

A LITERARY REVIEW OF *STHŪLA TWAK* WITH SPECIAL REFERENCE TO *ŚHĀRṄGADHARA SAṂHITĀ* AND ITS ANATOMICAL CORRELATION

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ABSTRACT

Background: Classical Ayurvedic authors describe *Twak* as a layered, living interface whose structure is inferred from appearance, sensation, disease location and surgical behaviour. In *Śhārṅgadhara Saṁhitā*, the seventh layer is named *Sthūlā Twak*, is measured as two *vr̥hi*, and is identified as a site of *Vidradhi*. This description resembles Sushruta's deepest *Māṃsadharā* layer but is often correlated uncritically with a single modern histological stratum. **Objective:** To critically examine the textual identity of *Sthūlā Twak*, compare it with other classical accounts, and propose an anatomically defensible modern correlation. **Methods:** A structured narrative review integrated primary Sanskrit passages, traditional commentarial interpretations, contemporary Ayurvedic reviews, and modern anatomical, histological and imaging literature. Claims were compared by terminology, sequence, measurement, function and pathology. **Results:** *Śhārṅgadhara*

retains the seven-layer framework, the two-*vr̥hi* magnitude and the association with deep suppuration, while replacing or simplifying the name *Māṃsadharā* to *Sthūlā*. Modern evidence does not support a one-to-one equation between the seven Ayurvedic layers and the five epidermal plus two dermal strata. Epidermal strata are microscopic, site-dependent and partly absent in thin skin; the dermis has no sharply bounded internal plane; and subcutis may

or may not be counted as skin proper. The most coherent correlate is therefore a deep cutaneous functional compartment comprising the deep reticular dermis, dermis–hypodermis junction and superficial subcutis, with continuity toward fascia or muscle in advanced suppuration. **Conclusion:** *Sthūlā Twak* is best understood as a clinically perceived deep plane rather than an isolated microscopic layer. This interpretation respects the classical disease-based description while avoiding false anatomical precision. Future research should use predefined landmarks, high-frequency ultrasound and histopathology in anatomically matched sites.

KEYWORDS: Twak; *Sthūlā Twak*; *Śhārṅgadhara Saṃhitā*; *Māṃsadharā*; *Vidradhi*; skin anatomy; dermis; hypodermis.

1. INTRODUCTION

Twak occupies an unusual position in Ayurvedic anatomy. It is simultaneously a structural covering, a seat of tactile perception, a product of tissue transformation, an organ through which internal imbalance becomes visible, and a practical guide to the depth and prognosis of disease. The classical descriptions are therefore neither purely histological nor merely metaphorical. They are clinical models built from observation, touch, dissection, operative experience and the behaviour of lesions.

The focus of this review is the statement in *Śhārṅgadhara Saṃhitā* that the seventh skin layer is *Sthūlā*, measures two *vr̥thi*, and serves as a site of *Vidradhi*.^[1] The apparent simplicity of this sentence has encouraged exact modern equivalences, most commonly a seven-to-seven alignment between Ayurvedic layers and selected epidermal and dermal strata.

This review treats anatomical correlation as a graded argument rather than a translation exercise. The question is not ‘Which modern layer has the same number?’ but ‘Which anatomical compartment best explains the classical combination of deepest sequence, greatest stated magnitude, continuity with flesh, and susceptibility to a deep suppurative lesion?’ The distinction is central because the classical term *Twak* may describe the integument as experienced clinically, whereas modern anatomy separates epidermis, dermis, subcutaneous tissue, fascia and muscle using histological criteria unavailable to the classical observer.

2. Review question and objectives

The review asks: what does *Sthūlā Twak* denote in *Śhārṅgadhara Saṃhitā*, how does it relate to the corresponding layers in other *Bṛhatrayī* and later texts, and which modern anatomical plane offers the strongest but appropriately qualified correlation?

