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AN APPREHENSION OF GALA ANALOGOUS TO MODERN LITERATURE

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ABSTRACT

Gala is one of the essential parts of the body, as it connects the head to the body, which is mainly responsible for the *Gati* of the *Shira*. It consists of structures such as *Marma, Peshi, Snayu, Kandara, Asthi, Sandhi etc. Gala Pramana* has been stated according to *Samhita.* In the region of *Greeva,* if abnormalities in the structures and interruption in normal physiology occur, it would cause morbidities such as *Vishwachi and Greeva Hundanam*. Besides these, diseases occurring in *Gala Pradesha* are included in the chapter of *Vatavyadhi*. The explanation about the neck is specified layer by layer according to contemporary science. They have mentioned the different structures involved in the neck region. According to yogic science, the plexus are included which has been compared to the *Vishuddha Chakra*. This article elucidates the structures of *Gala Pradesha* in detail in comparison with modern science and its clinical anatomy.

Keywords: *Gala, Marma, Peshi, Snayu, Asthi, Gala pramana, Chakra.*

INTRODUCTION

"Gala" is derived from the root word "Giratyanaya," which refers to the back part or nape of the neck. The synonyms for the term *Gala* are *Greeva, Kantha, and Shirodhara. Acharya Charaka* stated that the *Utpatti*

of *Greeva* can be observed during the third month of gestation[1]. The structures in the *Gala Pradesha* involves fourteen marmas*: Chatasra Peshi, Nava Asthi, and Ashta Kapala Asthi* from the *Greevasandhi*. *Shat trimshat Snayu* and *Chatasra Kandara* are present in the *Greeva* connecting it with the *Hridaya*, extending down to the *Shepha.*[2] The region of the *Gala* consists of *Kantha*, wherein *Vishuddha Chakra* resides.

In contemporary science, the cervical region consists of important muscles: platysma, sternocleidomastoid, scalene muscles and transverse spinalis-arteries like the common carotid artery, internal and external carotid artery. The external jugular vein is also located in this region.

Ligaments such as nuchal, anterior longitudinal, posterior longitudinal, supraspinous, ligamentum flavum are present. Seven cervical vertebrae and two joints can be observed, namely atlantooccipital and atlantoaxial joints.[3]

Acharya Charaka, in the context of *Dashavidha Pareeksha* has mentioned *Pramana* as one of the criteria and the *Gala Pramana* is also specified by *Acharya Sushruta.*[4]

Pramana is further classified into two, namely *Anjali Pramana* and *Anguli Pramana.*

DISCUSSION

In *Kautilya Arthashastra,* one *Angula* is the measurement of the *Madhyama Prakarsha* of the *Madhyama Anguli* of the *Madhyama Kaya Purusha.* If the measurements are altered, it may lead to *Hrusva* and *Deerghata* of the *Anga-Pratyangas.*[5]

While measuring the *Gala*, the *Acharyas* specified the *Ayaama* of the *Gala* as four *Angula* but *Charaka* and *Sushruta* have stated distinct measures of *Angula* in *Parinaha* i.e., 22 *angula* and 20 *angula,* respectively. This is because *Chakrapani,* in the commentary has explained that the *Parinaha* of the *Greeva* has to be taken in elevated position.[6] According to the *Dalhana, Parinaha* is measured with the rope tied around the maximum mass.[7]

The structures of the *Gala* imparts a significant role that bears the weight of the head while it also renders a gateway that reaches the thoracic region. It consists of the individual parts such as:

Marma: The fourteen *Marmas* are *Ashta Matrika Marma,Dwe Krikatika, Chatasra Nila* and *Manya marma*.

Matrika- It is a type of *Sira Marma* and *Sadhyopranahara marma.* An injury to any of the eight *Siras,* four on each side of the *Greeva,* ends lethally within a day.

