A CRITICAL UNDERSTANDING OF FUNCTIONS OF APANA VATA

Dr. J. Antony Stephen Raj¹, Dr. Udhaya Shankar T.², Dr. Jyothi T.³ and Dr. Vaidehi Raole*⁴

¹Post Graduate Scholar, Department of Kriya Shareera, Parul Institute of Ayurveda, Vadodara, 391760, Gujarat, India.
²Post Graduate Scholar, Department of Rasashastraam Evum Bhaishajya Kalpana, Parul Institute of Ayurveda, Vadodara, 391760, Gujarat, India.
³Post Graduate Scholar, Department of Kriya Shareera, Parul Institute of Ayurveda, Vadodara, 391760, Gujarat, India.
⁴Professor and H.O.D, Department of Kriya Shareera, Parul Institute of Ayurveda, Vadodara, 391760, Gujarat, India.

ABSTRACT

The human body is composed of dosha, dhatu, and mala. Dosha are the very important factor for our body in both the aspect i.e. health and illness. The healthy state of the human body can be attained and maintained only by keeping these dosha in equilibrium and their imbalance causes illness. Dosha are 3, i.e. vata, pitta and kapha. Vata is considered as the prime among them, due to its property of governing the functions of other dosha also. Apanavata is a sub-division of vata, which has many vital functions on human body, including nishkramana of mutra (urine), purisha (feces), shukra (semen), artava (menstrual fluid & ovulation) and garbha (fetus). In Ayurveda, almost all the acharyaa has quoted about apanavata and its functions but its mode of action is not explained and due to lack of the explanations, we have the incomplete knowledge about it. So present study has been made to evaluate the apanavata and complete understanding of its functions (physiological action) with the help of available modern theories.

KEYWORDS: Apanavata, Nishkramana karma, Mutra, Purisha, Shukra, Artava, Garbha.
INTRODUCTION
The human body is composed of dosha, dhatu and mala.\textsuperscript{[1]} Dosha are the very important factor for our body both physiologically & pathologically because vikruta dosha has the capacity to vitiate rasadidhatu, mala, malayanas (channel of their elimination) and cause many diseases.\textsuperscript{[2]} The healthy state of the human body can be attained and maintained only by keeping these dosha in equilibrium and an imbalance in the harmony of dosha results in diseases.\textsuperscript{[3]}

Dosha are three in number, i.e. vata, pitta and kapha. Vata is considered the prime among three, as it governs the functions of other dosha too and is given crucial importance.\textsuperscript{[4]} In its normal state, it regulates the activities such as enthusiasm, concentration, function of all organs of the body, respiration, circulation, metabolic transformation, natural urges and sustenance of the life.\textsuperscript{[5,6]} If vata moves unimpaired, if it is rooted in its own site and it is in its natural state, then a person can live for more than 100 years free from any disease.\textsuperscript{[7]} Corporeal vata, when get aggravated or vitiated leads to various type of diseases (nanavidha vikara), affecting the strength, complexion, happiness and even causes death.\textsuperscript{[8]}

Vata dosha achieves different names, on the basis of sthana, gati, marga and karmaviz. prana, udana, vyana, samana and apana.\textsuperscript{[9]}

Apana Vata: It is an important sub-division of vata, which resides in pakvashaya (apanasthana).It controls lumbosacral plexus and plays major role in elimination or excretion, which includes excretion of mutra, purisha, shukra, artavaandgarba. It attends the individual functions in the defined time.\textsuperscript{[10,11,12,13]}

Apanavata is responsible for operation of all the organs and systems concerned with the function of micturation, defecation, ejaculation, ovulation, menstruation, parturition and all movements of the low back and pelvic region.\textsuperscript{[14]}

The general guna of vatadosha is ruksha, laghu, sheeta, khara, sukshma and chala are inherent in apanavata and it is predominant of pruthvi mahabhuta. By combination of its pruthvi predominance and chalaguna, it governs the downward motion.\textsuperscript{[15]}
Sthana of Apana Vata (According to Different Acharyaa)

