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SIRA, DHAMANI AND SROTAS: A CRITICAL ANALYSIS OF THEIR DISTINCT IDENTITY WITH CONTEMPORARY ANATOMICAL CORRELATION

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ABSTRACT

Sira, *Dhamani* and *Srotas* occupy an important place in *Ayurvedic Rachana Shareera*. All three are associated with *Vahana* and movement of different substances within the *Shareera*, which has resulted in considerable discussion regarding their individual identity and possible contemporary anatomical correlations. A commonly used explanation equates *Dhamani* with arteries, *Sira* with veins and *Srotas* with channels or capillaries. Although useful for introductory understanding, this approach does not satisfactorily explain the complete classical description. *Acharya Charaka* differentiates these terms through their characteristic activities - *Dhmana*, *Sarana* and *Sravana*. *Acharya Sushruta* gives detailed accounts of *Sira Sankhya*, *Dhamani Vibhaga* and their distribution, and specifically discusses the distinction between *Sira*, *Dhamani* and *Srotas*. The present literary review analyses their classical descriptions with emphasis on *Nirukti*, *Sankhya*, *Mula*, *Prasara*, *Karma* and clinical significance, followed by cautious correlation with contemporary vascular anatomy, microcirculation, lymphatics, ducts and other transport pathways. The review suggests that *Dhamani* has a close functional

resemblance to pulsatile distributing pathways, *Sira* has a strong vascular and conducting association, while *Srotas* is a broader system-oriented concept concerned with transport of *Prana, Anna, Udaka, Dhatu-poshaka amsha* and *Mala*. These correlations are contextual and should not replace the original *Ayurvedic* concepts.

KEYWORDS: Sira; Dhamani; Srotas; Srotomula; Sarana; Dhmana; Sravana; Vahana; Rachana Shareera; Ayurveda.

INTRODUCTION

The living body is maintained by continuous movement, distribution, exchange and elimination. *Prana, Anna, Udaka, Rasa, Rakta, Dhatu-poshaka amsha* and different forms of *Mala* have to move from one region to another in an organised manner. *Ayurveda* recognises this dynamic nature of the *Shareera* and describes several pathways through which such *Vahana* takes place. Among these, *Sira*, *Dhamani* and *Srotas* are particularly important from the point of view of *Rachana Shareera*.

For a student approaching *Ayurvedic* anatomy through modern terminology, it is tempting to consider *Dhamani* as artery, *Sira* as vein and *Srotas* as a channel or capillary. This gives an immediate mental picture, but difficulties arise when the complete descriptions in the Samhitas are examined. The functions attributed to these structures extend beyond the boundaries of a single modern anatomical entity.

Acharya Charaka provides an important basis for their differentiation. In *Charaka Samhita, Sutra Sthana*, the terms are explained according to their characteristic activities: *Dhamani* through *Dhmana*, *Srotas* through *Sravana* and *Sira* through *Sarana*.[1] Thus, the classical nomenclature itself contains a functional element.

Acharya Sushruta, whose approach to *Shareera Rachana* is closely connected with *Shalya Tantra*, provides a detailed description of 700 *Sira* and 24 principal *Dhamani*.[2,3] More importantly, he records the opinion that *Sira, Dhamani* and *Srotas* may be considered undivided, but rejects their complete identity on the basis of different characteristic features, fixed roots or origins, specialised functions and separate textual description.[3]

This classical debate is important even today. Rather than forcing an exact equivalence with contemporary anatomy, a more useful approach is to understand the *Ayurvedic* concept in its

own context and then identify areas where modern anatomical knowledge can assist interpretation. Such an approach is especially relevant at the postgraduate level, where critical understanding is more valuable than simple terminology matching.

AIM

To critically analyse the concepts of *Sira, Dhamani* and *Srotas* described in classical Ayurvedic literature and to explore their possible contemporary anatomical correlations.

OBJECTIVES

1. To review the classical descriptions and *Nirukti* of *Sira, Dhamani* and *Srotas*.
2. To understand their *Sankhya*, *Mula*, *Prasara*, *Karma* and clinical significance.
3. To analyse the classical basis for their similarity and distinct identity.
4. To explore suitable contemporary anatomical correlations without forcing one-to-one equivalence.

