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Study of Sushrutokta types of 'Peshi' w.s.r. to Modern Anatomy: A Literary Review.

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Abstract:

Rachana Sharir is the branch of Ayurveda that deals with the study of structure of human body. Peshi Sharir is one among the most important concepts explained in classical ayurvedic literature. Similarly, muscular system is an important topic in modern anatomy. In Sushrut Samhita, total 12 types of 'Peshi' are explained. These 12 types of peshi are Bahala, Pelava, Sthul, Anu, Prithu, Vritta, Harasava, Dirgha, Sthir, Miridu, Slakshana and Karkasa. On the basis of differentiation of myocytes, the muscles are of three types namely skeletal, cardiac and smooth. In the present work a comparative study was done between the classification of 'Peshi' according to Sushrut Samhita and the classification of 'Muscles' according to Modern Anatomy. This comparative study will help us to understand the concept of Peshi and Muscle according to Ayurveda and Modern Anatomy respectively. Hence, there is need to study to find the basis on which the classification was done by Ayurveda and Modern Anatomy.

KEY-WORDS: Peshi, Muscle, Myocyte.

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INTRODUCTION:

Rachna Sharir is described in Sharirsthan of Charak, Shushrut and Vagbhat Samhita. 'Peshi Shariram' is the most important topic related to human anatomy. Total 500 peshi in male body and 520 peshi in female body has been explained in Sushrut Sharir Sthan. Shushrutacharya has divided peshi (muscles) of human body into 12 different categories. The 12 categories described by Shushrutacharya are as follows - Bahala, Pelava, Sthul, Anu, Prithu, Vritta, Hrasava, Dirgha, Sthir, Mridu, Slakshana, Karkasa. In the present work a comparative study is done between classification of 'Peshi' according to 'Sushrut Samhita and Classification of 'Muscles' according to Modern Anatomy.

Aim: To study Sushrutokta types of 'Peshi' w.s.r. to Modern Anatomy.

Objective: To do comparison between the classification of 'Peshi' according to Sushrut Samhita and Classification of 'Muscles' according to Modern Anatomy.

Material & Methods:

- Ayurvedic literature review will be done from Sushruta Samhita.
- Gray's Anatomy, Cumminham's Manual of Practical Anatomy, Williams M. Monier (A Sanskrit English dictionary) and Dorland's Pocket Medical Dictionary will be considered for Modern review of literature.
- Study will be done from Classical as well as modern text.
- Discussion will be done to see similarity and differences in the classification.
- Conclusion will be drawn after discussion.

Review of Literature:**Ayurvedic Review:**

Origin of Peshi: The word 'Peshi' is derived from the Sanskrit root word 'Pishita' which means flesh or meat¹.

Defination of Peshi:

Peshi-Mansavyavasanghat parasparvibhaktaha peshi ityauchyate²

Peshi is the compact form of mansa dhatu formed by the action of vayu.

Formation of Peshi:

Acharya Sushruta mentioned that vata combined with pitta for the same purpose, creates the srotas entering into the muscle tissues, the vata and pitta divide the muscle into peshi³.

Panch-bhautic Constitution of Peshi:

Commentator Chakrapani has said that mamsa is predominant of prithvi mahabhuta⁴.

Importance of Peshi:

Since Sira, Snayu, asthi, asthi-sandhi of the body are covered by peshi. So, they are stronger and more supported. This means peshi is responsible to provide strength and protection while covering them⁵.

Distribution of Peshi

Name of Acharya

Sushruta	500
Charaka	400
Ashtanga Sangraha	500
Ashtanga Hridaya	500
Bhavapraksha	500
Modern Science	Around 650

Classification of Peshi (6,7):

According to Sushrut Samhita, Peshi are of 12 Types namely Bahala, Pelava, Anu, Sthula, Prithu, vritta, Harswa, Dirgha, Sthira, Mrdu, Shlaksana and Karkasa.

1. Bahala Peshi:

M. Monier Williams Dictionary - Bahala means thick, dense, compact, firm, solid, wide and extensive⁸.

Dalhana- "Bahala Bahutara"

2. Pelava Peshi:

M. Monier Williams Dictionary: Pelava means delicate, soft, fine, tender, kalid, thin, slim and slender⁹.

Dalhana - Pelava Alpaha

3. Anu Peshi: -

M. Monier Williams Dictionary: - Anu means fine, minute, atomic, anatom of matter, an atom of time¹⁰.

Dalhana: "Anvaha Sukshamaha"

4. Sthula Peshi:

M. Monier Williams Dictionary: - Sthula means large, thick, stout, massive, bulky, big, huge, coarse, gross and rough¹¹.

Dalhana - "Tadviparitaha Sthulaha" means opposite of anu.

5. Prthu Peshi:

M. Monier Williams Dictionary: Prthu means broad, wide, expansive, extensive, spacious and large¹².

Dalhana: "Prthu Visirnaha"

6. Vritta Peshi:

M. Monier Williams Dictionary: Vritta means turned, set in motion, round, circular, rounded and continued¹³.

Dalhana: "Vritta Vartulaha"

7. Hrswa Peshi:

M. Monier Williams Dictionary: Hrswa means short, small, dwarfish, little, low, weak, unimportant and insignificant¹⁴.

Dalhana: "Hrswa Adirghaha".

8. Dirgha Peshi:

M. Monier Williams Dictionary: Dirgha means long, lofty and high¹⁵.

Dalhana: "Dirgha Aayataha"

9. Sthira Peshi:

M. Monier Williams Dictionary: Sthira means firm, hard, solid, compact, strong, fixed, immovable, motionless, still and calm¹⁶.

