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Human Morphology and Medical Thought in Fifth-Century Sri Lanka

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Abstract: The global history of anatomy demands closer attention across different eras, regions, and intellectual settings, especially reaching hitherto under-examined territories. This paper addresses the issue by reconstructing the knowledge of human morphology that prevailed in Sri Lanka during the fifth century CE, drawing primarily on the Pāli Buddhist Commentaries compiled from early Sinhala exegetical traditions. By systematically organising and analysing these texts through content and thematic analysis, this study reconstructs a coherent account of contemporary anatomical understanding. The findings reveal detailed descriptions of individual organs, composite bodily structures, their respective functions, and structural and functional interrelations. The specificity and consistency of these accounts indicate a level of empirical engagement, including dissection and direct observation. When situated within the broader social, cultural, and epistemic spectrum of early Sri Lanka, these findings suggest that anatomical knowledge formed part of a wider medical and intellectual landscape.

Keywords: history of anatomy, human morphology, early Sri Lanka, Buddhist commentaries, ancient surgical instruments

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The origins of anatomical knowledge remain a contentious issue within the historiography of medicine. Some scholars argue that its beginnings may extend as far as the Stone Age, inferred from archaeological evidence of early surgical practices and bodily interventions.¹ Within the conventional Western historical narrative, anatomy is often traced to the Golden Age of Greece. Alcmaeon (ca. 500 BCE), Hippocrates (ca. 460–377 BCE), Aristotle (ca. 384–322 BCE), Herophilus (335–280 BCE), and Galen (ca. 130–200 BCE) are often identified as the earliest figures to record systematic observations related to human anatomy.² Observational anatomy, based primarily on external examination and clinical observation, is generally dated to the fifth century BCE, while exploratory anatomy involving deliberate internal investigation is commonly associated with developments from the sixth century CE onward.³ Later conceptual advances, such as the emergence of functional anatomy in the sixteenth century CE—most notably through the works of Leonardo da Vinci (1452–1519) and Andreas Vesalius (1514–1564)—marked a shift toward correlating anatomical structure with physiological function.⁴ These chronological markers, however, reflect selective traditions and do not fully capture developments outside the Graeco-European intellectual sphere.

The development of anatomical studies was profoundly influenced by the philosophical, social and religious doctrines prevailing within societies. The empiricist school of thought, associated with Philinus of Cos (3rd century BCE), maintained that physicians could acquire all necessary knowledge of the human body through direct observation of wounds and clinical manifestations in living patients. According to this perspective, dissections revealed

¹ Omar Habbal, “The Science of Anatomy: A Historical Timeline,” *Sultan Qaboos University Medical Journal* 17, no. 1 (2017): 18–22, on 18; Martyna Dziedzic, Patryk Ostrowski, Sanjib Kumar Ghosh, Krzysztof Balawender, Mateusz Koziej, and Michał Bonczar, “Exploring the evolution of anatomy: From historical foundations to modern insights,” *Translational Research in Anatomy* 35, (2024): 1–4, on 1.

² Manash K. Paul, “Anatomy: Past, Present and Future,” *Journal of Human Anatomy* 3, no. 1 (2019): 1–3, on 1.

³ J. O. Owolabi, P. O. Ogunnaike and A. A. Tijani, “Anatomy: A Chronological Review of the Evolution of Context and Content,” *Asian Journal of Medicine and Health* 4, no. 4 (2017): 1–13, on 4.

⁴ Alexandra Mavrodi, George Paraskevas and Panagiotis Kitsoulis, “The History and the Art of Anatomy: a source of inspiration even nowadays,” *Italian Journal of Anatomy and Embryology* 118, no. 3 (2013): 267–76, on 268–69; Patricia Fara, “Versions of Vesalius,” *Endeavour* 35, no. 1 (2011): 4–5, on 4. Andreas Vesalius reformed anatomical knowledge and teaching in the Renaissance, and his work *De Humani Corporis Fabrica Libri Septem (On the Fabric of the Human Body in Seven Books)* is considered as the foundation work of modern scientific anatomy.

