

# A STUDY OF PINDA URPATHTHI AND COMPARISON WITH MODERN EMBRYOLOGY

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## Abstract

The process of embryonic development called embryogenesis in modern science is referred as pinda urpaththi in siddha medical science. The stages of development of human embryo are explained in Gunavaagam by ancient Siddhars. What the modern science has discovered with its technology was done by siddhars through their divine instincts. The concept of pinda urpaththi was explained by many siddhars like Thirumoolar, Dhanvanthiri, Yugi Muni, Pararasasekarar and Agathiyar through their Tamil literary poems. In this paper we compare the embryogenesis of modern science with the concepts of pinda urpaththi of age old siddha manuscripts. The days/week/month wise development of foetus is compared from both modern science and siddha science perspective.

**Keywords:** embryogenesis, pinda urpaththi, foetus, siddha science, modern science.

## 1. Introduction

Embryogenesis is the process of transformation of a single cell into a complete autonomous organism. This transformation starts with the fusion of a healthy egg and a sperm cell. This fusion of egg and sperm is termed as fertilization. This biological process results in a series of overwhelmingly complicated processes that eventually leads to a new human life, if everything goes well. The fertilized egg divides itself into multiple cells during its journey to the uterus through the fallopian tube. In the uterus it fixes well into the uterine lining till its maturity. A fertilized egg takes 40 weeks to mature itself into a living being. According to Siddha science, Vaayu (air), Theyu (fire), appu (water) of PanjaBoothaas along

with Saaram, Senneer and Sronidham of seven elements of the body constitute and transform into a embryo based on the chromosomal characters. The development of embryo on day basis given

S.No	Day	Siddha Literature	Description	Picture
1.	1	‘Seppiyadhaamdhinamondrilkadugupolaam’	The embryo is the size of a mustard seed	
2.	2	‘Naalirandimallipolaam’	The embryo is the size of a cilantro seed	
3.	3	‘Naalmoondrilmilagupolaam’	The embryo is the size of a pepper seed	
4.	4	‘Naangammaalavaraivitham’	The embryo is the size of a bean seed	
5.	5	‘Ainthamnaalkumilipolam’	The embryo develop like water bubbles	
6.	6	‘Aaramnalnelikai pol’	The embryo look like gooseberry	
7.	7	‘Naaelukkupunnaikaaiipolam’	The embryo look like punnaikai	

8.	8	‘Ettamnaalpanjabuthamathilundam’	The embryo get five boothas five colours	
9.	9	‘Navathinathilkaakaimuttaipolagam’	The embryo looks like crow egg	
10.	10 - 15	‘Pathumuthalaithunalumaugumaekolianda vadivam’	The embryo looks like hens egg	

## 2. Month Wise Comparison of Human Embryogenesis based on Siddha and Modern Science

In this section we compare the monthly foetal development based on siddha literature and modern science.

### 2.1 Month 1

The author Para Rasasekarar compares the first month embryo to a plantain flower.

The base and apex of the body along with brain and spinal cord gets to develop from this month and it measures about 1 cm in length.

In modern science the first month embryo development is divided into four weeks. During the first week, it fastens onto the uterine cavity and remains there for the whole term of pregnancy. In the second week, the formation of umbilical cord and placenta begins along with spinal cord and brain.

In the third week, the foundation of organs begins. The heart is formed which has a simple single-stage heart. In the fourth week, eye-sockets are formed, the arms and legs begin their development; the rudiments of almost all the internal organs are finished. The size of the fetus by the end of the 1<sup>st</sup> month can be compared to a rice grain – about 4 mm.

### 2.2 Month 2

The author Para Rasasekarar and Siddhars Agathiyar and Yugi have described the second month embryo development in their respective books.

According to Agathiyar, in the second month neck and head will form. Yugi in his book Nadi says, head and back bone of the body will start to form in second month. Pararasekarar says, back of the neck, shoulder, back of the body forms in the second month. At this stage, the embryo measures 2.5cm to 4.6cm long, called pindam.

In modern science, the second month embryo is compared to a blueberry and looks like a curled up tube, with one end of the tube becoming the head, and the other grows into bottom. Between these two ends lies the spinal cord and placenta that's beginning to form. Ears, nose, eyes, eyelids, heart tissues, limbs, muscle, bones and genitals begin to form. By the end of month 2, the embryo measures about 2 inches and all major organs have begun to develop.

### **2.3 Month 3**

From third month the embryo is called as foetus. The author Para Rasasekarar and Siddhars Dhanvanthiri and Yugi have described the third month foetal development in their respective books.

