### International Research Journal of Ayurveda & Yoga

Vol. 6 (3),82-87, March,2023

ISSN: 2581-785X: https://irjay.com/ DOI: 10.47223/IRJAY.2023.6310



# A Comprehensive Study of Peshi Sharira w.s.r. to Urdhavashakhagata Peshi

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#### **Article Info**

#### Article history:

Received on: 28-1-2023 Accepted on: 25-03-2023 Available online: 31-03-2023

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#### **ABSTRACT:**

Peshi are the compact form of Mamsa Dhatu having muscle fibres are arranged side by side and separated with each other. Peshi are lengthy and have fleshy appearance. Pitta Yukta Vayu enters the Mamsa and then divides it into Peshi. Peshi are component of body mainly composed of Mamsa Dhatu. Most of treatises provide the brief knowledge regarding the Peshi, but Acharya Sushruta mentioned more in details about the types, location, distribution, number and function of Peshi. The total number of Peshis enumerated is 500. Amongst these, 400 are located in Shakha, 66 in Koshtha and 34 in Greevapratyurdhwa. 100 Peshis of each upper limb divided under 8 regions and categorised under 12 Swaroopas. However, there is no specific identification of different Peshis based on Swaroopa, provided in the Samhita. Objective of this study is to study the literature on Peshi Shareera w.s.r. to Urdhavashakhagata Peshi in the light of modern science by cadaveric study and to categorise the *Peshi*s of upper limbs into 12 *Swaroopas*. As per literary and cadaveric study, a total of 53 Peshis are found in the upper limb. 9 of 12 Swaroopa are found to be relevant for categorising the Urdhavashakha Peshis. The reason for the difference in the number of *Peshi*s could be inclusion of tendons or aponeurosis, or single muscle observed in two or more regions or 2 heads of origin of a single muscle as two.

**Keywords-** *Urdhavashakha*, Upper Limb, Muscles, *Peshi*, *Swaroopa*.

#### INTRODUCTION

Sharir Sthana is one of the most important and fundamental part of Ayurveda Samhita in which Sharir Rachana is described in detail covering different structures, numbers, macroscopic detail and its other aspects as well.

Our great scholars of Ayurveda have described that the basic constituents of the body are *Dosha*, *Dhatu* and Mala. Out of seven *Dhatu*, *Maṃsa Dhatu* covers the frame work of the body.<sup>1</sup>

It is formed by the metabolism of its preceding Dhatu,



*Rakta Dhatu* and is responsible for the nourishment of the succeeding *Dhatu*, *Medo Dhatu* as well as *Lepana Karma* of the body.<sup>2</sup>

#### Peshi-

*Peshi* is the component part of the body derived from the *Mamsa Dhatu*.

*Peshi* wraps the body like a sleeve, covers the *Sira*, *Snayu*, *Asthi and Samdhi* thus provides the smooth contour to the body.<sup>3</sup>

During the development of *Peshi Vata Dosha* along with Pitta enters the *Mamsa Dhatu* and split it into the component parts.<sup>4</sup>

#### Number of Peshi-

The total number of *Peshi* in human body is five hundred. In female 20 extra *Peshi* present. The distribution of *Peshi* according to region are following- 400 *Peshi* are present in *Shakha*, 66 in *Koshtha* and 34 in *Urdhavajatrugata*. The 20 extra *Peshi* in female are present in *Stana pradesh* and *Yoni Pradesh*.<sup>5</sup>

The 100 *Peshi*s of one *Urdhavashakha* are distributed in nine regions according to different authors (Table no. 1). There is a clear difference in the enumeration of the muscles of upper limb as per contemporary science. According to the modern anatomy, the muscles of the upper limb are 65, categorised into 5 regions, including the pectoral and back region<sup>6</sup>. Ayurveda includes the *Vaksha* and *Prishtha Pradesha* in the *Madhya Shareera* (trunk region)<sup>7</sup>. This study attempts at understanding the structures included under the canopy of *Peshi*s in different regions of *Urdhavashakha*.

