthan; Edition-2014, page no-296.
 6. Tripathy B.N. Eds, Doshabhedhiya Adhyaya, Astanga Hridaya, Varanasi, India: Chaukambha Sanskrit Pratisthan; 2012: 171 Reprint.
 7. Gupta A.D. Eds, Doshabhedhiya Adhyaya, Astanga Sangraha, Varanasi, India: Chaukambha Krishnadas Academy; 2012: 160 Reprint.
 8. Hall. E, Guyton. C. (2016), Reproductive physiology, Textbook of medical physiology, New Delhi (India), Elsevier; 2016: 680.
 9. Hall. E, Guyton. C. (2016), Renal physiology, Textbook of medical physiology, New Delhi (India), Elsevier; 2016: 549.
 10. Hall. E, Guyton. C. (2016), Gastrointestinal physiology, Textbook of medical physiology, New Delhi (India), Elsevier; 2016: 472.
 11. Hall. E, Guyton. C. (2016), Reproductive physiology, Textbook of medical physiology, New Delhi (India), Elsevier; 2016: 665.
 12. Hall. E, Guyton. C. (2016), Reproductive physiology, Textbook of medical physiology, New Delhi (India), Elsevier; 2016: 691.
 13. Hall. E, Guyton. C. (2016), Gastrointestinal physiology, Textbook of medical physiology, New Delhi (India), Elsevier; 2016: 462.
 14. Hall. E, Guyton. C. (2016), Gastrointestinal physiology, Textbook of medical physiology, New Delhi (India), Elsevier; 2016: 418.
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