



Review Article

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A REVIEW OF THE POSTERIOR ASPECT OF GREEVA SHARIR AND ITS IMPORTANCE

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ABSTRACT

Nowadays, many people complain about cervical pain. Everyone is busy with work, which requires long sitting hours and improper posture. The use of mobile and laptops is increasing nowadays. Because of all these reasons, cervical region diseases are increasing in the community. Greeva is called "Uttamang" in Ayurveda. The posterior aspect of greeva contains various structures. It is a complex structure of bones, muscles, vessels, nerves, ligaments, and tendons. It contains the important structure of bone, i.e., cervical vertebrae. They give neck structure, support the head and provide a wide range of neck movement. It also contains various intervertebral joints, which offer movements like flexion, extension, and lateral neck rotation. The cervical spine contains intervertebral discs, which act as shock absorbers to the demands positioned on the spine. They also provide a cushion between the vertebrae during weight-bearing activities. Many muscles are present in the cervical region; not all are attached to the spine, but many do. Krukatika marma is located on the posterior region of the greeva at the junction of the head and neck. Injury to this marma causes 'Chala Moordhata', i.e., instability of the head. The neck is covered by numerous muscles which allow a lot of different movements of the head. These muscles contain many tiny and elastic fibres. The complaints we see in everyday life are spasms, strain, headache, and numbness in the neck region. All these complaints are associated with injury to neck muscles. Many vital structures in the posterior of the greeva make it an important topic for study.

Keywords: Greeva, Cervical region, marma

INTRODUCTION

To give detailed knowledge about the human body in the easiest way, acharya has divided the human body into six main parts, called "Shadang Sharir". Out of four are limbs; the fifth is the abdomen and thorax, sixth is the head and neck (shira and greeva).¹

Greeva has stated, "Greeva is the one who does the dharan of shira." Greeva is one of the important parts of the human body, having complex structures. The neck is unique in that it supports the weight of the head and allows a variety of head and neck movements.²

The posterior aspect of the greeva region contains the following structure.

Bones

There are 15 bones in the greeva region, according to Acharya Charaka.³ Greeva contains 9 bones, according to Acharya Sushruta.⁴ The spine or vertebral column makes up about 2/5 of the body's total height. It consists of 33 vertebrae, out of which the cervical spine consists of 7 vertebrae. 3rd-6th vertebrae are typical while 1st, 2nd and 7th vertebrae are atypical. 1st cervical vertebra is the atlas, 2nd cervical vertebra is the axis and 7th cervical vertebra is vertebra prominens.

Typical cervical vertebra

Body: The body is small and broader from side to side. Its superior surface is concave. The inferior surface is saddle-shaped, being convex from side to side. Anterior and posterior surfaces resemble those of other vertebrae.⁵

Vertebral foramen: Vertebral foramen is larger than body. It is triangular because pedicles are directed backwards and laterally.

Vertebral arch: The pedicles are directed backwards and laterally. The superior and inferior vertebral notches are of equal sizes. Lamina is relatively long and narrow. Superior and inferior articular processes form articular pillars, which project laterally at the junction of the pedicle and lamina. Superior articular facets are flat. Foramina transversaria pierces the transverse processes. Each process has an anterior and posterior root which end in tubercles joined by a costotransverse bar. The anterior tubercle of the sixth cervical vertebra is prominent and is called the carotid tubercle because the common carotid artery can be compressed against it. The spine is short and bifid. The ligamentum nuchae fill up the notch.

Attachments and relations: Anterior and posterior longitudinal ligaments are attached to the upper and lower borders of the body in front and behind, respectively. The upper borders and lower parts of the anterior surface of the lamina provide attachment to the ligamenta flava. Foramen transversarium transmits the vertebral artery, vertebra veins, and branches from the inferior cervical ganglion. Anterior tubercle gives origin to scalenus

anterior, the longus capitis and oblique part of longus colli. The anterior primary rami of the corresponding cervical nerve groove costotransverse bars. The posterior tubercle originates to scalenus medius, scalenus posterior, and levator scapulae. The splenius cervicis are inserted into the posterior tubercle. The spine originates from the deep muscles of the back of the neck-interspinales, semispinalis thoracic and cervicis spinalis cervicis and multifidus.

Ossification: Typical cervical vertebra ossifies from three primary and six secondary centres.

