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Conceptual Anatomical consideration of *peśī* regarding Human Female Body Constitution with its Applied Relevance

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Abstract: A Structure is always based upon the function and literature about the Sharir tatva is reflecting the same phenomena in various ayurveda Samhita. This basic constitution of living entity is build up by five basic elements i.e panchmahābhuta in micro texture but specific combination of those five lead to gross structural elements that are māṃsa, Sirā , Snāyu, asthi , sandhi via adopting the properties of dhātu either in single or combination form. Among those five specific modification of māṃsa element is the peśī. Formation and regional distribution of those elements are widely explain in literature but effect of functional constitution upon the structure is well explained by the acharya sushruta while describing the peśī avayava specially. Difference in number and peculiar arrangements of those peśī in female is quite important to explaining the two more important function related to female body constitution in terms of source of gestation and nutrition to new progeny. Possible anatomical consideration of those specific peśī in modern science is necessary to make proper understanding.

Keywords: Agneya constitution, māṃsa, Muscle panchmahābhuta ,peśī.,

I. INTRODUCTION

Relevance of any structure only can be considered in terms of its function. If any function persists in our body that must be depended to any murtabhava¹ i.e entity having any measuring capacity can be considered as murta. Responsible factor for formation of murta entity is the panchmahābhuta. This basic element attains their modification in terms of doṣa, dhātu and mala in both structural and functional aspect. Acharya have described that the basic constituents of the body are doṣa, dhātu and mala. Among these seven dhātu, māṃsa dhātu covers the frame work of the body. Peśī are nothing but the saṃghāta bheda of māṃsa dhātu. Suśruta has mentioned the number of peśī and also gave the development, distribution, function and types of peśī. Susruta also mentioned about the twenty extra peśī, in females but in literature there is not detail analysis of these twenty extra peśī.² In contemporary science muscles are studied under a specific branch titled as myology³. Here also classification and distribution of muscles has been given but the description of about these twenty extra peśī in females is not found anywhere in the literature. We feel that it is the need of time to develop this knowledge further, the detail description of these extra female peśī which can be helpful in describing labor, caesarean section and other pelvic disorders.

II. METHODS

Literatures and concepts regarding peśī and other concepts of māṃsa dhātu and snāyu have been collected from different saṃhitā and classical literature. Related anatomical concepts of muscle were studied from related literature, journals and internet material which were co-related, analyzed with present knowledge. Observation made through the literary study of āyurveda and modern anatomical literature were compared and analyzed with observation gained through dissection study.

III. REVIEW

Dhātu are basic nutritional and structural factors of the body. Seven *dhātu* are composed by combination of five *mahābhūta* where each one represents the predominance of one *mahābhūta*. Based upon this constitution of each one *dhatu*, their clinical aspect can be defined in terms of disease pathogenesis and their management.

A. *Māṃsa dhātu*

Māṃsa is one of the seven dhātu of the human body covering sirā, snāyu, asthi and saṃdhi. Snāyu and tvak are together said to be principle site of formation and control of māṃsa dhātu in body. However, it is present throughout the body along with osseous tissue the next dhātu viz., asthi. Along with this principle site it manages the components of māṃsa dhātu present all over the body through its micro circulating channels namely raktavāhī dhamanī.³ According to Śabda kalpa druma māṃsa appears in the eight month's of intrauterine life, but bhāgavat grantha clined that it appear in the 4th month⁴.

According to modern science, the embryonic period occurs from the third to the eighth weeks of development and is the time when each of the three germ layers, ectoderm, mesoderm and endoderm, gives rise to a number of specific tissues and organs. All muscles of the body are developed from mesoderm, except the arrector pilorum, muscles of the iris and the myo-epithelial cells of salivary, sweat and lacrimal glands which are derived from ectoderm. This process is known as myogenesis⁵.

B. *PESI*

Peṣī are the compact form of māṃsa dhātu, peṣī are component of body mainly composed of māṃsa dhātu. Morphology of māṃsa as explained by the ācārya Gaṇanātha Sena as peṣī are mostly like structure as of a rope being thick at centre and thin at end parts. According to modern anatomical science, skeletal muscle comprise of centrally located muscle belly with two narrowed end called tendons. The rakta accompanied by vāyu, jala, teja and ūṣmaṇa attains compactness and gets transformed into māṃsa with functioning of māṃsa-dhātvaṅni. Māṃsa dhātu is predominant of pṛthvī mahābhūta⁶; which is responsible for attaining a perfect and particular shape to body. When pitta yukta vāyu enters the māṃsa and then divides it into peṣī. From above discussion it is clear that peṣī are made up of and representatives of māṃsa dhātu in body so we can include all the muscular structures situated in body. Here two muscular structures are present- muscle bellies and tendons. According to modern contemporary science muscle segment is developed from the part of somatome named as myotome. Regional distribution of those myotome is decided by their specific nervous regulation. This peculiar nervous elements is always remains as same as they are in embryonic period. Further displacement of muscle fiber will lead to carrying related nervous element. This functional fixation aspect of muscle plays important role to manifests the various pathologies in terms of reflecting and radiating pain. Among three kinds of muscle pattern smooth muscle is more having similarity in this running context.

