

# Unlocking the Mysteries: Exploring Kakshadhara Marma and Thoracic Outlet Syndrome

Dr. Richa Tiwari<sup>1</sup>, Dr. Pavan R. Gulhane<sup>2</sup>, Dr. Shubhangi R. Wadhe<sup>3</sup>

<sup>1</sup>Assistant professor Rachana Sharir department in L.N. Ayurved College and hospital Bhopal M.P.

<sup>2</sup>Associate Professor & Guide, Department of Rachana Sharir, Dr. D. Y. Patil College of Ayurved and Research Centre, Pimpri, Pune – 411018, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune (Deemed to be University)

<sup>3</sup>PG Scholar, Department of Rachana Sharir, Dr. D. Y. Patil College of Ayurved and Research Centre, Pimpri, Pune – 411018, Dr. D. Y. Patil Vidyapeeth, Pimpri, Pune (Deemed to be University)

**Abstract-** One of *Ayurveda* specialties, *Marma Sharir* (traumatology), is important to surgical operations, treatment. Out of 107 Marma, *Acharya Sushruta* has described *Kakshadhara Marma* as *Snayu marma* and *Acharya Vagbhata* has described it as *Sira marma* and also described different *Vidhya Lakshana*. To effectively utilize valuable knowledge of *Kakshadhara Marma* in the present era which is mentioned by *Acharya Sushruta and Vagbhata*, it is important to closely match their understanding of the practice with modern anatomy viewpoints. Thoracic Outlet syndrome (TOS) is a group of disorders, having collection of symptoms in the shoulder and upper extremity area that results in pain, numbness, and tingling. Because of various etiologies, the true incidence of TOS is difficult to discern. It is one of the closely related syndrome which shows the symptoms mentioned as *Vidhya lakshan* of *Kakshadhara marma*. This study is carried out to fulfil the aim, so that TOS and its management can be considered with the help of *Ayurveda*. **Aim-** This study aims to find out the correlation between the *Vidhya lakshan* of *Kakshadhara Marma* as stated by *Acharya Sushruta and Acharya Vagbhata* in relation with the thoracic outlet syndrome. **Objective –** Objective of this study is to find the exact location of *Kakshadhara marma*. **Material and Methods -** A extensive conceptual review of *Kakshadhara Marma and Marma Sharir* (traumatology) was done with the help of *Ayurvedic literature*. Cadaveric dissection was carried out to finalised the location of this Marma and related structure. **Result -** *Kakshadhara Marma Vidhya lakshan and TOS* is compared on the basis of cadaveric dissection, structure involved and literature review.

**Key Words:** *Sira Marma, Snayu Marma, Traumatology, Urdhwashakha Marma, Vaikalyakar Marma.*

## INTRODUCTION

The branch deal with anatomical and morphological study of the body is titled as “*Sharir*”. One of the

things that is considered important in *Sharirasthan* is *Marma*. The term “*Marma*” was originally used in Indian *Rigvedic* literature. The practical use of *Marma* science has led to its greater significance. According to *Ayurveda*, *Marma* refers to a critical point in the body that might result in trauma, death, agony that is comparable to death (1), irregular pulsation, pain under pressure. (2). The fundamental ideas of *Ayurveda* are unique. In *Ayurveda*, trauma over important points of the body is studied under *Marma* science. *Marma* Therapy is the leading practice in India now a days and having more importance in clinical practice. A collection of multiple disorders together referred to as Thoracic Outlet Syndrome (TOS) cause compression of the neurovascular bundle and vasculatures as it leaves the thoracic outlet. A collection of three gaps between the clavicle and the first rib that serve as the anatomical location of the thoracic outlet in the lower neck are site to several important neurovascular structures.

According to *Ayurveda*, the position of *Kakshadhara marma*, *Acharya Sushruta* has mentioned concisely as “*Vaksha kakshayormadhyaye kakshadharam*” (meaning this marma is located between the *Vaksha* (thorax, chest) and *Kaksha* (axilla) (3). *Acharya Vagbhata* has mentioned its seat at “*Kaksha akshamadhyaye kakshadhara*” (meaning it is located between *Kaksha* (Axilla) and *Aksha* (collar bone) (4).

Although there are fibrous structures like nerve and vascular structures like artery and vein, in the shoulder region. *Acharya Sushruta* categorized *Kakshadhara Marma* as *Snayu Marma*. And *Acharya Vagbhata* has categorised it as *Sira Marma*. As a result, it is difficult to determine exactly where

*Acharya's* located; *Kakshadhara Marma*. Dissecting the shoulder area and with the help of literature study, anatomical location of *Kakshadhara marma* can be determined.

