



Review Article

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MASANUMASIK GARBHA VIKAS KARMA AND ITS CORRELATION WITH EMBRYOLOGY OF MODERN SCIENCE: A REVIEW

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ABSTRACT

Background: The Vedic scriptures say there is an inextricable link between the human and universe. The very elements of human life exist outside in the cosmos as well. The components of the body at the cellular and sub-cellular levels are innumerable due to overabundance, over-minuteness and transcending perception. Developmental anatomy is studied in the "embryology" branch of modern science. Embryology is the study of the embryo/foetus from the moment of its inception up to the time when it is born as an infant. In Indian literature, the history of embryology can be linked to the Vedas, Mahabharata, Buddhist literature, Upanishad Purana, etc. The 'Garbhavkranti' understanding of the garbha factor taking part in the formation of garbha has been dealt with mainly based on material available in Ayurveda and other allied resources. Therefore, because of the above, we can say the treatise of Ayurveda formerly validated the evidence of the development of a foetus in modern medical science. Aim and objectives: Comparative review of Masanumasik Garbha vikas karma concepts with special reference to embryology.

Keywords: Embryology, Monthly foetus development, Foetus Developmental Anatomy

INTRODUCTION

The very elements of human life exist outside in the cosmos as well. According to "Vaisheshik Darshana", origin of universe (shristhti- uttpatti) comes into existence due to the interaction of atoms (parmanu)¹. The atoms form diatoms (dwaynuk), three-atom tritons (trasrenu), four atoms (chaturnu) and so on, unite to form compact structures. According to Acharya Charaka, these atoms are responsible for the origin of life. The components of the body at the cellular and sub-cellular levels are innumerable due to overabundance, over-minuteness and transcending perception².

From the philosophical angle, embryology is the key that helps unlock such secrets as heredity, the determination of sex and organic evolution. Embryology may also interpret and explain the vestigial structure, growth, differentiation and repair and throw light on some pathological conditions³.

The intrauterine life of a foetus can be divided into⁴ the following:

1. Ovum Stage - from fertilization to end of 1st week.
2. Embryo Stage - from second to eighth week.
3. Foetus Stage - from third month to birth.

In the Ancient literature of Ayurveda, "Garbhavkranti-Shaarim" is the science which deals with all these phenomena. Veda, Purana, Brihatrayi, Laghutrayi, Commentators of

samhitas, especially Dalhana, Chakrapani, Arundatta, Indu etc. also illustrated Garbhavkranti-Shaariram. From the study point of view, "Garbhavkranti Shaariram" can be divided into three parts so that the gradual development and formation can be studied easily:

1. Garbha Avataran (Inception)
2. Garbha Nirman (Formation)
3. Garbha Poshan (Nourishment).

DISCUSSION

Through observation and discussion, the theory of panchamahabhuta is an undisputed and unanimously accepted doctrine of Indian philosophy, propounded after prolonged critical observation of the characteristics and behaviours of the gross bhutas. For the gross application of the theory of panchamahabhuta, Ayurveda develops secondary biological and psychological concepts. Tridosha's theory of Ayurveda is a biological application of the theory of panchamahabhuta. So, the concept of ahara-vihara and aushadh in relation to Dravyaguna and panchamahabhuta before and after birth is fundamental to understand.

In the Indian system of medicine, the body has been stated to be composed of Panchamahabhutas'. In a true sense, these 'mahabhutas, if looked upon very precisely, appear to share only the material aspect while the life principle or consciousness is controlled by Jeevatma' (part and partial of supreme

consciousness)⁵. On the other hand, modern science analyses the body into broadly organic and inorganic components. From the very movement of the union of paternal units till its full growth up to the delivery time⁶. The role of organic and inorganic components, nutrition, tissue metabolism, division, subdivision and even development, both at the level of organic and the body as a whole, is dependent on 'panchamahabhutas'. According to Sushruta, there is consciousness in the embryo. The 'Vayu' (or the vital force) divide it into dosha, dhatu, mala, limbs and organs, etc. The teja (or the heat latent in the fecundated matter) gives rise to the metabolism of the tissue, the 'apa' (water) keeps it in a liquid state, the prithvi (earth) is embedded in the shape and akasha (ether) contributes to its growth and development⁷.

