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A DESCRIPTIVE STUDY OF *DHAMANI SHARIR* WITH ITS STRUCTURAL CORRELATION TO THE MODERN ARTERIAL SYSTEM

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ABSTRACT

Background: The concept of *Dhamani Sharir* holds significant importance in *Ayurvedic* anatomy (*Sharir Rachana*), referring to pulsating channels that distribute *Rakta* (blood) and vital nutrients throughout the body. Although described extensively in classical texts like the *Charaka Saṃhitā*, *Sushruta Saṃhitā*, and *Ashtanga Sangraha*, its anatomical correlation with the modern arterial system remains underexplored in contemporary scholarship. **Aim:** To descriptively study *Dhamani Sharir* and establish its structural and functional correlation with the modern arterial system. **Objectives:** To explore classical *Ayurvedic* literature on *Dhamani Sharir*. To analyze the anatomical and physiological features of *Dhamanis*. To

compare *Dhamani Sharir* with the modern arterial system. To identify structural and functional similarities between *Dhamanis* and arteries. To highlight the clinical relevance of *Dhamani* knowledge in contemporary practice. **Materials and Methods:** This is a descriptive literary study based on classical references from *Charaka Saṃhitā*, *Sushruta Saṃhitā*, *Ashtanga Hridaya*, and commentaries like *Dalhana* and *Arunadatta*. Comparative analysis was conducted with modern anatomical literature, particularly focusing on arterial classification, origin, distribution, and physiological roles. Diagrammatic representations and tabular comparisons were employed for conceptual clarity. **Results:** The study revealed that *Dhamani*—originating from the heart—are pulsatile vessels that carry *Rakta* and *Prana* throughout the body. The classification into *Urdhwagami*, *Tiryakgami*, and *Adhogami Dhamanis* finds structural and functional similarity with ascending aorta and its branches, systemic arteries, and descending aorta, respectively. The number of *Dhamanis* described (24 in *Sushruta*, 10 in *Charaka*) appears to represent major arterial trunks rather than individual vessels. The correlation supports a physiological and anatomical resemblance to modern arteries in terms of directionality, pulsatility, and distribution. **Conclusion:** The *Dhamani Sharir* described in *Ayurvedic* literature, though conceptual in its presentation, shares notable structural and functional parallels with the modern arterial system. Bridging traditional and modern anatomical knowledge may contribute to a more integrative understanding of circulatory physiology in *Ayurvedic* education and practice.

KEYWORDS: *Dhamani Sharir*, *Rakta Vaha Srotas*, Arterial System, *Sharir Rachana*, *Ayurvedic Anatomy*, Cardiovascular Correlation

INTRODUCTION

Ayurveda, the ancient Indian science of life, presents a comprehensive view of human anatomy, physiology, and pathology through its unique lens. One of the critical concepts in *Ayurvedic Sharir* is that of *Dhamanis*, which are considered vital channels responsible for the circulation of *Rasa Dhatu* and other body constituents.[1] The classical literature, particularly the *Charaka Saṃhitā*, *Suśruta Saṃhitā*, and *Aṣṭāṅga Hṛdaya*, elaborates the concept of *Dhamanis* in a structured manner, offering insight into their numbers, origins, routes, and functions. These descriptions reflect the ancient seers' intricate understanding of human physiology and internal body systems.[2]

The term *Dhamani* is derived from the root "Dham," which means to pulsate or expand. This pulsatile nature is a key identifier distinguishing *Dhamanis* from *Siras* (veins) and *Srotas*

(channels). According to *Suśruta*, *Dhamanis* emerge from the heart and are responsible for transporting *Rasa* (nutritive fluid) to various body tissues.[3] The *Dhamanis* are classified into three categories based on their direction: *Urdhvaga* (ascending), *Adhoga* (descending), and *Tiryakgami* (transverse). Each of these types carries out specific physiological functions, ranging from nutrition to respiration and sensory functions.[4]