First cervical vertebra

It is called the atlas. Ring-shaped, It has neither a body nor a spine. It has a short anterior arch, long posterior arch, right and left lateral masses and transverse processes. The anterior arch is marked by a median anterior tubercle on its anterior aspects. Its posterior surface bears an oval facet which articulates with dens. The posterior arch forms about two-fifths of the ring and is much longer than an anterior arch. A median posterior tubercle marks its posterior surface. Each lateral mass shows its upper surface bears the superior articular facet. An inferior facet characterises the lower surface. A small, roughened tubercle characterises the medial surface of the lateral mass. The transverse process project laterally from the lateral mass.⁶

Attachments and relations: Anterior tubercle provide attachment to the anterior longitudinal ligament and provides insertion on each side to the upper oblique part of the longus colli. The anterior arch's upper border attaches to the anterior atlantooccipital membrane. The posterior tubercle provides attachment to ligamentum nuchae and gives origin to rectus capitis posterior minor on each side. The Tubercle on the medial side of the lateral mass attaches to the atlas' transverse ligament. It ossifies from 3 centres.

Second cervical vertebra

It is called the axis and identified by the presence of dens or odontoid process, a robust and tooth-like process projecting upward from the body. Dens are usually believed to represent the centrum or body of the atlas, which has fused with the centrum of the axis. The superior surface of the body is fused with dens. The inferior surface has a prominent anterior margin which projects downwards. The anterior surface presents a median ridge on each side.⁷

Vertebral arch: The pedicles are concealed superiorly by a superior articular process. The inferior surface presents a deep and wide inferior vertebral notch. Lamina is thick and strong. Each superior articular facet occupies the body's upper surface and the massive pedicle. Transvers processes are very small. The spine is large, thick and strong.

Attachments: Dens provide attachment at its apex to the apical ligament, below the apex to the alar ligament. The superior surface of the body receives insertion of longus colli. Lamina provides attachment to ligamenta flava.

Seventh cervical vertebra

They are also known as vertebra prominens because of their long spinous process. The spine is thick long, and nearly horizontal. It is not bifid but ends in a tubercle. Transverse processes are comparatively large. The posterior root is larger than the anterior.⁸

Attachments: The tip of the spine provides attachment to ligamentum nuchae, trapezius, rhomboid minor, serratus posterior, superior splenius capitis, semispinalis thoracis, spinalis cervicis, interspinales, multifidus. The anterior root of the transverse process may sometimes be separate. It then forms a cervical rib of variable size. Its ossification is similar to that of the typical cervical vertebra.

Clinical anatomy

- A cervical rib is an additional rib arising from the 7th cervical vertebra and usually gets attached to the 1st rib near the insertion of the anterior scalenus. If the rib is more than 5 cm long, it displaces the brachial plexus and subclavian artery upwards.
- Intervertebral foramina of the cervical vertebra lie anterior to joints between the articular processes. Arthritic changes in these joints, if they occur, cause tiny projections or osteophytes.
- Prolapse of the intervertebral disc occurs at the junction of different curvatures. So, the common site is the lower cervical and upper lumbar vertebral regions.
- During the judicial hanging, the odontoid process usually breaks to hit upon the vital centres in the medulla oblongata.
- Atlas may fuse with the occipital bone. This is called the C of the atlas and may sometimes compress the spinal cord, requiring surgical decompression.
- Hangman's fracture occurs due to a fracture of the pedicles of the axis vertebra.

Joints

The following joints are present in the cervical region or posterior aspect of the greva region.⁹

i) Atlanto-occipital joint: These are synovial joints of the ellipsoid variety. Articular surfaces are convex occipital condyles above and superior articular facets of the atlas vertebra below, which are concave.

Ligaments

- The fibrous capsule surrounds the joint.
- The anterior atlantooccipital membrane extends from the anterior margin of the foramen magnum above to the upper border of the anterior arch of the atlas below.
- The posterior atlantooccipital membrane extends from the posterior margin of the foramen magnum above to the upper border of the posterior arch of the atlas below.

Arterial and nerve supply: The vertebral artery and the first cervical nerve supply the joint.

Movements: These joint permits movement like flexion, extension and lateral bending.

ii) Atlantoaxial joint: These joints comprise a pair of the lateral atlantoaxial joint between the inferior facet of the atlas and the superior facet of the axis. These are plain joints.

A median atlantoaxial joint between the dens and the anterior arch and between the dens and transverse ligament of the atlas.

Ligaments

- Capsular ligament all around.
- The lateral part of the anterior longitudinal ligament.

- Ligamentum flavum.
- The accessory atlantoaxial ligament presents between the posterior surface of the axis's body and the atlas vertebra's lateral mass.

