

Foetal Development and Its Ayurvedic Concepts

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Abstract: After conception Foetal development from a microscopic fertilized cell to a tiny mass of cells to a fully developed baby is a continuous and complex process. It is characterised by process of cell division, cellular hyperplasia followed by hyperplasia and hypertrophy together and lastly by hypertrophy alone. In the development of the foetus after conception it is very important to study and monitor its month-wise growth and development. In the Ayurvedic literature one finds a good description of month-wise foetal growth in detail.

1. Introduction:

After conception Foetal development from a microscopic fertilized cell to a tiny mass of cells to a fully developed baby is a continuous and complex process. It is characterised by process of cell division, cellular hyperplasia followed by hyperplasia and hypertrophy together and lastly by hypertrophy alone. In the development of the foetus after conception it is very important to study and monitor its month-wise growth and development. In the Ayurvedic literature one finds a good description of month-wise foetal growth in detail. However, at places, in *Samhitas* some differences in description are noted. In this section, a review of the Ayurvedic literature with regard to month-wise foetal growth and its correlation with modern or scientific view of foetal development is presented.

2. Month-wise foetal development (Ayurvedic and Modern view):

First month: Ayurvedic view:

- **Charak:** In *Charak Samhita* the 'Atma' is described as possessing all the qualities which gets mixed up or vitiated by the *bhutas* to attain the shape resembling the 'shleshma', in which all the body parts are present but not visible.
- **Sushruta:** According to Sushruta the Embryo is in the shape of 'Kalala'.
- According to **Vagbhata** the description is Same as done by Sushruta.
- **Harita** describes that during first day it attains the form of 'Kalala' after union with

Shukra. In ten days *shonita* (ova + sperm) becomes 'Budbuda'. In 15 days it becomes 'Ghana'. In 20 days a mass of flesh and in 25 days it becomes more conspicuous.

- According to **Bhava Prakash** the *Shukra* and *Artava* deposited in the uterus remain in their original liquid state during 1st month.

Modern view: After a woman ovulates and meets the sperm the egg is normally fertilized within 24-48 hours. This process, leads to conception and the women gets pregnant.

The single fertilized cell begins to rapidly divide and at this point in time is called a zygote. Between days 7-10 from fertilization implantation usually occurs. The amniotic sac, umbilical cord and yolk sac are already beginning to form. By the end of this month, Baby is 4-5 mm. long and the lungs, stomach, and liver start to develop. Towards the end of this month the heart, digestive system, backbone and spinal cord begin to form. The Placenta (sometimes called "afterbirth") begins to develop. The single fertilized egg is now almost 10,000 times larger than it was at the time of conception.

Correlation: 'Shleshma' or 'Kalal' is single celled stage can compare with Zygote. 'Budbuda' becomes after 10 days, it can be relate with Blastocyst. 'Ghana' can be compared with Embryo and at 25th days organs are begin to form.

Second month: Ayurvedic view:

- According to **Charak** the Embryo becomes a solid mass during the second month. If this solid mass has oval (*pinda*) shape the child would be a male, if elongated (*peshi*) the female and with rounded (*arbuda*) mass the hermaphrodite.
- **Sushruta** is of the opinion that the accumulated *mahabhutas* get processed by the combined action of *shleshma*, *pitta* and *vayu* and becomes solid.
- The description of foetal development during second month in both **Vagbhata**

and **Bhava-prakash** is almost the same as given in Sushruta.

- **Harita**, however, suggests that in 50 days buds of future parts in embryo come up in the second month.

Modern view: By the end of 8 weeks the baby is now considered a foetus. At the 6th week, her heart will be beating and visible via ultrasound. Brain and cranial nerves will also begin to form this month. Eyes, nose, lips, tongue, ears and teeth are forming. The arms and legs are well formed. Penis begins to appear in boys. Baby is moving, although the mother cannot yet feel movement. Baby is 24 – 30 mm. long and weighs about 1-2 grams by the end of this month.

