



Review Article

APPLIED ANATOMICAL INSIGHTS OF *MARMA SHARIR* IN *GARBHA SHARIR*: A CLASSICAL AND MODERN REVIEW WITH SPECIAL REFERENCE TO *RACHANA SHARIR*

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ABSTRACT

Marma Sharir is described as *Shalya Vishayardha* by Acharya Sushruta. It is defined as the confluence of *Mamsa*, *Sira*, *Snayu*, *Asthi* and *Sandhi* where *Prana* resides. *Garbha Sharir* is the foundation of *Rachana Sharir*. In Ayurvedic classics, direct description of *Marma Utpatti* in *Garbha* is not available, which creates confusion among students. The present review aims to interpret the formation of *Marma Adhithana* during *Garbha Avastha* on the basis of *Masanumasika Garbha Vriddhi*. References from Sushruta Samhita, *Sharira Sthana* chapter 2, 3, 4 and 6 and Charaka Samhita, *Sharira Sthana* chapter 4 were reviewed along with modern embryology textbooks. It was found that *Tritiya Masa* is described as *Sarva Anga-Pratyanga* and *Sarva Indriya Nirvritti Kala* (Su.Sha. 3/18). Since *Marma* is the *Sannipata* of *Anga-Pratyanga* components, its *Adhithana* also develops in the same period. This period correlates with 9-12 weeks of intrauterine life where organogenesis occurs in modern embryology. Thus, *Tritiya Masa* can be considered as *Marma Adhithana Utpatti Kala*. This applied interpretation is useful for teaching and clinical understanding of congenital *Marma Vikriti*.

INTRODUCTION

Ayurveda is the science of life. *Rachana Sharir* is the base of all clinical subjects. Two most important topics of *Sharira* are *Garbha Sharir* and *Marma Sharir*. Sushruta has devoted separate chapters for both. *Marma* are 107 in number and are classified on the basis of structure, region, effect of injury and size. They are seat of *Prana* and injury to them causes either death or disability. *Garbha Sharir* explains month-wise development of fetus. Understanding how *Marma* forms in *Garbha* is very essential for *Rachana Sharir* scholar because it explains the applied aspect of why injury to *Marma* is so fatal from birth itself.

Marma are 107 in number as described by Acharya Sushruta (Su.Sha. 6/3)

Regional classification includes *Urdhva Jatrugata* 37, *Shakha Gata* 44 (22 in each upper and lower limb), *Ura Gata* 9, *Prishtha Gata* 14 and *Koshtha Gata* 12.

Structural classification includes *Mamsa Marma* 11, *Sira Marma* 41, *Snayu Marma* 27, *Asthi Marma* 8 and *Sandhi Marma* 20.

On the basis of *Parinama*, they are *Sadyo Pranahara* 19, *Kalantara Pranahara* 33, *Vishalyaghna* 3, *Vaikalyakara* 44 and *Rujakara* 8.

Despite such detailed description, *Acharyas* have not mentioned the exact *Garbha Masa* in which *Marma Adhithana* is formed. This creates confusion among PG scholars. The present study is an attempt to establish the period of *Marma Adhithana Utpatti* with the help of *Masanumasika Garbha Vriddhi* and modern embryology.

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AIMS AND OBJECTIVES

1. To search indirect reference of *Marma* formation in *Garbha Sharir*.
2. To interpret *Tritiya Masa* as *Marma Adhithana Utpatti Kala*.
3. To correlate with modern organogenesis.
4. To establish applied importance for P.G teaching and Ph.D. course works.

MATERIALS AND METHODS

Literary search was done from Sushruta Samhita with Dalhana commentary, Charaka Samhita with Chakrapani, Ashtanga Hridaya, and modern books- Langman's Medical Embryology 14th Edition and Inderbir Singh Human Embryology 12th Edition. Month-wise development was compiled and correlated with histogenesis of tissues involved in *Marma* formation.

Review of Literature***Garbha Vriddhi - Masanumasika Krama***

Prathama Mase Kalala (zygote to morula), *Dwitiya Mase Ghana* (organ anlage), *Tritiya Mase Sarva Indriya Sarva Anga-Pratyanga Nirvritti* (Su.Sha. 3/18) and *Hridaya Vyaktibhavati*. Charaka Sha. 4/18 - *Tritiye mase sarva indriya sarva anga avayava sambhavati yugapat*. *Chaturtha Mase Sthiratva, Panchame Manas, Shashthe Buddhi*.

Marma Paribhasha

Marmani Mamsa Sira Snayu Asthi Sandhi Sannipataha (Su.Sha. 6/16). There are 107 *Marmas*.

Dalhana and Chakrapani Commentary on Tritiya Masa

Dalhana while commenting on Su. Sha. 3/18 states "*Tritiye mase hastapada shirobhir vibhakto garbho bhavati*" i.e. in third month *Anga-Pratyanga* becomes *Vibhakta* and *Vyakta*. He further clarifies that *Vyakta* does not mean new formation but becoming perceptible. Since *Marma* is defined as *Sannipata* of *Mamsa, Sira, Snayu, Asthi, Sandhi*, when *Anga-Pratyanga* becomes *Vyakta*, automatically *Sannipata Sthana* also becomes *Vyakta*. Chakrapani on Cha. Sha.

