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# A COMPREHENSIVE STUDY OF *PESHI SHAREERA* W.S.R. TO *URDHWA SHAKHAGATA PESHI* - A CADAVERIC STUDY

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## ABSTRACT

The term *Peshi* is defined as "*mamsa khanda*".[1] The function of *peshi* extends to enveloping and supporting other anatomical structures such as *sira*, *snayu*, *asthi*, *parva*, and *sandhi*, thereby stabilizing and strengthening the body.[2] The classical literature enumerates a total of 500 *Peshi*[3], distributed as follows: 400 in the *shaakha*, 66 in the *koshta*, and 34 in the *greeva-jathrurdhwa* region.[4] An additional 20 *Peshi* are described in *stree*.[5] Each *shaakha* contains 100 *Peshi*, *urdhwashaakha peshi* are further divided into 8 distinct regions.[6] The texts also describe 12 characteristic features (*swaroopa*) of *Peshi*.[7] In contrast, modern anatomical science offers a different description and classification. Hence, this comparative approach seeks to enhance the understanding of *Peshi Sharira* and to bridge traditional knowledge with contemporary anatomical perspectives.

**KEYWORDS:** *Peshi, urdhwashaakha peshi, peshi swaroopa.*

## INTRODUCTION

Classical Ayurvedic texts provide a comprehensive description of *Peshi*, detailing its *utpatti* (origin), *nirukti* (etymology), *swaroopa* (morphological form), *karma* (function), *sankhya* (number), and its distribution throughout the body. The term *peshi* is defined as "*mamsa khanda*." In the *Samhitas*, *mamsa* is identified as one of the *sapta dhatus*[8] (seven bodily

tissues), whose principal *karma* is *lepana*,[9] meaning "to cover." Within the context of *Peshi*, this function extends to enveloping and supporting other anatomical structures such as *sira* (vessels), *snayu* (tendons), *asthi* (bones), *parva* (joints), and *sandhi* (articulations), thereby imparting stability and strength to the body.

The classical literature enumerates a total of five hundred *Peshi*, distributed as follows: 400 in the *shaakha*, sixty-six in the *koshta*, and thirty-four in the *greevajathrurdhwa* region. An additional twenty *Peshi* are described in *stree*. Each *shaakha* contains one hundred *Peshi*, and those of the *urdhwashaakha* (upper limb) are further divided into 8 distinct regions. The texts also describe 12 characteristic features (*swaroopa*).

In contrast, modern anatomical science offers a different classification. It identifies around 59 muscles in the upper limb, organized into 6 regional groups.[10] These differences highlight the distinct conceptual frameworks through which Ayurveda and modern anatomy interpret bodily structures.

Accordingly, the present study aims to analyse the morphology, numerical and functional descriptions provided in Ayurvedic literature and to correlate with those recognized in modern scientific anatomy.

## AIMS AND OBJECTIVES

1. To do a comprehensive cadaveric study on *urdhwashakhagata peshi*.
2. To undertake a literary study of *peshi sharira* with special reference to *urdhwashakhagata peshi* in detail.

## METHODOLOGY

Literature related to the *peshi*, with special reference to *urdhwashakhagata peshi* will be collected from the *bruhatrayees*, *laghutrayees*, modern textbooks, journals, and will be scientifically analysed.

Critical analysis of *sankhya* and *swaroopa* of *urdhwashakhagata peshi* will be done with the help of cadaver dissection carried out as per Cunningham's Manual of Practical Anatomy. Region-wise, layer-by-layer.

## OBSERVATION

The study was carried out by dissecting 5 cadavers in dissection hall as per the Cunningham's manual of practical. Anatomical structures like fascia, muscles, tendons etc. in relation to *Urdhwa Shaakhagata peshi* were observed. Dissection procedure was done layer by layer to observe and study the structures thoroughly.

## MARKING AND INCISION

### *KAKSHA PRADESHA*

The skin of the pectoral region was incised and reflected laterally to expose the superficial fascia. The deep fascia over the pectoralis major was incised, and the muscle's attachments to the humerus, clavicle, sternum, and costal cartilages were examined. The pectoralis major was then detached near its insertion and reflected laterally.