the body only in death, while vivisections exposed it under abnormal and ethically problematic conditions; consequently, neither approach was considered empirically reliable for informing the treatment of living patients.⁵ In ancient Rome, anatomical investigation was largely confined to animals, as the dissection of human bodies was prohibited on religious and cultural grounds. This prohibition stemmed from deep respect for the dead and the widespread belief that deceased bodies retained awareness of post-mortem events, thereby possessing an inherent right to be buried intact and undisturbed.⁶ The fundamental requirement of anatomy—the use of human cadavers—thus repeatedly posed a challenge to the advancement of the discipline. Debates over whether such practices were morally or religiously permissible periodically impeded the evolution of anatomical science.⁷ It was only during the nineteenth and early twentieth centuries that ecclesiastical permissions were more broadly granted for the examination of human corpses, enabling systematic anatomical research to flourish.⁸

The above discussion reveals a broad diversity encompassing chronological and geographical contexts, methodological approaches, moral restrictions, and philosophical foundations that have shaped the development of anatomical knowledge. Such diversity underscores the need to extend scholarly inquiry beyond conventionally emphasised regions and populations. This paper seeks to address that gap by examining knowledge of the internal morphology of the human body as it prevailed in Sri Lanka by the fifth century CE, thereby contributing to a more inclusive global history of anatomy.

Methodological Approach

This study adopts content analysis and thematic analysis to investigate the nature and extent of anatomical knowledge reflected in Sri Lankan sources, dated to the fifth century CE. The research does not assume the existence of a formal, systematised discipline of anatomy comparable to later medical tradi-

⁵ Christopher E. Cosans, “History of Classical Anatomy,” in *Encyclopaedia of Life Sciences*, 1–7 (Chichester: John Wiley & Sons, 2015), 4.

⁶ Steve Parker, *Kill or Cure: An Illustrated History of Medicine* (London: Dorling Kindersley, 2013), 44.

⁷ Mavrodi, Paraskevas and Kitsoulis, “The History and the Art of Anatomy,” 268.

⁸ Vatan Kavak, “The Role of Anatomy in Human History,” in *Complementary Medicine with New Approaches*, ed. Vatan Kavak, 1–14 (Istanbul: Nobel Tip Kitabevleri, 2024), 1.

tions; rather, it seeks to reconstruct implicit anatomical knowledge embedded within contemporaneous religious texts. The primary source material comprises Buddhist Commentarial literature (*aṭṭhakathā*) composed or compiled in Sri Lanka during or close to the fifth century CE. These texts, written in Pāli, were based on the currently extant commentaries in the local language, Sinhala. Although primarily exegetical and doctrinal in intent, these works contain numerous descriptive references to the human body, bodily processes, and physiological functions. The validity of adopting Buddhist Commentarial literature to delve into the Sri Lankan past has been discussed in detail elsewhere, hence it will not be elaborated here.⁹

The analysis proceeds in two complementary stages: content analysis, and thematic analysis. A directed content analysis is employed to organise the extracted textual material according to anatomically relevant categories. These categories—organs, functions, interrelations, and observational practices—are derived from the research objectives rather than imposed retrospectively from modern anatomical science. Care has been taken to avoid anachronistic interpretations; anatomical terms are analysed within their original semantic, doctrinal, and cultural contexts. A thematic analysis is then applied to identify recurring conceptual patterns and interpretive frameworks through which the human body is understood in the texts. Themes such as bodily decomposition, functional integration, corporeality in meditation, and the moral–philosophical valuation of the body are examined to reconstruct the intellectual environment that shaped anatomical understanding. This stage aligns dispersed references into a coherent representation of contemporaneous anatomical knowledge.

Several inherent limitations are acknowledged. First, the primary sources were not composed with the intention of documenting anatomical knowledge, leading to fragmentary context-dependent references. Consequently, the reconstructed anatomical understanding may be partial and uneven. Second, the reliance on translations introduces interpretive constraints, particularly where anatomical concepts lack direct lexical equivalents in English. These limitations are addressed through cautious interpretation, transpar-

⁹ Chandana Jayawardana and Wijeratne Bohingamuwa, *Pāli Commentaries and Sri Lankan Society: An Introductory Note* (Colombo: Royal Asiatic Society of Sri Lanka, 2021), 230–238.

ency in analytical decisions, and acknowledgement of uncertainty where applicable. Third, the linguistic and translation restraints should also apply. Given that the primary sources are in Pāli, the study recognises translation as a critical methodological concern. English translations are treated as interpretive aids rather than definitive representations.