Movements: Movement at all 3 joints is rotatory and occurs around a vertical axis. Dens form a pivot around which the atlas rotates.

iii) Typical cervical joints between the lower six cervical vertebrae

- An intervertebral disc unites the bodies of the cervical vertebra. On each side of the disc are small synovial joints called joints of Luschka or uncovertebral joints. The adjacent vertebra is connected by several ligaments, which are-
- Anterior longitudinal ligament
- Posterior longitudinal ligament
- Intertransverse ligament
- Interspinous ligament
- Supraspinous ligament
- ligamentum nuchae
- The joint between vertebral arches

Marma

Krukatika marma

It is located at the junction of the head and neck, i.e., shira and greeva. It is a crucial marma. It is type of sandhi marma and type of vaikalyakara marma according to parinam. These are two in number. This marma is made up of bony joints and also by the

mamsa, sira, snayu, and asthi. Its praman is ½ angula. When krukataka marma gets injured, it causes chala moordhata, i.e., instability of the head or continuous shaking of the head.¹⁰

Muscles

i) Scalene muscle: Usually three scalene muscles-scalenus anterior, scalenus medius, and scalenus posterior. The Scalenus medius is the largest, and the scalenus posterior is the smallest. These muscles extend from the transverse processes of the cervical vertebra to the first two ribs. Therefore, they can elevate three ribs or bend the cervical part of the vertebral column laterally. These muscles stabilise the neck along with other muscle.¹¹

ii) Sternocleidomastoid muscle: It is a large superficial neck muscle. Its sternal head arises from the superolateral part of the front of the manubrium sterni. The clavicular head is musculotendinous and arises from the medial one-third of the superior surface of the clavicle. A thick tendon inserts it into the lateral surface of the mastoid process and, by thin aponeurosis, into the lateral half of the superior nuchal line of the occipital bone. The spinal accessory nerve supplies it, and branches from the rami of C2 and C3 are proprioceptive. Branches from the thyroid artery, suprascapular artery and occipital artery supply it. When one muscle contracts, it tilts its head towards the shoulder of the same side. When both muscle contract together, they draw the head forwards, as in eating and lifting the head from the pillow with the longus colli, flexing the neck against resistance. Torticollis is a deformity in which the head is bent to one side and the chin points to the other. This results from spasms or contractures of muscles supplied by the spinal accessory nerve, which are sternocleidomastoid and trapezius muscles.¹²