1) **Charaka**: Vrushana (testes), basti (urinary bladder), medra (penis), nabhi (umbilicus), uru (thigh), vamkshana (groin), guda (rectum), apanasthana and antra (large intestine).\[16]\n
2) **Sushruta**: Apana / pakvadhana (large intestine).\[17]\n
3) **AshtangaSangraham**: Vrushana (testes), basti (urinary bladder), medra (penis), uru (thigh), vamkshana (groin), guda (rectum), shroni (pelvis) and pakvadhana (large intestine).\[18]\n
4) **AshtangaHrdayam**: Basti (urinary bladder), guda (rectum), medra (penis), uru (thigh) and shroni (pelvis).\[19]\n
In Bruhatrayee: The region below the umbilicus is mentioned as location of vata and apana vata. Acharya Vagbhata mentioned pakvashaya is chief location of vatadosha and apana vata.\[20]\n
VEGA (urge): Vega means natural urges, initiation of an urge is a physiological body activity through which unwanted body materials (metabolic waste) are excreted, this process is carried out timely by the body at regular intervals & is controlled by apanavata and suppression of a vega not only stops the elimination of waste product but also brings many diseases i.e. basti, gudashrayaroga (in case of apanavata).\[21]\n
Types of VEGA

1. **Adharaneeyavega**
2. **Dharaneeyavega**

Ayurveda explains that there are different natural urges exerted by the human body and for the well-being of the human body some urges are to be suppressed and the rest should not be suppressed. Acharya Charaka explained in detail about adharaneeyavega (non-suppressible) and dharaneeyavega suppressible for living a normal healthy life and it is necessary that the needs of these urges are satisfied instantaneously.\[22,23]\n
**Mutranishkramana**: Rasa is the nutrient portion of the food, while its non-nutrient portion called as kitta, liquid waste is brought to the vasti (urinary bladder) by the sira (mutravaha srotas) and it’s named as mutra.**Mutra (dravarupa mala)** is eliminated through the respective pathway (mutravahasrotas) by the help of apana, vyana, and pranavata.\[24,25]\n
**Micturition Reflex:** Discharge of urine from the urinary bladder is called micturition or urination or voiding which occurs via combination of involuntary and voluntary muscle contractions. When the volume of urine in the urinary bladder exceeds its pressure within the bladder increases considerably (reference 200–400 mL) and stretch receptors in the bladder wall transmit nerve impulses into the spinal cord. These impulses propagate to the micturition center in sacral spinal cord at segments S2 and S3 and trigger spinal micturition reflex. In this reflex arc, parasympathetic impulses from the micturition center propagate to the urinary bladder wall and internal urethral sphincter. The response is exhibited by, contraction of the detrusor muscle and relaxation of the internal urethral sphincter. 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.\(^{[26]}\) This physiology behind micturition can be related to the *mutraniskramana karma* of apanavata.

**Purishanishkramanam:** When ingested food product reaches the pakwashaya, further get digested and dehydrated by agni and vayu. That paripindita material (*drdarupa mala*) is stored in the *antra*, which is called *purisha* and is expelled out of body by the help of *apana, vyana* and *pranavata*.\(^{[27]}\)

**Defecation Reflex:** Mass peristaltic movements push fecal material from the sigmoid colon into the rectum, resulting in distension of the rectal wall stimulating 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.\textsuperscript{[28]} This physiology behind defecation can be related to the \textit{purishaniskramana karma} of \textit{apana vata}.

\textbf{Shukranishkramana:} \textit{Shukra dhatu} is formed \textit{from uttara dhatu (majja dhatu)} by the help of shukra dhatvagni & \textit{Samana vata}. Samana vata is \textit{agnisameepas}tha I.e. Enclose relation with agni and \textit{shukra dhatvagni} causes proper formation of the \textit{shukradhatus}, the \textit{shukra} present in body gets ejaculated through reproductive canal by the action of \textit{apana vata} along with \textit{vyana} and \textit{pranavata} in the \textit{vrsana} (testes) and medra (penis). The semen gets ejaculated when men indulge in sexual activities after getting stimulated by sexual thoughts, touch etc.\textsuperscript{[29,30]}