#### Swaroopa of Peshi (Types of Peshi) -

There are various patterns of *Peshi* differentiated to maintain support and movement of body viz. *Bahala*, *Pelava*, *Sthoola*, *Anu*, *Prithu*, *Vritta*, *Hriswa*, *Dirgha*, *Sthira*, *Mridu*, *Slakshna* and *Karkasha*. <sup>12</sup> *Dalhana* has explained each *Swaroopa* in his commentary on *Sushruta Samhita Shareera Sthana* 5 th chapter and *Ghanekar* commentary has given their respective meanings. <sup>13</sup> (Table no. 2)

Though *Acharya Sushruta* has given the 12 *Swaroopa* of *Peshis*, he has not mentioned about which *Peshis* are categorised under these 12 *Swaroopas*. This present work has been taken up with an idea to update the concept of *Peshi*, with emphasis on the *Peshis* of *Urdhavashakha* as well as their categorisation under the 12 *Swaroopas* of *Peshis* mentioned.

#### Karma of Peshi (functions)-

As per Acharya Sushrut, the main function of Peshis is to cover the joints, bones, Siras and Snayu and to keep them

in place and to provide strength to these structures.<sup>14</sup> *Acharya Kashyapa* opines just as a plank made of wood tied with grass and ropes is smeared with clay superficially, similarly, in the body the bones are tied together by the *Snayus* and *Snayus* are covered by *Mamsa* and they are nourished by the *Siras*. Skin is spread over these structures.<sup>15</sup>

#### Muscles of upper limb<sup>6</sup>

Muscles of the upper limb may be grouped as follows:

- 1) Muscles connecting upper limb with the vertebral column: Trapezius, Rhomboideus major and minor, Levator scapulae and Latissimus dorsi.
- 2) Muscles connecting the upper limb with the thoracic wall: Serratus anterior, Pectoralis major and minor.
- 3) Muscles of the scapula: Shoulder joint is surrounded by six muscles; Deltoid, Supraspinatus, Infraspinatus, Subscapularis, Teres major and minor, all extending from scapula to humerus.
- 4) Muscles of the upper arm: Coracobrachialis, Biceps brachii, Triceps brachii and Brachialis.
- 5) Muscles of the forearm consist of anterior or flexors and posterior or extensors groups.
- Anterior group of forearm muscles are divided into superficial layer (Pronator teres, Flexor carpi radialis, Palmaris longus, Flexor carpi ulnaris and Flexor digitorum superficialis)
- Deep layer (Flexor digitorum profundus, Flexor pollicis longus and Pronator quadratus
- Posterior group of forearm muscles are divided into superficial layer (Brachioradialis, Extensor carpi radialis longus, Extensor carpi radialis brevis, Extensor digitorum, Extensor digiti minimi, Extensor carpi ulnaris and Anconeus)
- Deep layer (Supinator, Abductor pollicis longus, Extensor pollicis brevis, Extensor pollicis longus and Extensor indicis).
- 6) Muscles of the hand: The intrinsic muscles of the hand may be described in three groups:
- Muscles that act on the thumb: Abductor pollicis brevis, Opponens pollicis and Flexor pollicis brevis within the thenar eminence and Adductor pollicis.
- Muscles of the hypothenar eminence: These consist of muscles acting on the little finger-Abductor digiti minimi, Flexor digiti minimi and Opponens digiti minimi together with Palmaris brevis.
- Muscles acting on the fingers: The interossei and the lumbricals.

#### AIMS AND OBJECTIVES

- 1. To undertake literary study of *Peshi Shareera* with special reference to *Urdhava Shakhagata Peshi* in detail.
- 2. To do a comprehensive cadaveric study on *Urdhava Shakhagata Peshi*.

#### **METHODOLOGY**

- Literature regarding the *Vyutpatti, Sankhya, Swarupa, Karya* etc. of *Mamsa Peshi* was collected from *Bruhatrayees, Laghutrayees* and other *Ayurvedic* texts, modern textbooks, including journals, presented papers and previous work done, and was correlated as well as analysed, critically.
- Dissection of upper limbs of five cadavers was done in the dissection hall of NIA, Jaipur, to analyse the number and *Swaroopa* of *Urdhavashakhagata Peshi*.

#### **RESULT**

Peshi are made up of Mamsa. It is a long mass of flesh. Morphology of Mamsa described by the Acharya Gananatha Sena as Peshi is structure as of a rope being thick at centre and thin at end parts. Some are also of different structure like Kosakara, Nalakakara, Sutrakara, Talavrntakara, Rajjavakara and Sarapunkhakara. Rajjavakara, Talavrntakara and Sarapunkhakara have two ends. Snayumaya may be these ends. In these ends which end is above and fixed is called Prabhava and that end below is called Nivesha.