Historical and Philological Context of the Sources

The primary textual sources examined in this study are the Buddhist commentarial literature, as noted in the preceding section. The use of these sources raises two fundamental considerations relevant to the interpretation of the anatomical knowledge they preserve. First, the anatomical and morphological information found in the commentaries must be situated within the broader intellectual and textual traditions of the Indian subcontinent, the cultural and historical milieu in which Buddhism emerged and developed. Second, the original material, preserved in Pāli, must be rendered into modern English in a manner that both respects the semantic nuances of the original terminology and facilitates its interpretation within contemporary scholarly discussions. The following discussion addresses these two methodological aspects.

Positioning the Anatomy-Related Information in Buddhist Commentaries

The Indian subcontinental textual tradition relating to anatomy and medical thought may broadly be divided into several historical phases. These include the period of the *Ṛgveda Saṃhitā* and *Atharvaveda Saṃhitā* (1500 BCE to 900 BCE); the period of exegetical and speculative literature, including the *Brāhmaṇas*, *Āraṇyakas*, and early *Upaniṣads* (900 BCE to 500 BCE); the era of the *Sūtra* literature (500 BCE to 200 BCE); and finally the period associated with the composition of classical Āyurvedic medical treatises, including the *Caraka Saṃhitā* and the *Suśruta Saṃhitā* (200 BCE to 300 CE), together with later compilations such as the *Aṣṭāṅgasamgraha* (c. 600 CE).¹⁰ This textual

¹⁰ Kenneth G. Zysk, “The Evolution of Anatomical Knowledge in Ancient India, with Special Reference to Cross Cultural Influences,” *Journal of the American Oriental Society* 106, no. 4 (1986): 687–705, on 687–93; Tony George Jacob, “History of Teaching Anatomy in India: From Ancient to Modern Times,” *Anatomical Sciences Education* 6, no. 5 (2013): 351–58, on 351–2.

tradition was supported by an intellectual and pedagogical environment presented by the high-level learning institutions. Centres such as Kāśī in the east and Takṣaśilā in the northwest are widely acknowledged as prominent seats of medical education where renowned physicians and surgeons are believed to have taught. Buddhist narrative traditions, for instance, record that the Buddha's physician Jīvaka received medical training at Takṣaśilā under the teacher Ātreya.¹¹

Within this broader intellectual context, different philosophical and religious traditions in early India appear to have articulated their own interpretations of the human body and its structures, resulting in multiple conceptualisations of human morphology.¹² At the same time, interactions among these traditions would likely have produced overlapping terminologies and conceptual similarities. It is also widely recognised that the classical Āyurvedic treatises, particularly the *Caraka Saṃhitā* and the *Suśruta Saṃhitā*, contain detailed discussions of human anatomy, physiology, and medical theory that later shaped South Asian medical traditions.¹³ While the present study does not attempt a direct philological comparison, the anatomical terminology encountered in the Buddhist commentarial literature may reasonably be viewed within the wider intellectual milieu influenced by such established medical traditions. It is therefore plausible that later textual traditions were influenced, directly or indirectly, by earlier bodies of knowledge while simultaneously preserving distinctive interpretive frameworks. The Buddhist commentarial tradition, as reflected in the texts examined in this study, should be understood within this wider intellectual landscape. However, establishing precise textual relationships or lines of transmission would require extensive comparative philological analysis, which lies beyond the scope of the present investigation.

¹¹ W. Woodville Rockhill, trans., *The Life of the Buddha and the Early History of His Order* (London: Trübner & Co., 1884), on 65, 96; A. F. Rudolf Hoernle, *Studies in the Medicine of Ancient India – Part I: Osteology or the Bones of the Human Body* (Oxford: Clarendon Press, 1907), 7.

¹² Dominik Wujastyk, "Interpreting the Image of the Human Body in Premodern India," *International Journal of Hindu Studies* 13, no. 2 (2009): 189–228, on 190.

¹³ Dominik Wujastyk, trans., ed. and introductions to *The Roots of Ayurveda: Selections from Sanskrit Medical Writings*, rev. ed. (London: Penguin Classics, 2003), 1–15.

