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Human Anatomical Concepts in Siddha Medicine and its Relevance in Modern Anatomy: A Literary Review

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ABSTRACT

Human Anatomy is crucial for diagnostic, therapeutic and surgical interventions in clinical practice. Siddha medical system which is one of the oldest traditional systems of medicine, contains extensive descriptions of human anatomical concepts that integrate both physical and spiritual dimensions. A comprehensive understanding of these concepts is essential for siddha physicians in clinical decision making and treatment planning. This literary review was aimed to identify and explore the siddha concepts of human anatomy and analyze their relevance in Modern medical anatomy. Data for this study were collected from the related siddha texts and research publications. Collected data were subjected to content analysis and humble efforts were made to compare siddha anatomical descriptions with modern anatomical science. The study identified major areas of focus, including spiritual anatomy, embryology, structural anatomy, regional anatomy, ocular anatomy, *Aasayangal*, musculoskeletal structures and neuroanatomy. Findings indicate notable similarities with modern anatomy in Embryology, body structure, ocular descriptions and regional anatomy while slight variations were found in musculoskeletal and neuroanatomy. Siddha texts place significant emphasis on Spiritual anatomy which is largely absent in modern medical science. Therefore, incorporating siddha anatomical perspectives into diagnostic and therapeutic frameworks may enrich siddha clinical practice and potentially improve treatment outcomes.

Key Words: Anatomy, Human body, Siddha medicine, Spiritual anatomy

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Introduction

Anatomy is the scientific study that deals with the development and structure of living beings. The term 'Anatomy' is a Greek word which means 'to cut' or 'cut repeatedly' (Cunningham, 1972; Wineski, 2024). Human Anatomy forms the cornerstone of diagnostic reasoning, surgical interventions and therapeutic procedures in medical science. Proper understanding of anatomy is mandatory for the better understanding of pathophysiology of diseases as well as for selecting appropriate clinical interventions.

The origins of modern anatomy are generally traced to the 16th century, with the discipline advancing significantly over subsequent centuries. Siddha system of medicine, one of the oldest traditional systems of medicine which is believed to have been practiced as early as 12,000 BCE (Shukla et al., 2011). According to Siddha philosophy, Human is considered as microcosm of universe and the human anatomy involves both the physical and spiritual dimensions. The Physical body is composed of 96 basic principles whereas the spiritual body reflects the inner essence that cannot be perceived through ordinary perceptions (Sambasivampillai, 1931, 1993).

The presence of detailed Human Anatomical concepts in Siddha literatures along with the disease diagnosis and surgical interventions indicates that the Human Anatomical approach was mostly linked to the diagnostic and surgical purposes in Siddha Medicine. Therefore, it is essential for the siddha physicians to understand and familiar with the fundamental concepts of siddha anatomy to make decisions on diagnosis and siddha treatment choice. This review was aimed to systematically explore siddha anatomical concepts and assess their relevance in comparison with modern medical anatomy.

Materials and Methods

This is a literary review related study. Data for this study were collected from the related siddha text books in the library at Faculty of Siddha Medicine, University of Jaffna and research publications on websites. Collected data were subjected to content analysis to extract descriptions of human anatomy. Identified concepts were compared with standard references in modern anatomy to assess their similarities, differences and clinical relevance.

Results and Discussion

Spiritual Anatomy

According to Siddha Philosophy, Human is considered as an integral part of universal nature and human body possesses all the constituents in the universe. The human is considered as microcosm and the world is considered as macrocosm. In siddha medicine, Anatomy of microcosm embodies both the physical and spiritual elements. The physical body consists of tangible structures such as bones, muscles, blood vessels, and nerves, while the spiritual body encompasses the mind and soul, which remain inaccessible to ordinary perception. These two dimensions of body are interconnected each other (Sambasivampillai, 1993). In contrast, modern anatomy prioritizes structural and functional analysis of the physical body, largely excluding the spiritual dimensions.

Karu Utpaththi (Human Embryology)

In siddha medicine, Formation of the embryo is explained as the union of the reproductive elements. Sperms (*Sukkilam*) are deposited in the vagina (*Yoni*) during sexual intercourse, from where they reach the uterus (*Katpaasayam*) and unite with the ovum (*Suronitham*) to form the embryo (*Karu*) (Aarumuga Mudhaliyar, 1912; Vinayagamoorthy, 2010). This description bears resemblance to the concept of fertilization in modern embryology, where the fusion of a sperm and ovum results in the formation of a diploid zygote, the first stage of human development. However, modern embryology extends this understanding by detailing stages such as cleavage, blastocyst formation and implantation (Sadler, 2019).