An embryo or a foetus has been designated as a functioning mechanism, adequately adapted to the needs and environment at all stages of their development. Development changes as a whole thus simulate sharply with the recurring, non-progressive, physiological changes concerned generally with the maintenance of the life and the species in particular⁸. Given the incidence of birth or hatching, the development of almost all creatures can be divided into prenatal and post-natal periods⁹. Thus, the concept of embryology incorporates into its range the entire development event resulting from sexual reproduction. Considering the nutrition supply, unlike many vertebrates, the human new-born, though fairly complete anatomically, depends on its elders for food and care. The progressive changes gradually end, and the body gets stabilized around the age of twenty to twenty-five years of adult condition¹⁰.

CONCLUSION

This text incorporates the modern and ancient periodical development, ancient literature on the history of 'embryology' and panchamahabhutas. "Tridosha" and "mahagunas" are essential factors contributing to the growth and development of the foetus overall, and the additional Ayurveda approach is very applicable now.

The origin of srishti (universe) starts from avyakt, mahan, ahankar, pancha tanmatra, panchamahabhuta and ekadash-indriya. So, the origin of srishti (universe) also influences "panchamahabhutas" in the development of garbha (foetus or embryo).







Acharya Sushruta has described that the mahabhutas prithvi, jal, teja, vayu, and aakash are responsible for sanghnana (solidification), kledana (moistening), pachana (metabolism), vibhajana (division), vivardhana (increase in size) respectively to the garbha (foetus or embryo). This again evaluates the structural and functional status of panchamahabhutas in the development of garbha (foetus or embryo).




We can draw the inference that if a physician wants to increase the particular guna (satwa, raja, tama) or panchamahabhuta or dosha (Vata, Pitta, Kapha) in garbha (foetus or embryo). Mothers can be suggested for particular ahara-vihara regarding the panchamahabhuta. This aspect can be clinically utilized to develop garbha and prevent anomalies regarding the garbha (foetus or embryo).

Table 1: The comparison between Ayurvedic classics and Modern concepts regarding month-wise Embryonic Development¹¹

Month	Gad-Nigrah	Agni Purana	Garun Purana	Modern view
Ist	Ist day-Kalal IIInd day to whole month- Budbudavastha	Kalal	Ist day Ahoratra-Kalal Kalal to Kathin	IIInd day-2 Cell stage. IIIrd day-Morula IVth day- Blastocyst 16th day- Embryonic disc formed
IIInd	In the form of pinda	Ghanavastha	Origin of twacha and meda	Organ formation, body form is established.
IIIrd	Origin of shakha (limb)	Beginning of body parts	Formation of asthi and majja	Formation of external body features, external genitalia.
IVth	Origin of udar, kati pradesh	Origin of twacha dhatu	Origin of kesha and gulf	The face has a human appearance.
Vth	Origin of prishtha-vansha	Origin of roma	Origin of karna, nasa, guda	Lanugo, hairs of the scalp, vernix present, foetal movements present.
VIth	Division of netra, karna, mukha	Feels dukha and chetna	Origin of aperture for kantha	Eyebrows and lashes become prominent, and the body is lean but proportionate.
VIIth	Jeevyukta (viable)	Jeevyukta (viable)	Formation of sex organs	Body well defined foetus is viable.
VIIIth	Fully developed foetus	Foetus tends towards expulsion	Fully developed foetus	Testes descend in scrotum.
IXth	-----	Foetus tends towards expulsion	Expulsion through Apan Vayu	Wrinkles smoothen, and nails project beyond the skin at birth.