Converting the Original Commentarial Information into Modern Scholarship

The primary Pāli sources consulted in this study were accessed through the Chatṭha Saṅgāyana digital edition of the Pāli canon and commentaries.¹⁴ Among the texts frequently cited is the *Visuddhimagga*, for which the English translation by Ñāṇamoli was consulted.¹⁵ While Ñāṇamoli's translation is widely respected for its philological fidelity to the Pāli original, its deliberate closeness to the source text can occasionally affect readability in interdisciplinary contexts such as the present historical analysis. Where necessary, adjustments were therefore introduced to improve clarity and conceptual accessibility. For other commentarial materials, published Sinhala translations were consulted alongside the original Pāli passages. In these cases, English renderings were prepared by the author, with careful reference to the Pāli originals and with assistance from established lexicographical resources. These included the standard Pāli–English dictionaries compiled by Robert Cæsar Childers,¹⁶ T. W. Rhys Davids and William Stede,¹⁷ as well as Nyanatiloka's glossary of Buddhist terms and doctrines.¹⁸

While these lexicographical works provide the linguistic bridge between Pāli and English terminology, the present study also considered subject-specific anatomical terminology to maintain conceptual clarity in modern discourse. For this purpose, reference was made to recent publications of the World Health Organization on international standard terminology in traditional medicine, particularly the compendium on Ayurveda, in which Sec-

¹⁴ The *Chatṭha Saṅgāyana Tipiṭaka* (Sixth Buddhist Council) version is regarded as an authoritative collection of the Pāli Canon (*Tipiṭaka*), Commentaries (*Aṭṭhakathā*), and Sub-commentaries (*Tīkā*), finalized in Myanmar between 1954 and 1956. Unless otherwise noted, all the Pāli sources cited hereafter can be accessed at <https://tipitaka.app/> and are copyright of the Vipassana Research Institute.

¹⁵ Bhikkhu Ñāṇamoli, trans., *The Path of Purification: Visuddhimagga* (Kandy: Buddhist Publication Society, 2010).

¹⁶ Robert Caesar Childers, *A Dictionary of the Pali Language* (London: Trübner & Co., 1875).

¹⁷ T. W. Rhys Davids and William Stede, *Pāli-English Dictionary* (London: Pali Text Society, 1921–1925).

¹⁸ Nyanatiloka, *Buddhist Dictionary: Manual of Buddhist Terms and Doctrine*, ed. Nyanaponika, rev. ed. (Kandy: Buddhist Publication Society, 2004).

tion 3 presents an extensive list of anatomical terminology in English and Sanskrit.¹⁹

In summary, the anatomical descriptions extracted from the *Chatṭha Saṅgāyana* edition of the relevant Pāli commentaries were translated into English by the author using established lexicographical tools while consulting internationally recognised terminological standards where appropriate.

Structural and Functional Notions of Human Morphology

Drawing upon textual references to discrete organs, composite anatomical groupings, inter-organ relationships, and physiological processes, it seeks to delineate the internal coherence of the anatomical model embedded in these sources. Rather than isolating terminological occurrences, the analysis examines how organs are conceptualised as both morphological entities and functionally integrated components of a living system.

Individual Organs

The most immediate layer of anatomical knowledge concerns the identification and enumeration of discrete bodily organs. Far from being merely symbolic, these organs appear in systematic listings, often associated with colours, shapes, directions, locations, and delimitations. Ascertaining the features of individual organs provides the foundational unit from which broader anatomical systematisation emerges.

Kidney (*vakka*): This consists of two pieces of flesh joined by a single ligature. Its colour is a dull red, resembling the seeds of the *pabbhaddaka* (coral tree). In shape, it resembles a pair of children's play balls or two mango fruits attached to a single stalk. It lies in the upper region of the body. It is situated on either side of the heart flesh (*hadayamaṃsa*), being secured by a stout sinew (*thūlanhāru*) that arises with a single root from the base of the neck (*galavāṭaka*) and soon divides into two branches.²⁰

¹⁹ World Health Organization, *WHO international standard terminologies on Ayurveda* (Geneva: World Health Organization, 2022).