Modern anatomical science describes arteries as muscular blood vessels that carry oxygenated blood away from the heart to the rest of the body, with the exception of pulmonary arteries. Structurally, arteries are characterized by thick, elastic walls that withstand and propagate the pressure generated by cardiac contraction. The aorta and its major branches—including carotid, subclavian, mesenteric, and iliac arteries—form a complex network that mirrors the physiological descriptions found in *Ayurvedic* texts.[5]

A comparative study between *Dhamanis* and arteries reveals a striking resemblance in their origin, pulsatile nature, and functional aspects. The upward, downward, and transverse movements described in the classical division of *Dhamanis* can be correlated with the arterial supply to the head and neck, lower limbs, and trunk, respectively.[6] Moreover, the distribution pattern and branching of *Dhamanis* resemble modern vascular pathways, indicating that ancient *Ācāryas* had a deep observational understanding of internal human structures.[7]

The clinical significance of understanding *Dhamani Sharir* is also immense. The principles of diagnosis, *Naadi Pariksha* (pulse examination), and the therapeutic basis of *Raktamokshana* (bloodletting) in *Ayurveda* depend upon a sound knowledge of *Dhamani* and its location. The knowledge also contributes to understanding various pathological conditions related to the circulatory system from both *Ayurvedic* and modern standpoints. Thus, a detailed analysis of *Dhamanis* has implications not only for anatomical correlation but also for integrative clinical practice.[8]

This study aims to systematically describe the concept of *Dhamani Sharir* from classical sources and establish its correlation with the arterial system known in modern anatomy. Through comparative analysis, the research seeks to highlight the parallels in structure and function, thus bridging ancient *Ayurvedic* wisdom with contemporary biomedical understanding. Such an integrative anatomical study provides a foundation for interdisciplinary dialogue and validation of traditional knowledge through modern frameworks.[9]

AIM AND OBJECTIVES

Aim:

To descriptively study *Dhamani Sharir* and establish its structural and functional correlation with the modern arterial system.

Objectives:

1. To explore classical *Ayurvedic* literature on *Dhamani Sharir*.
2. To analyze the anatomical and physiological features of *Dhamanis*.
3. To compare *Dhamani Sharir* with the modern arterial system.
4. To identify structural and functional similarities between *Dhamanis* and arteries.
5. To highlight the clinical relevance of *Dhamani* knowledge in contemporary practice.

MATERIALS AND METHODS:

This study is descriptive literary research based on classical *Ayurvedic* texts and modern anatomical references. Primary sources such as the *Charaka Saṃhitā*, *Suśruta Saṃhitā*, and *Aṣṭāṅga Hṛdaya* were thoroughly reviewed to extract details regarding the classification, number, origin, route, and functions of *Dhamanis*. Standard modern anatomy textbooks, including Gray's Anatomy and Cunningham's Manual of Practical Anatomy, were consulted to understand the structure and function of the arterial system. A comparative analytical approach was adopted to correlate the features of *Dhamanis* with arteries in terms of direction, pulsation, anatomical location

CONCEPTUAL STUDY

In *Ayurveda*, the anatomical concept of *Dhamani Sharir* holds a significant place in the understanding of internal bodily structures and their physiological roles. The term *Dhamani* is derived from the root "Dham" which means to pulsate or expand, indicating a structure that exhibits rhythmic movement. *Dhamanis* are essentially channels or tubular structures responsible for transporting *Rasa Dhatu* (nutritive essence) and are considered one of the vital *Srotomarga* (pathways) in the human body.[10]

Origin and Seat of Dhamanis

According to *Suśhruta Samhita Sharirsthana*, *Dhamanis* originate from the *Hridaya* (heart). The *Hridaya* is considered the central controlling organ for circulation, where *Rasa* generated from digested food is received and then distributed through *Dhamanis* to nourish the entire

body. The *Nābhī* (navel) is also mentioned as an associated point of origin due to the embryological importance and its role in development.[11]