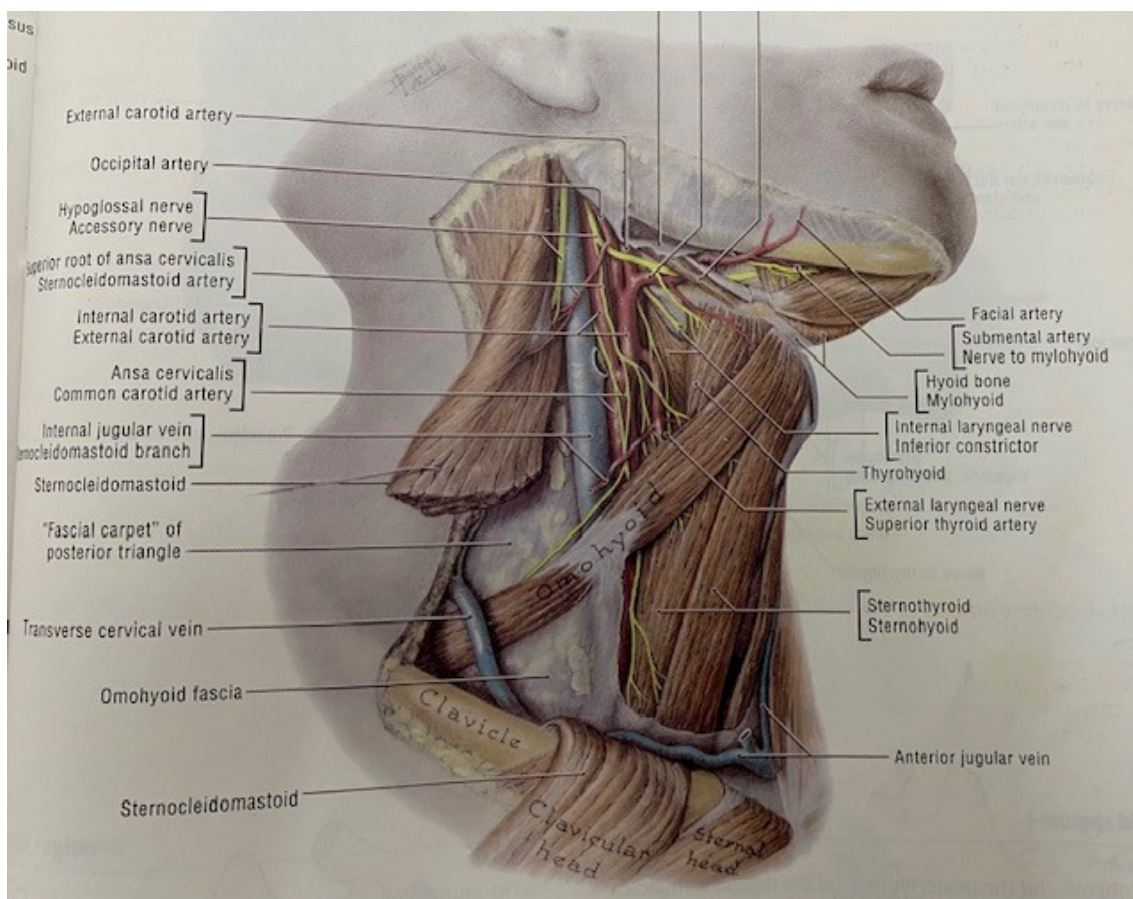


Figure 1: Sternocleidomastoid muscle¹³

iii) Trapezius muscle: The right and left muscles together form a trapezium. It originated from the superior nuchal line, C7 spine, ligamentum nuchae, and T1-T12 spine. Its upper fibres are inserted into the posterior border of the lateral one-third of the clavicle. Middle fibres into the medial margin of the acromion

process and upper lip of the crest of the spine of the scapula. Lower fibres on the apex of the triangular area at the medial end of the spine. The spinal part of the accessory nerve and branches from C3 and C4 supplies it. The upper fibres of both sides extend the neck.¹⁴

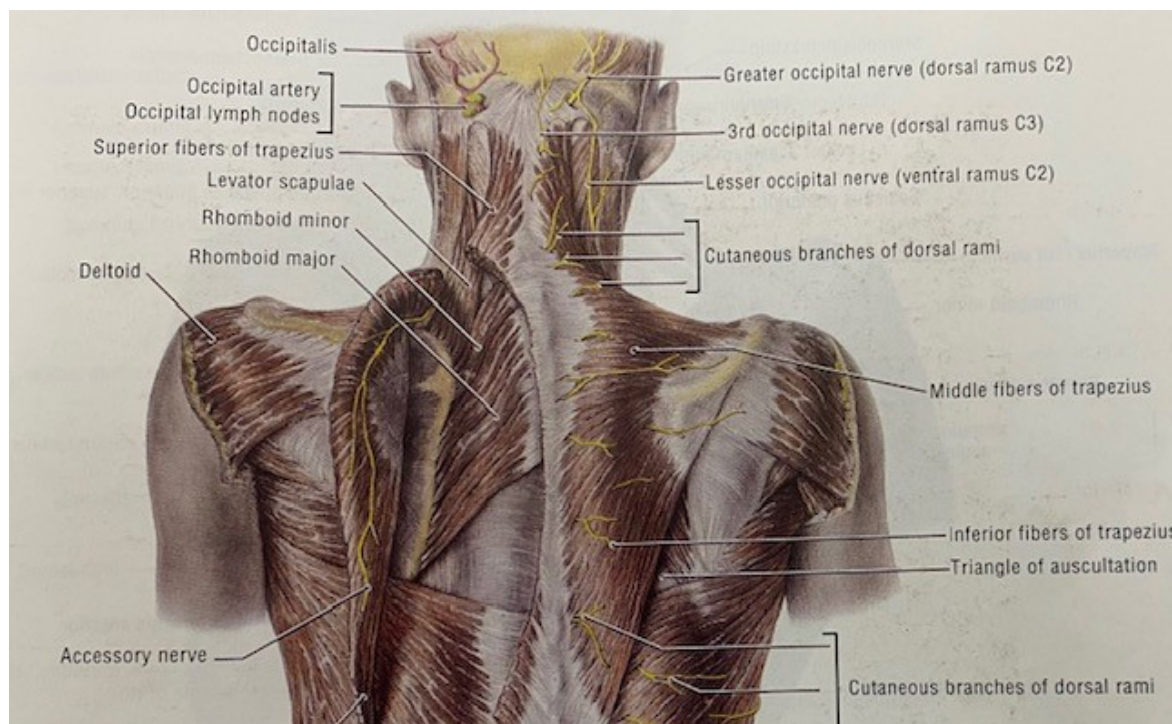


Figure 2: Trapezius Muscle¹⁵

iv) Levator scapulae muscle: It arises from transverse processes of C1, C2, posterior tubercles of transverse processes of C3, C4. It is inserted into the superior angle and upper part of the medial border of the scapula. It is supplied by branches from the dorsal scapular nerve (C5) and C3 and C4. It helps in the elevation of the scapula and steadies the scapula during the movement of the arm.¹⁶

