



AN ANATOMICAL PERSPECTIVE OF THE ROLE OF *PARSHWASANDHI MARMA* IN MUSCULOSKELETAL HEALTH

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Abstract: Marma science represents one of the most unique anatomical and clinical concepts in Ayurveda. Marma points are vital anatomical locations where structures such as muscles (*Mamsa*), vessels (*Sira*), ligaments (*Snayu*), bones (*Asthi*), and joints (*Sandhi*) intersect. These sites are considered physiologically important and clinically vulnerable due to the concentration of vital anatomical components. Among the 107 Marma points described in classical Ayurvedic texts, *Parshwasandhi Marma* occupies a significant position because of its anatomical location in the thoracolumbar region, which is critical for musculoskeletal stability and trunk biomechanics.

Musculoskeletal disorders, particularly low back pain, constitute one of the leading causes of disability worldwide. The region corresponding to *Parshwasandhi Marma* includes important musculoskeletal and neurovascular structures such as the psoas major, quadratus lumborum, thoracolumbar fascia, lumbar vertebrae, and lumbar plexus. Dysfunction in these structures can contribute to chronic low back pain, spinal instability, and impaired movement.

The present review aims to explore the anatomical and functional significance of *Parshwasandhi Marma* with special reference to its role in musculoskeletal health. Classical descriptions from Ayurvedic texts were analyzed and correlated with modern anatomical knowledge to identify the probable structural components associated with this Marma. Understanding the anatomical correlation of *Parshwasandhi Marma* may provide a scientific basis for the therapeutic application of *Marma Chikitsa* and other manual therapies in musculoskeletal disorders.

Index Terms - Marma, Parshwasandhi Marma, Musculoskeletal health, Psoas major, Thoracolumbar junction, Ayurveda anatomy

I. INTRODUCTION

Marma Science constitutes a critical domain within Ayurvedic anatomical knowledge. Marma points are defined as specific anatomical locations on the human body where vital energy, or prana, is theorized to converge.ⁱ These points are traditionally correlated with various physiological and psychological functions, and their manipulation is believed to facilitate health and healing. Given that injury to these regions may result in significant pain, functional impairment, loss of sensation, or even mortality, they are of paramount importance in surgical science, classified as *Shalya Vishayardha*.ⁱⁱ According to Acharya Sushruta, Marma Sthana—designated as crucial points—should not be compromised and must be preserved during surgical interventions.ⁱⁱⁱ Charak has mentioned Marma as such points where sense of pain is felt more intensively comparing to other parts of the body.^{iv} Raj Nighantu has mentioned Marma as the seat of Jeev. Vagbhatta has

described *Marma* as the place where an injury leads to irregular pulsations, ailment or discomfort (*peeda*) and pain (*ruk*).^v

Marma Science is known in different ways in different parts, traditions, and languages of the country. In Kerala it is used in *Kalaripayattu*, in Tamil Nadu it is used in *Varma-Kalai*, in Malayalam it is called *Marma kala*, in Sinhala it is called *Maru kala*, and in Telugu it is called *Marma vidyaka*.^{vi} Siddha system of medicine calls Marma as '*Varma*'.

Musculoskeletal health refers to the performance of the locomotor system, comprising intact muscles, bones, joints and adjacent connective tissues. Musculoskeletal impairments comprise more than 150 different diseases/conditions that affect the system and are characterized by impairments in the muscles, bones, joints and adjacent connective tissues leading to temporary or lifelong limitations in functioning and participation.^{vii} According to the WHO, the risk of developing a musculoskeletal disorder increases as a person ages. Additionally, 2022 research suggests that females may be more likely trusted source to develop a musculoskeletal disorder than males.

Other causes and risk factors for developing a musculoskeletal disorder may include:^{viii}

- doing heavy physical labor
- prolonged sitting or standing in an awkward position
- repetitive strain
- smoking
- having obesity
- eating an unhealthy diet
- not getting enough physical activity
- doing high intensity dynamic exercise
- having other health conditions, such as kidney dysfunction
- having a family history of a musculoskeletal disorder
- having autoimmune diseases
- having metabolic syndromes

This paper explores the role of *Marma* points, particularly *Parshwasandhi Marma*, in maintaining musculoskeletal health. *Parshwasandhi Marma*, located in the lower back region, is associated with the lumbar spine and plays a significant role in the functioning of the surrounding musculature and neurological pathways. So, for better understanding and efficient therapeutic benefits it is required that *Marma* points should be explored anatomically. In this article *Parshwasandhi Marma* is considered as subject of choice for further anatomical exploration. It will be analysed in relation to its exact site in purview of Modern Anatomy.