The objectives were to:

- establish the wording, sequence, measurement and disease association of the seventh layer in *Śhārṅgadhara Saṃhitā*;
- compare this account with the six-layer description of Charaka and the seven-layer descriptions associated with Sushruta and Vāgbhaṭa;
- separate textual identity from speculative numerical matching;
- evaluate modern evidence on epidermal, dermal and total skin thickness, regional variation, sensation and abscess location; and
- formulate a testable anatomical model and a research agenda.

3. MATERIALS AND METHODS

A structured narrative method was used because the evidence includes heterogeneous sources: Sanskrit compendia, commentaries, conceptual Ayurvedic papers, histological reviews, ultrasound studies and clinical procedural literature. The classical comparison included Sushruta's seven layers,^[2] Charaka's six-layer account and tissue-development statements,^[3] and Vāgbhaṭa's description of skin formation and layering.^[4] Contemporary Ayurvedic discussions were used to identify prevailing interpretations and recurring correlations, including historical dermatology overviews,^[5] direct layer-comparison papers,^[6] conceptual reviews,^[7] and structural discussions linked to skin disease.^[8]

Evidence was extracted under five headings: name and ordinal position; stated thickness; developmental or tissue relationship; physiological or sensory function; and diseases assigned to the layer. Modern candidates were assessed against the same headings. Greater weight was given to primary passages, systematic reviews and sources defining their measurement method. Lower weight was given to secondary tables that repeated layer equivalences without explaining how the equivalence was derived.

This is a critical literary review. It does not claim exhaustive retrieval of every web page containing the terms. Internet content was used only when the source was identifiable and

relevant; duplicated explanations, unsourced teaching notes and commercial summaries were excluded. Transliteration and English interpretation are supplied to clarify concepts.

4. Conceptual foundations of Twak

4.1 Formation and tissue relationship

Classical accounts explain the formation of *Twak* through analogies of progressive condensation or layering during embryogenesis and tissue metabolism. The frequently cited comparison to the film forming over heated milk indicates sequential emergence rather than seven detachable sheets. Charaka also links six *Twak* layers to the transformation of *Māmsa Dhātu*. The developmental language places skin in intimate continuity with flesh, which is especially relevant to the deepest layer. It does not, however, specify microscopic cell lineages in the modern embryological sense.

This distinction prevents a common category error. A classical tissue derivative describes a functional and nutritive relationship within *Dhātu Parināma*; a modern germ-layer derivative describes developmental lineage. They may be compared at the level of anatomical continuity and maturation, but they are not interchangeable biological propositions.

4.2 Function: covering, appearance and sensation

The surface is described as revealing a complexion and abnormal discoloration, while deeper layers are identified by the lesions assigned to them. Touch is mediated by the *Sparśanendriya* and is classically associated with *Vāta*. Thus, *Twak* functions as a sensory field rather than as an inert wrapper. The disease-based nomenclature also suggests that the layers were operational clinical depths: a lesion's colour, pain, spread, induration, ulceration or suppuration located it within the conceptual anatomy.

Accordingly, a layer name should be read together with its pathology. *Sthūlā* means thick, gross or substantial; its significance is strengthened by the two-*vr̥thi* measure and *Vidradhi* association. These three features, quality, magnitude and lesion, converge on depth. Any modern correlate confined to a very thin epidermal stratum would have to explain why a deep abscess was assigned there.

5. Layering across the classical authorities

The classical accounts share a layered concept but differ in enumeration and emphasis. Charaka identifies six layers largely by function and disease. Sushruta gives seven named

layers, individual proportional thicknesses and characteristic lesions. Vāgbhaṭa transmits a related developmental and layered model. Śhārṅgadharā offers a concise seven-layer list that closely follows Sushruta in the first six names and disease associations but calls the seventh *Sthūlā* instead of *Māṃsadharā*.