Matrika Marma corresponds to the four main blood vessels: the common carotid artery, internal and external carotid artery, and jugular veins. A compressive injury to the internal carotid artery paves the way for stretching the carotid sinus. It contains baroreceptors, which give impulses to the cardiovascular center in the medulla oblongata, which diminishes the heart rate. Further compression of this site leads to syncope, unconsciousness, and sudden death.[8]

Krikatika is a type of *Sandhi Marma* and *Vaikalyakara Marma* which is present at the junction of the head and neck. Injury to this *Marma* leads to *Chala Moordhata.*

The region where the *Krikatika Marma* resides precisely indicates towards the atlanto-occipital joint, but this joint but this joint is close proximity to the the atlanto-axial joint. The atlanto-occipital joint involves flexion, rotation, and lateral bending, which resembles nodding of the head as the primary motion. The lateral atlantoaxial joints are gliding-type synovial joints; the head may turn side to side, as when turning the head to show disapproval.

The posterior longitudinal ligament originates from the body of the axis and travels downwards, attached loosely posterior to the vertebral bodies and the intervertebral disc. This posterior ligament is responsible for the stability of the cervical spine; trauma to this structure leads to flexion-rotation injury, which in turn causes anterior cervical subluxation; this can be compared to the *Viddha lakshana* of *Krikatika Marma i.e., Chala moordhata.*[9]

Peshi

In the *Greeva* and the region above it consists of thirty-four peshis. It varies in shape and size like *Bahala, Pelava, Sthula,* etc. *Peshi* are considered as the strong

structure that envelops *sira, snayu, asthi, and sandhi* in their place naturally.[10] Among the muscles mentioned above, *Chatasra Peshi* are present in *Greeva*. These could be understood as the main muscles of the neck. These are namely:-

The ***platysma*** originates from the skin, fascia and the upper parts of the pectoralis major and deltoid-the anterior and posterior fibers curve upwards over the skin of the mandibular region.

The ***sternocleidomastoid*** has two heads: the clavicular head and the sternal head. It helps to rotate the head and controls the temporomandibular joint as it inserts into the temporal bone.

Scalene muscles originate from the cervical vertebrae to the tubercle of the first rib. These muscles help to breathe in.

Transversospinalis originates from the transverse process of T6-T10 and inserts in spinous process of C6-T4.It helps flexion, extension, and lateral bending and stabilizes the spine.

Acharya Sharangadhara stated that *Mamsa Peshi* is has an important action of maintaining strength, stability and structural integrity of the cervical spine. The *Mamsa Peshi* mentioned above has a resemblance to it.[11]

Asthi

According to *Sushruta,* it is *Nava Asthi* because each of the six upper vertebrae is considered single, but in modern science, there are seven cervical vertebrae. The third to the sixth are typical. The first and second are modified to permit head and neck movements. All seven cervical vertebrae have a foramen transversarium in the transverse process. *Dalhana* stated that the seventh is counted as three bones, i.e., a body with a spine and two transverse processes, and it is an atypical vertebra similar to the thoracic vertebra.[12] This may be because, unlike the other cervical vertebrae, the small transverse foramina do not transmit the vertebral artery and contains a long spinous process known as Vertebra prominens. The upper six vertebrae have the bifid spinous process as it develops from two secondary ossification centres.

The other reason is while counting and identifying the different vertebrae of the spine, the prominence of the seventh vertebra is appreciated on the neck region to estimate the vertebrae that occupy the lower thoracic and upper cervical vertebrae.[13] There are five types of *Asthi*, one of which is *Taruna Asthi*, present in the *Greeva*. According to its *Sthana,* it can be compared to the cartilaginous structure, i.e., intervertebral disc, present in between the adjacent vertebral bodies. According to *Karma*, this structure aids in movement and transmits load to the vertebral column.[14]

Sandhi

The *Ashta Kapala Asthi* forms the *Greeva Sandhi*. It comes under *Chestavanta Sandhi,* which includes slightly movable joints. The surfaces of articulating bones slide one over the other, which is the best example of the *Sandhi* of *Greeva*. These allow for the *Sankochana* and *Prasarana.*[15] The adjacent vertebra connects directly to form *Prushtavamsha*. According to contemporary science, it can be correlated to the intervertebral joints, which are the complex of three separate joints: intervertebral disc joint and two facet joints.