MATERIALS AND METHODS

The present study is a narrative review integrating classical Ayurvedic literature with modern anatomical understanding.

Primary data were obtained through a detailed review of classical Ayurvedic texts including:

- Sushruta Samhita
- Ashtanga Hridaya
- Relevant commentaries on Marma Sharira

The Sanskrit descriptions related to Parshwasandhi Marma were analyzed to determine its probable anatomical location, structural composition, and clinical significance.

Modern anatomical correlations were established by reviewing standard textbooks of human anatomy, clinical anatomy, and musculoskeletal biomechanics. Particular emphasis was placed on structures located in the thoracolumbar region.

Additionally, applied therapeutic aspects were explored through the literature related to Marma Chikitsa and manual therapy techniques.

LITERARY REVIEW

LOCATION: *Parshwasandhi Marma* is a *Prushtgata Marma*. This term comprises of two terms “*Parshwa*” & “*Sandhi*”. The term *Parshwa* is described as flank area that lies on sides and back of abdomen between lower ribs and hips. The term “*Sandhi*” stands for junction. *Acharya Sushruta* has stated “अधः पार्श्वान्तरप्रतिबद्धौ जघनपार्श्वमध्ययोस्तिर्यगूर्ध्वं च जघनात् पार्श्वसन्धी” and *Acharya Vagbhata* has stated as “अधः पार्श्वान्तरप्रतिबद्धौ जघनपार्श्वमध्ये तिर्यगूर्ध्वं च पार्श्वसन्धी”. The term *Jaghan* is used for Ala of Ileum.^{ix}

NUMERAL ENTITY: According to classical texts, *Parshwasandhi Marma* are two in number, one on each side of the body.

TYPE IN ACCORDANCE WITH DOMINANT STRUCTURAL ENTITY: It is the type of *Sira Marma* which means the major structural entity present in this area is *Sira*. The other 4 components *Mansa*, *Asthi*, *Sandhi*, *Snayu* are also present but in lesser proportion as compared to *Sira* component.

TYPE ON BASIS OF ABHIGHATAJ PARINAAM (PROGNOSTIC STATUS): The *Parshwasandhi Marma* is classified as a *Kaalantara Pranhara Marma*, indicating that it can lead to death gradually over time. This *Marma* possesses both *Agneya* and *Saumya* qualities. The presence of *Saumya* qualities mitigates the immediate effects of the *Agneya* qualities, thereby extending the duration before fatal consequences occur.^x Consequently, the *Saumya* qualities reduce the individual's susceptibility to trauma associated with the *Agneya* qualities.

ANGULA PRAMANA (ANTHROPOMETRIC MEASUREMENT)- It holds a measuring value of 1/2 Angula which is approximately equal to half of breath of proximal interphalangeal joint of one's own middle finger.^{xi} Each *Parshwasandhi Marma* has same dimensions.

EFFECT OF INJURY ON PAARSHWASANDHI MARMA: The effect of trauma at this Marma Site mainly leads to *Lohita Poorna Koshttha* i.e. blood-filled cavities sequentially leading to gradual death.

Table 1: Information of Parshwasandhi Marma-

S.no.	Particulars	Information regarding <i>Parshwasandhi Marma</i>
1.	Location	<i>Prushthgata</i>
2.	Number	2
3.	Structural Particularity	<i>Sira Marma</i>
4.	Prognostic Particularity	<i>Kaalantara Pranhara</i>
5.	Anthropometric Measurement	<i>Ardha Angula</i>
6.	Traumatic Sign on Marma	<i>Rakta Poorna Koshttha</i>

ANATOMICAL CORRELATION WITH MODERN STRUCTURES

Based on the classical descriptions and cadaveric dissection, the probable anatomical region corresponding to *Parshwasandhi Marma* includes the posterolateral thoracolumbar region.

Important structures present in this region include:

Muscles

- Psoas major
- Quadratus lumborum
- Latissimus dorsi
- Internal and external oblique muscles
- Intercostal muscles

Skeletal Components

- Lumbar vertebrae
- Lower ribs
- Iliac crest

Connective Tissue Structures

- Thoracolumbar fascia
- Intertransverse ligaments
- Costotransverse ligaments

Neurovascular Structures

- Lumbar plexus
- Intercostal vessels
- Lumbar arteries and veins

These structures collectively contribute to spinal stability and trunk movement.

