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An Integrated View on Physiology of *Stanya Utpatti* (Lactation)

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Abstract

The knowledge regarding the *Stanyam* (Breast Milk) and *Stanya Utpatti* (Lactation) is unique in Ayurveda. The physiology of *Stanya Utpatti* (Lactation) in ayurveda describes breast milk as an *Upadhatu* (Secondary tissue) of *Rasa Dhatu* (Nutrient fluid), with the process heavily influenced by maternal emotions, diet, and lifestyle. Modern science explains lactation through a detailed neuroendocrine pathway involving hormones like prolactin and oxytocin, a perspective that aligns with many of the psychosomatic principles described in Ayurvedic texts. This review provides insights into *Ayurveda* and contemporary science regarding the significance of the physiology of *Stanya Utpatti*, as well as the psychological factors that affect its production and ejection. Modern science offers a comprehensive hormonal explanation that is consistent with Ayurvedic principles.

Keywords: *Ayurveda*, Breast milk, Child, Lactation, Physiology, *Stanya Utpatti*.

Introduction

In *Ayurveda, stanya* (Breast milk) is considered a sacred fluid and the primary food for infants, crucial for their growth (*Pushti*), vitality (*Jeevana*), and immunity (*Vyadhikshmatva*). Ayurveda classics unanimously claims, the effective establishment of lactation occurs only after three days of parturition. *Stanya* is *Upadhatu* of *Rasa dhatu.*

रसप्रसादो मधुरः पक्काहारनिमित्तजः |
कृत्स्नदेहात् स्तनौ प्राप्तः स्तन्यमित्यभिधीयते ||

When *Rasa dhatu* is subjected to transformation in *prasoota avasta* in a female, its essence portion (*Rasa Prasada*) in the breast region is known as *stanya*. This physiology has been started since the time of conception [1].

तदेवापत्यसंस्पर्शाद्दर्शनात् स्मरणादपि |
ग्रहणाच्च शरीरस्य शुक्रवत् सम्प्रवर्तते ||
स्नेहो निरन्तरस्तत्र प्रस्रवे हेतुरुच्यते ||

The milk is ejected from the breast by he thought, touch, sight, and physical contact of the baby. This physiology is almost similar to the one in ejaculation. Maintenance of lactation is mainly by the uninterrupted affection ***(स्नेहोनिरन्तर)*** towards the baby [2].

Ayurvedic Perspective on *Stanya Utpatti* (Lactation):

Ayurveda explains *Stanya Utpatti* (Lactation) through the lens of *Doshas* (*Vata, Pitta, Kapha*), *Dhatus* (tissues), and *Upadhatu* (secondary tissue element)

Formation of *Stanya Utpatti*: *Stanya* is primarily considered an *Upadhatu* (secondary tissue element) of *Rasa Dhatu* (the first tissue formed from digested food/nutrients), which is circulated throughout the body by *Vyana Vata* and reaches the breasts. Some Acharyas also link its formation to *Rakta Dhatu* (blood tissue) or *Raja* (menstrual blood, which gets diverted post-delivery).

Channels of *Stanya Utpatti*: *Stanya* flows through channels called *Stanyavahi Siras* or *Srotas,* which can be correlated with the mammary ducts and lobes in modern anatomy.

Ejection (*Stanya Pravrtana*): The release of milk is a psychosomatic process heavily reliant on the mother's mental and emotional state, specifically *Vatsalya* (maternal affection/unconditional love). The sight, touch, thought, or suckling of the baby stimulates the *Stanya Pravrutti* (milk ejection), which opens the channels in the *Hridaya* region (often correlated with emotional centers and possibly the brain/pituitary) [3].