(proprioceptive, C2 and C3), levator scapulae (C3, C4), trapezius (proprioceptive, C3, C4). The nerve supply to the diaphragm is the phrenic nerve, which arises from the cervical plexus's 3rd, 4th, and 5th cervical nerves. It is only motor nerve supply to the diaphragm.¹⁹

v) Erector spinae: It is a true muscle of the back supplied by posterior rami of spinal nerves. Extends from sacrum to skull. It originates mainly from the back of the sacrum. It splits into three columns: iliocostalis, longissimus, and spinalis. Iliocostalis are short slips inserted into the angles of the ribs and posterior tubercles of the cervical transverse process. Longissimus cervicis inserted into transverse process of C2-C6 vertebrae. Spinalis is the medial column extending between the lumbar and cervical spine.¹⁷

Diseases of the cervical region

According to Ayurveda

Manyastambha: When vitiated vayu enters in manya nadi, it causes manyastambha (stiffness in the greeva region)²⁰. Manyastambha or greevastambha is vataj nanatmaj vyadhi²¹. It shows symptoms like tenderness, referred pain, cervical stiffness, and limited range of movements. In Ayurveda, cervical spondylosis can be correlated with greevastambha.

According to Modern

i) Cervical spondylosis: Cervical spondylosis is the commonest disorder of the cervical spine. It is a degenerative condition of the lower cervical region. It is characterised by degeneration of the intervertebral disc, surrounding fibrosis, and hypertrophy of the edges of vertebral bodies.²² Using panchmoola kwath or dashamoola kwath ruksha sweda is given in manyastambha. Massage with katutail is given in greevastamba²³.

vi) Splenius: These are 2 in number. These are splenius cervicis and splenius capitis. Splenius cervicis gets inserted into posterior tubercles of transverse processes of the C1-C4 vertebra. Dorsal rami of C1-C6 nerves¹⁸ supply it.

ii) Neck pain: It can be due to injury, mechanical or muscular problems, stress, falling asleep in awkward position prolonged use of a computer keyboard or mobile. It can be treated with the help of ayurveda panchakarma therapies for a period of 7/14/21/28 days. Abhyangam with specific herb oils, nadiswedanam, patrapottali, greevabasti, shirodhara, nasya

f) Nerves: Posterior aspect of the greeva region is supplied by spinal nerves, i.e., the cervical plexus. The anterior rami of the first four cervical nerves form the cervical plexus. The plexus is covered in front by the prevertebral layer of deep cervical fascia and is related to the internal jugular vein within the carotid sheath. Cutaneous branches are lesser occipital auricular, transverse cutaneous, and supraclavicular. Muscular branches of neck muscle are prevertebral muscles, sternocleidomastoid

different types of yogasana are also helpful in neck pain like Bhujangasana, Matsyasana, Purvottanasana, Shavasana, Suptavajrasana.²⁴

Importance of cervical region

As we know, the cervical region, i.e., greeva, does the dharan of shira, which is uttamanga, where every individual's life lies. Also, the centres of all sense organs are located in the shira. It provides support for the weight of the head. It protects the spinal cord. It allows a wide range of head movements. It also protects blood vessels which supply circulation to the brain. Provide an attachment point for many muscles in the shoulder and trunk. In this modern era, more individuals are living sedentary life. People are more inclined towards desk work, laptop, computer and mobile use. Most people suffer from cervical region pain (neck pain) and headache. The cervical region is a complex structure. It includes bones, joints, muscles, nerves, and blood vessels; also, it is an integral part of shadang sharir. Injury or pathology of any structure causes deformity or disease of the cervical region. Greevabasti or manyabasti, snehan is given for cervical diseases. We must protect it from any injury or extreme workload on the neck region to avoid any illness or injury to this region.

CONCLUSION

The posterior aspect of greeva is an important part containing complex structures. Any pathology in this region causes disturbance in day-to-day life. With the help of ayurvedic treatment, we can manage the pathology of the cervical region. Any treatment and surgery can be possible by getting detailed knowledge about its structures.

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