MUSCULOSKELETAL DISORDERS RELATED TO LOCATION OF *PARSHWASANDHI MARMA*-

The thoracolumbar region corresponding to *Parshwasandhi Marma* is commonly associated with several musculoskeletal conditions:

- Chronic non-specific low back pain
- Lumbar disc degeneration
- Muscle strain
- Myofascial pain syndrome
- Lumbar instability

These disorders may arise due to muscle imbalance, repetitive strain, poor posture, or degenerative changes. Chronic Non-specific low back pain is the pain between the lower ribs and gluteal fold that lasts more than 12 weeks and has no specific organic cause.^{xii} Psoas Major (PM) muscle overlies at the proximity of the lumbar vertebrae. It seems critical for the lumbar area to develop stability and prevent pain by producing compression force or being a part of the lumbopelvic cylinder and acting as a mechanical link between the pelvic floor and the respiratory diaphragm muscles.

ANATOMY & BIOMECHANICS OF PSOAS MAJOR-

Attachments: The psoas major muscle is anatomically subdivided into a superficial and a deep component. The deep portion originates from the transverse processes of the lumbar vertebrae L1–L5, while the superficial portion arises from the lateral surfaces of the last thoracic vertebra, lumbar vertebrae L1–L4, and the adjacent intervertebral discs. The lumbar plexus is situated between these two layers. Together with the iliacus muscle, the psoas major forms the iliopsoas, which is enveloped by the iliac fascia. The iliopsoas traverses the iliopubic eminence via the muscular lacuna, inserting at the lesser trochanter of the femur. Additionally, the iliopectineal bursa serves to separate the tendon of the iliopsoas from the external surface of the hip joint capsule at the level of the iliopubic eminence.^{xiii}

Nerve Supply: Innervation of the psoas major is through the anterior rami of L1 to L3 nerves.^{xiv}

Function: The psoas major joins the upper body and the lower body, the axial to the appendicular skeleton, the inside to the outside, and the back to the front.^{xv} It forms part of a group of muscles called Hip Flexors, whose action is primarily to lift the upper leg towards the body when the body is fixed or to pull the body towards the leg when the leg is fixed. As a component of the iliopsoas, the psoas major plays a crucial role in hip joint flexion. When contracted unilaterally, it facilitates lateral bending of the trunk; conversely, bilateral contraction assists in raising the trunk from a supine position. Furthermore, its attachment to the lesser trochanter, situated on the posteromedial aspect of the femur, contributes to lateral rotation and weak adduction of the hip.

Clinical Relevance: Tightness in the psoas major can lead to spasms or lower back pain by compressing the lumbar discs. A hypertonic and inflamed psoas may also irritate and entrap the ilioinguinal and iliohypogastric nerves, causing sensations of heat or a feeling akin to water running down the front of the thigh.^{xvi}

Biomechanics: Psoas exerts only very small moments that tend to extend the upper lumbar spine and to flex the lower lumbar spine, but at maximum contraction the psoas exerts severe compression forces on the lumbar segments, and large shear forces.^{xvii}

DISCUSSION:

The concept of *Marma* represents one of the most sophisticated anatomical observations described in classical Ayurvedic literature. Although the classical descriptions were formulated without modern anatomical tools, they demonstrate a remarkably accurate understanding of structurally vulnerable regions of the human body. *Parshwasandhi Marma* exemplifies this integrative perspective, as it is located in the thoracolumbar region where several musculoskeletal, vascular, and neural structures converge.

The thoracolumbar junction is biomechanically significant because it represents a transition between the relatively rigid thoracic spine and the highly mobile lumbar spine. This transitional nature exposes the region to substantial mechanical stress during daily functional movements such as flexion, extension, rotation, and load bearing. Modern biomechanical studies have demonstrated that forces transmitted through the

thoracolumbar region play a crucial role in maintaining spinal stability and distributing mechanical loads between the upper and lower body.

The anatomical structures located in the probable region of *Parshwasandhi Marma* include the psoas major muscle, quadratus lumborum muscle, thoracolumbar fascia, lumbar vertebrae, lower ribs, and elements of the lumbar plexus. These structures collectively contribute to trunk movement, postural stabilization, and load transmission during locomotion. Dysfunction in any of these components may lead to altered biomechanics and musculoskeletal pain.