Correlation: This is difficult to explain the embryo shapes given in Ayurveda, possibly this is given on the basis of expelled product of conception, which is usually in the form of big or small blood clots. The description of Harita is more appropriate, that described the mostly organs are begin to develop in 50 days.

Third month: Ayurvedic view:

- According to **Charak** during the third month all the *indriyas* and minor body parts become apparent.
- **Sushruta** is more specific in this regard and states that five buds, one for head and four for upper and lower extremities develop in the third month.
- **Ashtang sangrah** in this regard agrees with Sushruta with slight specification that all *indriyas* and body parts develop simultaneously.
- **Ashtang hridaya** said that in the third month with the development of head the embryo is capable of feeling sorrow and happiness.
- **Bhava Prakash** presents the same description as done in Charak.
- According to **Harita** in this month, hands and legs grow.
- **Kashyap** describes that Embryo starts quivering, develops consciousness and can feel pain.
- **Chakrapani** mentions of development of body hair in the third month.

Modern view: By the end of 12 weeks the baby's face is well formed and the baby looks like a baby. Baby's sex organs continue to develop, but it is still too difficult to differentiate gender. Her nails start to develop and earlobes are formed. The arms, hands, fingers, legs, feet and toes are fully formed. Eyes are almost fully developed. Baby has develops most organs and tissues. Baby's heart rate can be heard at 10 weeks with a special instrument called a Doppler. At the end of 12 weeks the baby is 60 – 70 mm. long and her weight is about 12 – 14 gms.

Correlation: all *Indriya* means, eyes, ears, nose, hands, skin and minors parts are almost fully developed. According to modern science now it looks like a baby and development of face, hands, legs and other body parts, like this the Sushruta and other acharys described development of head, hands and legs.

Fourth month: Ayurvedic view:

- **Charak** describes that in the fourth month various body parts become more observable and stability to the foetus comes in this month.
- According to **Sushruta** body parts become conspicuous. Manifestation of heart and consciousness associated with heart also occurs in the fourth month.
- The opinion of **Vagbhatta** is similar to Charak.
- Whereas the description of growth in fourth month in **Bhava Prakash** is same as done by Sushruta.
- **Kashyapa** mentions the Stability of the foetus in this month.
- According to **Harita** in 3 and 1/2 month head becomes stronger and in 4th month *lanugo* appear.

Modern view: At the end of 16 weeks the baby starts developing reflexes, such as sucking and swallowing, and may begin sucking thumb. Sweat glands are forming on palms and soles. Fingers and toes are well defined. The baby's fingers and toes have fingerprints. Gender is identifiable. Skin is bright pink, transparent and covered with soft, downy hair. The baby at this stage is about 12 cm. long and weight is about 110 gms. Although recognizably human in appearance, the baby would not be able to survive outside the mother's body at this stage.

Correlation: According to Ayurveda, body parts becomes more observable and stability of foetus comes, this can be explained in modern science that till the end of 3rd month placenta is fully formed which gives stability of foetus and now the abortion is like the mini-labour and body parts are more developed.

According to Harita, '*loma*' appear in 4th month, which is also correct in modern science like the body covered with soft, downy hair.

Fifth month: Ayurvedic view:

- **Charak:** Accumulation of flesh and blood in foetus is relatively more.
- **Sushruta:** 'Mana' becomes more enlightened.
- **Astanga sangrah:** Accumulation of more flesh and blood and 'mana' become more enlightened.
- **Astanga hriday:** Consciousness developed in this month.
- **Bhava Prakash:** Same as Sushruta.
- **Kashyap:** Same as Charak.
- **Harita:** Foetus becomes capable to live independently.

Modern view: At the end of 20 weeks the mother begins to feel foetal movement, which is called "quickening." Hair begins to grow on baby's head. Soft woolly hair called lanugo covers baby's body, some may remain until a week after birth when it is shed. The baby can by this time start sucking a thumb, yawn, stretch, and make faces. Ears are developed as well and may be able to hear. Internal organs also start maturing. Eyebrows, eyelids and eyelashes appear. By 20 weeks the baby is about 16 cm. long and its weight is about 300 gms.