²⁰ Vipassana Research Institute. (n.d.). *Visuddhimagga* – Visuddhimagga-1–8. Anussatikammaṭṭhānaniddeso – Koṭṭhāsavavattāpanakathā. Chatṭha Saṅgāyana; Vipassana Research Institute. (n.d.). *Abhidhammapiṭaka* (*aṭṭhakathā*) – Sammohavinodanī-aṭṭhakathā – 7. Satipaṭṭhānavibhaṇ-

Heart (*hadaya*): This refers to the heart flesh (*hadayamaṃsa*). Its colour resembles that of a red-lotus petal. However, the colour is said to vary according to temperament: in one of greedy temperament it is red; in one of hating temperament it is black; in one of deluded temperament it resembles the colour of water in which meat has been washed; in one of speculative temperament it is like lentil soup; in one of faithful temperament it resembles the colour of [yellow] *kanikāra* flowers; and in one of understanding temperament it is limpid, clear, unturbid, bright, and pure, like a well-washed gem of pure water, appearing to shine. In shape, it resembles a lotus bud with its outer petals removed and turned upside down. Its exterior is smooth, while its interior resembles the inside of a *kosātakī* (loofah gourd). It lies in the upper part of the body midway between the two breasts (*thana*), within the body.²¹ Just as a four-way junction (*siṅghāṭaka*) lies in the middle of a town (*nagaramajjhe*), so the four-way junction called “heart” (*hadayarūpa*) is situated in the centre of the body (*sarīramajjhe*).²²

Liver (*yakanana*): This is described as a twin slab of flesh (*yamakamaṃsapāṭala*). Its colour is a brownish shade of red, similar to the not-too-red backs of white water-lily petals. Its shape resembles a *koviḷāra* leaf with a single root and twin ends. In sluggish persons, it appears as a single large piece, whereas in those endowed with understanding it may appear as two or three smaller pieces. It lies in the upper part of the body and is located on the right side (*dakkhiṇapassa*), within the body and beneath the two breasts (*thana*).²³

Membranes (*kilomaka*): These form the covering of the flesh and are of two kinds: the concealed and the unconcealed. Their colour is white, like *dukula* (muslin) cloth. Their shape varies according to location. The concealed midriff lies in the upper part, while the unconcealed membrane extends through both parts of the body. The con-

go – 1. Suttantabhājanīyaṃuddesavāraṇṇanā – Kāyānupassanāniddesavaṇṇanā. Chattha Sangayana.

²¹ Ibid.

²² Vipassana Research Institute. (n.d.). *Samyuttanikāya (aṭṭhakathā)*–Saḷāyatanaṇṇavagga-aṭṭhakathā –1. Saḷāyatanaṇṇavagga-aṭṭhakathā–19. Āsīvisavagga–8. Kimsukopamasuttavaṇṇanā. Chattha Sangayana.

²³ *Visuddhimagga* – Koṭṭhāsavavattāpanakathā; *Sammohavinodanī-aṭṭhakathā*–Kāyānupassanāniddesavaṇṇanā

cealed midriff covers the heart (*hadaya*) and kidneys (*vakka*), whereas the unconcealed membrane covers the flesh (*maṃsa*) beneath the inner skin (*camma*) throughout the entire body (*sakalasarīra*). In terms of delimitation, it is bounded below by the flesh, above by the inner skin, and around by the structures associated with the midriff.²⁴

Spleen (*phiaka*): This is described as the flesh of the belly’s “tongue” (*udarajivhāmaṃsa*). Its colour is blue, resembling the colour of *niggunḍi* flowers. Its shape is compared to seven fingers placed together without attachments and also to the tongue of a black calf. It lies in the upper part of the body and is located near the upper side of the belly wall (*udarapaṭala*), to the left (*vāmapassa*) of the heart (*hadaya*).²⁵

Lungs (*papphāsa*): The flesh of the lungs (*papphāsamaṃsa*) is divided into two or three portions. Its colour is red, resembling that of not fully ripe *udumbara* figs. In shape, it resembles a thick unevenly cut slice of cake. It lies in the upper part of the body and is located within the body between the two breasts (*thana*), hanging above and concealing the heart (*hadaya*) and the liver (*yakana*).²⁶

Intestines (*anta*): This refers to the intestinal tube. It is coiled (*obhaggā*) in twenty-one loops. In a man, it is said to measure thirty-two hands (*attha*) in length, and in a woman, twenty-eight hands. Its colour is white, resembling lime mixed with sand. Its shape is like that of a beheaded snake coiled up and placed in a trough of blood. It occupies both parts of the body. It is attached above to the gullet (*galavāṭaka*) and below to the excrement passage (*karīsamagga*); thus, it is found within the body between these two limits.²⁷

Mesentery (*antagūṇa*): This is the structure that fastens the bowel at the points where it is coiled (*bhogatṭhānesu*). Its colour is white, resembling the roots of the *dakasīṭalika* (white edible water lily), and its shape is also compared to those roots. It occupies both parts of the body. It is located among the twenty-one coils of

²⁴ Ibid.