Number and Classification

As per *Suśruta*, there are twenty-four principle *Dhamanis* divided into three types:

1. **Urdhvaga Dhamanis (10)** – These ascend upward from the heart and supply the head, neck, sense organs, and brain. They are involved in sensory functions like vision, hearing, taste, and smell. They are also associated with respiration and speech.[12]
2. **Adhoga Dhamanis (10)** – These descend downward and are responsible for functions related to digestion, excretion, reproduction, and menstruation. They serve the lower parts of the body including the abdominal organs and lower limbs.[13]
3. **Tiryakgami Dhamanis (4)** – These move transversely throughout the body. Their primary function is the nourishment of *Dhatus* and regulation of body temperature. They spread laterally and help in distributing nutrients and subtle energies.[14]

Structural Characteristics

Dhamanis are described as hollow, tubular structures that carry *Rasa Dhatu* enriched with *Ojas* (vital energy). The pulsating nature of *Dhamanis* distinguishes them from *Siras* (veins), which are said to carry waste products (*Mala*), and do not pulsate. *Dhamanis* are also more prominent in carrying forward motion, while *Siras* carry retrograde flow back to the heart. The walls of *Dhamanis* are thought to be stronger, and their function is vital for maintaining vitality and life itself.[15]

Clinical Importance

In *Ayurveda*, clinical procedures like *Naadi Pariksha* (pulse diagnosis), *Raktamokshana* (bloodletting), and *Abhyanga* (massage) are based on a clear understanding of the location and function of *Dhamanis*. The proper identification of these structures is essential for effective diagnosis and treatment. Palpation of *Dhamani* at specific sites is used to assess the state of *Doshas* and internal organ function.[16]

Anatomical Sites for Palpation

Texts such as *Bhavaprakasha* and *Yogaratnakara* mention specific locations where *Dhamanis* can be palpated to assess the state of health:

- *Kara* (wrist)

- *Pada* (foot)
- *Greeva* (neck)
- *Urah* (chest)

These sites are analogous to arterial pulse points in modern practice and hold diagnostic value in traditional *Ayurvedic* examination. Unlike modern anatomy, which focuses on structural precision, *Ayurvedic* anatomy considers both physical and energetic aspects. *Dhamanis* are understood not only as blood-carrying vessels but also as conduits for *Prana*, *Ojas*, and *Tejas*. They are also involved in the communication between *Indriyas* (sense organs) and the *Mana* (mind) via the *Hridaya*. This dual structural and subtle role makes *Dhamanis* a unique anatomical and physiological concept in *Ayurveda*.[17]

MODERN ANATOMICAL REVIEW

The arterial system forms a fundamental component of the human circulatory system, responsible for transporting oxygenated blood from the heart to all tissues and organs of the body, except in the pulmonary circuit where arteries carry deoxygenated blood to the lungs. Structurally and functionally, arteries are highly specialized vessels that ensure the efficient distribution of nutrients and gases, and they play a vital role in maintaining blood pressure and tissue perfusion.[18]

Origin and Central Arteries

The arterial system begins at the heart, specifically from the **left ventricle**, where the **aorta**, the largest artery in the human body, emerges. The aorta arches and descends to give rise to several major branches: Ascending Aorta – arises directly from the left ventricle. Aortic Arch – gives rise to the brachiocephalic trunk, left common carotid artery, and left subclavian artery, which supply the head, neck, and upper limbs. Descending Thoracic Aorta – continues through the thorax.[19] Abdominal Aorta – supplies the abdominal organs and divides into the common iliac arteries for the lower limbs. This hierarchical branching ensures blood is delivered from the central organ to the periphery with both efficiency and pressure regulation.[20]

Classification of Arteries

Arteries are classified based on size and function into:

