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HEREDITARY MORBIDISATION IN AYURVEDA WITH SPECIAL REFRENCE TO CLEFT LIP AND PALATE

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ABSTRACT

Introduction: Congenital anomalies are major contributors to neonatal morbidity and mortality worldwide. Among these, cleft lip and cleft palate are common craniofacial malformations with multifactorial etiology involving genetic and environmental factors. Ayurveda provides a comprehensive understanding of hereditary and congenital disorders through concepts such as Beeja, Beejabhaga, Beejabhagavayava, Atmakarma, Ashaya, Kala, and Matura Ahara-Vihara. The present review explores these concepts with special reference to Khandostha (Cleft lip) and Khandataalu (Cleft palate) and the role of Vayu in their pathogenesis. **Materials and Methods:** This narrative literature review was conducted using classical Ayurvedic texts with their commentaries and contemporary scientific literature including PubMed and Google Scholar were searched for relevant studies published up to February 2026. The collected literature was critically analyzed to correlate Ayurvedic concepts of hereditary morbidisation with current embryological and genetic understanding of hereditary disorder with special reference to Cleft lip and palate. **Results:** Ayurvedic literature attributes

congenital anomalies to abnormalities in Beeja, Beejabhaga, Beejabhagavayava, Atmakarma, Ashaya, Kala, and maternal diet and lifestyle. Morbidisation of Vayu is considered responsible for embryonic division, differentiation, tissue morphogenesis, and developmental abnormalities including Khandostha (cleft lip) and Khandatalu (cleft palate). These concepts demonstrate similarities with modern mechanisms involving genetic mutations involving gene like IRF6, MSX1, ABC4, RARA, TGFα etc, chromosomal abnormalities, impaired neural crest cell migration, and defective fusion of facial processes. **Discussion and Conclusion:** The Ayurvedic concepts of hereditary morbidisation provide a comprehensive framework for understanding the etiopathogenesis of congenital anomalies. The role of Vayu, particularly its Chala and Ruksha properties, offers a plausible explanation for the developmental disturbances leading to cleft lip and palate. Integrating Ayurvedic preventive measures, including preconception care, appropriate maternal diet and regimen, and Vata-pacifying practices, with modern genetic counselling may contribute to reducing the burden of these congenital anomalies. Further study with karyotyping with environmental factors can enhance its field towards prevention.

KEYWORDS: Hereditary disorder, Congenital anomalies, Khandostha (Cleft lip), Khandataalu (Cleft palate), Vayu, Embryogenesis.

INTRODUCTION

'Congenital anomalies, also known as birth defects or congenital malformations, are structural, behavioural, metabolic or functional abnormalities that occur during intrauterine life and can be identified prenatally' existing at or before birth, regardless of the cause. Study on genetic disorders exposes that 3%–5% of all births result in congenital deformities and 20%–30% of all infant deaths are due to genetic disorders.[1] Globally, congenital disorders impose a significant burden, contributing to long-term disability and resulting in an estimated 240,000 newborn deaths within 28 days of birth every year, and a further 170,000 deaths in children between the ages of one month and five years.[1] Garbha vikruti can be emphasized with hereditary and congenital disorder are highlighted in Ayurveda with specific factor Beeja, Atmakarma, Kala, Ashya and Matur Ahar Vihar. Ayurveda describes various genetic disorders due to defects in Bija, Bijabhaga and Bijabhaga avayaba while explaining the morbidity of sperm and ovum responsible for organ formation and fetal characteristics.

Common congenital anomalies are heart defects, neural tube defects, down syndrome, congenital talus equinovarus, congenital blindness etc. Among them cleft lip and cleft palate are the most common congenital abnormalities of the craniofacial structure.

Cleft lip and cleft palate bear 1 of every 5th of an individual. Cleft lip and cleft palate associated with other congenital anomalies in 70 % (syndromic) cases while they are alone in 30% cases (non-syndromic).[20] As intervention here is only surgery which is complicated and costly too so its prevention is beneficial.

AIMS AND OBJECTIVES

1. To elucidate the concept of Hereditary disorders in Ayurveda
2. To understand the concept of Khandostha (Cleft lip) and Khandataalu (Cleft palate)and involvement of Vayu causing its morbidity

MATERIAL AND METHODS

The study is based on the literature review of the Ayurvedic classical texts with commentaries, valid interpretation were discussed. Electronic databases such as “PubMed” and “Google Scholar” had been searched to find the relevant studies and reviews published from inception until February 2026 and analyzed further.

REVIEW LITERATURE

Acharya Sushruta classified Garbha Vikruti under two categories *Aadibalapravrutta* and *Janmabalpravrutta*.[3] Acharya Vagbhata mentioned Sahaj and Garbhaja in relation to classification of disease.[18] The diseases that are produced by the abnormalities of sukra and Sonita are known as Adibala Pravritta diseases. Example – kushta, arsha etc.[4]

GARBHAJA VIKRUTI

- **गर्भ- कुक्षिस्थस्य प्राणिनः गर्भ इति। कुक्षिस्थ जीवः। (अमरकोष)**

The intra-uterine living organism is termed as garbha.

- **विकृतिः- प्रकृतेरन्यथा भावे विकृतिः। विरुद्ध क्रियायाः। (अमरकोष)**

Vikruti means other than normal/natural; the abnormalities may be structural or functional **(विरुद्ध क्रियायाः).**

'गर्भस्य विकृति गर्भविकृति'।

It can be understood with the abnormalities of Garbha in Intrauterine period where the result seen just after birth (Sarpa, Kushmand etc.) or in later part (Sahaj klaibya, Sanda etc.). Embryo dissimilar to the yoni (species kind) or of abnormal shapes are produced by the vitiated doshas.[5]

Table 1: Causative factor for Garbhaja vikruti.