Siddha medicine describes embryonic growth using symbolic analogies of seeds, fruits, and eggs to indicate progressive size and form, while also noting sequential organ development across the months of gestation. Modern embryology, in contrast, explains development through cellular, structural, and physiological processes, including fertilization, organogenesis, and maturation of organ systems. Despite differences in terminology and descriptive style, both frameworks share a common recognition of staged development, beginning with conception and culminating in birth.

Table 1: Comparison of embryonic development in Siddha and Modern Embryology

Gestational Age	Siddha Description	Modern Embryology Description
Day 1–15	Embryo compared to mustard, coriander, pepper, bean, bubble, gooseberry, oil nut, crow's egg, hen's egg	Fertilization, cleavage, blastocyst formation, implantation in uterine wall
1 month	Size of banana flower; ears and cheeks form	Neural tube closure; early heart tube beating; limb buds begin
2 months	Head, neck, occiput, back, and shoulder form	Organogenesis; limb buds elongate; facial structures begin to develop
3 months	Ribs, thighs, upper and lower limbs, joints form	Limbs well developed; digits separated; external genitalia begin to differentiate
4 months	Face is formed	Facial features more distinct; ossification centers appear
5 months	Mouth and nose formed; ears develop	Quickening (first fetal movements) felt; sensory organs differentiate
6 months	Gingiva, anus, and urethral orifices formed	Lungs develop alveolar structures; eyelids open; viability increases
7 months	Body hairs, nerves, blood vessels, joints, intestines, umbilicus formed; fetus breathes	Lanugo (fine hair) present; subcutaneous fat develops; respiratory movements begin
8 months	Fontanelles of skull and scalp hair formed	CNS matures; scalp hair thickens;

9 months	Fetus responds to sensations and strengthened	Full fetal movements; organ systems mature for survival
10 months	Birth occurs	Term birth (37–40 weeks); neonate physiologically mature

Sareera Amaippu (Structural layers of the Human Body)

According to siddha system, Human body is structured basically by bones, muscles, skin, nerves, fatty tissue, blood and brain. (Vinayagamoorthy, 2010). Bones and nerves are considered the core framework which are subsequently covered by muscles and then by skin. Within this structure of framework, *Ninam* (Lymph), brain, blood and blood vessels are formed. Blood vessels are distributed throughout the body (Vengadarajan, 1958). This description highlights a layered conception of the body where structural, circulatory and neural elements work together to maintain integrity and function.

In modern anatomy, the human body is described as consisting of layers, extending from the integumentary system to the innermost membranous coverings of vital organs. Beneath the skin, there are musculoskeletal layers including fascia, muscles and bones which provide strength, movement and protection. Within the body cavities, visceral organs are arranged and enclosed by serous membranes that reduce friction and ensure physiological stability (Tortora & Derrickson, 2017). Although expressed in different terminologies, both siddha and modern anatomical frameworks emphasize the layered arrangement of the body, structural role of bones and muscles and the integration of vascular and neural components. The siddha description, therefore, demonstrates conceptual alignment with modern anatomical science.

Regional Anatomy and Organs

In siddha medicine, human body is divided into six regions; Head (*Thalai*), Body (*Udal*), two Upper Limbs (*Kai*) and two Lower limbs (*Kaal*). The organs located within these regions are further classified into two categories; Visible which can be seen through naked eye and invisible which cannot be seen through naked eye (Uththamaraayan, 1983). In contrast, modern medical science distinguishes the human body into macroscopic and microscopic anatomy. Regional anatomy is one of the branches within macroscopic anatomy, in which the body is organized into head, neck, trunk and paired limbs. The trunk is further

subdivided into thorax, abdomen, back and pelvis. Despite the differences in terminology and approach, both siddha and modern perspectives emphasize a systematic regional classification of the human body.

According to Ponnaiyaah pillai (2016), siddha texts identify 32 organs including brain, sensory organs, oral structures, thoracic and abdominal components, reproductive organs and limbs. Among these, the abdominal region specifically encompasses the stomach, liver, intestines and umbilicus. These classifications demonstrate the systematic understanding of bodily structure in siddha medicine, showing parallels with modern anatomical concepts.