²⁵ Ibid.

²⁶ Ibid.

²⁷ Ibid.

the bowel (*antabhogānaṃ antarā*). Like the cords found inside rope rings used for wiping the feet, which hold the structure together, it binds the coils of the bowel so that they do not slip down.²⁸

Brain (*matthaluṅga*): This refers to the lumps of marrow (*miñja*) found inside the skull (*sīsakaṭāha*). Its colour is white, resembling the flesh of a toadstool, or the appearance of freshly turned milk that has not yet curdled. Its shape corresponds to its location. It belongs to the upper part of the body and is found inside the skull (*sīsakaṭāhabbhantare*), arranged like four lumps of dough corresponding to the skull's four sutured sections (*piṭṭhapinda*).²⁹

Stomach (*udara*): Its colour resembles that of swallowed food. In shape, it resembles rice loosely tied within a cloth strainer. It lies in the upper part of the body. It forms part of the bowel membrane (*antapaṭala*), resembling the swelling produced in the middle of a wet cloth when it is twisted and wrung from both ends. Its exterior surface is smooth. Inside, it resembles a cloth balloon soiled from wrapping meat refuse, or it may be compared to the inner surface of the skin of a rotten jackfruit.³⁰

Eye (*cakkhu*): The eye is situated above the eye-socket bone (*akkhi-kūpakaṭṭhika*) and below the eyebrow bone (*bhamukaṭṭhika*), within the eye socket (*akkhikūpa*). It has edges (*akkhikūṭa*) on both sides, is internally connected by a muscle to the brain (*matthaluṅga*) and is externally protected by the eyelids (*akkhiloma*).³¹

Ear (*sota*): The ear contains an ear opening (*sotabilā*), within which are ear hairs (*tambaloma*).³²

Nose (*ghānaṃ*): The nose possesses nasal openings (*ghānabila*) and an area shaped like a goat's hoof (*ajappadasaṇṭhāne padese*).³³

²⁸ Ibid.

²⁹ Ibid.

³⁰ Ibid.

³¹ Vipassana Research Institute. (n.d.). *Dhammasaṅgaṇi-aṭṭhakathā* – 2. Rūpakaṇḍo – Dukanidde-savaṇṇanā – Upādābhājanīyakathā – Chattha Sangayana.

³² Ibid.

³³ Ibid.

Tongue (*jivhā*): The middle part of the tongue is shaped like the tip of a blue lotus petal (*uppaladalaggasaṇṭhāne padese*).³⁴

Womb (*gabbha*): In the place where the child is conceived inside the woman, large red tumours appear, split and bleed (*puppha*). This is the cleansing of the ground. Conception may occur if the parents unite within seven days after cleansing. Uniting within the seven days will not bring any conception.³⁵ Beings do not develop suddenly in the womb (*mātukucchi*), but in a progression. At the moment of conception, the embryo (*kalala*) is said to be as small as a minute drop of oil resting on the tip of a woollen thread shaken three times, and its colour resembles that of the finest clarified butter. By the end of the first week, it develops into the *abbuda* stage, having the colour of water in which meat was washed. By the third week, it reaches the *pesi* stage, taking on the colour of molten lead (*vilīna tipu*) and resembling the congealed pulp of crushed pepper (*marica-phāṇita*). In the fourth week, it develops into the *ghana* stage and is like a hen's egg in appearance. During the fifth week, five protuberances (*piḷakā*) appear on the embryo, marking the locations of the head (*sīsa*), two hands (*dvinnam hattha*) and the two legs (*dvinnam pāda*). This process continues, and by the end of the forty-two weeks, hair (*kesā*), body hair (*lomā*), and nails (*nakhā*) begin to form. The navel (*nābhi*) of the foetus is connected to the membrane of the mother's abdomen (*udarapaṭala*) by a tube, described as hollow as the stem of a blue lotus. Through this tube, nutritive essence (*āhārarasa*) flows continuously to sustain and nourish the foetus. Thus, the foetus grows for ten months.³⁶

³⁴ Ibid.