Osteoarthritis may occur at the atlantoaxial joint and the lumbar region. This involves classic pathophysiology, such as loss of articular cartilage, osteophytes visible with radiography and bone thickening with a narrow joint space.

The structural classification of *Ashta sandhi* involves the *Pratara* type of *Sandhi* in *Greeva*. *Dalhana* explained that *Bhelakha* corresponds to *Pratara sandhi;* the articulating surfaces of this variety of joints are flat in nature and the two adjoining vertebrae supported by intervertebral discs in between resemble a floating appearance.[16] The intervertebral discs are made up of fibrocartilage and structurally form a symphysis type of cartilaginous joint.

Snayu

Snayu is formed from the *Medodhatu* as *Kharapaka* during the *Utpatti* of *Garbha*. Out of the four types of *Snayu*, *Pratanvati and Vrutta* snayu are present in all the joints.[17] *Pratanvati Snayu* can be interpreted as anterior and posterior longitudinal ligament, supraspinous and interspinous ligament, and ligamentum flavum because these ligaments pass between the adja-

cent spine and originate from the superior part of the vertebrae. *Vrutta snayu* can compared to membrana tectoria, broad ligamentous sheet which is the superior continuation of the posterior longitudinal ligament. *Chakrapani* clearly illustrates the word *Greeva Hundanam* as '*Greeva Stambha'. Dalhana* also demonstrates *Nishchalikaranam* as *Stambha* in the context of *Snayugata Vata Lakshana. Greeva stambha* can be correlated with the symptoms of torticollis which can be congenital; the causative factor is the fetus position in the uterus resulting in injury to the neck muscles leading to spasm. Secondary causes include slipped and herniated disc.

The *Snayugata vata* manifests symptoms like *Shoola, Kampa,Stambha* in the *Kurpara sandhi* which can be correlated to Tennis elbow. Tennis elbow develops due to injury and inflammation with microscopic degenerative changes encountered at the origin of the tendon of the extensor carpi radialis bravis muscle leading to pain and restriction of arm. *Vilekha Dahana* must be performed on the deeper structures and after the procedure *Yashtimadhu taila* has to be applied.[18] According to *Sushruta Agni karma* can be performed when there is *Teevra Ruja* due to *Vataprakopa* in *Snayu, Asthi, Sandhi,* etc.

Kandara

Mahat Snayus are known as *Kandara.* There are *Shodasha Kandara* among them *Chatasra Kandara* are located in *Greeva.*[19] These are the *Agra-praroha* of *Greeva* connecting to the *Hrudaya* which can be compared with the tendons of the sternocleidomastoid muscle which originates from the clavicle and the sternum, as the heart is situated behind the sternum.

The structures of *Greeva Pradesha,* like the *Snayu* and the *Kandara* gets affected in *Vatavyadhi* such as *Vishwachi, Greeva Hundaram, Manyastambha* etc. With the persistent exposure of *Aharaja* and *Viharaja Nidanas,* there will be prakopa of vata, which impacts the *Kandara* extending from *Talapratyanguli* to *Bahuprishta.*[20] It further exhibits the *Karmakshaya* of *Bahu*. Symptom like *Ruja* in *Vishwachi* could be compared with a frozen shoulder (adhesive capsulitis) which causes dull or aching pain. Over the time, the shoulder becomes very hard to move.