As per Yugi Nadi, from the third month the foetus forms hands, legs, fingers and general structure of the body. Para Rasasekarar says, hip, fingers and hand will form in the foetus. Dhanvanthiri says the foetus gets general body structure with hip and legs. At this stage, the foetus is developed to 9 cm long and sex determination is possible.

In modern science, the weekly development of foetus during the third month is given. During the 10<sup>th</sup> week, the foetus is about 10 grams in weight and 3-4 cm in length. Floating in the amniotic fluid, the embryo's neurological system is undergoing an enormous growth with the cells multiplying in a speed of hundreds of thousands every minute. The bones begin to become more solid in this week. During the 11<sup>th</sup> week, the two cerebral hemispheres become more distinct and has nerve cells developing that will become the neurons of the brain. The basis for the central nervous system, digestive system, cardiovascular, pulmonary and even the urinary systems are in place. Those systems and the organs within them will continue to become more complex as the weeks go on. In 12<sup>th</sup> week, the sensory and motor nervous systems are starting to develop, which detect contact and pain. During 13<sup>th</sup> week, face is also beginning to form, with the eyes, nose, mouth and ears becoming clearly defined. The liver starts secreting bile. By the end of third month, the foetus measures about 12 cms and weighs 90 Gms.

## **2.4 Month 4**

According to Yugi, foot and nose will develop in this time. Dhanvanthiri says, nose is developed well. At this stage, foetus measures about 15cm and weighs to 190Gms. Tiny hairs can be seen developing in the body.

As per modern science, the baby's skin is pink, and is covered with fine hair called lanugo and fingernails are now visible. The baby's face continues to develop. Eyebrows and eyelashes begin to appear in this month. Buds on the side of the head begin to form into the outer ear and he can hear your voice now. The tail has disappeared from the fetus and the head makes up about half of the baby's size. The baby's neck is long enough to lift the head from the body. The baby moves, kicks, sleeps, wakes, swallows, and passes urine. By the end of the fourth month, the baby will be 5 to 6 inches in length and weighs about 140 Gms. By the end of fourth month, the foetus is called as baby.

## **2.5 Month 5**

Agathiyar says ears get developed. Yugi says tongue, ears get developed. Para Rasasekarar says, ears, nose, mouth get developed. Dhanvanthiri says that ears, tongue get developed. The baby measures about 18-20cms long and weighs 500Gms. Vernix caseosa will appear in the body and the Umbilical cord will develop upto 30.48cm.

In modern science, there are a series of changes listed that happen in the baby's growth. The baby's weight would have doubled in the last two weeks of the 5th month. The height of baby will measure about 13 cm from head to tail. The blood vessels will be visible inside baby's translucent skin. Baby's legs will be disproportionate to the rest of the body. Ossification of bones will continue with calcium depositing regularly on them. Baby's reproductive system will now be certainly developed. If it's a girl, she will have ovaries containing as many as 3 million eggs, which is a lifetime's supply; In case of a boy, his testicles are still sitting high up in the abdomen. The nipples will be more prominent on baby's chest. The baby now possesses unique fingerprints. The kidneys are fully functional by the end of Month 5. The baby will also be producing urine that forms a fair share of the amniotic fluid. Baby's skin will now be covered in vernix caseosa, a white greasy substance.

## **2.6 Month 6**

According to Agathiyar, external genitalia organ will appear. Yugi says, the nails develop during the sixth month develops nails. ParaRasasekarar says, external genitalia organ and nerves will appear.

The series of changes that happen in the baby's growth are detailed in the modern science. They are, nostrils are well developed and functional while the lungs are busy coating themselves with tiny alveoli, necessary for breathing and retaining oxygen at birth. The eyes are wide open and the eyelids will start to blink. The baby measures about 900 Gms.

## **2.7 Month 7**

According to Vallathi, Yugi, Dhanvanthiri and Angathypaatham, the nervous system of the baby gets developed during this month along with hair growth and intestine.

According to modern science, neural and cognitive development happens for the baby. Millions of neurons are fast forming in baby's brain. Weight gain and fat accumulation happens within the skin. The respiratory system is now fully functional. Any case of unforeseen premature birth after this month is not very threatening to the baby. The baby spends more time doing Rapid Eye Movement (REM) sleep. The baby measures about 46 cms. REM is an important sleep pattern for humans.