4/18 while explaining "*Sarva Indriya Sarva Anga Avayava Yugapat Sambhavati*" says *Yugapat* does not mean at same moment but in quick succession within same period. Modern embryology also shows that heart septation (7-9 weeks), limb digit formation (6-8 weeks), and neural differentiation (8-10 weeks) occur almost simultaneously but not at same hour, thus supporting *Yugapat* concept.

OBSERVATION AND RESULTS***Interpretation of Marma Utpatti***

Marma is not a separate *Dravya* or organ. It is a *Rachana* of five *Dhatu/Upadhatu* meeting at one point. Therefore, its formation depends on histogenesis of those five structures.

1. ***Mamsa Dhatu***- Derived from *Mamsa Dhatvagni*, originates from paraxial mesoderm (myotome). Myotome differentiation begins in 4th week and definitive muscle fibers are formed by 8th week of IUL.
2. ***Sira (Upadhatu of Rakta)***- Vasculogenesis begins from blood islands in yolk sac in 3rd week, intra-embryonic angiogenesis occurs by 6th week and definitive vascular network by 8th week.
3. ***Snayu (Upadhatu of Meda)***- Dense regular connective tissue condensation begins by 7th week and tendon/ligament formation by 9th week.
4. ***Asthi***- Mesenchymal condensation 5th week, chondrification center 6th week, hyaline cartilage model by 8th week and primary ossification center appears 8-12 weeks.
5. ***Sandhi***- Interzone formation 6th week, joint cavitation for synovial joints occurs in 9-12 weeks.

Since all five components attain definitive morphology between 9-12 weeks, their *Sannipata Sthana* i.e., *Marma Adhithana* also attains definitive form in same period. In Ayurvedic terminology, this period is *Tritiya Masa* which is described as "*Sarva Anga-Pratyanga Nirvritti Kala*". Hence, we propose to use term "*Marma Adhithana Utpatti Kala*" for *Tritiya Masa*.

Table 1: Structural Correlation of Marma with Embryogenesis

Marma Type	Number	Dhatu Involved	Utpatti Kala according to Ayurveda	Modern Correlation (9-12 weeks)	Embryonic source
<i>Mamsa</i>	11	<i>Mamsa Dhatu</i>	<i>Tritiya Masa</i>	Myogenesis from paraxial mesoderm - 8 th week	Paraxial mesoderm
<i>Sira</i>	41	<i>Rakta / Sira</i>	<i>Tritiya Masa</i>	Angiogenesis - 3 rd to 8 th week	Lateral plate mesoderm
<i>Snayu</i>	27	<i>Meda / Snayu</i>	<i>Tritiya Masa</i>	Ligamentogenesis - 9 th week	Somatic mesoderm
<i>Asthi</i>	8	<i>Asthi Dhatu</i>	<i>Tritiya-Chaturtha Masa</i>	Chondrification & Ossification - 8-12 th week	Mesoderm
<i>Sandhi</i>	20	<i>Asthi/Sandhi</i>	<i>Tritiya Masa</i>	Synovial joint cavitation - 9-12 th week	Interzone mesenchyme

Table 2: Tritiya Masa as Marma Adhithana Utpatti Kala

Ayurvedic Event (Tritiya Masa)	Modern Embryology Event	Marma Formed	Clinical Importance (Marma Vikriti)
Anga-Pratyanga Nirvritti	Limb buds digits formation 6-8 weeks	Shakha Gata Marma, Kshipra, Kurcha, Talahridaya	Syndactyly, polydactyly
Sarva Indriya Utpatti	Eye, ear, nose development 6-9 weeks	Urdhva Jatrugata Marma - Phana, Apanga, Vartma	Cleft lip, choanal atresia
Hridaya Vyaktibhavati	Cardiac septation complete 7-9 weeks	Hridaya Marma - Sadyo Pranahara	ASD, VSD, CHD
Chetana Abhivyakti	Neural differentiation- 8-10 weeks	Sira Marma - Neela, Manya, Matrika	Neural tube defects, torticollis
Shira Greeva Nirvritti	Skull ossification begins 8-12 weeks	Seemanta, Adipati, Utkshepa	Craniosynostosis