Musculoskeletal Anatomy

According to the (Uththamaraayan, 1983), siddha medicine describes 360 bones, 500 muscles, 900 muscle fibers and 210 joints in human body. 360 bones in siddha literature contrasts with the 206 bones recognized in modern anatomical science. This discrepancy may arise from differences in classification of bones. Siddha anatomy includes not only major bones but also structures such as teeth, nails, tendons or cartilages and bony protuberances as bones, many of which are excluded in modern anatomy bone counts. Additionally, siddha classification often counts hardened body parts that decay slowly after death as bones. In contrast, Modern anatomical science limits the definition of bones to the structures which are specialized connective tissues composed of cells embedded in a mineralized matrix providing strength and rigidity. Siddha tradition categorizes bones mainly on their location whereas modern anatomy classifies them based on the shape, structure, region and function of bones. In siddha medicine, 500 muscles are described as providing structural support and covering blood vessels, with 400 of them distributed across four limbs, each containing 100 muscles. The nomenclature of muscles in siddha texts primarily based on the location whereas modern anatomy classifies muscles according to their shape, size, structure, position and function.

In siddha anatomy, joints (*santhigal*) are described as the locations where bones meet. Uththamaraayan, 1983 mentioned that there are 210 *Santhigal* (Joints) in the body in which 68 are present in upper and lower limbs, 59 are in the body and 83 present in the part above neck. These joints are categorized as either moveable or immoveable and furtherly into eight morphological types. In contrast, modern medicine recognizes around 360 joints in the body. This variation in number may be attributed to differing classification criteria and variations in bone counts.

Ocular Anatomy

The human eye is described in both Siddha literature and modern anatomy as a spherical organ situated in the anterior cranial cavity, serving as the primary organ of vision. Despite differences in terminology, a notable correspondence can be observed between the structural descriptions in Siddha texts and contemporary anatomical understanding.

According to Amirthalingam Pillai et al., 1976, the eye is divided into six regions: *Imai Mandalam, Kuvalai Mandalam, Vellai Mandalam, Karumai Mandalam, and Paarvai Mandalam*. The *Imai Mandalam* is compared to the eyelid region, while *Kuvalai Mandalam* (or *Ireppai*) represents the junction where the upper and lower eyelids meet, analogous to the canthi in modern anatomy. The *Karumai Mandalam* is described as an avascular structure, corresponding to the cornea, whereas the *Paarvai Mandalam* is considered the region of vision in which the structure *Iyavam* (lens) is situated. The *Vellai Mandalam* parallels the sclera, the white protective covering of the eye.

With regard to its layers, Siddha texts describe four distinct strata, each composed of membranes. The first layer, comprising *Kadinai* and *Sirungai*, corresponds broadly to the fibrous tunic of modern anatomy. The second layer includes *Tharanisam*, *Varuni*, and *Parithikam*. Of these, *Tharanisam*, in which blood vessels are arranged in a network called *Nethira Koalakam*, is comparable to the choroid. *Varuni* is described as possessing seven concentric zones, among which *Paavai* (*Thaarai*) can be correlated with the iris. The third layer, *Tharisiyam*, is analogous to the retina, where visual perception occurs through the distribution of nerves. Siddha texts also describe internal components of the eye in a manner consistent with modern structures. The *Iyavam* resembles the crystalline lens, *Vanam* represents the aqueous humor located anterior to the lens, and *Padikam* corresponds to the vitreous humor posteriorly. Supporting structures such as muscles (*Pesikal*) and tendons (*Murunthugal*) are described as stabilizing the globe of the eye, while *Kanneer Koalankal* (lacrimal glands) and their draining ducts into the nasal cavity are comparable to the modern lacrimal apparatus (Amirthalingam Pillai et al., 1976; Snell, 2013; Tortora & Derrickson, 2017).

Thus, Siddha ocular anatomy, though articulated in indigenous terminology, demonstrates substantial parallels with modern anatomical concepts. This comparative analysis highlights the continuity of structural knowledge across traditional and contemporary medical systems.

Aasayangal (Resting or Storage sites)

In siddha medicine, the concept of *Aasayangal* denotes the resting places or storage sites within the body, which may be correlated with the hollow organs described in modern anatomy that serve as reservoirs or functional cavities. According to *Uththamaraayan*, 1983, there are five *Aasayangal* in human body. *Raththaasayam* is considered as the site where the blood is stored and it may be comparable to the heart which serves as the central organ for blood circulation in modern physiology. *Aamaasayam* refers to the organ where ingested food is stored primarily which is comparable to the stomach. *Pakkuvaasayam* is described as the site of further processing of food, corresponding to the small intestine where nutrient absorption predominantly occurs. *Moothiraasayam* is regarded as the reservoir of urine which corresponds to the urinary bladder in modern science. Finally, *Katpaasayam* is associated with the reproductive functions and is identified as uterus, which in modern anatomy serves as the site of implantation and fetal development. These comparisons indicate that the siddha conceptualization of *Aasayangal* captures the structural and functional essence of visceral organs recognized in modern medical science.