Causes of Garbhaja vikruti	
According to Acharya Charak[5]	**According to Acharya Sushruta**[6]
Beejadosha (deformity in spermatozon and ovum)	**Papakarma-** Sins or bad deeds
Atmakarmadosha (deeds of previous life)	**Nastikya maata-pitro** i.e Atheist mother and father
Ashyadosha (deformity in Reproductive organ)	**Asubhascya Purakrita** i.e bad deeds of parents or in previous life
Kaladosha (time factor and abnormalities of Ritukala)	**Vatadinam Prakopan** i.e Aggravation of vata etc.
Matur aahar-vihar (diet and regimen of mother).	

Acharya Sushruta further mentions the formation of Anga -pratyanga occurs due to swabhava, which are influenced by dharma & adharma of previous birth; quoting falling & reappearing of teeth and absence of hair on palms are due to its swabhav. Bhavprakash also explains same.

Acharya Bhela has mentioned the causative factors of Garbha vikruti as Beeja dosha, apathya rasa (unwholesome diet), Vega sandharana (suppression of natural urges) and yoni dosha.[9] Acharya Bhavamishra explains that dushta retas cannot procreate healthy progeny, it causes Janmandha (congenital blindness), Badhirya (deafness), Pangu (lameness) etc.

यस्य यस्य ह्यङ्गावयवस्य बीजे बीज भाग उपतप्तो भवति, तस्य तस्याङ्गावयवस्य

विकृतिरुपजायते, नोपजायते चानुपतापात्; तस्मादुभयोपपत्तिरप्यत्र| | (Ch.Sha. 3/17)

1. Bija, Bijabhaga and Bijabhaga avayaba

The area of Beeja and Beejabhaga when vitiated, the structure that going to be develop from that area will be morbidised.

By the term; Bija both the male and female reproductive elements viz., Sukra and Shonita are taken. In certain contexts, the word Bīja means either one of them. It is analogous to Gametes carrying haploid genetic material.

The Bijabhaga is defined by Cakrapani as those parts of the Bija that are responsible for the development of specific parts and organs of the body.

The Bijabhagavayava has been defined by Cakrapani as components of the bijabhaga that are responsible for the development of specific parts of a particular organ.

Abnormality due to Beeja, Beejabhaga and Beejabhagabayava indicate abnormalities in chromosome, gene and DNA material which cause morbidity in different ways.

Table 2: Abnormalities due to Beeja, Beejabhaga & Beejabhagaavayaba Disorder produced due to abnormalities in Beeja & its component.

i) Genetic Disorders in women caused by defects in Śoṇita Bīja & its subcomponents

Disorder	Cause	Modern correlation
Vandhya[10]	Due to abnormality in beejabhaga of Garbhasaya	Primary infertility
Putipraja	Defect in Garbhsaya Beejabhagaavyava in Artava results in Putipraja.	IUD where Septate, Arcuate or hypoplasia uterus influenced habitual abortion.
Varta Trunamukha (Ash.san.sa2/49-52)	Beejabhagaabyava of mother involve causing Varta. Purusha avayaba akriti, caused due to matruja avayava vikruti.	Androgen insensitivity / intersex phenotype. Phenotypic characteristics looks like male, can be interpreted as sex chromosomal disorder.

ii) Genetic Disorders in men caused by defects in Śukra Bīja its subcomponents

Disorder[14]	Cause	Modern correlation
Vandhya	Due to abnormality in Beejabhaga of sukra	Non- obstructive azoospermia/ Y deletion syndrome
Putipraja	Defect in Beejabhagaavyava of Sukra results in Putipraja.	Teratospermia / gene mutation affecting spermtogenesis
Trinaputrika Trunapulika (Gangadhar)	Due to abnormality in Beejabhagaabyava and Beejabhaga. (Apurusha)	Klinefelter syndrome (47, XXY) and androgen insensitivity syndrome where mutation of AR gene occurs. Clinical feature of abnormality in masculine character and dominance of feminine character.

Sahaja roga

Sahaj roga explained by Acharya Vagbhata are either influenced by- i) Matruja (maternal) ii) Pitruja (paternal) responsible for carrying genetic defects in progeny.[12] Adibala pravrutta rogas are mentioned by Acharya Charak as Kulaja, Vagbhata as Kuladbhava, Sahaja roga while Bhela mentioned it as 'Prakrutiprabhava roga'. Acharya Bhavamishra explained it Ashadhya.

Table 03: Sahaja roga mentioned by different Acharya.

Sahaja roga	Charak[14]	Sushruta[3]	Ash.hru[18]	Ash. San[15]	Bhav Prakash[7]	Bhela[9]	Harita[22]
Sthoulya	✓			✓ (swabhvam)			
Karshya	✓			✓ (swabhvam)	✓ (swabham)		
Prameha	✓ Kulaja vikara, Ashadya	✓ Sahaja (bijadosha)		✓ Sahaja roga		✓ Jatapramehi	
Arsha	✓ Bijaupatapta, matrupitruu pachara -purvakrita karma	✓ Sahaja arsha/ Adibala pravritti roga[26]	✓ Sahaja arsha (asadhya)	✓ Sahaja arsha	✓ Sahaja arsha		✓ Sahaja arsha
Kushta		✓ Bijaupatapta **Dalhana-** sanjata kushta[31]			✓ Sukrashonita Dosha		
Jatyandha		✓		✓	✓ Janmandha		
Klebya	Apuman (klebya)				✓ Janmapravrutta		
Twak dosha		✓					
Swara bheda					Sahaja swarabheda		
Badhirya					Badhirya		
Khan dostha			✓ Sahaja				

Interpretation of Hereditary disorder

Kustha- It mentioned under aadibalapravritta disease which is due to abnormality in sukra and sonita. Kustha indicate skin diseases. Albinism a hereditary disease occurs by absence of

tyrosinase influence through autosomal recessive trait. It is a mutation of genes OCA1, OCA7.(Bijaupatapta).

Arsa- It is mentioned under Aadibalaprabritta disease (Susruta). Charak also considers it as Sahaj.

Genetic relationship: - Congenital vein wall weakness result reduction in resistance and cannot tolerate intravascular pressure, which gradually expanded.