³⁵ Vipassana Research Institute. (n.d.). *Majjhimanikāya (aṭṭhakathā) – Mūlapaṇṇāsa-aṭṭhakathā – 4. Mahāyamakavaggo – 8. Mahātaṇhāsāṅkhasuttavaṇṇanā* – Chattha Sangayana; Vipassana Research Institute. (n.d.). *Vinayapiṭaka (aṭṭhakathā) – Pārājikakaṇḍa-aṭṭhakathā – 1. Paṭhamapārājikaṃ – Sudinnabhāṇavāraṇṇanā* – Chattha Sangayana.

³⁶ Vipassana Research Institute. (n.d.). *Samyuttanikāya (aṭṭhakathā) – Sagāthāvagga-aṭṭhakathā – 10. Yakkhasamyuttaṃ – 1. Indakasuttavaṇṇanā* – Chattha Sangayana; reproduction, fertilisation, and embryological concepts preserved in ancient Sri Lankan Buddhist literary sources – such as the *Samantapāsādikā*, *Papañcasūdanī*, *Sāratthappakāsinī*, *Linatthavaṇṇanā*, *Kammavibhāga*, and the *Milindapañha* – have been examined by R. A. Leslie H. Gunawardana in “Obstetrics and Theories of Reproduction in Ancient and Early Medieval Sri Lanka,” *Kalyāṇi: Journal of Humanities and Social Sciences of the University of Kelaniya*, vols. III–IV (1984/85): 1–21.

Composite Anatomical Systems

Building upon the recognition of discrete organs, the references advance toward composite anatomical groupings, including musculature, sinew-like structures, and osseous structures. These components are conceptualised as interrelated structural assemblages that constitute the corporeal framework. The skeletal and muscular systems, in particular, reveal an understanding of structural support and bodily cohesion.

Flesh (*mamsa*): There are said to be nine hundred pieces of flesh (*mamsa*). In colour, it is entirely red, resembling the colour of *kiṃsuka* flowers. In shape it varies according to location: the flesh of the calves (*jaṅghapiṇḍika*) resembles cooked rice packed in a palm-leaf bag; that of the thighs (*ūru*) resembles a rolling pin; the buttocks (*ānisada*) resemble the end of an oven; the back (*piṭṭhi*) resembles a slab of palm sugar; the flesh between each pair of ribs (*phāsuka*) resembles clay mortar pressed thin through a flattened opening; the breasts (*thana*) resemble a lump of clay shaped into a ball and thrown down; and the two upper arms (*bāhu*) resemble large skinned rats. In direction, it extends on both parts of the body. In location, it is spread over the three hundred bones (*aṭṭhi*). In delimitation, it is bounded below by the surface attached to the collection of bones (*aṭṭhisāṅghāta*), above by the skin (*taca*), and on all sides by adjoining pieces of flesh.³⁷

Sinews (*nahāru*): There are nine hundred sinews. In colour, they are all white. Their shapes vary considerably. Sixty major sinews, known as “body supporters” (*sarīradhāraka*), descend from the neck and bind the body together; these are also called “tendons” (*kaṇḍarā*). They resemble the shoots of the yam plant. Other sinews are distributed throughout different parts of the body and are finer than these major ones. Some resemble strings or cords; others, still finer, resemble creepers; others resemble the thick strings of a lute; and some resemble coarse thread. The sinews on the backs of the hands and feet (*hatthapādapiṭṭhi*) resemble a bird’s claw. Those in the head (*sīse*) resemble children’s head nets, while those on the back

³⁷ *Visuddhimagga* – Koṭṭhāsavavatthāpanakathā; *Sammohavinodanī-aṭṭhakathā* – Kāyānupassanāniddesavaṇṇanā.

(*piṭṭhi*) resemble a wet net spread out in the sun. Those extending along the limbs resemble a net jacket fitted to the body. In direction, they extend in both parts of the body. In location, they bind together the bones of the whole body (*sakalasarīre aṭṭhīni ābandhitvā*). In delimitation, they are bounded below by the surface attached to the three hundred bones, above by the portions in contact with the flesh and the inner skin, and around by one another. Five of the major sinews that support the body (*sarīra*) descend from the upper part of the neck (*gīvāya*) along the front, and five more descend along the back; another five extend along the right side and five along the left. Of those that bind the right hand (*dakkhiṇahattha*), five descend along the front of the hand and five along the back; the same arrangement applies to those that bind the left hand (*vāmahattha*). Similarly, of those that bind the right foot (*dakkhiṇapāda*), five descend along the front and five along the back, and the same arrangement applies to those that bind the left foot (*vāmapāda*).³⁸