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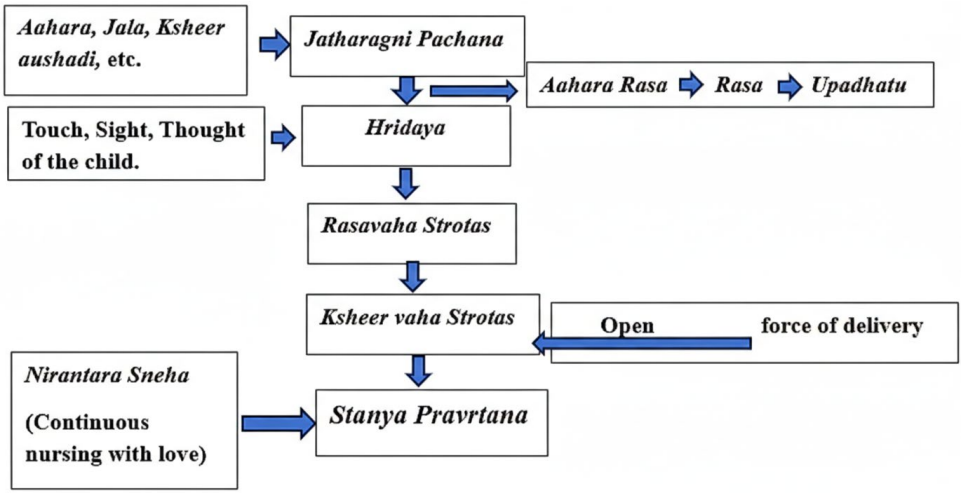

Chart 1: Flowchart of Stanya Utpatti: Stanya Pravrtana (Lactation)

Modern Physiology of Lactation: [4, 5, 6]

Lactation is the process through which milk is produced, with human milk being secreted by the mammary glands located in the fatty tissue of the breast.

The lactation process is an extraordinary biological journey that a mother's body experiences to provide nourishment to her infant. The four stages of lactation signify unique physiological and hormonal transformations that prepare, initiate, sustain, and ultimately stop milk production. Each stage is vital in guaranteeing that the baby obtains the appropriate nutrients at the right moments for optimal growth and development.

Lactation does not solely commence after childbirth; it actually begins much earlier in pregnancy and persists long after the infant is delivered. These phases are meticulously regulated by hormones including prolactin, oxytocin, estrogen, and progesterone.

Gaining knowledge about these stages offers valuable insights into the mechanics of breastfeeding and what mothers can anticipate throughout their breastfeeding experience.

The Four Stages of Lactation:

It includes Mammogenesis, Lactogenesis I, Lactogenesis II, and Galactopoiesis, each of which is essential for milk production and the breastfeeding process.

i). **Mammogenesis: Breast Development during Pregnancy:** Mammogenesis is the process of developing and growing the mammary glands throughout pregnancy. This phase commences early in pregnancy with a significant increase in estrogen and progesterone levels. These hormones promote the growth of milk ducts, alveoli (the cells responsible for milk production), and the supportive tissues in the breast. During this period, breasts typically become fuller, heavier, and more sensitive in preparation for milk production. The alveoli increase in number rapidly, establishing the necessary infrastructure for milk synthesis once lactation starts. This phase is essential for laying the groundwork for effective milk production after childbirth.

ii). **Lactogenesis I: Initial Milk Secretion:** Lactogenesis I takes place in the later stages of pregnancy and continues for approximately two days after childbirth. During this time, the mammary glands begin to produce colostrum, a dense, yellowish liquid that is abundant in antibodies, proteins, and crucial nutrients, yet contains minimal fat. While the secretion of milk initiates at this stage, complete milk production does not commence until after delivery, as elevated progesterone levels prevent significant milk secretion until the baby is born. This phase prepares the breasts for active milk production and offers essential immune protection to newborns right after birth.

iii). **Lactogenesis II: Onset of Copious Milk Production:** Lactogenesis II generally commences between 30 to 72 hours after childbirth, coinciding with a significant decline in progesterone levels following the delivery of the placenta. This shift in hormones leads to an increase in prolactin activity, which in turn promotes substantial milk production. During this period, mothers may observe that their breasts feel fuller and heavier due to the large quantities of milk being generated. It is also during this time that the transition from colostrum to mature milk occurs; mature milk is composed of a well-balanced combination of water, fats, proteins, carbohydrates (primarily lactose), vitamins, and minerals that cater to the needs of the infant. This phase is often marked by engorgement or a feeling of fullness in the breasts as milk supply increases rapidly. Effectively starting breastfeeding during this critical period is essential for establishing a sufficient milk supply.