Prameha- Sahaj prameha occur due to beeja dosha mentioned as Kulaja vikara. Children born with the HLAD ¾ DQB genotype make up 50% of all children who developed type 1 diabetes within 5 years of age. Gene associated with developing type 2 diabetes include TCF7L2, PPARG, FTO, KCNJ11, NOTCH2, WFS1, IGF2BP2, SLC30A8, JAZF1, HHEX among others.

Dviretas- Due to vitiation of sperm and ovum **(uptaptabeeja)** where offspring will have characteristics feature of both the sexes indicate hermaphrodite. It is multifactorial clinical condition. The hereditary cause is understood with chromosomal karyotype 47 XXY, 46 XX/46XY etc. and various degree of mosaicism.

Klaibya: Sahaj klaibya (Susruta) indicates congenital impotency or erectile dysfunction. Genetic inheritance are observed where natural variation of DNA sequences is observed.

Janmandha (congenital blindness)- Influenced by genetic abnormality for example Choriodermia- it is an X-link disease responsible for degeneration of retinal and choroid. Leber Hereditary Optic Neuropathy (LHON)- due to mutation in ND1, ND4 and ND6 in complex 1 of the mithochondrial chain.

Badhirya: Congenital deafness found in autosomal recessive and autosomal dominant due to mutation in gene COL11A2 (DFNA13) (leenheer et al, 2001).

Alport syndrome- It is caused by mutations in COL4A3, COL4A4 or COL4A5 influence progressive sensori neural deafness.

2. Atmakarma Chakrapani quotes "आत्मीयं कर्म आत्मकर्म" Ch.Sha 2/29

Atmakarma means own deeds of previous life. The effects of the actions of the previous life are carried by the soul to his next life, which are the results of good or bad actions.

Chakrapani quoted all the Indriyas are derived from Atma, hence their presence or absence or deformity depends on deeds of previous life or Daiva. If the Beeja of a blind person consists of Asubhabhava, then owing to Kakataliya nayaya born child will be blind.

Different shape of foetal abnormality

- **According to Sushruta** the foetus may have different shape of snake, scorpion or field-pumpkin etc. are the result of sins or bad deeds of previous life. Therefore, the malformations of the child should be considered due to evil deeds of his parents, or to the effects of his own bad deeds.[6]
- **Bhavprakash** has also explained different abnormal shape of fetus like of snake, scorpion or field pumpkin etc. caused due to bad deeds in previous life.[7]
- **According to Bhela**, vitiated Vayu and Akasha along with curse of God is responsible for abnormal shape like elephant, dog.[9]

Table 04: List of Sahaja roga & Garbha vikruti explained by different Acharya caused due to Atmakarma.

Unmada[10]	The primary cause of insanity in an individual are his own misdeeds and other agents like the gods etc.
Arsha[14]	Killing brahmana, women and pious person and other act of sin cause upatapta in Balibija (rectal fold) causing Arshas. - due to improper activities of parents & daiva.
Twak dosha[3]	Committing sinful act and purakritakarma causes kushta.
Yamala Garbha[6]	Due to adharma – unrighteous activities of previous lives, the bija gets divided into two inside the uterus by Vayu known as Yamala Garbha). Division of Bija by Vayu has been described by both Vagbhatas and Kashyapa and of kalala by Bhela.
Jatyandha[6]	The Tejo dhatu did not reach the Drishti bhaga during 4th month of gestation, which is due to deeds of previous life. (Dalhana)
Yoni roga[2]	Occurs due to bad deeds of her own, vitiated bija, and daiva or karma (result in evil actions of past life causes yoni roga.
Apuman[12]	Due to committing sins in past, leading to complete dryness of retovaha srotas resulting in impotent male child.

Papakarma explained by Acharya Sushruta

The bad deeds in previous life are said be *daiva*, while that action done in present life are said to be *paurusa*. Purvakarma (bad deeds of the parents or previous life of own) is responsible for foetal deformity in present life.

3. Ashaya "आशयो गर्भाशयः' Ch. Sha 2/29

Garbhasya included as Kshetra (Dalhana) is the place where fertilization, implantation and subsequent development of fetus. Any defect in asaya (especially uterus) may cause congenital malformation in foetus. The term Kshetra is understood as uterus while it can also include other different Female Reproductive System which facilitate the process.

Table 05: The disorders describe due to deformity of Asaya are as below.[14]

(i) Vikruta yoni[10]	Vitiation of Vayu leads to malformed yoni in fetus. Indu explains that other dosas along with vayu is responsible for yoni vikruti.
(ii)Suchimukhi yoni vyapad[14]	If a pregnant woman resorts to Ruksha Aahara-Vihara, then vayu in her gets aggravated. Because of the Ruksha guna of aggravated Vayu, the Yoni of the female foetus in the womb of the mother become narrow in opening. This ailment of the Yoni is called Sucimukhi (needle like or narrow opening of the genital tract).
(iii)Sandi yoni vyapad[14]	Because of the Beeja Dosha, the Vayu in the fetus destroys its developing Aasharya in the womb of the mother. It is characterised by Astani (absence of breast) and Naradweshani. This occurs due to malfunction (uphatashya) of Vayu in uterus which is of incurable in nature. This can be correlated as -Primary infertility- Sushruta Secondary infertility (Anupkarmat)- Charak
(iv)Heena yoni[17]	Congenital Abnormality in female reproductive organ can be understood as underdeveloped, malformed vaginal canal. This can be correlated as Vaginal agenesis

4. Kaala: The word 'Kala' has been interpreted in many ways. Kala can be considered for denoting Puspa-kala (menstrual period), Bija kala (ovulation period) and Garbhavastha kala (gestational period).

Effects of various kala (periods) are described hereunder

(a) Age of the parents: Most of the ancient texts are of the view that male and female become sexually mature up to the age of twenty-five and sixteen years, respectively. Therefore, they have recommended attempting for achievement of good progeny, only after attaining this age.

Table 06: Opinion of Acharya's on the age of marriage and their effect.