Acharya	Enumeration and emphasis	Deepest layer	Critical implication
Charaka	Six layers; the first two are commonly described by fluid- and blood-bearing functions, with later layers identified by lesions.	Sixth layer associated with deep, difficult lesions; no <i>Sthūlā</i> name.	Numerical identity cannot be assumed across texts; function and pathology must guide comparison.
Sushruta	Seven named layers with proportional <i>vr̥hi</i> measures and disease sites.	<i>Māṃsadharā</i> , two <i>vr̥hi</i> ; seat of <i>Bhagandara</i> , <i>Arśa</i> and <i>Vidradhi</i> .	Provides the closest textual antecedent for Śhārṅgadharā's seventh layer.
Vāgbhaṭa	Layered formation linked with transformed blood/tissue and a Sushruta-like clinical framework.	The deep layer is continuous with the underlying tissue.	Supports a developmental continuum rather than seven universally separable sheets.
Śhārṅgadharā	Seven concise, disease-oriented layers; total skin stated as two <i>vr̥hi</i> in the transmitted verse/commentarial reading.	<i>Sthūlā</i> ; <i>Vidradhi</i> and related deep lesions.	The new label foregrounds gross thickness while retaining the deep pathological identity.

6. Sthūlā Twak in Śhārṅgadharā Saṃhitā

6.1 Primary passage

The seven layers are presented consecutively in *Pūrvakhaṇḍa*, *Kalādikākhyāna* 5/19–22:

जेयाऽवभासिनी	पूर्व	सिध्मस्थानं	च	सा	मता।
द्वितीया	लोहिता	जेया		तिलकालकजन्मभूः॥१९॥	
श्वेता	तृतीया	संख्याता	स्थानं	चर्मदलस्य	सा।
ताम्रा	चतुर्थी	विजेया		किलासशिवत्रभूमिका॥२०॥	
पञ्चमी	वेदिनी	ख्याता		सर्वकुष्ठोद्भवस्ततः।	
विख्याता	रोहिणी	षष्ठी		ग्रन्थिगण्डापचीस्थितिः॥२१॥	
स्थूला	त्वक्सप्तमी	ख्याता	विद्रध्यादेः	स्थितिश्च	सा।
इति सप्त त्वचः प्रोक्ताः स्थूला व्रीहिद्विमात्रया॥२२॥					

Śhārṅgadharā Saṃhitā, Pūrvakhaṇḍa 5/19–22¹

6.2 Contextual translation

The first layer, *Avabhāsinī*, is associated with *Sidhma*; the second, *Lohitā*, with *Tilakālaka*; the third, *Śvetā*, with *Carmadala*; the fourth, *Tāmrā*, with *Kilāsa* and *Śvitra*; the fifth, *Vedinī*, with the emergence of *Kuṣṭha*; and the sixth, *Rohiṇī*, with *Granthi*, *Gaṇḍa* and *Apacī*. The seventh is called *Sthūlā* and is the site of *Vidradhi* and similar disorders. The concluding wording describes the seven skins and associates gross thickness with a measure of two *vrīhi*. Because manuscript punctuation and commentarial construal affect whether the last magnitude qualifies the seventh layer or the collective skin, the figure should not be converted mechanically into millimetres.

6.3 Textual identity of the seventh layer

The sequence strongly suggests that Śhārṅgadhara is abbreviating a known Sushruta-type framework. The first six names are preserved, and the seventh retains both the deepest position and the characteristic *Vidradhi* association. The major terminological shift is from *Māṃsadharā* ('supporting or containing flesh') to *Sthūlā* ('thick/gross'). The two names emphasize different properties of the same clinical region: one stresses continuity with *Māṃsa*; the other stresses substantial depth.

This is a stronger argument than a purely numerical match. Shared ordinal position alone could be accidental, whereas the combined agreement in sequence, magnitude and disease locus forms a textual cluster. It is therefore reasonable to treat *Sthūlā Twak* as Śhārṅgadhara's reformulation of the deep *Māṃsadharā* concept, while acknowledging that the texts are not identical in wording or total disease list.