## **2.8 Month 8**

In Vallathi, it has been stated that hair growth and weight gain are the main changes with the baby. Yugi says, nutrition food gets pass through the umbilical cord to the baby. In VaithiyaSaaram, it says that the baby excretes the body waste through the umbilical cord.

Some of the key changes that happen to the baby at this month according to modern science. The baby would have settled in the cephalic (head down) position by this time. The Diminishing amniotic fluid signifies that, baby's kidneys have started to function. More cortisol is produced by the kidneys. The pregnancy hormones cause baby's scrotum to appear swollen at birth. The baby will gain about 2.72 Kgs by the end of this month and measures about 50 centimeters long.

## **2.9 Month 9**

In this stage, the baby looks like doing meditation. The baby is well developed in this period and the brain is fully developed in this time.

The changes that happen to the baby during this month according to modern science are, the lungs are now fully developed, functional and breathing through the amniotic fluid. The baby's brain is now complete with development. All the vital organs are now fully developed and functional. The baby's movements will slow down as there is no room inside the womb. The baby weighs between 2.5 to 3.5 kilograms and measures about 53 centimeters long.

## 2.10 Month 10

In the tenth month with the help of panjapoothas of theyu (fire) and vayu (air) pressure is increased, which expels the baby out.

According to modern science brain grows particularly rapidly at this stage. In utero development is complete, baby is curled up and fast running out of room, either head first (cephalic presentation) or bottom first (breech presentation). At around 53 cms in length and 3 to 3.5kg in weight, baby is ready to come out into the world. If you deliver vaginally, baby will make a series of movements in order to descend and slide across your pelvis.

The monthly development of embryo is given in table 2.1 below.

**Table 2.1 Comparison of Embryonic Development on Monthly Basis with Siddha and Modern Science**

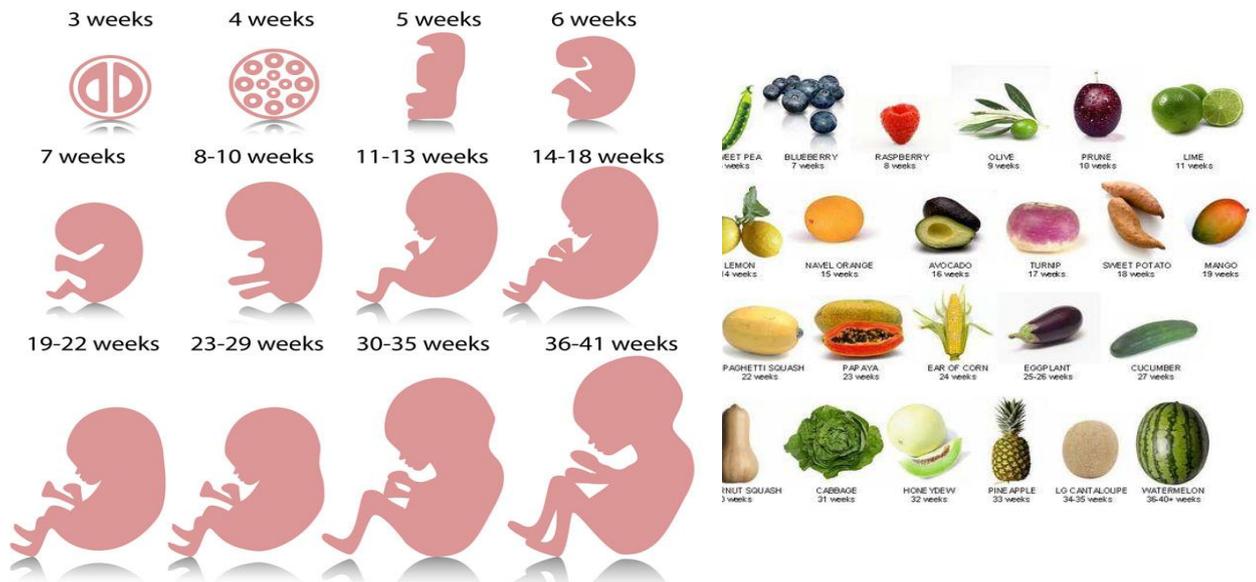
Month	Siddha Literature	Description	Modern Science	Picture
1	<i>'Thingaloondrilvaa zhaipoovae'</i> (Para Rasasekarar)	The embryo looks like Plantain flower	<ul style="list-style-type: none"> <li>➤ Two layers epiblast and hypoblast develop, from which organs grow.</li> <li>➤ Placenta starts developing</li> <li>➤ Growth of amniotic sac with amniotic fluid</li> <li>➤ Embryo resembles a tadpole</li> <li>➤ The neural tube sprouts from the ectoderm in which brain, spinal cord, nerves, skin, hair, nails, mammary, sweat glands, tooth enamel and backbone will develop.</li> <li>➤ baby is the size of a <a href="#">poppy seed</a></li> </ul>	
2	<i>"Poovilaeiranduthi ngalkaluthuundagum, Puzhalsirasuuru pagum"</i> (AgathiyarVallathi) <i>"Aagumaeirandamt"</i>	Neck, head, backbone and shoulder will form.	<ul style="list-style-type: none"> <li>➤ Hands and feet are emerging from developing arms and legs .</li> <li>➤ hands and feet are developing webbed fingers and toes eyelids almost cover his eyes.</li> <li>➤ breathing tubes extend from his throat to the branches of his developing lungs.</li> </ul>	