Table 3: Masanumasika Garbha Vriddhi and Marma Formation Status

Month (Masa)	Ayurveda Lakshana (Su.Sha. 3/18 & Cha.Sha. 4)	Modern Equivalent (Langman)	Marma Formation Status (Proposed)
Prathama	Kalala - Semisolid slimy mass	Zygote to morula to blastocyst (week 1-4)	Beeja Rupa - No Marma Adhithana
Dwitiya	Ghana - Pinda (male), Peshi (female), Arbuda (Napumsaka)	Embryonic disc, somites, organ anlage (week 5-8)	Marma Beeja - primordia of 5 structures starts
Tritiya	Sarva Anga-Pratyanga, Sarva Indriya Vyakti, Hridaya Vyakta	Organogenesis	Marma Adhithana Utpatti definitive Sannipata
Chaturtha	Sthiratva, Chetana, Spandana, mother feels heaviness	Rapid growth, fetal movements (13-16 weeks)	Marma Spandana - Prana establishment
Panchama	Shashtha Masa Mamsa Shonita Upachaya, Mana, Buddhi Vyakti	Growth & maturation, muscle & bone strengthening (17-24 weeks)	Marma Poshana & Vriddhi
Saptama Ashtama Navam	Sarva Anga Pratyanga Sthula, Ojo Asthiram	Viability, subcutaneous fat, Ojas transfer (25-40 weeks)	Marma Paripurnata

DISCUSSION

In modern science, first trimester especially 9-12 weeks is called organogenesis where all organs form. This exactly matches *Tritiya Masa* of Ayurveda. Teratogenic insult in this period causes major congenital anomalies. If we apply *Marma* concept, insult in *Tritiya Masa* will cause *Marma Vikriti* leading to congenital disability like club foot (*Gulpha Marma*), cleft palate (*Seemanta Marma*) etc. This shows *Acharya's* deep observation. For *Garbhini Paricharya*, *Tritiya Masa* should be protected with proper diet, no trauma, no excessive travel to protect developing *Marma*.

The first trimester, especially 9-12 weeks, is considered most teratogenic period in modern science. Any insult during this period causes major congenital anomalies (*Langman*). Ayurveda also advises *Garbhini* to avoid *Abhighata* (trauma), *Ativyayama*, *Ativyavaya*,

and *Vata Prakopaka Ahara Vihara* in *Tritiya Masa* (Cha.Sha. 8/21, Su.Sha. 3/16). This can be interpreted as protection of developing *Marma Adhithana*.

From genetic point of view, HOX gene expression (HOXA, HOXD cluster) determines limb patterning between 4-8 weeks which also decides location of *Shakha Gata Marma* like *Kshipra*, *Talahridaya*, *Kurcha*, *Indrabasti*. Thus, Ayurvedic concept of *Tritiya Masa* as *Marma* formation period is molecularly validated.

We propose a new concept of "*Marma Vikriti*" as congenital anomaly related to *Marma Sthana*. For example, *Gulpha Marma Vikriti* leads to Congenital Talipes Equino Varus (CTEV), *Kshipra Marma Vikriti* leads to syndactyly/ polydactyly, *Seemanta* and *Phana Marma Vikriti* leads to cleft lip/palate and choanal atresia, *Hridaya Marma Vikriti* leads to atrial/ventricular septal defect, *Basti Marma Vikriti* leads to

bladder exstrophy. This interpretation will help to understand why *Marma* injury is fatal since birth.

Clinical Importance

1. *Rachana Sharir* Teaching- This interpretation helps to integrate *Garbha Sharir* and *Marma Sharir* chapters for better understanding that *Marma* are present since birth.
2. *Stree Roga* and *Prasuti Tantra- Trito Masa* should be considered as critical period for *Garbhini Paricharya*. Proper use of *Ghrta*, *Madhura*, *Snigdha Ahara*, complete rest and avoidance of trauma will protect *Marma Adhithana* and prevent congenital disabilities.
3. *Shalya Tantra*- Knowledge of congenital *Marma Vikriti* helps surgeon to plan surgery near *Marma Sthana* with extra caution.
4. *Marma Chikitsa*- *Marma* therapy should be strictly avoided in pregnant women, especially near *Udar Gata Marma* like *Nabhi*, *Basti*, *Hridaya*, as it may affect fetal *Marma* development.
5. Ayurvedic Genetics- Concept of *Beejabhagavayava Dushti* (Cha.Sha. 3/17) can be applied. If *Beejabhagavayava* related to particular *Marma Sthana* is vitiated by *Dosha*, that *Marma* will be *Vikriti* in child.
6. Academic- As per NCISM PG curriculum of *Rachana Sharir*, integration of *Garbha* and *Marma* is required. This paper can serve as teaching module.

CONCLUSION

Marma Utpatti should not be searched as a direct reference. It should be understood as *Marma Adhithana Utpatti*. On the basis of *Masanumasika Garbha Vriddhi Krama*, commentaries of Dalhana and Chakrapani and modern organogenesis (9-12 weeks), *Trito Masa* can be considered as *Marma Adhithana Utpatti Kala*. This period is critical for *Garbhini Paricharya* to prevent *Marma Vikriti*. Proper *Ghrta*, *Madhura Rasa*, rest, avoidance of trauma protects *Marma*. This will prevent congenital disability. This applied interpretation will bridge classical Ayurveda with modern embryology and will be useful for PG scholars, teachers and clinicians. Further fetal cadaveric and radiological studies are required to validate this hypothesis.

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