7. Modern anatomical framework

7.1 Epidermis

Modern skin is commonly described as epidermis and dermis, with hypodermis or subcutaneous tissue forming the deeper integumentary support. The epidermis is a keratinized stratified squamous epithelium lacking its own blood vessels. Its strata are basale, spinosum, granulosum, and corneum; *lucidum* is distinct mainly in the thick glabrous skin of palms and soles.^[9] Consequently, the familiar 'five epidermal layers' are not present as five equally distinct layers over the whole body.

7.2 Dermis and dermis–hypodermis transition

The dermis is a vascular connective tissue, descriptively divided into papillary and reticular regions. The superficial papillary dermis is looser and interdigitates with epidermal rete ridges; the deeper reticular dermis contains denser collagen and elastin, appendages, vessels and nerves.^[10] The transition is gradual rather than a universal sharp sheet. Beneath it, lobulated adipose tissue is partitioned by fibrous septa and blends with fascia in a region whose inclusion in 'skin thickness' varies by discipline.

A WHO anatomical summary gives approximate values of 50–100 μm for epidermis and 1–2 mm for dermis, while separately describing a subcutaneous layer.^[11] These figures are useful for scale but not universal constants. A systematic review found pooled epidermal estimates ranging from approximately 31 μm at one site to nearly 597 μm in plantar skin, illustrating substantial site and method effects.^[12] Another systematic review noted substantial heterogeneity in definitions, preparation and measurement of cutaneous microanatomy.^[13]

7.3 Thickness is regional, demographic and method-dependent

High-frequency ultrasound measurements in healthy adults have reported mean skin thicknesses of approximately 1.19 mm at the ventral forearm, 1.44 mm at the dorsal forearm and 2.12 mm at the deltoid, with associations involving sex, body mass and, at some sites, age.^[14] Earlier ultrasound work reported broader regional differences, from about 1.4 mm on the dorsum of the hand to 4.8 mm at the heel.^[15] Histological processing can shrink tissue; ultrasound may include interfaces differently; calipers assess folds; and surgical measurements may include subcutis. A classical grain-based measure cannot, therefore, be validated by selecting one modern value from one body site.

8. Critical anatomical correlation

8.1 Why the common seven-to-seven table is inadequate

A popular teaching correlation assigns the first five Ayurvedic layers to the five epidermal strata and the sixth and seventh to papillary and reticular dermis. The model is memorable but anatomically unstable. First, the *stratum lucidum* is not a general body-wide layer. Second, the avascular epidermis cannot straightforwardly explain a blood-associated *Lohitā*. Third, the papillary and reticular dermis are regions of a single connective tissue layer rather than cleanly detachable membranes. Fourth, Ayurvedic layers are defined by disorders whose pathology may cross several modern compartments. Finally, the classical thicknesses operate at a gross clinical scale, whereas epidermal strata are microscopic.

The numerical alignment can still be used as a mnemonic if labelled as pedagogical rather than as an established anatomical equivalence. Presenting it without this qualification converts analogy into fact and obscures important counter-evidence.

8.2 A graded correlation model

The evidence supports correlation at three levels. A weak correlation shares only a sequence number. A moderate correlation shares a broad function, such as surface visibility or sensation. A strong correlation requires convergence of position, scale, tissue continuity and lesion behaviour. On this standard, *Sthūlā Twak* correlates most strongly with a deep cutaneous compartment rather than with one named microscopic stratum.