	<i>hingalthalai, muthuguthondrum</i> (YugiNadi)		<ul style="list-style-type: none"> <li>➤ baby is about the size of a <a href="#">kidney bean</a></li> </ul>	
3	<i>“aduthamoondarmt hingal Arai viral kaikalgum”</i> (Para Rasasekarar)	The foetus forms hands, legs, fingers and general structure of the body.	<ul style="list-style-type: none"> <li>➤ earlobes, mouth, nose, and nostrils are more distinct.</li> <li>➤ heart finishes dividing into four chambers</li> <li>➤ kidneys, intestines, brain, and liver are in place and starting to function.</li> <li>➤ gums and bones are beginning to harden.</li> <li>➤ hands will soon open and close into fists</li> <li>➤ baby is about the size of a <a href="#">lime</a></li> </ul>	
4	<i>“Naalelaevaainaak umooku undam” “naalaththingalpat hammooku undam”</i> (Yugi Muni)	Foot and nose will develop in this time.	<ul style="list-style-type: none"> <li>➤ facial muscles are getting a workout as his tiny features form one expression after another.</li> <li>➤ The baby is busy moving amniotic fluid through her nose and upper respiratory tract, which helps the primitive air sacs in her lungs begin to develop.</li> <li>➤ legs are growing longer than arms now</li> <li>➤ the baby can move all of her joints and limbs</li> <li>➤ now we able to find out sex difference</li> <li>➤ baby is the size of an avocado</li> </ul>	

5	<p><i>“navilukindranmat hamaiythilseviundu agum”</i> (Agathiyar)</p> <p><i>“aiythamthingaltha nilnaasevikaanam”</i> (Yugi)</p>	Tongue, ears and mouth get developed.	<ul style="list-style-type: none"> <li>➤ The kidneys are fully functional by the end of Month 5.</li> <li>➤ The blood vessels are visible through thin skin, and ears are now in their final position</li> <li>➤ If it’s a girl, her uterus and fallopian tubes are formed and in place.</li> <li>➤ If it’s a boy, his genitals are noticeable now.</li> <li>➤ the bay is able to hear your voice. Talk, sing or read out loud to her, if you feel like it.</li> <li>➤ baby is the size of a banana</li> </ul>	
6	<p><i>“aarathingalpothit hidunagamaeeiythum, uunjiyamalasalagal othathornarambu undam”</i> (Para Rasasekarar)</p>	External genitalia organ, nails and nerves will appear.	<ul style="list-style-type: none"> <li>➤ baby's eyebrows and lids are present now</li> <li>➤ ifit’s a girl, her vagina has begun to form.</li> <li>➤ Features such as lips and eyebrows are more distinct, but the pigment that will color his eyes isn't present yet.</li> <li>➤ Blood vessels in lungs are developing to prepare for breathing.</li> <li>➤ skin is still thin and translucent.</li> <li>➤ baby is the size of an ear of corn</li> </ul>	
7	<p><i>“eelukunarambuthanae Narambuthanaeeth upathirayiramnadi”</i> (Vallathi)</p>	the nervous system of the baby gets developed along with intestine.	<ul style="list-style-type: none"> <li>➤ baby's wrinkled skin is starting to fill out with baby fat, making her look more like a newborn.</li> <li>➤ hair is beginning to come in, and it has color and texture.</li> <li>➤ brain is very active.</li> <li>➤ The baby can blink her eyes, which now sport lashes.</li> <li>➤ developing billions of neurons in her brain and adding more body fat in preparation for life in the outside world.</li> <li>➤ baby is the size of a large eggplant</li> </ul>	