1. **Elastic Arteries** – e.g., aorta, pulmonary arteries. These have large diameters and high elastic content in their walls, allowing them to withstand and moderate the high pressure from cardiac output.[21]
2. **Muscular Arteries** – e.g., radial, femoral, brachial arteries. These medium-sized arteries have more smooth muscle, allowing regulation of blood flow via vasoconstriction and vasodilation.[22]
3. **Arterioles** – the smallest arteries, they lead directly into capillary beds and are the primary site of vascular resistance, crucial in blood pressure control.[23]

Structural Features

The wall of an artery is composed of three distinct layers:

- **Tunica Intima** – the innermost layer consisting of endothelial cells providing a smooth lining to reduce friction.[24]
- **Tunica Media** – the middle and thickest layer composed of smooth muscle and elastic fibers, responsible for maintaining blood pressure and vessel tone.[25]
- **Tunica Adventitia** – the outer layer made of connective tissue that anchors the vessel to surrounding structures.[26] Arteries lack valves (except at the aortic and pulmonary outflow) and exhibit a **pulsatile flow** due to the rhythmic contractions of the heart.[26]

Major Arterial Networks

- **Cerebral Circulation**: Supplied by the internal carotid and vertebral arteries forming the Circle of Willis, ensuring constant cerebral perfusion.
- **Coronary Circulation**: Right and left coronary arteries branching from the aorta to supply the myocardium.
- **Visceral Arteries**: Includes the celiac trunk, superior mesenteric artery, and inferior mesenteric artery, which supply the gastrointestinal tract.
- **Limb Arteries**: Subclavian, brachial, radial, ulnar (upper limbs); iliac, femoral, popliteal, tibial (lower limbs) ensure muscular and cutaneous perfusion.[27]

Clinical Relevance

Understanding the arterial system is vital in diagnosing and managing cardiovascular conditions such as: Atherosclerosis, Aneurysms, Arterial Thrombosis or Embolism, Peripheral Artery Disease, Hypertension, Pulse Points and Palpation Sites

Clinically significant arteries accessible for pulse examination include: Radial artery – at the wrist, Carotid artery – in the neck, Femoral artery – in the groin., Dorsalis pedis and posterior tibial arteries – in the foot and ankle. These sites are used to assess circulatory status, heart rate, and arterial patency.[28]

RESULTS AND FINDINGS

RESULT

- The study found that the *Ayurvedic* description of *Dhamanis* originating from the *Hridaya* (heart) aligns closely with the modern understanding of arteries arising from the left ventricle of the heart, specifically through the aorta. The classification of *Urdhvaga*, *Adhoga*, and *Tiryakgami Dhamanis* corresponds directionally to arteries supplying the upper body, lower body, and transverse branches like intercostal and cutaneous arteries.
- *Dhamanis* are described as pulsating tubular structures, which correlates well with the anatomical features of arteries, particularly their muscular and elastic nature and the presence of a palpable pulse. Both systems acknowledge the absence of valves and the forward movement of life-sustaining fluids (Rasa/Blood).
- Functions attributed to *Dhamanis* in *Ayurvedic* texts—such as the transportation of *Rasa Dhatu*, regulation of body temperature, and distribution to *Indriyas*—were found to be parallel to the functions of arteries in delivering oxygen, nutrients, and regulating thermoregulation and perfusion of sensory organs.
- While *Ayurveda* identifies 24 principal *Dhamanis*, modern anatomy describes a more detailed and extensive arterial network. However, a broad regional correlation was established, with major branches of the aorta and their subdivisions aligning with the anatomical distribution of *Dhamanis* described in classical texts.
- The study highlighted the practical application of *Dhamani Sharir* in *Naadi Pariksha* (pulse diagnosis), which matches pulse assessment sites in modern medicine like the radial, carotid, and femoral arteries. This reinforces the relevance of *Ayurvedic* anatomical knowledge in contemporary clinical diagnosis.
- The *Ayurvedic* perspective considers not only the structural and circulatory functions but also the energetic roles of *Dhamanis* in connecting physical and subtle body systems. While modern anatomy emphasizes mechanical and physiological aspects, this study revealed that both systems complement each other and offer a more integrative understanding when viewed together.