Acharya	Age	Effect
Charak[10]	Woman with age below sixteen years is impregnated by a man of twenty-five	Mritagarbha
Sushruta[11]	i. Man who has not attained twenty-five years of age copulates with the woman who is less than sixteen years of age ii. Man copulates with advanced age women & vice versa	-Mritagarbha, Durboulya deha, indriya (if child survives) -Mritagarbha, and child born will be suffering from chronic disease
	iii. Man who attains 25 years should be married to 16 years old women	Attains dharma, Artha, kama & praja (healthy progeny)
Vagbhata I[18]	A man who has not attained twenty-five years of age copulates with the woman who is less than sixteen years of age	Garbha vinasa, and if born the child will be of alpaayu, alpabala, rogi, vikruta indriya
VagbhataII[15]	if the age of women is below 16 years copulates with male of below 20 years	Offspring could be either rogi, alpaayu or of inauspicious nature or there may be no formation of fetus
	If a woman of 16 years copulates with a man of 20 years	Gives birth to viryabant (valient) child
Kashyapa[17]	Both man & woman attaining sixteen years are capable of giving birth.	Healthy progeny

(b) Effect of Ritu-kala

Acharya sushruta

It has been advised that a man should not perform coitus with his wife during ritu-kala, especially in first three days because conception in these days may result in a defective or even dead child. This is contraindicated because downward menstrual flow obstructs the movement of sukra towards the site of fertilization leading adverse effect on progeny as given below.

Table 07: Conception days in Ritukala and its effect on fetus.

Day of conception in Ritu-Kala	Effect of fetus (Sushruta) [11]	Effect of fetus (Kashyap)[17]
1st day	Death of baby occurs immediately after birth	Vatagarbha or there will be no formation of fetus
2nd day	Death of baby occurs in Sutikagruha	Garbhasrava
3rd day	Asampurna anga, Alpayu (Deficient or defective body parts with short life-span).	Fetus with Alpa ayu, Heenanga.
4th day Akalaja (kashyapa)	Sampurna Anga and Dirghayu (Fetus grows well and is delivered healthy and normal with all body parts).	Fetus with inferior quality (heenaguna), weak (dourbalya), unstable (asthira), bhangura (Delicate body parts)

Acharya Vagbhata[15]

In 'Putrakamiya adhyaya', Acharya has enumerated the conception during first three days of menstrual flow, abnormality in shukra and artava and also delivery **vikrut garbha** due to bearing-down effects made in absence of labor pain. Whatever things the women see, or thinks same type of child is born.

According to Bhavprakash[7]

The fetus will not born alive if one indulges conception during 1st and 2nd day of ritukala. During 3rd day of ritukala, if one indulges in coitus, the fetus born will be abnormal with short life span (alpayu).

According to Bhela Samhita[9]

During Ritu kala, if male and female consume ruksha ahara, does suppression of natural urges causes vitiation of Garbha, shonita etc by vata dosha; thereby causing abnormalities like gadgada, badhirya, minmina etc. He also explained same regarding pitta & sleshma dosha.

5. Matura ahara-vihara

The fetus is wholly dependent on mother; therefore, her diet and other activities may affect the growing fetus during pregnancy.

Janmabala pravritta vyadhi - Janmabala pravritta vyadhi are caused by improper diet & regimen of the mother causing Pangu (Lameness), Jatyandha (Blindness), Badhirya (Deafness), Muka (Aphasia), Minmina(dwarfism). Dalhana also mentioned vamana, hrswa sharira in regard to this.

Types

1. **Rasakrita** 2. **Dauhrida Apachara Krta**

1. **Rasakrita**: The fetus is wholly dependent on mother; therefore, her diet and other activities may affect the growing fetus during pregnancy. Maternal diet during gestational period triggers the virulence of dosha in zygote affects the form of genotype of offspring.

- **Acharya Sushruta:** A couple will procreate a progeny in accordance to the Ahara (diet), Achara (regimen), Chesta (action) they indulge in. hence a couple should follow the diet and regimen accordingly.

- **Acharya Vagbhata:** He explains that the embryo formed from the subtle mahabhutas followed by satva gradually grows in the kukshi of the mother, nourished by the essence of the food of the mother.

Table 08: Consumption of vitiated diet (prakupit dosa) by woman and its effect on her fetus.

Use of dosa prakopak Ahar	Effect on Fetus (VagbhataI)[12]	Effect on Fetus (Vagbhata II)[18]	Effect on fetus (Bhela)[9]
Vata prakupita Ahara	Jada, Badhir, Muka, Minmin, Gadgad, Khanja, Kubja, Vaman, Hinanga, Adhikyanga, and Vatavikaraja	Kubja, Andha, Jada, Vamana	Gadgada, Badhirya, Minmina, Vataja vikara
Pitta prakupita Ahara	Khlaitya, Palitya, Samsruhin, Tvakanakhakeshapingalta.	Khalitya, Palitya	Pittaja vikara
Kapha prakupita Ahara	Kustha, Kilasa, Sadenth-janma, svitra, pandu.	Switra, Pandu	Shleshmaja vikara

Table 09- shows Viharas of mother mentioned by different acharya that creates impact on fetus-

Viharas of mother	Garbhaja vikriti
Akalaprvahana (straining) in case of absence of labour pain	Early expulsion of urine and faeces ,Kasa, swasa, sosha, kubjata etc (ash. san. sar3/30) swasa, kasa, sosa, pliha roga (ch.sa.8/50) badhirya, muka, kubja, hanumurdhaabhighata, kasa, swasa, sosha Badhirya, muka, kubja, vikalanga (Su.s.sa.2/51
Dhumapana	Kuni, andha, durvala indriya, vivarna, garbhapata due to ushnata of dhuma (ka. sam. khila10/20)
Mithya achra, beeja dosha, past deeds, deva	Aartava dushti(cha.chi 30/3 , su.utt 38/5)
Asatmya sevana, purvajanma krita papa	Twak dosha (su.chi.9/3)
Apathya sevana , mutra rodhana	Ashmari (ha.sam 3/31/1)
Dushit aahara, vihara of mata,pita and copulation with vitiated women	Anda vruddhi (ha.sam 3/32/1-2)
Vega dharana	Gadgada, badhirya, minmina, vata-pitta vikara (bhela. Sar 5/11) Yoni dosha (bhela. sutra11/15)
Garbhini swedana application	Garbha vaivarnata (ka. sam. khila10/4)
Asthapana, anuvasana vasti prayoga Nasya	Hinanga, mrita Garbha (ka. sam. khila10/23) Hinaanga, pakshaghata, arochaka (kas.si.4/6-10), vikalaindriya
Garbhini jwara	Vikruta Garbha (kas.sam. khila 10/4)

2. **Dauhrda Apachara Krta:** Produced by non-fulfilment of 'longings or cravings' of pregnancy.