C. *Development of Smooth Muscle*⁷

Smooth muscle fibres differentiate from splanchnic mesenchyme surrounding the endoderm of the primordial gut and its derivatives. The somatic mesoderm provides smooth muscle in the walls of many blood and lymphatic vessels. The muscle of the iris i.e. sphincter and dilator pupillae and the myoepithelial cells in mammary and sweat glands are thought to be derived from mesenchymal cells that originate from ectoderm. The first sign of differentiation of smooth muscle is the development of elongated nuclei in spindle- shaped myoblasts. During early development, additional myoblasts continue to differentiate from mesenchymal cells but do not fuse as in skeletal muscle; they remain mononucleated. During later development, division of existing myoblasts gradually replaces the differentiation of new myoblasts in the production of new smooth muscle tissue. As smooth muscle cells differentiate, filamentous but nonsarcomeric contractile elements develop in their cytoplasm, and the external surface of each cell acquires a surrounding external lamina. As smooth muscle fibres develop into sheets or bundles, they receive autonomic innervations. Muscle cells and fibroblasts synthesize and lay down collagenous, elastic and reticular fibres.

Suśruta, Aṣṭāṅga hṛdaya, Bhāvaprakāśa, Śārṅgadhara has described about 500 muscles and Caraka has described 400 muscles. This mentioned number is denoted for the group of muscle having general constituitonal features in both male and female. This general structural constituiton have variant of functional exposures due difference in their functional tava i.e female is predominantly agenyia predominance functions. This functional variety is mentioned by acharya sushruta in terms of their structural element i.e mamsa dhatu or segment of this pesi. Extra numerical presense of pesi is peculiar to female constitute only that described as follow-

D. *Stri Tu Viṃśatiradhikā Peṣī*²-

Although the *ṣaḍaṅga śārīra* is common in both the sexes but there are some differences in *pratyāṅga*, *srotasa*, *sirā* and *dhamanī* in both sexes. The main difference is because of the *yoni*, *garbhāśaya*, *stanyāśaya*, *ārtavavaha srotasa* etc. According to ayurveda text there are twenty *peṣī* extra in female entity, threfore there are total five hundred twenty *pesi*. Among these twenty *peṣī*, five are present in each *stana* that develops during puberty. Four are present in *apatyapatha*, further these are distributed in circular pattern around orifice of canal two inner and two outer *peṣī*. The *garbhachidra* contains three *peṣī* and other three are present in *śukrārtavapraveśinī*.

Distribution of peśī of yoni according to different ācārya

| Name of Peśī | <i>Suśruta</i> | <i>Vāgbhaṭa</i> ⁸ | <i>Bhāvamiśra</i> ⁹ | <i>Āḍhamalla</i> ¹⁰ |
|--|----------------|------------------------------|--------------------------------|--------------------------------|
| 1. <i>Apatyapatha</i> | | | | |
| (a) <i>Abhyāntara prasṛta peśī</i> | 2 | 2 | 2 | 4 |
| (b) <i>Mukhāśrita bāhya vṛttākāra</i> | 2 | 2 | 2 | |
| 2. <i>Garbhachidra sanśrite</i> | 3 | 3 | 3 | 3 |
| 3. <i>Śukrārtavapraveśinī / garbhāśaya</i> | 3 | 3 | 3 | 3 |

According to contemporary science these 20 *peśī* may considered either by direct muscle fiber or sometimes as ligamentous sheath. So possible understanding of these 20 *peśī* can be taken here in terms of their function as described in *samhita* mostly related with female reproductive systems.