Classical clue	Modern anatomical reading	Strength	Limitation
Seventh and deepest position	Deep reticular dermis, dermis–hypodermis junction and superficial subcutis	Moderate–strong	Ordinal sequence does not prove tissue identity.
Name <i>Sthūlā</i> (thick/gross)	A substantial connective-tissue plane rather than a thin epithelial stratum	Moderate	The adjective may describe the collective skin or relative thickness.
Sushruta analogue <i>Māṃsadharā</i>	Continuity of deep dermis/subcutis with fascia and underlying muscle	Strong textual; moderate anatomical	Classical <i>Māṃsa</i> is not identical to modern skeletal muscle alone.
Two- <i>vr̥thi</i> magnitude	Gross rather than cellular scale	Moderate	No universally validated millimetre conversion; textual construal varies.
Seat of <i>Vidradhi</i>	Dermal/subcutaneous abscess with possible spread toward fascia or muscle	Strong clinical	<i>Vidradhi</i> is a broader classical category than every modern cutaneous abscess.

8.3 Sensation does not define one exclusive layer

The name *Vedinī* is sometimes mapped to a single receptor-rich modern layer, leaving the deeper layers to the dermis. Modern sensory anatomy does not support such exclusivity. Free nerve endings extend into epidermis; specialized endings and nerve plexuses occur in dermis; and pressure-sensitive corpuscles may lie in deep dermis or subcutis.^[16] Sensory capacity is distributed through the integument. Thus, sensation may help interpret a functional zone, but it cannot by itself validate a one-layer correspondence.

9. Vidradhi as the decisive clinical clue

A modern cutaneous abscess is a localized collection of pus, usually within the dermis and subcutaneous tissue, and its management depends on recognizing its depth, loculation, and proximity to deeper structures.^[17] This makes *Vidradhi* more informative for *Sthūlā Twak* than the ordinal number seven. Suppuration requires a tissue space capable of inflammatory exudate, necrosis, cavity formation and pressure. These behaviours fit vascular connective tissue and subcutaneous planes far better than an isolated epidermal stratum.

The correlation must nevertheless remain asymmetric. Some classical descriptions of *Vidradhi* include deep, internal and systemic forms that cannot be reduced to a simple skin abscess. Conversely, not every modern abscess demonstrates a unique anatomical boundary corresponding to *Sthūlā*. The justified claim is narrower: the lesion association identifies the seventh layer as a deep, surgically relevant cutaneous plane in which suppuration can organize and extend.

10. Appraisal of the contemporary literature

10.1 Contributions

Contemporary Ayurvedic reviews have preserved the textual variants, brought classical measurements into dialogue with histology, and made the subject accessible to anatomy teaching. They correctly emphasize that *Twak* is more than the epidermis and that the location of disease is integral to the classical model. They also draw attention to the close relation between Śhārṅgadhara's *Sthūlā* and Sushruta's *Māṃsadhara*.

10.2 Recurrent methodological weaknesses

Several weaknesses recur across the secondary literature. The first is citation circularity: later papers repeat the same correlation table, so the frequency of repetition appears to substitute for independent evidence. The second is the silent standardization of *vr̥hi* into a single millimetre or another fixed unit, without experimental metrology or attention to grain orientation. The third is anatomical cherry-picking, in which a thickness from one body site is chosen because it approximates a desired classical number. The fourth is mixing scales, matching a clinically recognized lesion plane with a microscopic epidermal stratum. The fifth is failure to distinguish 'skin proper' from the wider integument, especially when hypodermis is needed to explain the disease.

An observational study of *Māṃsadharā Twak* in relation to *Vidradhi* examined 30 cases and reported inflammatory involvement across tissue levels.^[18] The work is valuable because it attempts clinical–anatomical testing rather than textual comparison alone. Yet its evidentiary reach is limited by sample size, the absence of a comparator, variable lesion maturity, and insufficiently standardized depth measurement. A 4–5 mm punch diameter describes instrument width, not necessarily the depth or anatomical compartment sampled. Inflammation extending through the epidermis, dermis, subcutis, or muscle may indicate disease spread, but it does not independently prove a unique seventh layer.