MATERIALS AND METHODS

The present work is a literary and conceptual review. Classical Ayurvedic texts, mainly *Charaka Samhita, Sushruta Samhita* and *Ashtanga Hridaya*, along with relevant commentaries and translations, were reviewed for references pertaining to *Sira, Dhamani* and *Srotas*. Standard textbooks of *Rachana Shareera*, contemporary anatomy and histology were consulted for anatomical interpretation. Relevant published literature was also referred to wherever required. The collected information was compiled, compared and critically analysed.

Classical Basis of the Terminology

Nirukti and Functional Understanding

The classical derivation of these terms is useful because it directs attention to their characteristic activity. *Sarana* conveys movement or progression and is associated with *Sira*. *Dhmana* conveys pulsation, filling or forceful movement and is associated with *Dhamani*. *Sravana* conveys flowing, oozing or continuous movement and is associated with *Srotas*.[1]

These derivations suggest that the *Acharyas* did not classify internal pathways solely according to their gross appearance. The nature of movement occurring through them was also important. Therefore, two structures may lie close to each other or even participate in the same broad transport process and yet receive different names because their characteristic

activity is different.

Concept of Sira

Sira Sankhya* and *Prasara

Acharya Sushruta describes 700 *Sira* in the human body.[2] The numerical description is important within the classical system of *Sankhya Shareera*, but it need not be interpreted as an instruction to identify exactly 700 named veins in modern anatomy. What becomes clear is the concept of an extensively distributed conducting network.

The wide *Prasara* of *Sira* is consistent with the requirement for continuous *Vahana* throughout the *Shareera*. In different contexts, the material or function associated with this conduction may vary. This is one reason why translating every *Sira* simply as a vein can become restrictive.

Vedhya and Avedhya Sira

The clinical importance of *Sira Shareera* becomes especially evident in the description of *Vedhya* and *Avedhya Sira*. *Acharya Sushruta* gives importance to recognising structures that can be approached during *Siravyadha* and those that should be avoided because injury may result in serious consequences.[2]

This association with puncture, bleeding and surgical safety provides a strong basis for vascular correlation. In practical terms, superficial veins are readily accessible for puncture, while injury to major vascular structures can lead to significant haemorrhage. However, the classical category should not be reduced to venous anatomy alone. Published anatomical analysis has also highlighted the need to interpret Sira according to context rather than assigning one fixed equivalent.[4]

Rachanatmaka Interpretation of Sira

From a *Rachana Shareera* perspective, *Sira* can be understood as a class of conducting pathways characterised by *Sarana*. Where the text specifically relates the structure to *Rakta*, *Raktasrava* or *Siravyadha*, vascular correlation becomes particularly strong. In other contexts, the term may carry a wider implication. Therefore, the safer academic interpretation is that Sira has a strong vascular component but should be identified according to *Prakarana*, location and function.

Concept of Dhamani

Dhmana as the Characteristic Feature

The term *Dhamani* is linked with *Dhmana*, making pulsation, rhythmic filling or forceful movement an important identifying feature.[1] This is one of the strongest reasons for comparing *Dhamani* with arteries. Arterial pulsation is an observable feature of the living body and is produced by the pressure wave generated during cardiac contraction.[5]

Still, the classical description cannot be limited to pulse-bearing vessels alone. *Acharya Sushruta* attributes a wide range of functions to the principal *Dhamani*, suggesting that the concept combines distribution with function.

Twenty-four Dhamani

Acharya Sushruta describes 24 principal *Dhamani* and divides them according to direction of distribution into ten *Urdhvaga Dhamani*, ten *Adhoga Dhamani* and four *Tiryagga Dhamani*.[3] The directional classification is significant because it emphasises Prasara rather than merely naming isolated structures.

The *Urdhvaga Dhamani* are related to the upper part of the body and several activities occurring there. The *Adhoga Dhamani* are related to lower regions and their functions, while the *Tiryagga Dhamani* spread transversely through the body.[3] Their description includes functions connected with nourishment, sensation, excretion and other physiological processes. Hence, searching for exactly 24 individual modern arteries is unlikely to reproduce the intended classical classification.