With the upper limb abducted, the axilla was defined. Its boundaries were identified: anterior wall by pectoralis major and minor, posterior wall by subscapularis, teres major, and latissimus dorsi, medial wall by serratus anterior, and lateral wall by the intertubercular sulcus of the humerus. The skin and fascia were reflected, and the axillary contents and insertions of subscapularis, teres major, and latissimus dorsi were studied.

An incision was made on the back skin and superficial fascia were reflected. The deep fascia was incised to expose and reflect trapezius, revealing the latissimus dorsi.

At the shoulder, the deltoid was exposed, and its origins and insertion were examined. After reflecting the muscle and removing deep fascia, the subacromial space and rotator cuff muscles—supraspinatus, infraspinatus, teres minor, and subscapularis—were identified.

### *BAAHU* (ARM)

The skin of the arm was reflected, the superficial and deep fascia was incised longitudinally, and the medial and lateral intermuscular septa were traced to define the anterior and posterior compartments.

In the anterior compartment, the biceps brachii was exposed; its two heads were identified and followed to the common tendon inserting on the radial tuberosity. Deep to it, the brachialis was seen arising from the anterior humerus and inserting on the coronoid process of the ulna.

In the posterior compartment, the triceps brachii was displayed, with its long, lateral, and medial heads traced to the olecranon.

### *KURPARA PRADESHA* (ELBOW REGION)

For elbow dissection, the forearm was slightly extended and supinated. The skin, superficial fascia and deep fascia forming the roof of the cubital fossa was incised and reflected, and the boundaries of the cubital fossa were defined: laterally by brachioradialis, medially by pronator teres, and superiorly by a line joining the medial and lateral epicondyles of the humerus.

The contents of the fossa were identified along with the tendon of biceps brachii. The radial nerve and its branches were seen deep to brachioradialis. The floor of the cubital fossa was formed by brachialis and supinator. The origins and insertions of the muscles were studied, and posteriorly the attachments of triceps brachii and anconeus were observed.

### *MANIBANDHA–KURPARANTHARA PRADESHA* (FOREARM)

A midline skin incision was made from the elbow to the wrist with transverse cuts at both ends, and the skin was reflected to expose the superficial fascia. The deep fascia was incised to reveal the anterior compartment muscles. The superficial group—pronator teres, flexor carpi radialis, palmaris longus, flexor carpi ulnaris, and flexor digitorum superficialis—was exposed and their common origin from the medial epicondyle noted. After reflecting these muscles, the deep group consisting of flexor digitorum profundus, flexor pollicis longus, and pronator quadratus was displayed.

The posterior compartment was examined with the forearm prone. The skin and fascia were reflected to expose the superficial extensors—brachioradialis, extensor carpi radialis longus and brevis, extensor digitorum, extensor digiti minimi, and extensor carpi ulnaris—followed by the deep muscles including supinator, abductor pollicis longus, extensor pollicis longus and brevis, and extensor indicis. The origins and insertions were studied.

### *MANIBANDHA PRADESHA* (WRIST REGION)

A transverse incision was made at the distal forearm and proximal palm through skin reflecting superficial and deep fascia to reveal the flexor retinaculum. The palmaris longus tendon was identified inserting into the palmar aponeurosis. The flexor carpi radialis tendon was traced through its compartment to the bases of the second and third metacarpals, and the

flexor carpi ulnaris tendon to the pisiform, hamate, and base of the fifth metacarpal. The tendons of flexor digitorum superficialis, flexor digitorum profundus, and flexor pollicis longus were observed passing through the carpal tunnel.

With the forearm prone, the posterior skin and fascia were reflected to expose the extensor retinaculum. Beneath it, the tendons of extensor carpi radialis longus and brevis, extensor digitorum, extensor digiti minimi, and extensor carpi ulnaris were identified and traced distally. Laterally, the tendons of abductor pollicis longus, extensor pollicis brevis, and extensor pollicis longus were observed.