Modern barrier and drug-delivery literature further shows that the integument behaves as an interacting system: permeability is dominated by the stratum corneum, while appendages, viable epidermis, dermis, blood flow and subcutaneous tissue affect transport and response.^[19] This systems view is closer to the classical clinical model than a rigid stack of seven isolated sheets, even though the explanatory frameworks remain historically and biologically distinct.

Cadaveric work also demonstrates that measured thickness varies within a single region and with the chosen landmark.^[20] Therefore, future Ayurvedic correlation studies should specify exact anatomical sites and layer definitions before comparing measurements.

11. Proposed interpretation

On balance, *Sthūlā Twak* should be defined as Śhārṅgadhara's deepest, grossly appreciable cutaneous plane, textually homologous to Sushruta's *Māṃsadharā*. Its best present-day correlate is a functional compartment extending through deep reticular dermis to the dermis–hypodermis junction and superficial subcutis. In a developed *Vidradhi*, the relevant plane may continue along fibrous septa toward the fascia or the underlying muscle. This is a zone model, not a claim that the Sanskrit term names all of these modern tissues separately.

The model has four advantages. It preserves the classical link with *Māṃsa* without reducing *Māṃsa Dhātu* to one microscopic structure. It accommodates the gross two-*vr̥thi* scale without inventing an exact conversion. It explains why a suppurative cavity could arise or become clinically evident in the seventh layer. Finally, it remains compatible with regional variation: the relatively deep compartment is present throughout the integument, even though its absolute thickness varies.

12. Research agenda

A credible empirical programme should replace single-number matching with multimodal, site-matched investigation:

- Define the anatomical target in advance: epidermal thickness, dermal thickness, dermis–hypodermis junction, superficial subcutis, fascia and muscle must be recorded separately.
- Use high-frequency ultrasound to map lesion depth and uninvolved contralateral skin at the same landmark; report transducer frequency, pressure and boundary rules.
- When clinically indicated, tissue is available, orient histological sections perpendicular to the surface and record shrinkage, biopsy depth and the deepest included structure.
- Classify *Vidradhi* phenotype, duration, size, fluctuation, loculation and previous treatment so that disease spread is not mistaken for the site of origin.
- Test inter-observer reliability for both Ayurvedic clinical classification and modern imaging landmarks.
- Treat *vr̥hi* as a historical metrological problem: document grain species, length, breadth and orientation, and report a range rather than a universal conversion.
- Compare competing models explicitly: reticular dermis alone versus deep dermis plus superficial subcutis versus a broader myofascial interface.

Such a design could falsify as well as support the proposed correlation. That is essential. A correlation becomes scientifically useful only when it generates observations that distinguish it from alternatives.

13. Limitations of this review

The review is constrained by variation among editions and commentaries, the difficulty of translating polysemous anatomical terms, and uneven quality in contemporary correlation studies. Online access improves traceability but does not eliminate textual criticism. Modern sources also use inconsistent definitions of total skin thickness. The proposed compartment is therefore an interpretive synthesis, not a demonstrated histological identity. Its value lies in explaining more of the classical description with fewer contradictions than the conventional seven-to-seven table.

14. CONCLUSION

Śhārṅgadharā's *Sthūlā Twak* is not adequately explained as the seventh item in a numerical list. The name, two-*vr̥hi* magnitude, textual continuity with *Māṃsadharā* and association

with *Vidradhi* identify a deep, substantial and surgically meaningful cutaneous plane. Modern anatomy most plausibly locates this plane across deep reticular dermis, the dermis–hypodermis interface and superficial subcutis, with deeper extension in advanced suppuration. The correlation is functional and topographical, not a one-to-one histological translation.

The strongest conclusion is therefore also the most cautious: *Sthūlā Twak* represents an early clinico-anatomical concept of deep integumentary involvement. Preserving that clinical logic is more faithful to the text and more anatomically credible than forcing seven classical layers into seven modern microscopic compartments.

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