Chakra

Shad Chakras are situated in *Shareera; among* them, the fifth one is the *Vishuddha Chakra* which resembles the knot along with the petal of the lotus. It consists of *Shodasha Dala*(16 petals) and it is of *dhoomravarna*. The complexity and energy level of the *Chakra* increases at each ascending level. It is located in the root of *Kantha*. It resides in significant structures like the endocrine gland i.e., thyroid and parathyroid gland and plexus such as carotid plexus, pharyngeal plexus, laryngeal plexus. The *Vishuddha Chakra* endures self-awareness, strength, complexion, and memory.[21]

As specified above, the thyroid gland resides within *Kantha* and secretion of the hormones is its primary function. The *Kantha* is integral part for the verbal communication; people with imbalanced *Vishuddha Chakra* may combat issues by asserting themselves. The reason for this *Chakra* being essential is because it helps in portraying oneself. Balance of *Vishuddha Chakra* in *Gala* exhibits good communication mental and emotional state.[22]

CONCLUSION

According to *Ayurveda* and Modern literature, the regional anatomy of the Gala Pradesha has been illustrated. The variance of *Aayama*, according to *Acharya Charaka* and *Sushruta* has been explained. Enumeration of the structures in the *Gala Pradesha* has been elaborated. *Marma* and its underlying structures, comparison of *Chatasra Peshi* with muscles. Interpretation of *Navasthi* by vertebrae, *Sandhi* in *Greeva* and intervertebral joints are explained. The resemblance of *Snayu* by ligaments, explanation of *Kandara* in *Greeva*, pathology of *Snayu* and *Kandara* are mentioned. *Chakra* and its significance in the *Gala Pradesha* have been stated.

REFERENCES

1. Paia-sadda-mahannavo; a comprehensive prakrit Sanskrit-dictionary.p.no.7.
2. Kaviraja Ambikadatta Shastri. Sushruta Samhita of Maharshi Sushruta; ayurveda tattva sandipika; hindi com-