Through this study, an attempt is being made to elaborate Thoracic outlet syndrome in view of *Kakshadhara marma* to help clinicians for therapeutic interventions, surgical operations performed on the shoulder area.

**AIM**

To find out the anatomical and clinical correlation between the *Vidhya lakshana* of *Kakshadhara marma* as stated by *Acharya Sushruta* and *Acharya Vagbhata* in relation with the thoracic outlet syndrome.

**MATERIAL AND METHODS**

The concept of *Kakshadhara Marma* and *Marma Sharir* (traumatology) was studied in detail with the help of Ayurvedic literature. The anatomy of the shoulder area, including its applied aspect, was evaluated with the help of dissection and literature review, with consideration given to the location of *Kakshadhara marma* as reported by our *Acharya's*.

Dissection- Dissection of neck, shoulder, pectoral region and arm region was carried out and structures was observed and identified in view of the study. The location of *Kakshadhara marma* was precisely identified and marked as stated by both the *Acharya's*.

Table 1: Ayurveda literature about *Kakshadhara Marma* –

- A) According to *Acharya Sushruta*- (5)
  - Types  
Rachanatmak (constitution)- *Snayu marma Aghat Lakshana* (trauma) - *Vaikalyakar Marma*  
*Shadanganusar* (location) - *Urdhwashakhagat Marma*
  - Sthana (Position) - *Vaksha kakshayormadhyaye*

- *Pramana* - 1 Angul
- *Viddha Lakshan* - *Kakshadhare pakshaghata*
- *Sankhya* – 2

B) According to *Acharya Vagbhata*- (6)

- Types  
Rachanatmak (constitution)- *Sira marma Aghat Lakshana* (trauma) - *Vaikalyakar Marma*  
*Shadanganusar* (location) - *Urdhwashakhagat Marma*
- Sthana (Position) - *Kaksha akshamadhyaye kakshadhara*
- *Pramana* - 1 Angul
- *Viddha Lakshan* –
  1. *Sandramjastram bahavasraksravet*
  2. *Kuditvam tatra jaayte*
- *Sankhya* - 2

**THORACIC OUTLET SYNDROME (TOS) –**

It is described as group of clinical symptoms caused by compression of the subclavian vessels and brachial plexus during their passage through the thoracic outlet, either congenital or acquired.

It can have a connection to a) trauma b) congenital c) functionally acquired reasons.

A cervical rib or an abnormal first rib are two examples of congenital etiologies. The most frequent traumatizing causes are falls and whip-lash injuries. Sports or the workplace might include intense, repeated activities that are linked to functional acquired causes. (7)

It exhibits the given clinical characteristics.: (8)

1. As lower trunk of the brachial plexus is involved, there is numbness, tingling, and discomfort along the medial side of the forearm and hand, as well as wasting of the small hand muscles (T1).
2. Narrowing of the subclavian artery due to pressure may lead to ischemia and causes symptoms like cold upper extremities, pallor, weak radial pulse.

Table 2: Types and symptoms of thoracic outlet syndrome -(9)

TYPES	Description
1. Neurogenic thoracic outlet syndrome (nTOS)	Upper limb discomfort, paraesthesia, and numbness are the general symptoms (90–95%) due to brachial plexus compression.
2. Venous thoracic outlet syndrome (vTOS)	Narrowing of the subclavian vein can leads to venous thrombosis and cause discomfort and swelling in the upper limbs.

3. Arterial thoracic outlet syndrome (aTOS)	Less than 3% of occurrences of subclavian artery compression result in ischemia, which is characterized by pallor, reduced upper limb pulses, and coldness.
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Table 3: The thoracic outlet syndrome and its anatomical spaces-(7)