Table 10: Effect of Dauhridaavamannana by different acharya.

Acharya sushruta[11]	Kubja, kuni, khanja, jada, vamana , vikruta aksha, anaksha Dalhana -kuni, vikruta hasta,kubja, swaavayabain driyaadhisthana dosha
Charaka[10]	Mrita Garbha, vinasha/vairupa/ vikruta Garbha
Vagbhata[16]	Kubja, pangulya, kilasa
Bhavprakash[7]	Kubja, kuni, sanda, vamanam, vikruta Akshi, anksha pangu, muka, minmina. Also mentions vikara of that particular indriya, whose longings are not fulfilled. (Bha.pur.a3/296)

The importance of Vayu in foetal developmen

Acharya sushruta

गर्भस्य खलु रसनिमित्ता मारुताध्माननिमित्ता च परिवृद्धिर्भवति || Su.Sha 4/57-59

The term 'Rasa nimitta' emphasises nutrition coming from maternal diet which passes through placenta via umbilical cord to the foetus. While 'Maruta adhmana nimitta' emphasises increase in body part specifically in its size and shape under the influence of vayu. Acharya Bhavamishra has explained exactly like Sushruta.

Acharya Kashyap[17]

Kasyapa says that Vayu responsible for union, division and perform flexion and extension etc, as well as division of major and minor body parts, dhatu, chetana (consciousness) and channels due to their specific nature.

Acharya Vagbhata[15]

Vagbhata states that the cell division is carried out by vayu. All the organs are made up of paramanus (cells) which are very small and innumerable, the union (combination) and division (into parts) of the paramanus is brought about by vayu, influenced by actions of the past and present lives.

Harita[22]

After the formation of Kalala, Vayu transforms Kalala into budbudakara. Further this Kalala develops into Pinda with the help of Panchamahabhuta. After attaining pinda form, VyanaVayu forms different parts of the body such as upper limbs, lower limbs, head etc.

Udana Vayu in the heart and neck forms Oral cavity. Vayu gives shape to different parts of body and forms nine orifice of body – mukha, ghrana, karna, netra, apana, meha.

Bhela[9]

Bhela explains that Vāyu and Agni both enter forming different body parts, initiate activity and growth. When Vāyu and Agni come out of the body, the foetus dies.

Table 11: Vata dosha in the etiopathogenesis of congenital anomalies.

Charak	Bahupatyata, Dwireta PavanendriyaVatika sanda (andakosha nasha), Suchimukhi yoni vyapad Sandi, Klebya (Apuman), Karnasaskuli, Putraghni, Jataghni
Sushruta	Yamala Garbha, Garbhasosha, Anasthi Garbha
Vagbhata I	Bahupatyata, Vikruta yoni, Vikruta Garbha, Kuchikarnika, Garbhasosha, Jataghni, Sanda, Kubja, Andha, Jada, Vamana, Khandostha
Vagbhata II	Bahupatyata, Vatendriya Vikrutaksha, Rukshaaksha, Jatandhya, Jada, Badhirya, Muka, Minmina, Gadgada, Khanja, Kubja, Vamana, Vata vikara, Hinanga
Sarangadhara	Janmandha, Badhirya, pangu
Bhavaprakash	vikruta Garbha,Kubja, Kuni, Pangu, Muka, Minmina
Kashyap	Hinanga, Pakshaghata
Bhela Samhita	Kubja, kuni, khanja, Hinanga, Adhikanga, Gridhrasi Hinaindriya, Gadgada, Badhirya, Minmina

Specific Congenital anomalies due to vata dosha

Acharya charak explained that due to excess intake of vataprakopa ahara causing aggrevation of vata which later completely afflicts the garbhasaya causing Garbhanasa, if there is incomplete affliction of garbhasaya which leads abnormality in the matruja bhava of the foetus.

Specific congenital anomalies mentioned by different Acharya are described below

1. Vikruta Garbha – Embryo dissimilar to the yoni (species kind) or of abnormal shapes- are produced by the abnormal (vitiated) dosas. Aruna dutta further mentioned this is due to Unmargi vata which gives rise to Vikruta Garbha.

2. Bahupatyata

- The term **'Bahupatyata'** Multiple embryos are produced due to vitiation of shukra and artava, getting divided into several parts by vayu and due to the aggrevated doshas giving birth to a deformed child.
- Acharya charak also opines sames that this is due to deeds of previous life and is beyond the control of women.

- According to Harita, while explaining the aetiogenesis of multiple pregnancy quotes excessively vitiated vata situated in uterus divides the shukra, artava into several division and no of fetus is formed accordingly.

Yamala Garbha

- The Bija getting divided into two inside the uterus by vayu forms two foetus; known as yamala (twins) which is due to actions other than dharma (in other words adharma- unrighteous activities of previous lives).
- Division of Bija by Vayu has also been described by Kashyapa and of Kalala by Bhela.

Modern view

Conjoined twin- 2 separate organising centre appearing simultaneously in germ disc. Overlapping there to such an extent that 2 embryos are partially separate from each other. Conjoined twin may be- i.Craniophagus- united by head ii.Thoracophagus- fusion of thorax. iii. Pygophagus- fusion at sacral region. iv. Cephalothoracophagus- fusion of head and thorax.

Parasitic twin: Where one partner may be rudimentary and grows like a parasite from the body of another co-twin.