***HASTATALA / MANIBANDHATALA PRADESHA, HASTHOPARI KURCHA PRADESHA, PRAHASTA / HASTAGRA PRADESHA* (PALM AND HAND)**

A longitudinal midline incision was made along the thenar and hypothenar eminences, connected by transverse cuts across the distal palmar crease and finger bases. The palmar aponeurosis was identified and incised centrally to reveal the flexor tendons. The tendons of flexor digitorum superficialis, flexor digitorum profundus, and flexor pollicis longus were traced.

The thenar muscles—abductor pollicis brevis, opponens pollicis, and flexor pollicis brevis—and the hypothenar muscles—abductor digiti minimi, opponens digiti minimi, and flexor digiti minimi brevis—were exposed and their attachments studied. The lumbricals arising from the profundus tendons and the palmar interossei were displayed.

On the dorsum of the hand, the skin was reflected, the tendons of extensor digitorum, extensor indicis, and extensor digiti minimi were traced to the extensor expansions, while abductor pollicis longus and extensor pollicis longus and brevis formed the anatomical snuff box. The dorsal interossei were observed.

***HASTHANGULI PRADESHA* (DIGITS OF THE HAND)**

Longitudinal incisions were made on the dorsal and palmar aspects of each finger, connected by transverse cuts at the fingertips and proximal phalanges. After incising the deep fascia, the flexor digitorum superficialis and profundus tendons were identified on the palmar side, traced through the fibrous digital sheaths to their insertions on the middle and distal phalanges respectively.

The lumbricals arising from the profundus tendons were displayed and followed to their insertion into the extensor expansions. The palmar and dorsal interossei were defined and traced to their insertions into the proximal phalanges and extensor expansions. On the dorsal aspect, the tendons of extensor digitorum and extensor indicis were exposed and followed to the extensor expansions. The vincula and synovial sheaths of the flexor tendons were observed.

## DISCUSSION

*Peshi* according to few opinions is the integration of *mamsa,* elongated transformed form of *mamsa according to few*. In *Samhitas,* mamsa is mentioned as one of the *saptha dhatus,* its main *karma* being *lepana* i.e. to cover. Its *karma* is said to encompass structures like *sira*, *snayu*, *asthi*, *parva*, and *sandhi*, and strengthen them.

According to contemporary science tissue are of four types, epithelial, muscular, connective and nervous. The muscular tissue by nature has the ability to contract and expand as necessary and is seen covering vital anatomical structures of the body. Hence, gives mobility, protection, strength primarily.[11]

### Formation of *Mamsa Dhatu*

*mamsa dhatu* is formed from *raktha dhatu* under the influence of *vayu*, *jala*, *agni* and *ushma* and becomes compact.[12] According to Modern science myoblast of the mesenchymal origin undergo migration, proliferation, differentiation and maturation to form muscle tissue.[13] From this explanation *mamsa dhatu* can be corelated to muscle tissue.

### *Peshi*

*Mamsavayava sanghata* forms the *peshi*. Structurally *peshi* are elongated thread like with central fleshy part, with the *Mamsavayava* being *vibhakta* from one another.[14] *Mamsavayava* may be considered as myocyte as it is structurally similar with fiber like elongated shape. Each muscle fiber is covered by an endomysium, collectively forming a fasciculus. Each fasciculus is covered with perimysium. And the whole muscle is covered by epimysium, separating it from the other muscle. All these coverings are formed by connective tissue.[15] From this, *peshi* can be considered as integrated muscle fibers that form muscle.

**Formation of *peshi***

*Vayu* and *Ushma* penetrate *mamsa dhatu* forming the *peshi*.[16] The migration and proliferation can be considered as *karma* of *vaayu* and differentiation and maturation as the *karma* of *ushma*. *Shakhagata peshi*, i.e. the muscles of the limbs are mostly skeletal. *Snayu* is responsible for binding the *mamsa*, which indicates the muscle fibers are united with each other by connective tissue to form a muscle.

***Swaroopa* of *peshi***

Twelve *Swaroopa* of *peshi* are told. They are, *Bahala, Pelava, Sthoola, Anu, Prithu, Vritta, Hrisva, Deergha, Sthira, Mridu, Slakshna, and Karkasha implying* extensive, slender, stout, minute, flat, domed, short, elongated, firm, delicate, smooth and rough muscles respectively. According to modern, the nomenclature of the muscle usually describes the character as well.