8	<p><i>“nadiettanthingalm ayirundagum Urambaevaethaipu sikumannasaram Uuchivalithaneragi udalperukum”</i></p> <p>(Vallathi)</p>	<p>hair growth and weigh gain are the main changes</p>	<ul style="list-style-type: none"> <li>➤ baby's muscles and lungs are busy getting ready to function</li> <li>➤ baby is surrounded by a pint and a half of amniotic fluid</li> <li>➤ baby can now turn his head from side to side.</li> <li>➤ A protective layer of fat is accumulating under his skin, filling out his arms and legs.</li> <li>➤ Baby has toenails, fingernails, and real hair (or at least respectable peach fuzz).</li> <li>➤ baby is the size of a large jicama.</li> </ul>	
9	<p><i>“oonpathilaeuyirth annvanthu Maraignamundagu muchivalimoodum”</i></p> <p>(Vallathi)</p>	<p>the brain is fully developed in this time.</p>	<ul style="list-style-type: none"> <li>➤ baby's central nervous system is maturing, as are her lungs.</li> <li>➤ Babies born between 34 and 37 weeks who have no other health problems usually do well in the long run.</li> <li>➤ baby's kidneys are fully developed</li> <li>➤ Most of his basic physical development is now complete.</li> <li>➤ shedding most of the downy covering of hair that covered body, as well as the vernixcaseosa</li> <li>➤ baby is the size of a head of romaine lettuce</li> </ul>	
10	<p><i>“Thingalpathagkilt heyuvoduvayuserth uth Thangimalarthyiam aliyaikelnoki Pongipirathanalpuz halvenar Thangisenirkaierita noiyummuttrathae”</i></p> <p>(Thirumoolar)</p>	<p>Due to theyu (fire) and vayu (air) pressure is increased, which expels the baby out.</p>	<ul style="list-style-type: none"> <li>➤ Over the next two weeks his lungs and brain will fully mature.</li> <li>➤ continues to build a layer of fat to help control his body temperature,</li> <li>➤ skull bones are not yet fused.</li> <li>➤ This so-called "molding" is the reason your baby's noggin may look a little pointy after birth.</li> <li>➤ Rest assured – it's normal and temporary.</li> <li>➤ baby is the size of a small pumpkin.</li> </ul>	

The weekly development of foetus is compared to the size of fruits and the same is given below in figure 2.1(a) and 2.1(b).



**Fig 2.1 (a) Comparison of weekly foetus development with fruits (b) Foetal weekly development**

**Table 2.2 Development in height of the baby during 10 months**

S.No	Month	Height (in Cms)
1.	1 <sup>st</sup>	1
2.	2 <sup>nd</sup>	4.6
3.	3 <sup>rd</sup>	12
4.	4 <sup>th</sup>	15.24
5.	5 <sup>th</sup>	20
6.	6 <sup>th</sup>	31
7.	7 <sup>th</sup>	46
8.	8 <sup>th</sup>	50
9.	9 <sup>th</sup>	53
10.	10 <sup>th</sup>	53

**Table 2.3 Development in weight of the baby during 10 months**

S.No	Month	Weight (in Gms)
1.	1 <sup>st</sup>	35
2.	2 <sup>nd</sup>	60
3.	3 <sup>rd</sup>	90
4.	4 <sup>th</sup>	140
5.	5 <sup>th</sup>	500
6.	6 <sup>th</sup>	900
7.	7 <sup>th</sup>	1800
8.	8 <sup>th</sup>	2720
9.	9 <sup>th</sup>	3500
10.	10 <sup>th</sup>	3500



**Figure 2.2 Graphical Representation of table 2.2**



**Figure 2.3 Graphical Representation of table 2.3**

## Conclusion

The detailed study on embryogenesis was conducted based on Siddha science and modern science and the same was compared and an elaborate analysis is done in this paper. The monthly foetal development was compared to the size of fruits and vegetables, which gives a more insight on embryonic development. The height and weight of the foetus is tabulated and a graph is drawn to show the development in anatomical structure. The modern science was able to find this with the aid of technology, but the age old Siddhars had discussed in detail about the embryogenesis in their books through divine wisdom and by studying the pulse patterns. With the varying pulse patterns they were able to identify the changes in the foetus. There's a lot more to be explored and studied in Siddha manuscripts which will be more fascinating and interesting. The Siddha medical science is really a mystery in its own way and will amaze everyone who reads it. In future many aspects of modern science can be compared and studied with the Siddha science which will open more research opportunities.

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