Neuroanatomy

The Six *Aadharangal* (Six Nerve Centers or Plexuses)

In siddha medicine, the six *Aadharangal* are described as vital energy centers or plexuses through which the life force (*Prana vayu*) circulates and sustaining physiological and psychological functions. These are the six stations where the soul relays in body. Each of these plexuses are rounded like a wheel and called as '*Chakras'*. These major Chakras helps the nerve passages (*Thasa Naadigal*) to function. These six *Aadharangal* are; *Moolaatharam, Swaathiddaanam, Manipooragam*, *Anaathagam*, *Visuththi* and *Aakkinai.* They are positioned along the central axis of the body, extending from the sacral region up to the point between the eyebrows. They are conceived as nodal regions where the body's subtle energies are concentrated and circulated. (Saampasivampillai, 1931; Vinayagamoorthy, 2010).

In modern anatomy, comparable sites can be recognized in relation to autonomic and somatic plexuses, as well as endocrine structures. *Moolaatharam* is located at the base of the spinal column and associated with the sacral and pelvic plexuses, which regulate excretory and reproductive systems. *Swaathiddaanam* corresponds to the inferior hypogastric plexus influencing pelvic–abdominal activity. *Manipooragam* is aligned with the celiac (solar)

plexus that governs gastrointestinal and adrenal functions. *Anaathagam* lies near the cardiac plexus, a network involved in heart and lung regulation. *Visuththi*, situated in the cervical region, is comparable to the cervical and pharyngeal plexuses together with the thyroid gland. Finally, *Aakkinai* is generally correlated with higher neuroendocrine centers, particularly the hypothalamus and pituitary complex (Vinayagamoorthy, 2010; Rajesh kumar, W., 2023). Thus, although Siddha medicine conceptualizes the *Aadharangal* as subtle energy hubs, their approximate parallels in modern biomedical science may be understood through nerve plexuses and endocrine nodes that coordinate vital body functions. The comparison illustrates potential points of dialogue between traditional and modern perspectives.

Table 2: Comparison between modern and Siddha anatomy of Six *Aatharangal*

Aatharangal	Location	Plexus
Moolaatharam	Pelvis	Sacral / Pelvic Plexus
Swaathiddaanam	Pelvis	Inferior Hypogastric Plexus (Prostatic plexus / Uterovaginal Plexus)
Manipooragam	Abdomen	Coeliac / Solar Plexus
Anaathagam	Thorax	Cardiac Plexus
Visuththi	Neck	Cervical / Pharyngeal Plexus
Aakkinai	Head	Brow Plexus

Origin, Count and Classifications of Nerves

Siddha texts describe the nervous system in ways that differ markedly from the anatomical framework recognized in modern medicine. According to Uththamaraayan (1983), the body contains 200 primary functional nerves, which are believed to originate from the *Moolaatharam*. From this origin, 24 major nerves arise, of which 10 ascend toward the upper body, 10 descend to the lower body, and four extend transversely. The ascending nerves are said to branch into 30 divisions at the level of the heart, while the descending ones divide into 30 branches between the stomach and intestine. The transverse nerves give rise to multiple minor branches that distribute across the body.

In another description, Vinayagamoorthy (2010) notes the presence of 72,000 *Naadi Narambugal*, with their distribution mapped to various regions of the body: 1,000 in the head, 3,000 in each ear and cheek, 4,000 in both eyes, 5,000 across the occipital and shoulder regions, 6,000 in the neck, 3,330 in the nose, 3,000 in each upper limb, 9,016 between the throat and umbilicus, 3,000 along the sides of the chest, 8,000 in the spinal cord, 2,000 in each thigh, 7,000 in the lower abdomen and genital region, 8,654 in the ankle and foot, and 1,000 in the anal canal.

In contrast, modern anatomy provides a precise classification of the nervous system into central (brain and spinal cord) and peripheral components, with the latter further divided into cranial nerves, spinal nerves, autonomic fibers, and their plexuses. The human body contains 12 pairs of cranial nerves and 31 pairs of spinal nerves, making a total of 43 paired nerve roots. These are systematically mapped and studied based on structural, functional, and physiological characteristics.

The numerical disparity between Siddha and modern accounts may reflect differences in terminology and conceptual framing. The Siddha term *Naadi Narambugal* does not always distinguish between nerves, blood vessels and subtle channels of energy also could explain the large counts reported in classical texts. Modern neuroanatomy, by contrast, restricts the definition of nerves to well-defined anatomical structures comprising axons, connective tissue coverings, and vascular supply.