\textbf{Ejaculation Reflex:} Ejaculation, the powerful release of semen from the urethra to the exterior consists of two phases’ emission and expulsion. Emission is caused by 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, 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). Expulsion of semen is originated by the parasympathetic reflex from the sacral portion of the spinal cord(S2-S4) via the pudendal nerve, which induces contractions of the bulbospongious, bulbocavernous and perineal muscles, which in turn rhythmically force the ejaculate through the distal urethra.\textsuperscript{[31]} This physiology of ejaculation can be related to the \textit{shukraniskramana karma} of\textit{apana vata}.

\textbf{Artava Nishkramana}

\textbf{Artava Nishkramanasy}mobilizes two things

\begin{enumerate}
\item \textbf{Menstruation} (Excretion of \textit{rajah} (menstrual blood) via cervix and vagina).
\item \textbf{Ovulation} (Excretion of \textit{beeja} (ova) from ovary into uterus via fallopian tube).
\end{enumerate}

\textbf{Artava Nishkramana:} (Menstruation)

Menstrual cycle is influenced by various factors i.e. \textit{rasa, rakta, dhama}ni\textit{and}\textit{dosha}. \textit{Rajah} is said to be an \textit{upadhatu} of \textit{rasa}, which supplies nourishment to body. Commentator \textit{Aruna}datta has said \textit{rajah} as synonyms of \textit{rakta} and \textit{Bhavanisha}ra has mentioned \textit{rajah} as an
upadhatu of rakta. So according to Ayurveda, rajah is said to be formed from rasa or rakta. The blood collected for whole month by both the dhamani is brought down by vayu for the excretion. Especially apana vayuis responsible for this action of artavanishkramana.[32]

Menstruation: Menstrual flow from the reproductive canal consists of 50–150 ml of blood tissue, fluids, mucus and epithelial cells shed off from the endometrium. This discharge occurs because of the declining levels of progesterone and estrogens stimulating the release of prostaglandins resulting in constriction of uterine spiral arterioles. Due to this constriction, the cells they supply become oxygen deprived and start to die an eventually the entire stratum functionalis sloughs off. The menstrual flow passes from the uterine cavity through the cervix and vagina to the exterior.[33] This physiology of menstruation can be related to the artavaniskramana karma ofapanavata.

Estrogens are responsible for maturation and maintenance of the vagina and uterus, and are also involved in ovarian function, such as maturation of ovarian follicles. In addition, estrogens play an important role in regulation of gonadotropin secretion. For these reasons, estrogens are required for female fertility. Progesterone is anti-mitogenic in endometrial epithelial cells and as such, mitigates the tropic effects of estrogen. If pregnancy does not occur, progesterone levels will decrease, leading, in the human, to menstruation. Normal menstrual bleeding is progesterone-withdrawal bleeding. During implantation and gestation, progesterone appears to decrease the maternal immune response to allow for the acceptance of the pregnancy.[34]

HPO axis (Hypothalamic-Pituitary-Ovarian axis): Hormonal control of the menstrual cycle & ovulation / feedback mechanism.[35]

The event of menstrual cycle & ovulation are controlled by interplay of five hormones secreted by three organs and known as the hypothalamic-pituitary-ovarian-axis (H-P-O axis).

<table>
<thead>
<tr>
<th>Organs</th>
<th>Hormones</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hypothalamus</td>
<td>1. Gonadotropic Releasing Hormone (GnRH)</td>
</tr>
</tbody>
</table>
| 2. Pituitary gland| 2. Follicle Stimulating Hormone (FSH)  
|              | 3. Luteinizing Hormone (LH)               |
| 3. Ovary      | 4. Estrogen                           |
|              | 5. Progesterone.                       |
Artava Nishkramana: (Ovulation)

Artava is also called asbeeja which has the capability to reproduce and is one of the four essential factors of conception contributed by mother and father.[36]