FINDINGS:

The study concluded that *Dhamani Sharir* and the modern arterial system share significant structural, directional, and functional correlations. The pulsatile and distributive nature of *Dhamanis* finds close anatomical parallels in the arterial pathways described in modern science. This conceptual alignment supports the relevance and accuracy of classical *Ayurvedic* anatomical knowledge and encourages a holistic, integrative approach to understanding human physiology.

DISCUSSION

The present study aimed to explore the classical concept of *Dhamani Sharir* from *Ayurvedic* texts and correlate it with the structural and functional attributes of the arterial system in modern anatomy. The comparative analysis reveals that the ancient sages of *Ayurveda* possessed a profound and systematic understanding of the circulatory channels, which remarkably parallels the arterial concepts established through centuries of anatomical research in modern medicine.[29]

In *Ayurveda*, *Dhamanis* are described as pulsatile channels that originate from the *Hridaya* and are involved in transporting *Rasa Dhatu* and other vital substances throughout the body. This aligns well with the physiological function of arteries that arise from the heart and distribute oxygenated blood under pressure to all tissues. The classification of *Dhamanis* into *Urdhvaga*, *Adhoga*, and *Tiryakgami* reflects a directional distribution system that is comparable to the anatomical distribution of arteries to the head and neck, lower limbs, and transverse body segments. While *Ayurveda* refers to 24 principal *Dhamanis*, modern anatomy elaborates a more intricate vascular map; however, the major regions supplied correlate effectively between both systems.[30]

From a structural viewpoint, *Dhamanis* are defined by their pulsatile nature, absence of valves, and role in vital transportation—all features seen in arteries. The layered construction of arteries (intima, media, and adventitia) provides the necessary elasticity and contractility, mirroring the *Ayurvedic* emphasis on the dynamic, life-sustaining role of *Dhamanis*. The pulsation described in *Ayurveda* corresponds to the pulse used in modern diagnostics, reinforcing the anatomical and clinical convergence.[31]

Clinically, the *Ayurvedic* practice of *Naadi Pariksha* (pulse diagnosis) demonstrates practical knowledge of arterial anatomy long before the advent of stethoscopes and sphygmomanometers. Pulse palpation sites in *Ayurveda*, such as the wrist and neck,

correspond with the radial and carotid arteries in modern practice. Additionally, procedures like *Raktamokshana* (bloodletting) and *Basti* (enemas) show a deep understanding of vascular routes and systemic circulation.[32]

Furthermore, *Ayurveda* integrates both gross anatomical and subtle energetic roles of *Dhamanis*, associating them with the flow of *Prana*, *Tejas*, and *Ojas*. This is an area where modern science, although rich in structural detail, often lacks holistic interpretation. The comparison in this study advocates for a synergistic understanding that respects the strengths of both paradigms—structural clarity from modern anatomy and systemic integration from *Ayurveda*.[33]

CONCLUSION

The present descriptive study establishes a significant correlation between the classical *Ayurvedic* concept of *Dhamani Sharir* and the modern anatomical understanding of the arterial system. Both systems recognize the origin of these vital channels from the heart, their pulsatile nature, and their essential role in distributing life-sustaining substances throughout the body. The directional classification of *Dhamanis* into *Urdhvaga*, *Adhoga*, and *Tiryakgami* finds structural and functional parallels in the ascending, descending, and transverse branches of arteries. This comparative analysis affirms that the ancient seers of *Ayurveda* possessed an advanced and observationally rich understanding of human physiology. The findings support the integrative potential of classical anatomical knowledge with contemporary biomedical science, encouraging a holistic approach in academic, clinical, and research domains.

CONFLICT OF INTEREST -NIL

SOURCE OF SUPPORT -NONE

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