Thus, while Siddha literature emphasizes the extensive and subtle distribution of *Narambugal* as functional pathways of vital energy, modern anatomy recognizes a finite and well-defined network of nerves organized into cranial, spinal, and autonomic systems. These perspectives highlight two distinct frameworks of understanding - one rooted in traditional physiology and subtle channels, and the other grounded in structural and functional evidence of the nervous system.

Narambu Mudichchu **(Neuroganglion)**

In Siddha literature, the term *Narambu Mudichchu* refers to points where nerves cluster together in the body. These are described as knot-like structures that integrate with muscles, with the nerve arrangement likened to the branching pattern of veins in a leaf (Vinayagamoorthy, 2010). Classical texts note the presence of *Narambu Mudichchugal* in several regions, including the base of the head, forehead and eyebrows, neck, chest, upper and lower limbs, elbows, knees,

and feet. Saampasivampillai (1931) suggests that these structures may correspond to what is recognized in modern science as neuro-ganglia.

From the perspective of modern anatomy, neuro-ganglia are defined as clusters of neuronal cell bodies located outside the central nervous system. They serve as relay stations where neurons form synaptic connections, often sharing related functions or pathways. The parallel between Siddha *Narambu Mudichchu* and modern neuro-ganglia illustrates a point of convergence between traditional and biomedical descriptions: both recognize localized nerve clusters as vital sites of integration and coordination, though Siddha accounts tend to emphasize broader functional and energetic roles.

Thasa Naadigal **(Major Nerves Passages)**

Siddha texts describe *Thasa Naadigal*, the ten principal nerve channels, as pathways for communication and interchange of forces between the body's nerve centers and the external universe (Saampasivampillai, 1931). These are identified as *Idakalai, Pingalai, Sulimunai, Gandhari, Purudan, Aththi, Alan (Alanpudai), Singhu, Guru (Kuru),* and *Sangini*. Among them, *Sulimunai* is considered the central channel, originating from the *Moolaatharam* in the pelvic region and extending upward along the spine to the head. *Idakalai* and *Pingalai* follow this channel, intersecting one another in a crossing pattern (Vinayagamoorthy, 2010). Uththamaraayan, (1983) notes that *Idakalai* arises from the right great toe and terminates in the left nostril, while *Pingalai* begins at the left great toe and ends at the right nostril. These two channels may be compared to motor and sensory pathways that cross between the central and peripheral nervous systems.

Other *Naadigal* are described with functions analogous to specific cranial nerves. According to Vinayagamoorthy, (2010), *Gaandhari* extends from the *Moolaatharam* to the head, passing through the neck, nose, forehead, and tongue, and is linked with speech and salivation. This description may parallel the functions of the hypoglossal, glossopharyngeal, or facial nerves. *Singhu* and *Aththi* originate in the pelvic region and ascend through the right and left ears, respectively, to reach the eyes, while *Alan* and *Purudan* travel from the lower abdomen to the chest wall and axilla, terminating at the ears and contributing to auditory function. *Guru (Kuru)* arises from the umbilical region, extends to the liver, and is associated with sensations such as nausea and salivation, corresponding closely with the vagus nerve. Finally, *Sangini* originates from the genitals and is said to play a role in balancing the 96 *Thathuvangal* which are the fundamental principles of Siddha physiology.

In modern neuroanatomy, these descriptions may be correlated with major nerve tracts and cranial nerves. *Sulimunai, Idakalai*, and *Pingalai* are comparable to central motor and sensory pathways that regulate communication between the brain, spinal cord, and peripheral structures. The remaining *Naadigal* resemble cranial nerves involved in vital functions such as speech, salivation, vision, hearing, and swallowing. Thus, the Siddha account of *Thasa Naadigal* illustrates an early attempt to map vital functional pathways within the body. While expressed in symbolic and energetic terms, several of these descriptions correspond closely with the roles of cranial and autonomic nerves recognized in modern anatomy.

Conclusion

In conclusion, this review demonstrates that Siddha medicine contains a detailed framework of anatomical knowledge, integrating both physical and spiritual dimensions. While modern anatomy emphasizes structural precision supported by diagnostic technologies, Siddha anatomy incorporates holistic perspectives that account for physiology and spirituality. Significant overlaps exist in embryology, structural anatomy, regional divisions, and ocular anatomy, while differences are evident in musculoskeletal and neuroanatomy. Therefore, recognizing these Siddha anatomical concepts may enhance integrative approaches to diagnosis and treatment, particularly for practitioners within traditional medicine systems.

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