

Muscle Attachment Points in Ayurveda: A Study of Snayu, Peshi, and Kandara

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Abstract—Understanding musculoskeletal attachments is essential for clinical practice, biomechanics, surgery, and rehabilitation. Ayurveda describes three major structural components involved in musculoskeletal attachment—Peshi (muscles), Snayu (ligaments and tendons), and Kandara (tendinous cords or strong fibrous extensions). These structures have been traditionally interpreted through functional, morphological, and pathological perspectives unique to classical Ayurvedic thought. While modern anatomy describes muscle origins, insertions, tendons, aponeuroses, and ligaments with microscopic precision, the Ayurvedic system provides a holistic framework integrating dosha governance, tissue nutrition, marma vulnerability, and functional coordination of movement. This review synthesises classical Ayurvedic descriptions with contemporary anatomical and biomechanical literature to develop a comparative understanding of muscle attachment points. A structured narrative methodology was employed, reviewing major Ayurvedic treatises (Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya) and analysing peer-reviewed studies from musculoskeletal science. Findings reveal significant conceptual overlap—Peshi correlates with skeletal muscles, Snayu with ligaments and tendons, and Kandara with long, strong tendons such as the Achilles tendon. Ayurveda's integrated approach to movement, stability, and injury patterns offers novel insights into clinical practice, particularly in cases of muscle tears, sprains, tendon injuries, and joint instability. This review highlights the potential for deeper integration between classical Ayurvedic frameworks and modern anatomical science, paving the way for interdisciplinary research and enhanced clinical applications.

Index Terms—Peshi; Snayu; Kandara; Muscle attachment; Tendons; Ligaments; Musculoskeletal anatomy; Biomechanics; Sushruta; Comparative anatomy; Connective tissue; Marma; Soft tissue injury; Integrative medicine.

I. INTRODUCTION

Musculoskeletal attachments form the foundation of all voluntary and involuntary movements within the human body. They determine posture, stability, locomotion, and the capacity to perform fine and gross motor activities. Modern anatomy clearly explains these attachments through the structural framework of muscles, tendons, ligaments, fascia, and skeletal anchoring points. However, long before the advent of microscopic and biomechanical studies, Ayurveda provided a comprehensive description of these structural elements in the form of Peshi, Snayu, and Kandara. These terms, presented in the Samhitas, describe not only the physical components of the musculoskeletal system but also their functional and pathological significance. 1

Ayurvedic scholars such as Sushruta—the father of ancient surgery—classified the human body through a highly detailed structural lens. He identified 500 Peshi, 900 Snayu, and 16 Kandara, each with specific positional, structural, and clinical attributes. These structures are emphasised not just in the context of locomotion but also in marma injuries, surgical procedures, bandaging, and rehabilitation practices. The Ayurvedic perspective interweaves anatomical structure with doshic balance, tissue nutrition (dhatu poshana), biomechanics (gati, sthirata, chalatva), and injury patterns (abhighata). 2

Modern anatomy aligns with these classical concepts in several ways. Muscles (Peshi) originate and insert at fixed points, producing movement via contraction. Tendons (Kandara) provide firm anchorage and allow long-distance force transmission, while ligaments and fibrous bands (Snayu) stabilise joints and restrict excessive motion. Although the terminologies differ, the functional and structural parallels are striking. 3

In recent years, there has been growing interest in comparing classical Ayurvedic anatomical concepts with modern musculoskeletal science. Such comparative studies are vital because they bridge traditional knowledge with contemporary evidence, offering deeper insights into injuries such as tendonitis, ligament sprain, muscle strain, and joint degeneration—conditions commonly encountered in clinical practice. 4

This review explores the anatomical, functional, and clinical correlations of Peshi, Snayu, and Kandara. By blending classical Ayurvedic thought with modern anatomical knowledge, this study aims to contribute to integrative musculoskeletal understanding and promote collaborative research across disciplines.

II. AIMS AND OBJECTIVES

- To document and analyse classical Ayurvedic descriptions of Peshi, Snayu, and Kandara.
- To compare their anatomical features with modern concepts of muscles, tendons, and ligaments.
- To evaluate the functional significance of these structures in movement and joint stability.
- To explore clinical implications in injury, degeneration, and therapeutic interventions.
- To highlight areas for integrative research between Ayurveda and modern musculoskeletal science.