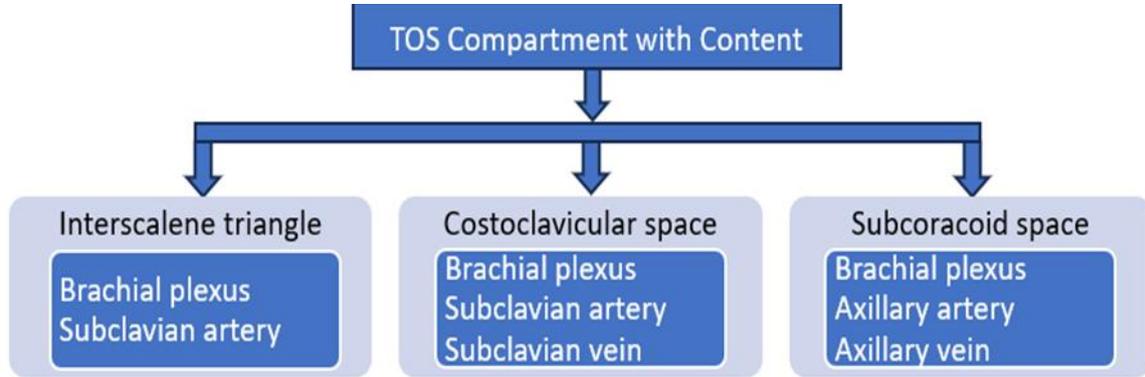
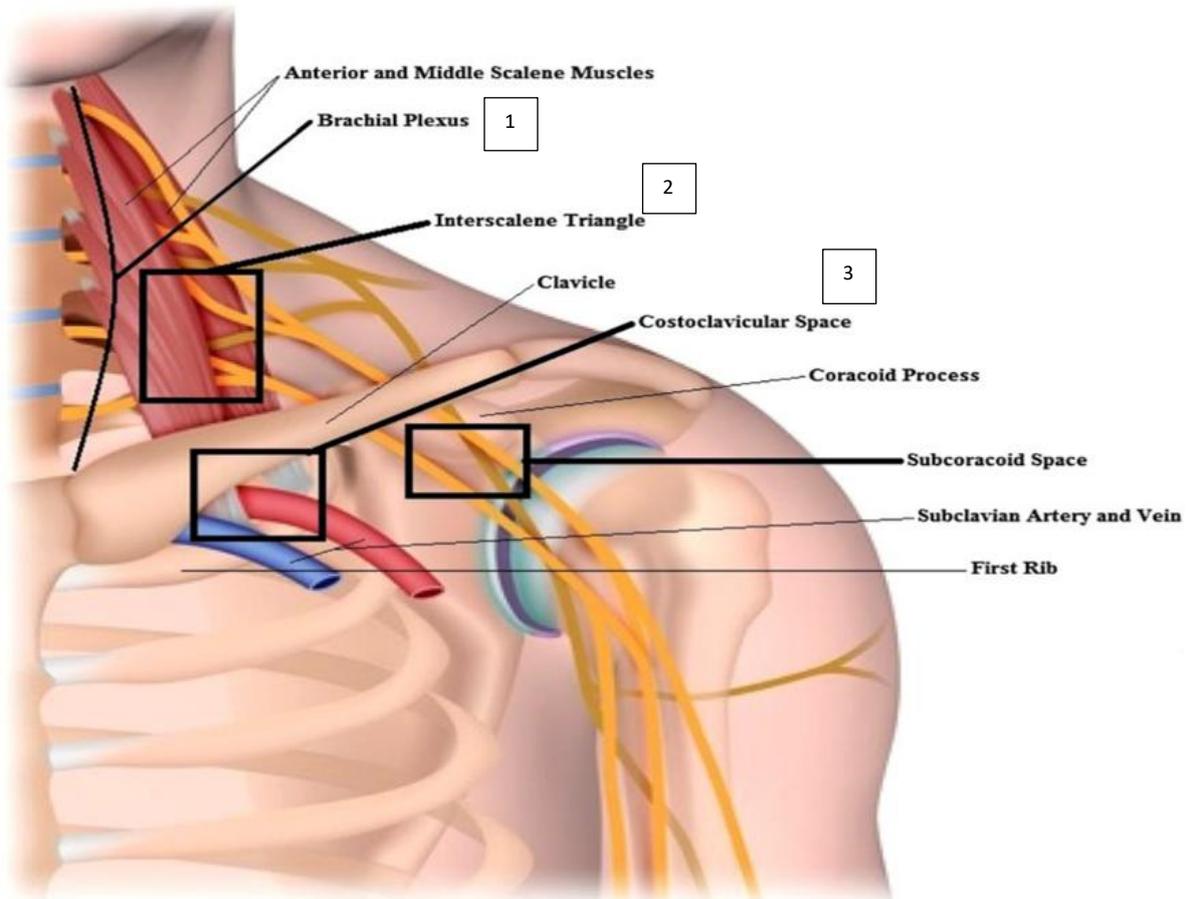


Image 1: Image showing the thoracic outlet (7)

1. Interscalene Triangle
2. Costoclavicular Space
3. Subcoracoid Space



OBSERVATION

A) Cadaveric Dissection

The main structures that are present at the site of dissection are –

- i. Nerves - Brachial plexus
- ii. Subclavian artery, Subclavian vein
- iii. Axillary artery, Axillary vein

Above described structures are seen just after dissecting the shoulder region.