Nabhi and Dhamani Prabhava

Acharya Sushruta describes the principal *Dhamani* in relation to *Nabhi*.[3] This has generated several interpretations. A literal attempt to identify the adult navel as the origin of all arteries is difficult to reconcile with contemporary anatomy. The description may instead be considered in the wider classical context of central distribution, foetal nourishment and the functional importance attributed to the *Nabhi* region.

This is an area where correlation should remain cautious. A modern explanation can assist understanding, but it should not be presented as proof of a single anatomical identity unless supported by the classical context.

Concept of Srotas

Sravana and Vahana

The term *Srotas* is related to *Sravana*, indicating continuous flowing, oozing or movement.[1] Compared with *Sira* and *Dhamani*, the concept of *Srotas* has a particularly broad functional range. It is not limited to one type of vessel or one material.

Acharya Charaka systematically discusses *Srotas* in *Srotovimana*, including their roots, factors responsible for disturbance and features of *Srotodushti*.[6] The chapter demonstrates that knowledge of the pathways is inseparable from understanding normal physiology and disease.

Different Srotas and Their Functional Scope

The description of *Pranavaha*, *Annavaha*, *Udakavaha*, *Rasavaha*, *Raktavaha*, *Mamsavaha*, *Medovaha*, *Asthivaha*, *Majjavaha*, *Shukravaha*, *Mutravaha* and *Purishavaha Srotas* shows that the term cannot denote one uniform anatomical tube. The pathway concerned with *Anna Vahana* is structurally different from one concerned with Mutra Vahana, and both differ from the processes involved in *Dhatu Poshana*.

Thus, *Srotas* may be better understood as an organised pathway or system through which a particular substance or functional entity moves. In some cases this pathway may have an obvious gross anatomical basis, whereas in others its expression may include vascular, tissue-level or microscopic transport.

Srotomula

The concept of *Srotomula* deserves special attention. If *Srotas* were simply equivalent to hollow tubes, the *Mula* would be expected to mean only the anatomical beginning of that tube. Classical descriptions are broader. The structures named as *Mula* often have major functional and pathological relationships with the corresponding *Srotas*.[6]

For this reason, *Mula* may represent an important anatomical site, a functional centre, a major component of the system or a region whose injury significantly disturbs that *Srotas*. This interpretation is often more useful than translating *Srotomula* as 'origin' in every instance.

Srotodushti and Structural Relevance

Although *Srotodushti* is primarily discussed in relation to pathology, it also helps a student of *Rachana Shareera* understand the functional importance of the channel. Altered flow,

obstruction, abnormal movement or inappropriate passage presupposes the existence of a pathway capable of being affected. Therefore, the concept of *Srotas* brings *Rachana* and *Kriya* together rather than treating them as completely separate domains.

Classical Distinction between Sira, Dhamani and Srotas

Four Grounds of Distinction by Acharya Sushruta

The discussion in *Dhamani Vyakarana Sharira* is central to this topic. *Acharya Sushruta* records the opinion that there is no real division between *Sira*, *Dhamani* and *Srotas* and that *Dhamani* and *Srotas* may be considered modifications of *Sira*. He rejects complete identity and provides four broad grounds for distinction: difference in characteristic features (*Vyanjananyatva*), regulation or specificity of roots/origins (*Mulasanniyama*), difference in specialised functions (*Karma-vaisheshya*) and separate authoritative description (*Agama*).[3]

This passage is especially valuable because it shows that the problem of overlapping terminology is not merely a modern difficulty. The classical text itself recognises both similarity and difference.

Why Do They Appear Similar?

Acharya Sushruta also explains why these structures can appear undivided. Their close relationship or *Sannikarsha*, similarities in some functions and their subtle nature (*Saukshmya*) can make distinct structures appear functionally continuous.[3]

This is conceptually similar to modern anatomical systems in which structurally different components work in continuity. Arteries, capillaries and veins are distinct, yet they form a continuous circulation. Likewise, lymphatics, blood vessels and interstitial spaces cooperate in fluid exchange. Functional continuity therefore does not require structural identity.