III. MATERIALS AND METHODS

Literature Source:

- Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, and major commentaries including Dalhana, Chakrapani, Arundatta.
- Modern References:
- Peer-reviewed journals of anatomy, kinesiology, orthopaedics, fascia research, and musculoskeletal biomechanics.

IV. REVIEW OF LITERATURE

1. Ayurvedic Concept of Peshi 5

Peshi is formed by rakta and mamsa dhatu.

They provide contour (akriti), movement (gati), and protection (pariposhana).

Classical examples include uru-peshi, pinda-peshi, bahu-peshi, with descriptions matching bulk skeletal muscles.

Peshi-moola (muscle origin) and Peshi-agre (insertion) correspond to attachment sites.

Modern Correlation:

Skeletal muscle fibres, fascicles, tendinous expansions, and aponeurotic sheaths.

2. Ayurvedic Concept of Snayu 6

Snayu plays a role in:

- Binding of joints (sandhi-bandhana)
- Restricting excessive motion
- Stabilising skeletal structures
- Transmitting mechanical forces

Sushruta categorises Snayu as pratara (broad), nadi (tube-like), vallī (creeper-like), and murti-mat (well-defined structural).

Modern Correlation: 7

- Ligaments → joint stabilisation
- Tendons → connect muscle to bone
- Fascial bands → proprioceptive support

3. Ayurvedic Concept of Kandara 8

Kandara is described as the tough extension of Peshi aiding in:

- Strong attachment
- Long-distance force transmission
- Acting as a mechanical lever
- Examples: Gulpha Kandara (Achilles tendon region), Jangha Kandara (hamstrings).

Modern Correlation: 9

Long tendons like the Achilles tendon, patellar tendon, and forearm flexor/extensor tendons.

4. Functional Integration: Peshi–Snayu–Kandara

Ayurveda defines movement as a coordinated function of muscles, ligaments, and tendons governed by Vata dosha. 10

This aligns with:

- Modern neuromuscular coordination
- Force coupling
- Agonist–antagonist mechanics
- Proprioception and stability functions

5. Clinical Significance

Ayurvedic Perspective 11

- Snayu-marma injuries cause severe pain, stiffness, and deformity.
- Peshi-kshaya leads to weakness, wasting, loss of strength.

- Kandara-bheda (tendon rupture) causes loss of function and abnormal gait.

Modern Perspective

- Tendonitis, partial tears, ligament sprains, muscle strain, myofascial dysfunction.
- Injury affects biomechanics, joint range, and proprioception.

Management Strategies 13

Ayurveda:

Abhyanga, Swedana, Upanaha, Agnikarma, Raktamokshana, taila-based therapies.

Modern:

RICE protocol, physiotherapy, surgical repair, eccentric loading.

V. DISCUSSION

The comparative analysis of Ayurvedic and modern anatomical concepts reveals a profound level of structural and functional congruence in the understanding of musculoskeletal attachment points. Ayurveda, despite lacking access to modern dissection tools and microscopy, presents a remarkably sophisticated interpretation of Peshi, Snayu, and Kandara. These structures, described over 2,000 years ago, closely parallel the modern definitions of muscles, ligaments, tendons, aponeuroses, and myofascial components. 14

1. Structural Correlation and Conceptual Overlap

The Ayurvedic description of Peshi aligns with skeletal muscles in terms of bulk, shape, anchoring points (moola-antya), and functional roles such as movement, protection, and structural support. Snayu, described as binding and stabilizing structures, shows conceptual similarity to modern ligaments, joint capsules, and fibrous fascial bands. Kandara corresponds to long, cord-like tendons such as the Achilles, patellar, and hamstring tendons, known for transmitting muscular force across joints. 15

These overlaps demonstrate that classical Ayurvedic scholars had a keen observational insight into the mechanical behaviour of musculoskeletal tissues, likely derived from surgical practice, trauma management, and clinical experience. Their classification of Snayu into types (e.g., pratara, nadi, valli) resembles the modern understanding of varied connective tissue morphology. 16