iv). **Galactopoiesis: Maintenance of Milk Production:** Galactopoiesis is the continuous maintenance phase in which the regular removal of milk, either through nursing or pumping, supports ongoing production. Prolactin plays a crucial role in this process, but its effectiveness is largely influenced by demand: more frequent breastfeeding indicates a need for increased production. During this phase, the composition of milk stabilizes, with foremilk (which is watery and thirst-quenching) transitioning to hindmilk (which is rich in fat). This balance ensures that infants receive both hydration and the necessary calories for growth. The duration of this stage can vary, lasting from months to years, depending on how long breastfeeding continues. The milk supply adjusts dynamically to the needs of the infant through feedback mechanisms that involve nipple stimulation and the frequency of emptying.

Hormonal Regulation throughout the 4 Phases of Lactation:

Hormones play a crucial role in all stages of lactation, functioning with precise timing:

- **Estrogen & Progesterone:** Facilitate the development of

breast tissue during pregnancy while inhibiting full milk production.

- **Prolactin:** Starts and sustains milk production after birth; its levels peak around the time of delivery.
- **Oxytocin:** Activates the let-down reflex, facilitating the ejection of milk from alveoli into ducts during breastfeeding.
- **Placental Hormones:** Their abrupt decline following delivery indicates the beginning of abundant milk production.

The interaction of these hormones guarantees that the breasts are prepared prior to birth and can respond swiftly once the infant is born.

Challenges and Considerations at Every Stage

Each stage presents distinct challenges that mothers might encounter:

- **Mammogenesis:** Breast tenderness or swelling can be uncomfortable, yet it is a normal occurrence.
- **Lactogenesis I:** Some women may experience thick colostrum leakage prior to birth, while others may not visibly produce much at this stage.
- **Lactogenesis II:** Engorgement can lead to pain or difficulties with latching if not addressed appropriately.
- **Galactopoiesis:** Supply issues frequently emerge if the frequency of feeding decreases or if stress disrupts the let-down reflexes.

Ayurvedic Perspective and Modern Perspective of Lactation:

Table 2: The two systems, although they use different terminologies, have considerable similarities.

Comparative Feature	Ayurvedic Perspective	Modern Perspective
Origin of *stanya*	*Ahara Rasa* and *Rasa Dhatu* offer essential nourishment. *Stanya* serves as an *Upadhatu* of *Rasa Dhatu (*nutrient fluid/plasma).	The nutrition of the mother and the transfer of nutrients to the mammary gland are vital. Alveolar cells produce milk using nutrients derived from the blood.
Key Factors/Hormones	*Vata* (*Vyana Vata*, responsible for circulation and flow), *Pitta* (associated with conversion and metabolism), *Kapha* (related to the structure and qualities of milk), and *Vatsalya* (representing maternal affection).	Prolactin (involved in synthesis), Oxytocin (responsible for ejection), and mechanical stimulation (from suckling).
Ejection Mechanism	Psychosomatic response: Initiated by the baby's sight, touch, or thought, motivated by *Vatsalya,* resulting in the clearing of *srotas* (channels) in the *hridaya* area.	Neuroendocrine reflex: Nerve impulses to the hypothalamus lead to the release of oxytocin and contraction of myoepithelial cells.
Factors contributing to insufficiency	*Ahara* (diet), *Vihara* (lifestyle), *Manasika bhava* (psychological factors such as anger, fear, grief, and lack of affection), *Dosha* vitiation, and *Agnimandya* (impaired digestion).	Additionally, hormonal imbalances, malnutrition, stress (due to cortisol/adrenaline inhibition), and improper techniques also play a role.
Management	A comprehensive strategy that encompasses diet (*Ahara*), lifestyle (*Vihara*), and herbal remedies (*Aushadi* - such as galactagogues like *Shatavari*) to achieve *Dosha* balance.	Nutritional guidance, stress management, hormonal assessment, and support for lactation.

Conclusion

Both ancient Ayurvedic classics and contemporary scientific research agree that Breast milk (*Stanyam*) serves as the optimal nutrition for infants, and that a mother's physical health, nutritional condition, and emotional wellness are essential for effective lactation.

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