Correlation: In Ayurveda description of accumulation of flesh and blood in foetus can explained with that the organogenesis is completed and now there is growth and development of foetus is started. Probably explanation of enlightenment of *mana* is that by 5th month auditory reflexes and peripheral sensory reflexes develop and the knowledge or perception is the result of interaction between *Indriya* and *mana*.

Sixth month: Ayurvedic view:

- **Charak:** Relatively more accumulation of energy and complexion.
- **Sushruta:** More enlightenment of 'buddhi'.
- **Astanga sangrah:** Development of hair, body hair, nails, bones, tendons and increase in energy and complexion.
- **Astanga hriday:** Development of tendons, vessels, body hair, hair, skin, energy and complexion.
- **Bhava Prakash:** Same as Sushruta.
- **Kashyap:** More development of energy, complexion and 'ojas'.
- **Harita:** Quivering of foetus.

Modern view: By the time 24 weeks end, the eyebrows and eyelashes of the baby are usually recognizable. Baby's immune system is developing and beginning to create its own antibodies. Lungs are beginning to develop and alveoli are forming. Skin is wrinkled and red. At this stage the baby is 21 cm. long and its weight is about 630 gms.

Correlation: At the end of 24th or 25th weeks sensory or motor organs attain some maturity, which can explained enlightenment of *buddhi*. At this time skin becomes more pink, which can be explanation of accumulation of complexion. Harita described *sfuran* of foetus, which is quickening, that is already started in 5th month, but it's possible that some woman feel it later.

Seventh month: Ayurvedic view:

- **Charak:** All the features (muscles, blood, bone etc.) get proper nourishment.
- **Sushruta:** All the major and minor body parts are more visible.
- **Vagbhata:** All body parts are fully developed.
- **Kashyap:** Whole body gets completely associated with vata, pitta and kapha.
- **Bhava Prakash:** Same as Sushruta.

Modern view: At the end of seventh month the baby may be very active now and others may be able to see its movements. Fat layers are forming. Eyes partially open, eyelashes are present. Thin

skin is red and covered with vernix caseosa. The baby at this stage is about 25 cm. long. Its weight is about 1100 gms. If born at this time, the baby will be considered premature and require special care.

Correlation: Both in Ayurveda and modern science, it is told that now foetus is fully developed.

Eighth month: Ayurvedic view:

- The description of foetal growth in the eighth month given in **Charak, Vagbhata, Kashyapa and Bhava-prakash** is more or less the same. According to them due to immaturity of foetus, the '*ojas*' remains unstable. It moves from mother to foetus and from foetus to the mother through rasa carrying channels. Due to the transfer of '*ojas*' mother and foetus become happy and dull alternatively. If delivery takes place the life becomes doubtful and they do not consider this month for delivery.
- According to **Sushruta** due to instability of '*ojas*' child born in this month dies due to absence of '*ojas*' and influence of '*nairrta*' portion.
- According to **Harita** in this month '*pachakagni*' (digestive enzymes) starts functioning and in ninth month activities are more apparent.

Modern view: During the 8th month the overall growth of baby is rapid. Tremendous brain growth occurs at this time. Most body organs are now developed, except for the lungs. Movements or "kicks" are strong enough to be visible from the outside. Skin is less wrinkled. Baby is about 28 cm. long. Weight is about 1800 gms.

Correlation: According to Ayurveda body is fully developed but due to lack of *ojas* (Immunity), if delivery takes place, it is not sure that baby remain alive or not. It is also true in modern science and without any support few child remain alive.

Ninth month: Ayurvedic view:

After 9th month it is time to deliver the foetus.

Modern view: At the end of the 9th month the baby is now fully developed and can survive outside the mother's body. The lungs are mature. Skin is pink

and smooth. Testes in the scrotum are palpable in the inguinal canal. Finger nail reaches beyond finger tips. The baby at this stage is 32 – 36 cm. long. Weight is about 2500-3400 gms. The baby settles down lower in the abdomen to prepare for birth and may seem less active.

3. Conclusion:

In 9 months review of both ayurvedic and modern, we can see that, except few things whole description of foetal growth and development are same.

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