3. Anasthi Garbha

If woman, after taking purificatory bath during menstruation cycle, performs coitus in dream, Vāyu taking the ovum forms embryo in uterus. This develops from month to month producing features of pregnancy in the woman, but remains as kalala (semisolid mass like nasal discharge), devoid of paternal qualities.

4. Heenaindriya

According to Bhela, due to vitiation of Vata, Hinaindriya is formed.

5. Vikruta Aksha

The Tejas when associated with Vata will lead to Vikruta aksha (abnormal eye), Ruksha and Aruna Akshi (dry and crimson-coloured eyes).

6. Hinanga, Adhikanga

- Chakrapani commented due to bija dushti, there is formation of Hinanga, Adhikanga, kurupa (deformed) child is born.
- Due to Unmargi Vata (upward movement of vata), it dries up the rasavaha srotas in the foetus; resulting child born with vata roga, Hinanga (deficient/poorly developed parts).
- Bhela also mentioned Hinanga, Adhikanga in child caused due to vitiated Vata.

Modern view

Common errors in meiotic cell division include non-dysjunction, anaphase lag, and abnormal chromosomal number. Heenanga and adhikanga, which can be seen as either evident congenital abnormalities like polydactyl or the absence of visible bodily parts, are caused by vata vitiation.

- **Adhikanga:** polyploidy- more sets of chromosomes. Klinefelter's syndrome (47XXY) Trisomy – having additional number of chromosomes, Down's syndrome
- **Heenanga:** Monosomy – having deficient number of chromosomes e.g. turner's syndrome (45XO**)**

7. Vagbhata have mentioned that due to abnormality of vayu of fetus, the pinna of ear contracts, this is known as **kucikarnaka**.

8. Yoni roga[14]

- **Putraghni:** When the aggravated Vayu, because of its Rukshata destroys each and every Garbha produced from the Dusta Artava, known as Putraghni.
- **Jataghni:** Vagbhata says that Jataghani is caused by Anila (vata) which, by increasing the dryness of the vitiated Aartava, kills every child that is born.

KHANDOSTHA & KHANDATALU

(ओष्ठः, पुं, (उष्यते दह्यते उष्णाहारेणेति । उष दाहे "उषिकुषीति" । २ । ४ । थन् ॥) दन्ताच्छादकाव

(Shabdakalpadrum)

Vācaspatyam- (ओष्ठ पु० उष्यते उष्णाहारेण उष-कर्मणि थल् । (ओठ) दशनच्छदे)।

Monier-Williams- (oshtha, as, m. (contracted fr. avastha), the down-hanging lip, i.e. the upper lip (opposed to adhara), a lip in general; oṣthau or dvāv oshthau, du. the lips, the two lips).

The term '**oṣtha**' is derived from 'uṣa dāhe' dhātu with 'uṣikusīti' sūtra and is defined as the part of body which gets heat up and burnt in contact with usṇāhāra (hot edible items). It is also undertaken as part which covers the teeth. In general, they are called as lips.

Paryaya- Radanacchada, daśanavāsa, dantavāsa, dantavastra, radacchada, daśanacchade.

Khandostha

तत्र खण्डौष्ठ इत्युक्तो वातेनौष्ठो द्विधा कृतः || Ash.Hru. Utt 22/7

Splitting of lips into two parts by vata is termed as khandostha.

स०-तेषु मुखरोगेषु मध्ये पवनादोष्ठो द्विधा कृतः खण्डौष्ठ इति गदितः|

Aruna dutta has commented in relation to Mukha roga, bifurcation of lips occurs medially due to vitiation of vata dosha causing Khandostha.

- It is one of the Sahaja vyadhi, It is also said to be kulaja roga.
- **It can be correlated with Cleft lip.**

Khandatalu – Acharya Vagbhata described it is one among the Sahaja vyadhi.

- It is also described as Kulaja vyadhi.
- It can be correlated with cleft palate

CLEFT LIP AND PALATE

Cleft lip and palate in the orofacial region are an important congenital anomaly affecting humanity. Upper lip formation starts on 24th day after conception and is finished by 37th day post conception, whereas for the palate it is the end of the 5th week to 12th week post conception.[1]

Definition: Cleft lip and palate, congenital craniofacial anomalies (Structural abnormality) result due to non-fusion or clefts in the facial structure (includes various parts of the face, lip and palate) during developmental process.

Incidence and prevalence

- This constitutes nearly one-third of all congenital malformations of the craniofacial region with an average worldwide incidence of 1 in 700.

- In India, **35,000** children are born every year in India with cleft lip and palate. Its incidence among the Asian population is reported to be around 1.7 per 1,000 live births or higher (ICMR) FEB 14, 2019.

Causes - Cleft lip appears because of the hypoplasia of the mesenchymal layer resulting in the failure of the median nasal and maxillary processes to join caused due to abnormality in 1st pharyngeal arch. **Cleft palate** results from failure of palatal shelves to fuse.

Table 13: Syndromic and Non-syndromic cleft lip and palate.

Syndromic cleft lip and palate	Non- syndromic cleft lip and palate
i)Associated with other congenital anomalies. ii)30% of cleft lip and palate are syndromic.[20] iii) The syndrome that is most frequently referred to in Syndromic Cleft Lip and Palate is van der Woude syndrome. Trisomy 21, Pierre Robin, CHARGE syndrome, Sticklers, Treacher Collins syndrome etc.	i)Isolated cases of cleft lip and palate. ii)70% of the cleft lip and palate (CLP) cases are non-syndromic. iii) Aetiology of NSCLP involves both genetic and environmental factors. Various researchers discovered multiple candidate genes linked to NSCLP such as **IRF6, MSX1, ABC4, RARA, TGFα, TGFβ, p63, etc involved with NSCLP[21].**

DISCUSSION

Ayurveda recognizes *Bija, Atmakarma, Ashhaya, Kala, Matura ahara vihara* as the factor responsible for causing congenital anomalies in fetus. Defects in *Bīja, Bījabhāga or Bījabhāgāvayava* are the components causing abnormalities such as Vandhya, putipraja, Vaarta, Trinaputrika etc. There are different **Sahaja roga** caused due to abnormality in sukra and shonita such as Sthoulya, Karshya, Jataprameha, Sahaja Arsha, Sanjata kustha, klebya, Swarabheda, Janmandhya, Badhirya, Khandostha, Khandataalu etc.