Beeja is two types, streebeeja –artavabeeja (ovum), pumbeeja- shukra. Sushruta opines that beeja gets nourishment through raktavaha siras & moves to garbhashaya by the influence of apanavata and gets artava qualities due to action of dhatwagni & is accumulated in garbhashaya.[37]

Sushruta has mentioned that artavabeeja is formed from ahararasaroopi rakta which reaches the garbhashayathrough sukshmasiras. The upachaya of this rakta forms beeja & due to artava dhatwagni and beeja is converted to artava.[38]

In similar way modern science explains it as ovulation, the phase of a menstrual cycle in which a mature egg is released from the ovarian follicles into the oviduct and is available to be fertilized. The process of ovulation is controlled by Hypothalamic-Pituitary-Ovarian Axis (BPO-axis).[39]

Garba Nishkramana: Delivery of the fetus can take place after 9 months of pregnancy. In Ayurveda, the mechanism of labor are clearly mentioned, here it has been tried to correlate these stages with the steps mentioned in modern medicine.

Garbha Parivartana: When the fetus descends or is ready to be expelled (parivartita), it leaves the hridya, descends into the lower abdomen and stays at the region of neck of bladder leading to increase in frequency duration and labor pain. Acharya Kashyapa has mentioned languor feeling of severe compression and tearing pain in vagina which is the internal rotation occurring in pelvis after descend and exaggerated flexion. Internal rotation of vertex fits better in the word parivartana. Acharya Bhela has included discharges per vagina in clinical features.[40,41,42,43]

Apara Patanam: Though expulsion of placenta has been mentioned in all the classics, however, well-defined description has been given only by Acharya Charaka, Vagbhata and Kashyapa.

Acharya Charaka says that after delivery of fetus, one of the attendants must inspect carefully that whether placenta is expelled or retained.[44]
AshtangaSangraha - defining normal labor says that delivery of fetus in vertex presentation followed by expulsion of placenta is normalcy (prakriti).\textsuperscript{45}

Acharya Kashyapa says that without expulsion of placenta the woman cannot be termed as puerperal women (sutika).\textsuperscript{46}

**Effect of Avi on Prasava:** The woman having normally situated fetus, dilatation of aparamukha (cervix uteri) and presence of avi (normal uterine contractions during labor i.e. contraction, relaxation and retraction) along with the grahishula (seizing pain arising due to contraction of abdominal wall i.e. secondary force of labor) is very much ready to deliver. If the avi is delayed, the fetus is troubled (weak uterine contractions can delay the labor resulting in asphyxia to fetus). Thesesquence of movements are governed and completed by the help of apanavatasa supported by prana and vyanavata.\textsuperscript{47}

**Parturition**

The term placenta secretes corticotropin releasing hormone

- Stimulate the anterior pituitary of fetus

- Secrete cortisol & dehydroepiandrosterone (DHEA)

- Placenta converts

- DHEA into estrogen

- Stimulates the placenta to release prostaglandins

- Production of enzymes digest collagen fibers

- Cervix become soft

- Increase the oxytocin secretion

- Increase the uterine contractions, and relaxation dilate the cervix.

*The positive feedback mechanism will continue till the delivery of the fetus.*\textsuperscript{48}

The physiology of Parturition can be related to the Garba Niskramanakarma of Apana Vata.

**CONCLUSION**

Apana vayu is the responsible for elimination of non-suppressible urges, if they are suppressed it leads to apnana vayu vigunya and it produces maharoga like Arshas, Bhagandhara, Gulma etc. It is our prime aim to understand the apana vayu karma and should be maintained in balance at most care.
REFERENCES

32. Ayurvedic concepts in Gynaecology, Dr. Nirmala G. Joshi, chapter VIII, Chaukamba Snskrit Pratishthan, Delhi, 21.


38. IBID.


46. Pandit Hemraj Sharma Kashyapsamhitakhilsanth 11/6 Varanasi, Chukambhaprakashan Reprint, 2009; 305.

47. Pandit Hemraj Sharma Kashyapsamhita sharer sthan 10/11, Varanasi Chukambhaprakashan Reprint, 2009; 85-86.