Photographs-

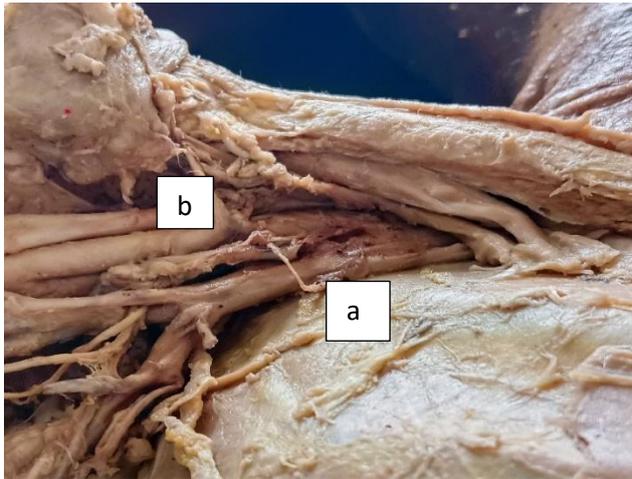


Image 2: Dissection of -a. Axillary vein, b. Axillary artery

Image 3: A dissected shoulder region- Brachial plexus

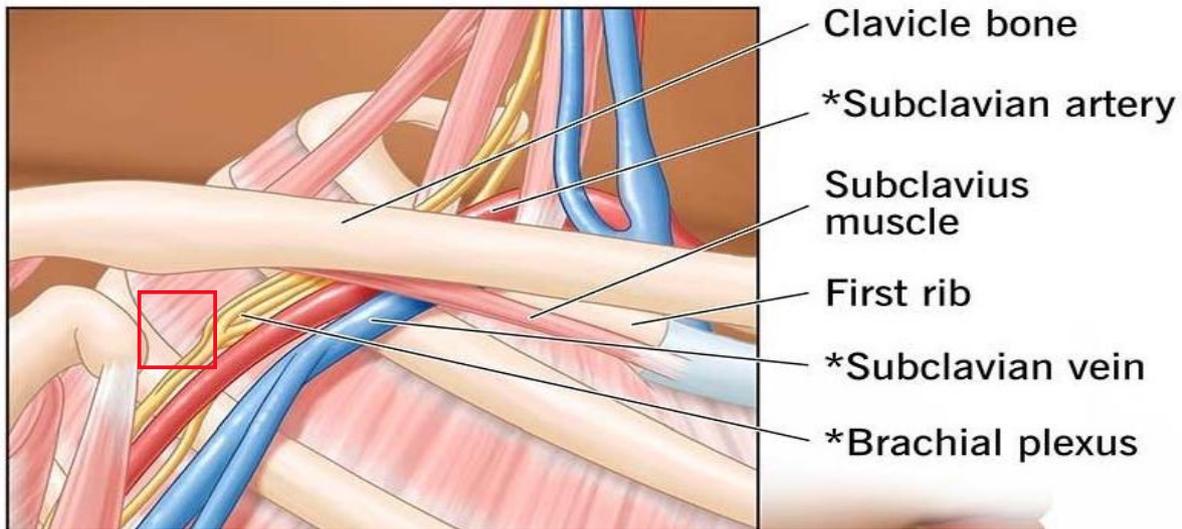
Table 3: Findings of *Kakshadhara Marma* and TOS -

	<i>Acharya Sushrut</i>	<i>Acharya Vagbhatt</i>	Modern Science
On basis of the constitution	<i>Snayu marma</i>	<i>Sira marma</i>	1.Neurogenic TOS (nTOS) 2.Venous TOS (vTOS) 3.Arterial TOS (aTOS)
According to trauma	<i>Vaikalyakar Marma</i>	<i>Vaikalyakar Marma</i>	1.Congenital 2.Traumatic 3.Functionally acquired
On the basis of location	<i>Urdhwashakhagat Marma</i>	<i>Urdhwashakhagat Marma</i>	Thoracic region
Position mentioned	<i>“Vaksha kakshayormadhyaye”</i>	<i>“Kaksha akshamadhyaye Kakshadhara”</i>	1.Interscalene triangle 2.Costoclavicular space 3.Subcoracoid space
Dimension	1 Angula	1 Angula	-
Total number	2	2	2 (unilateral/bilateral)
Effect of trauma	<i>“Kakshadhare pakshaghata”</i>	<i>“Sandramjastram bahavasrak sravet”</i> <i>“Kuditvam tatra jayte”</i>	Brachial plexus block, leading to permanent nerve injury. (10)