The term '***Beeja Upatapta'*** denotes concept of genetic susceptibility where impairement of parental reproductive factors may lead to congenital abnormalities in progeny. This concept aligns with genetic mutation, chromosomal aberration, epigenetic modification. 'Mutation 'is where change of gene`s DNA sequence to produce different affect. It influences genetic disorder where one or few gene involve. Acharya Charak mentioned 'Beeja upatapta' in certain diseases such as Pavanendriya, Sanda (Nara & NariSanda), Arsha. Acharya Sushruta

mentioned in case of Kustha while Vagbhata has mentioned Arsha, Sandi caused due to Beeja upatapta.

The normal structure and position of uterus (Garbhasaya) is essential for normal pregnancy and uninterrupted development of fetus which otherwise cause different abnormalities in fetus. Women with bicornuate uterus (Heart shaped) may have a risk of repeated miscarriage and have a greater chance of developing birth defects in fetus. (Alana et al, 2017).

Ayurveda considers '**Ātmakarma'** as one of the subtle causes influencing the manifestation of congenital conditions. Vulnerability of one's unknown chance for susceptibility of inheritance abnormalities is understood with Atmakarma. In autosomal dominant inheritance 50% of offspring will suffer from the affected gene and 50% will remains normal. However, in autosomal recessive inheritance 25% of offspring will suffer from affected gene 50% become carrier and 25% are unaffected. There are different Garbhaja vikruti explained by acharya sushruta like Yamala Garbha, jatyandha occurs due to Atmakarma. For ex- **Yamala Garbha** can be understood as Conjoined twin- 2 separate organising centre appearing simultaneously in germ disc. Overlapping there to such an extent that 2 embryos are partially separate from each other. These may be.

i. **Craniophagus-** united by head ii. **Thoracophagus**- fusion of thorax.

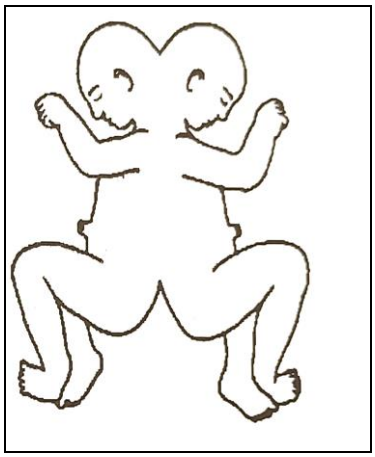


Fig. 1: Craniophagus.

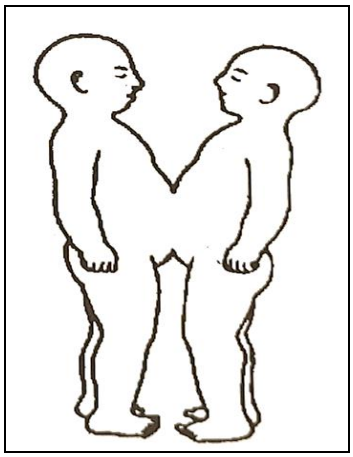


Fig. 2: Thoracophagus.

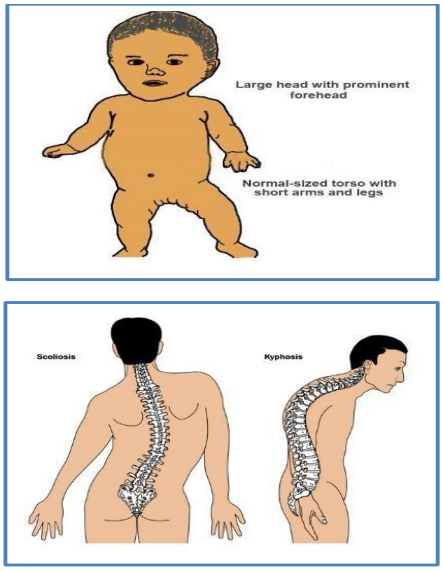


Fig. 3: Achondroplasia.

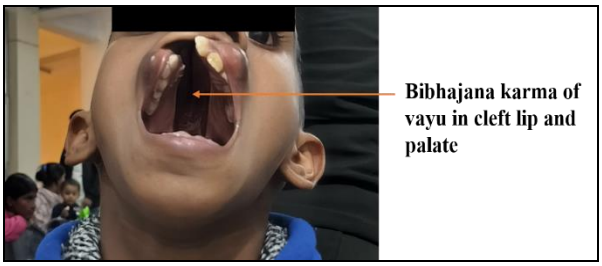
Maternal diet during gestational period triggers the virulence of dosha in zygote affects the form of genotype of offspring. Acharya Vagbhata states that Vata prakupita ahara causes different effect on progeny like Jada (low intelluctuality), Badhirya (congenital deafness), Muka (congenital aphaxia), Khanja (unilateral deformity in lower extremity), Kubja (congenital hump), Vamana (dwarfism), Hinanga, Adhikanga, Khandostha (cleft lip), Khandatalu (Cleft palate) and other Vata vikaraja.

Vaamana can be interpreted as various types of dwarfism which are due to genetic abnormality. Among them Achondroplasia, an autosomal dominant disorder where mutation of FGFR4 is seen.

Effect of Vayu in Congenital anomalies with special reference to Cleft lip and palate

Modern genetics similarly attributes cleft lip and palate to genetic susceptibility interacting with environmental influences. Vāyu is responsible for division, movement, differentiation and morphogenesis of embryonic tissues. Developmentally, it is responsible for initiation of movement of gamete, leading to formation of zygote travels to uterine cavity and gets implanted & subsequently bilaminar germ disc is formed. Primary neurulation—a process driven by the neural plate, neural tube, and neural crest to establish the early embryonic area, from which cranial neural crest cells undergo an epithelial-mesenchymal transition to populate the prominent facial processes, where any subsequent disruption in their migration, proliferation, or midline fusion ultimately culminates in the congenital formation of a cleft lip and palate.