***Karma* of *peshi***

The primary function of peshi is to cover, strengthen and stabilize *sira, snayu, asthi, parva, sandhi* etc. Though directly not involved, through *khandara* which itself is said to be *mahasnayu* does contribute in movements like *prasarana, aakunchana* as well. Skeletal muscles are primarily responsible for movement. Structurally it is found in close contact with other structures such as bone, joints, vessels, and internal organs in few instances. Hence guarding, strengthening, and stabilizing them as well.

**DISCUSSION OF *URDHWASHAKHAGATA* PESHI AND MUSCLES OF THE UPPER LIMB**

***Hastaanguligata peshi* -** According to classicals, there are 15 *peshi* in *padanguli pradesha* of one *urdhwashakha*, 3 in each *anguli*.[14] Total *peshi* in *hasthanguli* observed through dissection are 14 in number.

***Prahasthagata peshi* -** The *peshi* is told in this region are 10.[14] The total *peshi* observed during dissection are 12 in number.

***Hasthopari kurchasannivishta peshi* -** Number told according to classics are 10[14], dissected are 8.

***Manibandhatala peshi* -** The *Peshi* told in the *Sushrutha Samhita* in this region are 10[14] in number, *peshi* dissected in this region are 7.

*Bhaavaprakash* opines 5 each in *manibandha* and *Manibandhatala*. 5 and 3 are the number of muscles found during dissection.[17]

*Vaghbhata* opines 10 peshi each in both *manibandha* and *manibandha tala*.[18] 14 peshi were dissected at *manibandha* region apart from muscles of *manibandhatala* as told previously.

***Manibandhakurparantara peshi* -** The *Peshi* told in this region according to classicals are 20.[14] Muscles were observed in this region are 20.

***Kurparagata peshi* -** The *Peshi* told in this region, according to classics, are 5.[14] observed are 5 as well.

***Baahugata peshi* -** The *Peshi* of this region are 20.[14] The total number of *peshi* found in this region is 18.

***Kakshagata peshi* -** The number of *peshi* told in *kaksha pradesh* are10.[14] The total number of peshi found in this region 8.

Longus muscles with their length being the primary feature is considered under *deergha.* Similarly, Brevis muscles under *hrisva*. Muscles with girth under *sthoola*. Miniature muscles under *anu*. The muscles which stabilize the region rather than providing movement are considered under *sthira*, flat muscles under *Prithu*, Cylindrical muscles under *vritta* and Muscles with extensive coverage under *bahala*, slender muscles under *pelava*. Muscles with delicate fasciculi were considered under *mridu*. All skeletal muscles are considered under *karkasha Swaroopa*.

All *urdhwashakhagata peshi* and skeletal muscles of the body may be classified under *karkasha*. All striated muscles- skeletal and cardiac muscle- may be taken in this category.

## CONCLUSION

*Peshi*, *mamsa Sanghata* and does the karma of Lepana covering the *sira*, *asthi*, *snayu* and *sandhi*. Hence *peshi* can be related to muscles according to contemporary science.

Out of 100 stated, the total number of peshi discovered in *urdhwa shakha* can be enumerated up to 92 with respect to *Sushrutha Samhita*, 93 with respect to *Bhaavaprakash Nighantu* and 98 with respect to *Ashtanga Hridaya* and *Sangraha*. However, two or more heads of a single muscle or tendon might have been considered separately and single muscle present in two or more regions might have been counted individually based on its contribution to that particular region.

12 *swaroopa* of peshi have been told on the basis of appearance, nature, size, length, function etc. 11 sw*aroopa* were found relevant to *urdhwa shakha*. *Slakshna* however could not be

related anywhere in this region and might be relevant to other *peshi* of *koshta* or *greevajathrurdhwa.* It is not justified to categorize a muscle under single *Swaroopa* as they can be seen in multiple attributes.

This study gives us an insight regarding the necessity for further understanding of different structures such as *peshi*, *kandara*, *snaayu* and their standardization according to modern anatomy aiming at bridging the gap between *Ayurveda* and contemporary science.

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