Comparative Analysis

Parameter	Sira	Dhamani	Srotas
Key classical activity	*Sarana*	*Dhmana*	*Sravana*
Dominant idea	Conduction / movement	Pulsatile distribution	Flow / transport through a pathway
Classical numerical emphasis	700 *Sira*	24 principal *Dhamani*	Varies with text and classification
Important distribution	Widespread network	*Urdhvaga*, Adhoga, *Tiryagga*	System-specific

Important Ayurvedic concepts	*Vedhya-Avedhya sira*: *Siravyadha*	*Nabhi-prabhava*; directional *Prasara*	*Srotomula*; *Srotodushti*; *Dhatu*/*Mala Vahana*
Useful modern comparison	Vascular/conducting structures	Arterial/pulsatile distributing pathways	Vessels , ducts , tubular organs and micro – transport pathways
Exact equivalence	Not fixed	Not fixed	Not fixed

Contemporary Anatomical Correlation

Dhamani and Arterial Pathways

Modern arteries conduct blood away from the heart and distribute it through progressively smaller branches. Their elastic and muscular walls allow them to withstand and regulate pulsatile pressure.[5] These features provide a strong functional comparison with *Dhmana* and the distributing character of *Dhamani*.

However, the complete classical functions of the 24 principal *Dhamani* cannot be explained only by arterial circulation. Therefore, it is more accurate to state that the arterial system provides an important anatomical correlation for *Dhamani*, particularly where pulsation and distribution are emphasised, rather than claiming complete identity.

Sira and Venous/Vascular Pathways

Modern veins form an extensive conducting network and are clinically accessible for venepuncture. This makes them a useful comparison in contexts such as *Siravyadha*. Injury to important vascular structures also provides a reasonable modern basis for understanding the caution associated with *Avedhya Sira.*

Nevertheless, the wider use of *Sira* in classical literature means that venous correlation should be applied according to context. A broader term such as vascular or conducting pathway is often more defensible at the conceptual level.[4]

Srotas and Gross Channels

Several *Srotas* can be understood partly through gross anatomical passages. The gastrointestinal tract provides an obvious model for movement of ingested material, urinary passages for *Mutra Vahana*, and glandular ducts for transport of secretions. These examples show how a channel may possess a clear structural basis while remaining part of a larger functional system.

Srotas, Microcirculation and Tissue Exchange

At the microscopic level, capillaries form the principal exchange interface between blood and tissues. Their endothelial walls allow movement of water, gases, nutrients and metabolic products, while interstitial fluid provides the immediate environment through which exchange with cells occurs.[7]

Such mechanisms can help a modern student conceptualise subtle forms of *Vahana* and *Dhatu Poshana*. They should not, however, be presented as evidence that *Srotas* literally means capillary, intercellular space or lymphatic channel. Rather, these are possible anatomical expressions relevant to particular contexts.

Lymphatics as a Supporting Correlation

The lymphatic system returns interstitial fluid to the circulation, participates in immune function and transports absorbed lipids. Its widespread, delicate and channel-like organisation provides another useful comparison when considering certain aspects of subtle transport. Yet, as with capillaries, the lymphatic system represents only one possible modern model and not the complete identity of *Srotas*.

DISCUSSION

The present review highlights a basic difficulty encountered when classical *Ayurvedic* anatomy is translated directly into contemporary anatomical terminology. Modern anatomy generally identifies a structure according to morphology, tissue composition, continuity and spatial relationships. *Ayurvedic* terminology frequently integrates *Rachana* with *Kriya*; the movement occurring through a structure and its functional role may contribute to its identity.

The functional derivations *Sarana*, *Dhmana* and *Sravana* are therefore not merely linguistic details. They provide a conceptual framework for distinguishing *Sira*, *Dhamani* and *Srotas*.[1] All three participate in *Vahana*, but the nature of that movement differs in emphasis.

In *Sira*, the concept of *Sarana*, the description of 700 structures and the practical importance of *Vedhya-Avedhya Sira* point towards an extensive conducting network with a major vascular component.[2] The relationship with *Siravyadha* strengthens this interpretation. Still, a postgraduate discussion should avoid treating every classical Sira as a modern vein because the term is used in contexts wider than venous anatomy.[4] In *Dhamani*, *Dhmana* offers a strong basis for arterial comparison. Pulsatility is a distinctive property that can be appreciated

clinically, and the distributing character of the arterial tree fits several classical descriptions. Yet Acharya *Sushruta's* division into *Urdhvaga*, *Adhoga* and *Tiryagga Dhamani* and the variety of functions assigned to them show that the concept is not simply a list of named arteries.[3] The classical description is better understood as a functional-distributional classification.