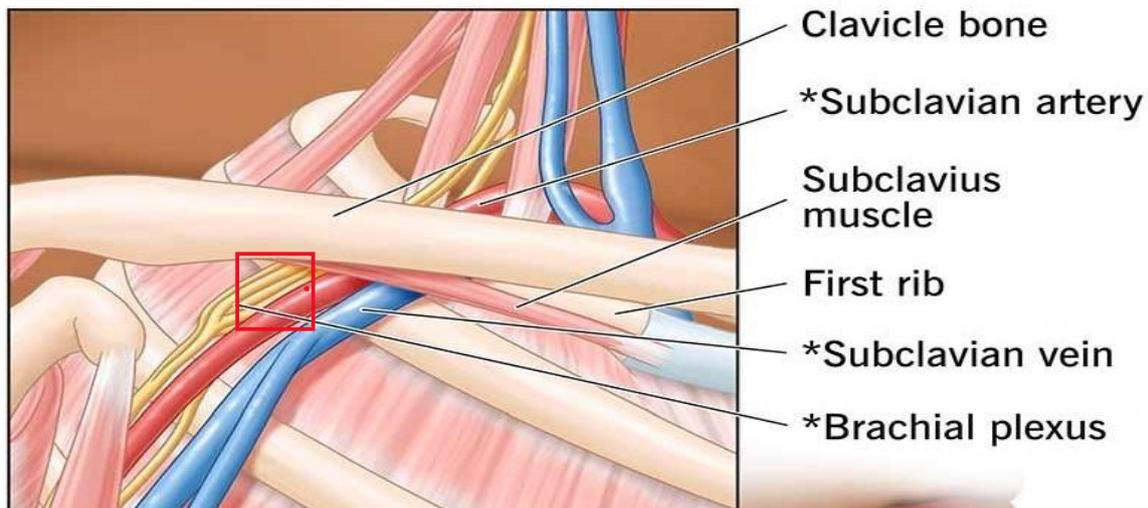
DISCUSSION

i)Location of *Kakshadhara Marma* –

According to *Acharya Sushrut*, *Kakshadhara Marma* lies in between *Vaksha* and *Kaksha* region. According to modern the word *Vaksha* can be related with thorax or chest region. And *Kaksha* as axilla or arm pit. So, according to *Acharya Sushrut*, the exact location of this marma is the sub clavicular area towards the axilla as shown in the figure.



According to *Acharya Vagbhata* the *Marma* lies in between *Kaksha* and *Aksha*. The word in modern is can be related with *Kaksha* as axilla and *Aksha* as collar bone. So, the precise location of this marma according to *Acharya Vagbhata* lies nearer to clavicle bone at its middle part as shown in the figure.



ii) The composition of *Kakshadhara Marma*-

*Marma* is a collection of structures found at a specific location together with functional implications that may arise from damage to the *Marma* location. It Depends on whatever structures are prominent, the *Marma Vidhya lakshan* varies accordingly. *Kakshadhara Marma* is a *Snayu* form of *Marma* according to *Acharya Sushrut*. *Snayu* includes fibrous structures like nerve which is made up of nerve fibres. And *Sira Marma* according to *Acharya Vagbhata* like artery and vein. In addition to these structures involved in this *Marma* are *Mamsa* (flesh), *Asthi* (bones), and *Sandhi* (joints).

In the shoulder region, If there is any injury (*'aghat'*) or trauma that will result in nerve or vascular disease as permanent nerve injury (*'Pakshaghata'*) and neurological damage resulting from compression of the brachial plexus or subclavian vessels, as they travel through the thoracic outlet. Brachial plexus compression (90-95% of all Neurogenic TOS cases), Venous TOS accounts for 3-5% of cases and Arterial TOS the final 1-2% result in a variety of unique symptoms, such as upper extremity pallor, paraesthesia, weakness, muscle atrophy, numbness

of the upper limb and pain, are brought on by compression of this region.(7)

iii) *Pramana* (Dimensions) of *Kakshadhara Marma*

The *Samhitas* (ayurvedic standard texts) explain every *Marma* in terms of definite *Pramana*, that helps in locating Marma. Both *Acharya's* state that *Kakshadhara Marma's Pramana* is *Eka Swa Angul*. All these structures are quite nearly convergent in the area of one finger width.