This can be understood as each muscle fibre within a fasciculus is separated by an endomysium, each fasciculus is covered by a connective tissue layer called the perimysium and the whole muscle is covered by the epimysium which separates it from other muscles. From this definition of *Peshi*, it can be considered as a consolidated bundle of numerous *myocytes* or muscle fibres to form the muscle. The deep fascia enveloping and supporting the muscle may be considered as *Mamsadhara* Kala; it also transports blood vessels and nerves. The superficial fascia may be considered as *Mamsadhara Tvaka*.

Acharyas categorised the *Peshis* into twelve shapes depending on their region of distribution. They are *Bahala*, *Pelava*, *Stoola*, *Anu*, *Prithu*, *Vritta*, *Hrisva*, *Deergha*, *Sthira*, *Mridu*, *Slakshna* and *Karkasha*. As per *Acharya Ghanekar's* commentary, these *Peshis* are large, small, thick, thin, flat/broad, dome shaped, short, long, firm, soft, smooth and rough respectively. This study has attempted to categorise the *Peshis* of the upper limb into these twelve

Swaroopa as per their region of distribution and function (Table no. 3).

Another view in this category is that *Sthula* category: those muscles which we can see easily by naked eyes and in *Anu* category those muscles which we did not see easily with naked eye were considered. All the skeletal muscles included in *Sthula* category and in *Anu* category we include smooth muscles of *visceras* and arteries.

So in Ayurveda, *Peshi* are classified or named on the basis of their size, shape, action and the feeling of touch like thick or thin, short or long are on the basis of size a shape; wide/thick or round/circular are on the basis of their structure; fix/stable or movable are on the basis of their movement; hard or soft, smooth or rough are on the basis of perception of touch.

*Peshi* having various types like *Sthul* (Large), *Prithu* (Flat), *Rhswa* (Small), *Dhirgha*(Long) etc. according their shape. Formations of these various shapes are depending upon the region, functions, underline structures and associated joints regarding particular muscle.

The number of *Peshis* in *Urdhavashakha* are 100 in each limb. These *Peshis* are distributed in 9 regions of the limb from *Padanguli*, *Prapada*, *Padopari Kurcha*, *Padatala/Gulphatala*, *Gulpha*, in between *Gulpha and Janu*, *Janu*, *Uru* and *Vankshana Pradesha*.

The muscles of upper limb are considered to be 65 including the Trapezius, Rhomboideus major and minor, Levator scapulae and Latissimus dorsi, four lumbricals, four palmer interossei and four dorsal interossei. These muscles are divided into 5 regions as muscles of the pectoral region, scapular region, arm region, forearm region, and palm and hand.

Samhitas mention the ten muscles of Sphik Pradesha (scapular region), Vaksh Pradesh (pectoral region) in the Koshthagata Peshis and do not consider these under urdhavashakhagata Peshi. However, the modern anatomical classification clearly mentions that some muscles of scapular and pectoral region as part of the upper limb. Based on dissection findings, 3 muscles of the pectoral region and six muscles of shoulder region are found in kaksha Pradesha. As per dissection findings, we got 53 Peshis in the urdhavashakha including the 3 muscles of the pectoral and 6 muscles of shoulder region. The distribution of Peshis region wise was found as follows.

#### Distribution of Peshi-

On the basis of dissection we were decided the number of *Peshi* (muscle) in human body. We were made some criterions for counting of muscles in a particular region.

The base of counting were following-

- a) On the basis of origin and insertion
- b) On the basis of major part of muscle (muscle belly)
- c) On the basis of action of particular muscle

#### • Muscles of pectoral region-

We were found four muscles (Platysma, pectoralis major, pectoralis minor, subclavius) in this region. Due to the action (pulling down the mandible) and major part (neck region) of platysma muscle we were not include this muscle in this region. Total number of muscles we found in this region was six.

## • Flexor compartment of Upper Limb – Muscles of rotator cuff or Shoulder joint-

In this region we found six muscles (deltoid, supraspinatus, infraspinatus, teres major, teres minor and subscapularis). These muscles act on shoulder joint or humerus so we include these muscles in this region. Total no of muscles we found in this region was twelve at both side.