Dalhana: "Sthira Kathinaha"

10. Mrdu Peshi:

M. Monier Williams Dictionary: Mrdu means soft, delicate, tender, pliant, mild, gentle, weak, feeble and slow (gait)¹⁷.

Dalhana: "Mrdu Komalaha".

11. Shlaksna Peshis

M. Monier Williams Dictionary: Shlaksna means internal support¹⁸ and uniting metal¹⁹.

Dalhana: "Shlaksna sparsha – sukhaha".

12. Karkasha Peshis:

M. Monier Williams Dictionary: Karkasha means hard, firm, rough and harsh²⁰.

Dalhana: "Tadvipantaha Karkashaha" - means opposite to shlaksna.

Modern Review

Muscles:

•The muscles are the red flesh of the body and form nearly half of its weight²¹.

•An organ that by contraction produces movement of an animal organisms²².

Muscle cell:

•Muscle cells are also known as myocytes²³.

Types of Muscles:

•Myocytes differentiate along one of three main pathways to form skeletal, cardiac and smooth muscles²⁴.

•Both, skeletal and cardiac muscle may be referred to as striated muscle, because in these types of muscles the myosin and actin filaments are organized into repeating elements that give the cells finely cross-striatic appearance when they are viewed in a light microscope.

A. Skeletal muscle:

•Skeletal muscles consist of parallel bundles of long multinucleate fibres.

•By virtue of the regular organisation of its contractile proteins this type of muscle is capable of powerful contractions around 100 watts per kilogram for skeletal muscle.

•It is sometimes referred to as voluntary muscle, because the movement in which it participates are often initiated under conscious control.

•Skeletal muscle is innervated by somatic motor nerves.

•It forms the bulk of the muscular tissue of the body.

•It has its embryological origin in mesenchymal condensations in the somites and in equivalent areas of mesenchyma in the head and brachial pouches²⁵.

B. Cardiac muscle²⁶:

•Cardiac muscle consists of a branching network of individual cells that are linked

electrically and mechanically to function as a unit.

- Compared to skeletal muscle, cardiac muscle is much less powerful (about 3-5 watts per kilogram) but far more resistant to fatigue.

- These differences are not unconnected, in cardiac muscle space that could otherwise have been filled with contractile machinery is occupied by the blood vessels around the fibres and the mitochondria within them specializations that are essential for the continuous supply of energy.

- This type of muscle is found only in the heart, but extends into the walls of large veins where they enter the heart.

- It differs structurally and functionally from skeletal muscle.

- During embryological development, cardiac muscle arises from a continuous sheet of cuboid cells that line the ventral splanchnic wall of the pericardial cavity.

C. Smooth muscle²⁷:

- Smooth muscles contain actin and myosin, but these are not organized into repeating units and its microscopic appearance is unstriated or 'smooth'.

- The elongated cells are smaller than those of striated muscle, and taper at the ends.

- They are capable of slow but sustained contractions, and although this type of muscle is less powerful than striated muscle, the amount of shortening can be much greater.

- Smooth muscle is sometimes referred to as involuntary muscle.

- It is found in all systems of the body: in the walls of the viscera, including most of the GI, respiratory, urinary and reproductive tracts in the tunica media of blood vessels, in the dermis, in the intrinsic muscles of the eye, and the dartos muscular layer of the scrotum.

- Smooth muscles develop from mesenchymal cells in many parts of the embryo.

Naming of muscles²⁸: The names given to Individual muscles are usually descriptive, based on their shape, size, number of heads or bellies, position, depth, attachments, or actions.

a) Shape:

- Deltoid = triangular
- Quadratus = square
- Rhomboid = Diamond shaped
- Teres = round
- Gracilis = slender
- rectus = straight
- lumbrical = worm like

b) Size:

- major or minor
- longus = long
- brevis = short
- latissimus = broadest
- longissimus = longest

c) Number of heads or bellies:

- Biceps = 2 heads
- Triceps = 3 heads
- Quadriceps = 4 heads
- Digastric = 2 bellies
- Biventer = 2 bellies

d) Position:

- Anterior, Posterior
- Interosseus = between bones
- Supraspinatus = above spine of scapula
- Infraspinatus = below spine of scapula
- Dorsi = of the back
- Abdominis = of the abdomen
- Pectoralis = of the chest
- Brachii = of the arm
- Femoris = of the thigh
- Oris = of the mouth

e) Depth:

- Superficialis = superficial
- Profundus = deep
- Externus = externi
- Internus = interni

f) Attachment:

- Sternocleidomastoid = from sternum and clavicle to mastoid process

•Coracobrachialis = from the coracoid process to the arm.

g) Action:

- extensor, flexor
- abductor, adductor
- levator, depressor
- supinator, pronator
- constrictor, dilator

DISCUSSION:

After studying the classification of 'Peshi' as per Sushruta Acharya, we can say that the classification is done on the basis of its external appearance. The Classification of muscles by modern anatomy is done on the basis of differentiation of myocytes i.e., muscle cells. The naming of muscles by modern anatomy is done on the basis of shape, size, position, action, attachment etc. Description about 'Peshi' suggests that our ancient scholars had thorough knowledge about dissection thousands of years ago.

CONCLUSION:

The Classification of 'Peshi' as described by Sushrutacharya suggests that the basis of classification was gross appearance by means of dissection of human body. Due to advancement in technology and availability of microscope, classification of muscles is done depending upon the nature of myocyte, by Modern Anatomy.

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