Among these structures, the Psoas Major muscle deserves particular attention because of its important biomechanical role in spinal stabilization. The psoas muscle acts as a link between the axial skeleton and the lower extremities, forming part of the lumbopelvic stabilization system. During normal movement, the muscle contributes to spinal compression forces that enhance segmental stability of the lumbar vertebrae. However, hypertonicity or shortening of the psoas muscle may increase shear forces acting on the lumbar discs and vertebrae, thereby contributing to chronic low back pain.

Similarly, the Quadratus Lumborum muscle plays an important role in lateral flexion of the trunk and stabilization of the twelfth rib during respiration. Dysfunction of this muscle has been frequently implicated in myofascial pain syndromes and chronic lumbar discomfort. The presence of these muscles in the region corresponding to *Parshwasandhi Marma* suggests that therapeutic interventions targeting this area may influence muscular tension and spinal stability.

The classification of *Parshwasandhi* as *Sira Marma* indicates the predominance of vascular structures in this region. Modern anatomical studies confirm that the thoracolumbar area contains branches of lumbar arteries, intercostal vessels, and extensive venous plexuses. Injury to these vessels can lead to internal bleeding or retroperitoneal hematoma formation. This observation provides a possible explanation for the classical description of "*Lohita Poorna Kosktha*," which refers to the accumulation of blood within body cavities following trauma to this *Marma*.

In addition to vascular structures, the lumbar plexus is also located in close proximity to the psoas muscle. Compression or irritation of these nerves may produce symptoms such as radiating pain, paresthesia, or motor weakness in the lower limb. Such neurological manifestations further emphasize the vulnerability of this region and reinforce the clinical importance attributed to *Parshwasandhi Marma* in classical texts.

From a therapeutic perspective, stimulation of *Marma* points is believed to regulate physiological processes through neurovascular and musculoskeletal pathways. Contemporary explanations for the therapeutic effects of *Marma* stimulation may include mechanisms such as neuromodulation, activation of mechanoreceptors, enhancement of local blood circulation, and reduction of myofascial tension. These mechanisms are consistent with modern concepts of manual therapy, trigger point therapy, and myofascial release.

The anatomical location of *Parshwasandhi Marma* also overlaps with regions commonly targeted in various manual therapy approaches used in musculoskeletal rehabilitation. This overlap suggests that the traditional knowledge of *Marma* points may reflect empirical observations of clinically effective anatomical sites for pain modulation and functional restoration.

Another important aspect is the role of the thoracolumbar fascia, which forms an essential component of the posterior spinal stabilization system. This fascial complex connects the spine with the abdominal wall and the pelvic girdle, creating an integrated network responsible for transmitting mechanical forces during movement. Alterations in fascial tension or stiffness may contribute to chronic low back pain. Stimulation of *Parshwasandhi Marma* may potentially influence the tension patterns within this fascial network, thereby improving functional mobility.

Despite the theoretical correlations between classical descriptions and modern anatomy, scientific evidence supporting the precise anatomical location and clinical significance of *Parshwasandhi Marma* remains limited. Future investigations using imaging techniques, cadaveric studies, and clinical trials are necessary to establish clearer anatomical correlations and therapeutic mechanisms.

Overall, the integration of classical Ayurvedic concepts with modern anatomical and biomechanical knowledge provides valuable insights into the potential functional significance of *Parshwasandhi Marma*. Such interdisciplinary exploration may contribute to the development of integrative therapeutic approaches for musculoskeletal disorders, particularly chronic low back pain.

CONCLUSION

Parshwasandhi Marma represents a vital anatomical point situated in the posterolateral thoracolumbar region. Classical Ayurvedic descriptions emphasize its importance due to the presence of critical vascular structures and its potential role in maintaining physiological balance.

Modern anatomical correlation suggests that this *Marma* corresponds to the region involving the thoracolumbar fascia, lumbar vertebrae, psoas major muscle, quadratus lumborum, and associated neurovascular structures. These elements are integral to spinal stability, trunk mobility, and musculoskeletal function particularly chronic low back pain.

Understanding the anatomical basis of *Parshwasandhi Marma* provides a scientific foundation for integrating traditional Ayurvedic concepts with contemporary musculoskeletal medicine. Further clinical and experimental studies are required to explore the therapeutic potential of this *Marma* in the management of musculoskeletal disorders such as chronic low back pain.

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