#### o Muscles of Arm-

We found four muscles, three (Coracobrachialis, Biceps brachii, Brachialis) in anterior compartment and one (Triceps brachii) in posterior compartment of arm. Major parts of these muscles were present in arm so we included in arm region. Total number of muscles in this region we found eight in both arm.

#### **Muscles of Forearm-**

In the flexor compartment of forearm we found five superficial (pronator teres, flexor carpi radialis, palmaris longus and flexor carpi ulnaris, flexor digitorum superficialis) and three deep muscles (flexor digitorum profundus, flexor pollicis longus and pronator quadratus). Belly parts of these muscles were present in forearm region. Flexor carpi ulnaris, flexor carpi radialis and palmaris longus acts on wrist and flexor pollicis longus acts on thumb, flexor digitorum superficialis and flexor digitorum profundus acts on interphalangeal joint. But we considered major part of muscle present in particular region so above muscles we were count in forearm. Sixteen muscles we found in forearm region.

#### Muscles of palm or hand-

#### Thenar group muscles-

Flexor pollicis brevis, abductor pollicis brevis, opponens pollicis and adductor pollicis all muscles act on thumb.

**Hypothenar group muscles-** We found two slips of Abductor digiti minimi, flexor digiti minimi brevis and opponens digiti minimi all muscles act on the little finger. We found four Lumbricals and three palmer interossei and four dorsal interossei muscles act on the fingers and the palmaris brevis is a superficial or subcutaneous muscle that

lies beneath the ulnar palmer skin. Major part of above muscles lies in palm region so we considered these muscles in palm or hand region. In this region we found twenty muscles and in both palm and hand we found fourty muscles.

#### Muscles of Extensor compartment of forearm-

We were found in this region total twelve muscles i.e. **Superficial layer-** This layer consists seven muscles i.e. (anconeus, brachioradialis, extensor carpi radialis longus, extensor carpi radialis brevis, extensor digitorum, and extensor digiti minimi and extensor carpi ulnaris.)

**Deep layer-** This layer consists five muscles i.e. (supinator, abductor pollicis longus, extensor pollicis brevis, extensor pollicis longus and extensor indicis.) We found that belly part (major part) of these muscles were present in forearm region. Extensor carpi radialis longus, extensor carpi radialis brevis, extensor carpi ulnaris act on hand and extensor digitorum, extensor digiti minimi, extensor indicis act on digits. Abductor pollicis longus, extensor pollicis brevis, extensor pollicis longus act on thumb. We were found 24 muscles in both limbs.

#### Superficial Muscles of the Back Region-

We were found two major muscles (trapezius muscle and lattisimus dorsi muscle) trapezius muscle act on scapula (rotates, elevates, retracts and depresses) and lattisimus dorsi muscle extends, adducts and medially rotates the humerus. However these muscles cover the back region mostely. Rhomboideus minor, major muscles also act on scapula and situated in back. Levator scapulae muscle mostely situated in neck but act on scapula so we considered this in back region. We found two intermediate muscles (serratus posterior superior and serratus posterior inferior- four fleshy digitation) in back region. We found total fourteen muscles in both side.

#### **CONCLUSION**

The total number of muscles of lower limb is 65, including the shoulder, pectoral and back region muscles and dissection of *Urdhavashakha* explains 53 muscles excluding 7 muscles of back region and including 3 muscles of pectoral region and 6 muscles of shoulder region. The difference in the enumeration of *Peshis* as 100 in each *Shakha* may be because of including two separate heads of a single muscle or tendons and aponeuroses as *Peshi* depending on location and function or tracing a single muscle in two or more regions and considering these as separate muscles.

Swaroopa of Peshis – Various types of Peshi(Muscle) like

Sthul(Large), Prithu(Flat), *Rhswa*(Small), Dhirgha(Long) etc. are according their shape and formations of these various shapes are depends upon the region, location, functions, underline structures and associated joints regarding particular muscle.

These 12 Swaroopas have been described for all the Peshis of the body. Acharyas must have considered Peshis of the Koshtha and Shiro-Greeva Pradesha under these categories. In this way we can say that the basic concept for study and expedient classification of Myology was given by the seers of Ayurveda. Further scope of study could be standardisation of these explanations in terms of modern anatomy knowledge for easier access to understanding ayurvedic viewpoint as well as, updation of our knowledge systems.