IV. MUSCULATURE OF FEMALE REPRODUCTIVE ORGANS

- 1) *Mammary Glands*: Mammary gland is ectodermal in origin. Each breast has one pigmented and muscular projection, the nipple, covered by smooth muscles which make it erectile. The circular pigmented area of skin surrounding the nipple is called the areola which contains few involuntary muscles. The breast is composed of 15 to 20 lobes, which are each composed of several lobules. Each lobe terminates in a lactiferous duct which opens through a constricted orifice into the ampulla of the nipple. The lining epithelium of the duct is cubical, becomes stratified squamous near the openings. Each duct divides and subdivides ultimately *ends* in alveoli, which is lined by columnar epithelium. A network of branching longitudinal striated cells called myoepithelial cells surrounds the alveoli and smaller ducts. Fibrous bands of connective tissue travel through the breast (Cooper's suspensory ligaments), insert perpendicularly into the dermis, and provide structural support.
- 2) *Muscles of Pelvic Floor*: The muscles arising within the pelvis form two groups. Piriformis and obturator internus, although forming part of the walls of the pelvis, are considered as primarily muscles of the lower limb. Levator ani and coccygeus form the pelvic diaphragm and delineate the lower limit of the true pelvis.
- 3) *Musculature of Perineum*: The muscles of the perineum are arranged into two layers: superficial and deep. The muscles of the superficial layer are the superficial transverse perineal muscle, the bulbospongiosus and the ischiocavernosus. The deep muscles are the deep transverse perineal muscle, the compressor urethrae, sphincter urethrovaginalis and urethral sphincter.
- 4) *Musculature of Uterus*: The wall of the uterus is composed of three layers: the perimetrium, myometrium and endometrium. The perimetrium, the outermost serosal layer, consists of the thin visceral peritoneum. The thick myometrium is composed of three thick poorly defined layers of smooth muscle, arranged in longitudinal, circular and spiral patterns.
- 5) *Musculature of Fallopian Tubes*: Histologically, the uterine tubes are composed of three layers: mucosa, muscularis and serosa. The mucosa consists of epithelium and lamina propria. The middle layer, the muscularis, is composed of an inner, thick, circular ring of smooth muscle and an outer, thin region of longitudinal smooth muscle, additional internal longitudinal fibres appear in some parts. The outer layer of the uterine tubes is a serous membrane, which is part of the visceral peritoneum.
- 6) *Musculature of Vagina*: The vaginal wall is composed of three layers: an inner mucosal layer, a middle muscularis layer and an outer fibrous layer. The mucosal layer consists of nonkeratinized stratified squamous epithelium that forms a series of transverse folds called vaginal rugae. The muscularis layer consists of longitudinal and circular bands of smooth muscle interlaced with distensible connective tissue. The fibrous layer, the superficial layer of the vagina, consists of areolar connective tissue. Few author of twentieth century have made some efforts to describe these twenty *peśī* in detail and have tried to correlate these *peśī* with present anatomy
- 7) *Muscles of Stana or Female Breast*: five in each stana (breast) may correlated in anatomical aspect as following
 - a) Longitudinal muscles of nipple
 - b) Horizontal muscles of areola
 - c) Longitudinal and horizontal muscles around the lactiferous ducts
 - d) Myoepithelial cells in alveoli
 - e) Suspensory ligament of cooper

All above catergerized into smooth muscle group whose growth is influenced by hormone of pitutatry gland.

Correlation of the *peśī* of yoni with modern anatomy according to different authors

| Yoni | Dr.Ghāṇekara | Dr. P.V. Tivāri ¹¹ | Pt. Gangādhara Josī | Dr. D.G. Thatte ¹² |
|---|--|--|--|---|
| 1.Peśī of apatyapatha- 4 (a) Two outer circular (b)Two spreading inside | (a) Sphincter vaginae (b) Two muscular layer of vaginal canal (inner circular and outer longitudinal) | (a) Sphincter vaginae (b) Anterior and posterior vaginal wall or muscular layer and pubocervical ligament along with recto vaginal fascia | (a)Labia majora and minora (b)Broad ligaments | (a) Sphincter vaginae (b) Two layers of muscle fibres in the wall of vaginal canal |
| Three situated in garbhamārga or garbhachidra | Three muscular layers of uterus | Uterosacral, cardinal and pubocervical ligaments or fundus, corpus and isthmus of uterus | Cardinal and utero-sacral ligaments -2 Pubocervical fascia -1 | Wall of uterus external, middle and internal layer |
| Three for responsible for entry of <i>śukra</i> and <i>ārtava</i> | Muscular layers of fallopian tubes | Cervix uteri, both fallopian tubes | Endosalpinx -2 Endometrium of uterus-1 | Muscular layer of fallopian tubes same as that of uterus |

V. DISCUSSION AND CONCLUSION

Various permutation combination of Panchmahabhuta elements further express their variation according to functional base platform that is build up by two active mahabhuta i.e somya(Aap/jala) and Agneya (agni). Garbha also having two constitutional functional aspect simultaneously but predominance will lead to either male or female sex. This agneya constitutional makes platform upon which all structures get build up vice versa in male individuality. One of the basic structural elements responsible for expression of movement named as *peśī* whose distribution is vary according to this above mentioned functional constitution. This variation in terms of 20 extra *peśī* predominantly provides covering or govern the passage of three bahirmukhani strotas i.e two stana (site for production and ejaculation of nutrition element) and Adhah raktavaha strotas (governs movement of beeja and garbha). For those two 10-10 *peśī* has been described seperatley. Agaenya tatva also can be regulated by these two kind of bahirmukhani strotas .It means this may be taken as those all 20 *peśī* are under influenced by female sex hormones that’s why they may considered as smooth muscle in nature. Here for this paper 10 *peśī* related with Adhah raktavaha strotas has taken for possible correlation. Based upon the function as described in Samhita, various commentators have presented their possible anatomical consideration either with muscular layer or ligamentous structure. Based upon more similarity in shape also *peśī* of apatyapatha- 4 may taken as Spinctor vaginae (outer circular smooth muscle)and from two spreading inside layer form as two muscular coat of uterus and continue in vagina also. *Peśī* of Garbhachidra may consider as 3 muscular ligaments of uterus and *peśī* for governing entry of *śukra* and *ārtava* as endosalpinx and endometrium based upon its more functional similarities this possible correlation can be taken here for making intial understanding of beginners.



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