Table 2: Prenatal Chart¹²

First Trimester	Growth and Development	Make Good Choices
During the First month 	Cell multiplication begins. The fertilized egg attaches to the lining of the uterus. Internal organs and circulatory systems begin to form. Small bumps show the beginning of the arms and legs. Gender is determined at conception. 1/100 th of an inch (the thickness of a heavy pencil dot).	Good health affects the development of your baby. Alcohol, tobacco and drugs will alter the growth of the baby. If your pregnancy is stressful, hormones that are not good for you and your baby may be released.
During the Second month 	All major body parts have formed. Eyes, ears, and nose are developed. Tear ducts are forming in the eyes. The heart is beating. Hands and feet take shape. Fingerprints have developed. Baby moves often have an exercise routine. It measures 0.56-0.8 of an inch and weighs no more than a peanut.	The bond between you and baby will form when you begin communicating. Introduce yourself to your baby. Assure baby that you will provide love and protection. Get permission from your doctor before taking any medicines. Stay physically fit. Eat healthy foods, drink plenty of fluids, and get lots of rest.
During the Third month 	The head is the most significant part of the body. Can lift the head off of the chest. Eyes have moved closer together. Ears moved into position. Baby can frown, yawn, hiccup, suck thumb, open mouth, curl toes. Bones and muscles are growing. External genitals are formed. The foetus never sleeps. It measures 2.5 inches from crown to rump, weighs 2.8 ounces, is the size of your little finger.	Take your prenatal vitamins. Use deep breathing and walking to rock your baby. Always wear your seat belt. Your baby will become your primary focus as you learn about foetal development. Read and ask questions about how your baby is growing. Envision your baby floating safely in your womb. When you are safe, your baby is safe.
Second Trimester	Growth and Development	Make Good Choices
During the Fourth month 	Baby is rocked and swayed by mom's breathing and walking. Baby kicks and wiggles toes Makes a fist and brings hands together. Fingernails start to grow. Kidneys begin to make urine. Sex organs are distinct. Floats in a quart of amniotic fluid. The placenta is completely formed. It measures 6-7 inches and weighs about 2.8 ounces.	Tight clothing will not allow room for your baby to move and grow. Your baby exercises daily and hopes you do, too. Depression and distress produce chemicals which may cross the placenta and affect your baby. Stroke and pat your baby. Play and rest with the baby. Read and sign to baby.
During the Fifth month 	Mom can feel the baby move, quickening. Baby drinks and tastes amniotic fluid. Clean fluid is replaced every 3 hours. Baby plays with umbilical cords. Eyebrows and eyelashes are growing. Skin is covered with a yellowish substance, vernix. Fine hair called Lanugo covers the body. A layer of fat is formed around the neck and shoulders to keep warm. Measures 8-12 inches. Weights 9 ounces.	Your centre of gravity changes as the uterus grows. Check home for hazards that might make you fall. Just as your actions affect your baby's physical development, your feelings affect her emotional development. Select calm and pleasant surroundings.
During the Sixth month 	Skin is thin and wrinkled. The hair is soft and delicate. Baby touches and explores the body. Moves and manipulates fingers. Sucks thumb and fingers. Eyelids begin to part, eyes open. Baby listens to conversations. Can see a bright light. Loud sounds startle, baby. Measures 11-14 inches Weighs 1.2 pounds	Vigorous exercise or bathing in hot water will cause the baby's heart rate and temperature to go up. Don't ignore warning signs: severe swelling, vision disturbances, headaches. Recognize your baby's attempts to communicate. He is waiting for your response. He hears your voice and responds to it.

Third Trimester	Growth and Development	Make Good Choices
<p>During the Seventh Month</p> 	<p>Baby is adding fat and gaining muscle control. Hair is growing longer. Skin is red and wrinkled. Pupils dilate and adjust to light and dark. See shades of red when eyes are open. Recognizes voices. Responds to pain. Legs are bent toward the chest. Measures 15.75 inches. Weighs 2.4 pounds.</p>	<p>Poor nutrition can impair brain and organ growth. Loud noises may cause the baby's heart rate to increase and the body to tremble. Start preparing for the baby's birth and homecoming. Accurate information about labour and delivery will reduce fears. Talk to the baby about your movements and daily activities.</p>
<p>During the Eighth Month</p> 	<p>Lungs are maturing. Gaining more fat under the skin. Bones are becoming harder. Lanugo disappeared from my face. Fingernails reach fingertips. Drinks amniotic fluid and practices swallowing. Measures 18.9 inches. Weighs 4-5 pounds.</p>	<p>Braxton Hicks contractions exercise your uterus. Choose between bottle or breastfeeding. Don't skip meals. Walking is an excellent form of exercise. A warm bath or shower is a great way to relax.</p>
<p>During the Ninth Month</p> 	<p>Skin is smooth. Vernix and Lanugo disappear. Will recognize family member's voices when born. The position is head down, facing mom's back. The head will engage in the pelvis enlighten. Bones in the head are soft for birth. Movements are limited in the womb. Measures 19-21 inches. Weighs 6-9 pounds.</p>	<p>Weekly prenatal visits increase your chances of having a healthy baby. Your emotions will peak as your body gets ready to give birth. Expect to feel excited, anxious, impatient, irritable. Review signs of labour. Count your baby's movements for one hour several times a day. Relax and enjoy your unborn baby. Let the baby know she is loved.</p>

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