Acknowledgments- Nil Conflicts Of Interest- Nil Source of finance & support – Nil

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**How to cite this article:** Dudi S, Choudhary A, Sharma M.K, Sharma R.K "A Comprehensive Study Of *Peshi Sharira* W.S.R. To *Urdhavashakhagata Peshi*"

IRJAY. [online]2023;6(3);82-87.

Available from: <a href="https://irjay.com">https://irjay.com</a>

DOI link- https://doi.org/10.47223/IRJAY.2023.6310

Table 1: Number of Peshis in Urdhavashakha Pradesha according to different Acharyas

Regions	Sushruta <sup>8</sup>	Ashtang Sangraha <sup>9</sup>	Ashtang Hridaya <sup>10</sup>	Bhavaprakash <sup>11</sup>
Padaanguli (Toes)	15 (3*5)	15	15	15
Prapada/Padagra (Forefoot)	10	10	10	10
Padopari Kurcha (Above foot, attached to	10	10	10	10
Kurcha)				
Padatala/Gulphatala (Sole of foot	10	10	10	5
Gulpha (Ankle)		10	10	5
Jangha/Gul phaJanvantare (Leg)	20	20	20	20
Janu (knee)	5	5	5	5
Uru (Thigh)	20	20	20	20
Vankshana (Groin)	10			10
Total	100	100	100	100

Table no. 2 Peshi Swaroopa

S.N.	Peshi Swaroopa	According to Dalhana	According to Ghanekara
1	Bahala	Bahutara	Large
2	Pelava	Alpa	Small
3	Sthoola	Opposite of Sukshama	Thick
4	Anu	Sukshama	Thin
5	Prithu	Visteerna	Flat/broad
6	Vritta	Vartula	Dome shaped
7	Hrishva	Adirgha	Short
8	Dirgha	Ayata	Long
9	Sthira	Kathina	Firm
10	Mridu	Komala	Soft
11	Shlakshana	Sparshasukha	Smooth
12	Karkasha	Opposite of Sparshasukha	Rough

Table no. 3 Name of *Peshi* according to *Swaroop* 

S.N.	Swaroop	Name of <i>Peshi</i>			
1	Bahala	1. Biceps brachii 2. Triceps brachii 3.Pectoralis major 4.Trapezius 5.Lattisimus dorsi 6.flexor			
		digitorum profundus 7.Extensor digitorum			
2	Pelava	1.Platysma 2. Serratus posterior superior 3.Serratus posterior inferior 4.Palmeris brevis 5.Extenso			
		pollicis longus 6.Extensor indicis 7.Abductor pollicis 8.Flexor carpi radialis 9.Flexor carpi ulnaris			
3	Stoola	1. Pectoralis major			
4	Anu	1. Lumbricals 2. Palmer and dorsal interossei			
5	Prithu	1. Trapezius 2. Lattisimus dorsi 3. Rhomboid major 4. Serratus posterior superior and inferior 5. Platysma			
		6.Pectoralis major 7.Serratus anterior 8.Pronator quadratus			
6	Vritta				
7	Hrisva	1. Thenar muscle- Flexor pollicis brevis, abductor pollicis brevis, opponens pollicis, adductor pollicis			
		2. Hypothenar muscle- Abductor digiti minimi, flexor digiti minimi brevis, opponens digiti minimi			
		3.Palmar and dorsal interossei and lumbricals 4.Rhomboidus major, minor 5.Serratus posterior			
		superior and inferior 6. Anconeus 7. Suppinator 8. Coracobrachialis 9. Pronator teres 10. Supraspinatus,			
		infraspinatus, teres minor, teres major, subclavius 11.Levator scapulae			
8	Dirgha	1.Flexor digitorum superficialis 2.Flexor digitorum profundus 3.Flexor pollicis longus 4.Triceps			
		brachii 5.Brachioradialis 6.Extensor carpi radialis longus 7.Extensor carpi radialis brevis 8.Extensor			
		digitorum 9.Extensor digiti minimi 10.Extensor carpi ulnaris 11.Abductor pollicis longus 12.Extensor			
		pollicis longus 13.Extensor indicis 14.Biceps brachii 15.Flexor carpi radialis 16.Flexor carpi ulnaris			
9	Sthira	1. Palmeris longus			
10	Mridu	1. Pectoralis major 2. Lattisimus dorsi 3. Biceps brachii 4. Triceps brachii			
11	Shlakshana	1. Platysma			
12	Karkasha	1. Serratus anterior			