iv) *Vidhya lakshan* of *Kakshadhara Marma*–

i. *Acharya Sushrut*–

"*Pakshaghata*" or Paralysis, it results in reduced/loss of functions of upper arm, is a traumatic sign of *Kakshadhara Marma* that occurs from the injury ("*aghat*") of brachial plexus nerves. The brachial plexus trunks or cords, originating from nerve roots C5 to T1, are responsible (nTOS).

ii. *Acharya Vagbhata*–

"*Kuditvam*" or distortion of arm or severe disability, due to damage to the local vasculature resulting to blood loss. Compression of the Subclavian artery, vein and Axillary artery, vein are responsible (aTOS, vTOS).

iii. Thoracic Outlet Syndrome–

It have symptoms and signs as upper extremity pallor, paraesthesia, weakness, muscle atrophy, and pain resembling those of *viddha lakshana* as described in *Kakshadhara Marma* by both the *Acharyas*.

CONCLUSION

On the basis of review of literature and cadaveric dissection and contemporary science -

i) According to *Acharya Sushrut*–

As *Acharya* has described it as "*Vaksha kakshayormadhyaye*" that is it is located at sub clavicular area towards the axilla and the structure involved is Nerves of brachial plexus.

ii) According to *Acharya Vagbhata*–

As *Acharya* has described it as "*Kaksha akshamadhaye kakshadhara*" that is the located in sub clavicular area that lies nearer to clavicle bone at its middle part and the structures involved are artery and veins.

iii) As different locations are cited by *Acharya Sushrut* and *Acharya Vagbhata*, if trauma occurs at those specific location, mentioned *viddha lakshan*

("*Kakshadhare pakshaghata*" ~ Paralysis and "*Kuditvam tatra jaayte*" ~ Distortion or disability of arm) can be seen as structures involved are different.

iv) Those *Lakshana* or clinical anatomy is closely related to the symptoms of Thoracic Outlet syndrome which differs according to the site of trauma.

v) nTOS is most common (90-95%) and it can be compared with *lakshan* described by *Acharya Sushrut* i.e. *Pakshaghat*.

vi) aTOS (1-2%) and vTOS (3-5%) can be compared with *lakshan* described by *Acharya Vagbhata* i.e. *Kuditvam*.

REFERENCE

- [1] Prof. Murthy K R S, Ashtang Samgrah, Sharir Sthan, Vol 2, Chaukhamba Orientalia, Varanasi, addition-2016 page no. 90 –97
- [2] Kunte A M, Navare K R S, Sharira Sthana, Ashtang Hridaya, Chaukhamba Orientalia, Varanasi, addition-2002–page no. 413
- [3] Shastri A., Sushrut Samhita, Vol 1, Chaukhamba Sanskrit Sansthan, Varanasi, Reprint addition- 2018, page no. 72
- [4] Prof. Murthy K R S, Ashtang Samgraha, Vol 2, Chaukhamba Orientalia, Varanasi, Third addition-2001, page no. 91
- [5] Shastri A., Sushrut Samhita, Vol 1, Chaukhamba Sanskrit Sansthan, Varanasi, Reprint addition- 2018, page no. 68
- [6] Atridev Gupt K., Ashtang Hridayam, Vol 2, Chaukhamba Orientalia, Varanasi, Reprint edition- 2010, page no. 265
- [7] Jeremy B. Green, Mark R. Jones, Thoracic Outlet Syndrome: A Comprehensive Review of Pathophysiology, Diagnosis, and Treatment, 2019 Apr 29; 8(1): 5–18. Doi: 10.1007/s40122-019-0124-2. PMID: PMC6514035, PMID: 31037504
- [8] Vishram sing, Vol 1, Textbook of Anatomy, 2014 Reed Elsevier India Private Limited, Second edition- 2014, page no. 204
- [9] D'Souza D, Silverstone L, Sharma R, et al., Liz Silverstone, Thoracic outlet syndrome. Reference article, Radiopaedia.org, Accessed on 21 Feb 2024, last revised on 30 Oct 2023. DOI: <https://doi.org/10.53347/rID-2172>
- [10] Haller André P Boezaart, Sarah Laduzenski Allison Haller, Neurogenic thoracic outlet

syndrome: A case report and review of the literature, Apr-Jun 2010; 4(2): 27-35. Doi: 10.4103/0973-6042.70817