Thus Growth, Development and Differentiation exclusively caused by Vayu. Hence, abnormality in 1st pharyngeal arch involving in formation of maxillary process or development of gametic mutation involving gene such as IRF6, MSX1, TGFA, RARA, ABC4 leading to cleft lip and palate can be understood from this aspect.



The term '**Bibhajana'** which is a function of vayu, seen in relation with cell development and maturation. Vitiated Vayu during pregnancy may disturb the normal fusion of embryonic facial structures and contribute to congenital anomalies such as cleft lip and palate The Ayurvedic concepts of Beeja, Atma Karma, Ashaya, Kala and Matura Ahara-Vihara provide a comprehensive explanation for congenital anomalies thereby encouraging its prevention.

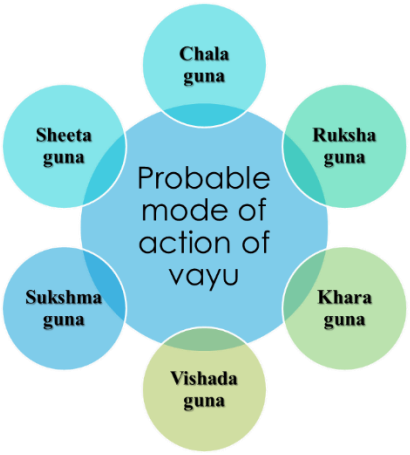
Genetic transmission of Cleft lip and palate

Though there is no consistent evidence for maternal /paternal transmission effect, **it seems maternal transmission of Gene irrespective like IRF6 (allele rs7552506) (Reema rose et.al), TGFB3, TGFA, PAX3 (Min Shi et.al, 2012), TCOF1 (Jae Woong Sul et.al, 2008), PAX7, PAX3 (Jae Woong et.al, 2009), MSX1(allele rs3775261)**(A.R. Vieira et al,2004) influence the risk of Cleft lip and palate in offspring to the utmost.

This clearly emphasize that **maternal status** in relation to Prakriti formation as well as transmission to the offspring has more probability

Probable mode of action of Vayu in causing cleft lip, cleft palate & cleft lip and palate

The most potent gunas of Vayu responsible for probable morbidisation for selected congenital anomalies are given below:



a) **Chala guna**: Developmental instability, structural abnormality, improper positioning are caused mainly due to Chala guna.
b) **Ruksha guna**: The basic pathology of hypoplasia of mesenchymal layer of Cleft lip occurs due to Ruksha guna. Hypoplasia i.e. inadequacy of nutrition results in poor structural development
c) **Chala and Ruksha Guna**: The deficiency in the fusion of Median nasal process and Maxillary process to join resulting in Cleft lip. The above phenomenon may be due to both Chala and Ruksha guna.
d) **Khara guna**: This Guna emphasizes for irregularity specially in surface and in this work may attribute for Cleft palate.
e) **Vishada guna:** Vishada i.e. non-cohasiveness, may attribute to defective tissue integration resulting in non-fusion of lip.
f) **Sukshma guna:** Because of pervasive nature of this guna may affect neural crest cell migration and microcellular coordination responsible for nasal process formation.
g) **Sheeta guna:** This guna may reduce enzymatic and cellular activity necessary for apoptosis which prevents fusion of lip and palate.

Among all the different characteristics, Chala guna may be hypothesized as the main quality of Vata that may attribute in the occurrence of Cleft lip, Cleft lip, Cleft Palate and both.

Associated symptoms of cleft lip and palate may be attributed by Vayu

Clinical feature of cleft lip and palate	**Probable role of Vayu**
(i) Non-fusion of lip/palate	Vayu causing excessive Bibhajana
(ii)Difficulty in speech	Udana vayu dushti
(iii)Malalignment of teeth	Chala guna of vayu
(iv) Dryness of oral cavity	Ruksha guna of aggrevated vayu

(v)Difficulty in sucking and feeding	Dysfunction of Prana vayu and udana vayu
(vi) Recurrent ear infection	Vata dushti associated with Akasha mahabhuta causing improper functioning of srotas.

CONCLUSION

Ayurveda presents a comphrensive understanding of hereditary and congenital disorder through concepts such as Bijadosha, Sahaja vyadhi, Garbhaja vyadhi and Janmabala pravrutta vyadhi. The concept of *Bija, Bijabhaga and Bijabhagavayava* indicate an early understanding

In the literary study, Garbhaja vikruti has been explained by different Acharya caused due to morbidisation of Vayu such as Vikruta Garbha, Bahupatyata, Dwireta, Hinanga, Adhikanga, Hinandriya, khandostha and Khandatalu. The 'Bibhajana karma' of Vayu seen in relation with cell development and maturation.

'**Rastriya Bal Swasthya Karyakram'** is an initiative aiming at early identification, early intervention to cover ***4 'D' viz Defects at birth, Deficiency, Diseases and Developmental delays including disability***. It includes 30 elected health condition including Cleft lip and Palate aims at screening, early detection and free management.

As Cleft lip and palate included under these 30 disorders of RBSK where intervention is only surgical aspect and prevention is also being targeted through genetic counselling, supplemention of 400 micrograms of folic acid per day, avoiding exposure of smoking, alcohol etc. is minimum i.e only 18%. So, here prevention through Ayurveda definitely plays a great role.

Among all the Guna of Vayu, ***Chala guna*** may be hypothesized as the main quality of Vayu that may be attributed in the occurrence of Cleft lip, Cleft palate and Both. Antenatal care right from preconception to full term delivery along with subsiding the vayu dosha by different diet and regimen with respect to guna; right from conception will certainly play a key role in the prevention of congenital anomalies such as Cleft lip and palate.

Ayurveda also emphasizes prognosis indicating hereditary disorder are often considered difficult to cure suggesting its importance in prevention of such anomalies.

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