The concept of *Srotas* is broader still. Different *Srotas* are named according to the substance or functional entity with which they are associated. This system-based classification accommodates both gross and subtle transport. *Annavaha* and *Mutravaha Srotas* invite correlation with recognisable tubular systems, while *Rasavaha* and other *Dhatuvaha Srotas* require consideration of circulation, tissue exchange and nourishment at more than one anatomical level.

The idea of *Srotomula* is particularly important. A purely tubular interpretation would require the *Mula* to be simply the beginning of a channel. The classical descriptions suggest a broader relationship in which the *Mula* may be a major anatomical component, functional centre or clinically vulnerable site associated with the system.[6] This makes the concept more meaningful and avoids unnecessary attempts to force a single modern 'origin'.

Acharya Sushruta's four-fold reasoning for differentiating *Sira*, *Dhamani* and *Srotas* provides the strongest classical foundation for the present analysis.[3] *Vyanjananyatva* directs attention to distinguishing features; *Mulasanniyama* to specificity of roots or origins; *Karma-vaisheshya* to specialised functions; and *Agama* to their separate authoritative description. At the same time, his acknowledgement of *Sannikarsha* and *Saukshmya* explains why the boundaries may appear indistinct.

This approach has a useful parallel in contemporary anatomy. The arterial, capillary and venous segments of circulation are morphologically distinct, but their functions are integrated. Blood vessels and lymphatics are separate systems but cooperate in fluid homeostasis. Gross ducts may communicate with microscopic secretory units while remaining parts of one functional pathway. Thus, functional integration does not require structural identity.

For a *Rachana Shareera* student, contemporary correlation is most useful when it is applied after the classical concept has been understood. *Dhamani* may be compared with arteries when *Dhmana* and pulsatile distribution are central. *Sira* may be compared with vascular

pathways when *Rakta Vahana*, *Raktasrava* or *Siravyadha* is the context. *Srotas* may be interpreted through vessels, ducts, tubular organs, microcirculation or tissue pathways according to the substance and function being discussed.

The commonly used formula *Dhamani* = artery, *Sira* = vein, *Srotas* = capillary can therefore serve as a preliminary teaching aid but should not become the final postgraduate interpretation. A contextual approach respects both the *Ayurvedic* description and the strengths of contemporary anatomical knowledge.

CONCLUSION

Sira, Dhamani and *Srotas* represent closely related yet distinct concepts in *Ayurvedic Rachana Shareera*. Their common involvement in *Vahana* explains their apparent similarity, while their characteristic activities - *Sarana, Dhmana* and *Sravana* - provide an important basis for understanding their individuality.

Acharya Sushruta's descriptions of *Sira Sankhya*, *Vedhya-Avedhya Sira*, *Dhamani Vibhaga* and directional *Prasara* demonstrate the practical and anatomical importance of these structures. His explicit differentiation of *Sira*, *Dhamani* and *Srotas* through *Vyanjananyatva*, *Mulasanniyama*, *Karma-vaisheshya* and *Agama* is particularly significant.[3] *Acharya Charaka's* account of *Srotas*, *Srotomula* and *Srotodushti* further shows that transport in *Ayurveda* is understood as an organised system rather than as a collection of isolated tubes.[6] Contemporary anatomy offers useful but partial correlations. The pulsatile and distributing features of *Dhamani* resemble arterial pathways; many contexts of *Sira* have strong vascular associations; and *Srotas* can find structural expression through vessels, ducts, tubular organs, microcirculation and tissue-level pathways. None of these correlations should be regarded as universally exact.

Therefore, the classical Ayurvedic description should remain the primary framework, with modern anatomy used as a supportive tool for interpretation. Such a contextual approach preserves the individuality of *Ayurvedic Rachana Shareera* while allowing meaningful academic dialogue with contemporary anatomy.

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