mentary; Published by chaukhamba Sanskrita sansthana; Reprint 2012;Volume first shareerasthana 5/18, p.no.191.
3. Dr Rachel Koshi MBBS, MS, PhD. CUNNINGHAM'S MANUAL OF PRACTICAL ANATOMY, Published in the United States of America by Oxford University Press; Sixteenth edition:2018. Volume 3 Head, neck and brain Pg no.121.
4. Agnivesha, Charaka Samhitha, revised by Charaka and Dridhabala with Sri Chakrapanidatta Ayurveda Dipika Commentary in Sanskrit edited by Vaidya Yadhavji Trikamji Acharya. Choukambha Sanskrit Sansthan, Varanasi, Reprint. Edition, 2008. Pp-738, P No- 276.
5. Vagbhata, Ashtanga Hrudaya with Sarvangasundari of Arunadatta & Ayurvedarasayana of Hemadri edited by Pt Harisadasivasastri Paradakara Bhisagacarya 6th edition 2002, Chouhkamba Surbharathi Prakashan, Varanasi, Pp-956, P No- 405.
6. Agnivesha, Charaka Samhita with Ayurveda Deepika commentary by Chakrapaanidutta, edited by Vaidya Yadavji Trikamji Acharya, Varanasi, Chowkamba Sanskrit Sansthan, Vimanasthana 8/117 Pg no.280
7. Sushruta, Sushruta Samhita with Nibandhasangraha Commentary of Sri Dalhana Acharya (Nyayachandrika Panjika of Gayadas Acharya on Nidhanasthana edited by Trikamji Acharya and Narayanaramacharya Kavyathirtha). Choukambha Orientalia, Varanasi, VII Edition. 2002. sutrasthana 35/14 pg. No. 131.
8. Dr. Nilkanth G Thakare, Assistant professor, Department of Rachana Sharir, G. S. Gune Ayurved College, Ahmednagar, Maharashtra, Conceptual study of the Matrika Marma w.r.t Carotid sinus and Carotid body.
9. Webb JK, Broughton RBK, McSweeney T, Park WM: Hidden flexion injury of the cervical spine. J Bone Joint Surg [Br] 58:322-327, 1976.Anterior Cervical Subluxation: An Unstable Position.
10. Sushruta, Sushruta Samhita with Nibandhasangraha Commentary of Sri Dalhana Acharya, (Nyayachandrika Panjika of Gayadas Acharya on Nidhanasthana edited by Trikamji Acharya and Narayanaramacharya Kavyathirtha). Choukambha Orientalia, Varanasi, VII Edition. 2002 shareerasthana. 5/40 Pg no.98
11. Sarangadhara. Pandit Parasurama Sastri, editor. Sarangadhara Samhita with Adhamallas's Dipika & Kasirama's Gudhartha dipika commentary, 5th edition Varanasi: Choukhamba Subharti prakashan; 2002. 5/62, pg 45.
12. Dr. Gaurav Soni, Assistant Professor, Dept of Sharir Rachana Northeastern Institute of Ayurveda, Shillong; A Study of Asthi Sharir in Context of Various Types of Asthi Described in Ayurvedic Samhitas.
13. Ayurveda Acharya Aathwale, Ayurvedic, Allopathic, Sanskrit, Religious books writer and editor, Hariyana; Drishtartha shareera, a textbook on Rachana shareera, Dwitiya khanda. Chp-Asthi shareeram pg no.130.
14. Sushruta, Sushruta Samhita with Nibandhasangraha Commentary of Sri Dalhana Acharya (Nyayachandrika Panjika of Gayadas Acharya on Nidhanasthana edited by Dr. Kevala Krishna Thakral). Choukambha Orientalia, Varanasi, VII Edition. 2002 shareerasthana. 5/20 Pg no.80
15. Ayurveda Acharya Aathwale, Ayurvedic, Allopathic, Sanskrit, Religious books writer and editor, Hariyana; Drishtartha shareera, a textbook on Rachana shareera, Dwitiya khanda. Chp-Sandhi shareeram pg no.175.
16. Sushruta, Sushruta Samhita with Nibandhasangraha Commentary of Sri Dalhana Acharya (Nyayachandrika Panjika of Gayadas Acharya on Nidhanasthana edited by Dr. Kevala Krishna Thakral). Choukambha Orientalia, Varanasi, VII Edition. 2002 shareerasthana. 5/27 Pg no.86
17. Sushruta, Sushruta Samhita with Nibandhasangraha Commentary of Sri Dalhana Acharya (Nyayachandrika Panjika of Gayadas Acharya on Nidhanasthana edited by Trikamji Acharya and Narayanaramacharya Kavyathirtha). Choukambha Orientalia, Varanasi, VII Edition. 2002 shareerasthana. 5/30 Pg no.93
18. Dr. Vyasadeva Mahanta I.P.G.T and R.A, Dept. of Shalyatantra, Gujrat Ayurveda University, Management of tennis elbow by Agnikarma, J-AIM(Journal of Ayurveda and integrative medicine).
19. Sushruta, Sushruta Samhita with Nibandhasangraha Commentary of Sri Dalhana Acharya (Nyayachandrika Panjika of Gayadas Acharya on Nidhanasthana edited by Trikamji Acharya and Narayanaramacharya Kavyathirtha). Choukambha Orientalia, Varanasi, VII Edition. 2002 shareerasthana. 5/11 Pg no.81
20. Sushruta, Sushruta Samhita with Nibandhasangraha Commentary of Sri Dalhana Acharya (Nyayachandrika Panjika of Gayadas Acharya on Nidhanasthana edited by Trikamji Acharya and Narayanaramacharya Kavyathirtha). Choukambha Orientalia, Varanasi, VII Edition. 2002 Nidanasthana.1/75 Pg no.222
21. Kriyatmaka Anveshana of Shat Chakras. Unique Journals of Ayurvedic and Herbal Medicines, 2013;1(03): 34-36
22. Dr. Mahesh Kumawat, M.D Scholar, Dept. of Rachana Shareera, Shri Ganganagar College of Ayurvedic Science Rajasthan, Conceptual study on Chakra and its applied aspect. Journal of WJPMR.

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