2. Functional Integration and Biomechanics

Ayurveda emphasizes the coordinated action of Peshi, Snayu, and Kandara under the regulatory influence of Vata dosha. This concept parallels modern neuromuscular physiology, where nerve impulses control muscle contraction, tendon tension, joint stability, and coordinated movement. 17

Peshi provides force generation, Snayu offers stability and prevents excessive motion, while Kandara transmits mechanical force efficiently across joints. This triad mirrors modern biomechanics involving agonist-antagonist systems, tensional integrity, kinetic chains, and fascial continuity. 18

The Ayurvedic view also explains how imbalances—such as Vata aggravation—lead to stiffness, spasms, reduced joint movement, or tearing of Snayu and Kandara, which correlate directly with modern diagnoses like tendinopathy, muscle strain, ligament sprain, or reduced proprioception. 19

3. Clinical Relevance in Injury and Rehabilitation

Ayurvedic texts extensively describe injuries to these structures—Snayu bheda, Kandara bheda, and Peshi vrana—each associated with pain, instability, deformity, or loss of function. This is consistent with modern orthopaedic findings where ligament tears lead to joint instability, tendon ruptures result in functional loss, and muscle tears cause weakness and altered gait. 20

Management approaches such as:

- Abhyanga, shashtika shali pinda sweda
- Upanaha, Agnikarma, Raktamokshana

Taila-based therapies (Mahanarayana, Karpasasthyadi, Dhanwantaram, etc.) functionally support tissue healing, reduce inflammation, and restore biomechanics. Modern rehabilitation incorporates similar goals using soft tissue therapy, eccentric loading exercises, bracing, and physiotherapy modalities. 21

This suggests strong translational potential for integrative approaches where Ayurvedic therapies can complement physiotherapy, sports medicine, and orthopaedic rehabilitation.

4. Anatomical and Surgical Implications

Sushruta's detailed descriptions of Snayu and Kandara are not merely theoretical—they have direct implications for surgical dissection, trauma care, marma protection, and post-surgical bandaging. Modern surgical anatomy also emphasizes identification and preservation of tendons and ligaments, especially around joints. 22

The Ayurvedic marma framework, which identifies vital points composed of Snayu and Kandara (e.g., Koorcha, Indrabasti, Janu marma), correlates with modern neurovascular and musculoskeletal high-risk zones. Injury at these sites leads to paralysis, deformity, or severe functional loss, supporting the accuracy of classical observations. 23

5. Integrative Potential and Research Needs 24

The overlaps suggest a strong foundation for integrative musculoskeletal science. Future research could explore:

- Histological comparison of Kandara–Snayu descriptions
- Mechanobiology of soft tissues in the context of Vata regulation
- Clinical trials evaluating Ayurvedic therapies for tendon/ligament injuries
- Modern imaging (USG, MRI) correlation with Ayurvedic classifications
- Development of integrative rehabilitation protocols

Such efforts may enhance evidence-based validation of classical concepts and introduce new therapeutic pathways.

VI. CONCLUSION

This review demonstrates that Ayurvedic descriptions of Peshi, Snayu, and Kandara offer a sophisticated understanding of musculoskeletal attachments that closely parallels modern anatomy and biomechanics. Ayurveda, through its holistic and functional lens, provides insight into the structural classification, movement mechanics, injury patterns, and therapeutic management of these tissues. The striking similarities between Ayurvedic concepts and contemporary musculoskeletal science underscore the depth of classical anatomical knowledge. The integration of classical perspectives with modern evidence can significantly enhance clinical practice. Ayurvedic principles enrich the understanding of joint stability, kinetic chains, fascial continuity, and force transmission. Modern anatomy, in turn, provides microstructural validation and technological depth to ancient descriptions. Together, they offer a comprehensive framework beneficial for orthopaedics, physiotherapy, sports medicine, and Ayurvedic clinical practice. The study highlights the

need for further interdisciplinary research to validate Ayurvedic anatomical concepts using modern investigative tools. Such collaboration can refine therapeutic strategies, improve musculoskeletal rehabilitation outcomes, and establish Ayurveda as a valuable contributor to global anatomical and biomechanical knowledge.

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