Osseous structures (*aṭṭhi*) make a special case as descriptions of numbers, shapes, and locations are expressed in detail.³⁹

Foot bones (*pādaṭṭhi*): Sixty-four in number. The bones of the toes at the ends resemble *kataka* seeds; those in the middle sections resemble jackfruit seeds; those at the base resemble small drums; and the bones on the back of the foot resemble a bundle of bruised yarns.

Heel bones (*paṇhikaṭṭhi*): Two in number. They resemble the seed of a single-stone palmyra fruit.

Ankle bones (*goppakaṭṭhi*): Two in each leg. They resemble children's play balls bound together.

Shin bones (*jaṇghaṭṭhi*): Two in each leg, resting on the ankle bones. Their shape resembles a *sindi* shoot with the skin intact. The smaller (*khuddaka*) shin bone resembles a toy bow stick, while the larger one (*mahanta*) resembles the back of a shrivelled snake. The place where the shin bone rests is shaped like a blunt cow's horn.

³⁸ Ibid.

³⁹ Ibid.

Knee bones (*jaṇṇukaṭṭhi*): Two in number. Their shape resembles a lump of froth melted on one side.

Thigh bones (*ūruṭṭhi*): Two in number. Their shape resembles the roughly pared handle of an axe or hatchet. The place where each fits into the hip bone resembles a play ball.

Hip bones (*kaṭṭhiṇi*): Two in number. The cavity in the hip bone where the thigh bone fits resembles a large *punnāga* fruit with the end cut off. When the two hip bones are joined together, they resemble the ring fastening of a smith's hammer. The buttock bone resembles an inverted snake's hood and is perforated in seven or eight places.

Bones of the backbone (*piṭṭhikaṇṭakaṭṭhi*): Eighteen in number. Internally, they resemble lead-sheet pipes placed one upon another; externally, they resemble a string of beads. They bear two or three rows of projections beside one another like the teeth of a saw.

Rib bones (*phāsukaṭṭhi*): Twenty-four in number. The incomplete ones resemble incomplete sabres, while the complete ones resemble complete sabres. Together they resemble the outspread wings of a white cock.

Breast bones (*uraṭṭhi*): Fourteen in number. They resemble the frame of an old chariot.

Heart bone (*hadayaṭṭhi*): One in number. It resembles the bowl of a spoon.

Collarbones (*akkhakaṭṭhi*): Two in number.

Shoulder blade bones (*koṭṭaṭṭhi*): Two in number. They resemble a Sinhalese hoe worn down on one side.

Hand bones (*hatthaṭṭhi*): Sixty-four in number, including the wrist bones (*maṇibandhaṭṭhi*), which resemble lead-sheet pipes joined together, the bones on the back of the hand, which resemble a bundle of bruised yams, and the finger bones. Regarding the fingers (*aṅguli*), the bones of the base sections resemble small drums, those of the middle sections resemble immature jackfruit seeds, and those of the end sections resemble *kataka* seeds.

Upper-arm bones (*bāhuṭṭhi*): Two in number. They resemble the handles of looking glasses.

Forearm bones (*aggabāhuṭṭhi*): Two in each arm. They resemble the trunks of twin palms.

Neck bones (*gīvaṭṭhi*): Seven in number. They resemble the rings of a bamboo stem threaded one after another on a stick.

Jaw bones (*hanukaṭṭhi*): Two in number. The lower resembles the ring fastening of a smith's iron hammer, while the upper resembles a knife used for scraping the rind of sugarcane.

Nose bone (*nāsikaṭṭhi*): One in number. It resembles a young palmyra seed with the kernel removed.

Eye bones (*akkhiṭṭhi*): Two in number. They resemble young palmyra seeds with the kernels removed.

Ear bones (*kaṇṇaṭṭhi*): Two in number. They resemble the cases used for storing a barber's razor.

Frontal bone (*nalāṭaṭṭhi*): One in number. It resembles an inverted bowl made from a shell.

Bone above the frontal bone (*nalāṭakaṇṇacūlikānaṃ upari paṭṭa bandhanokāse aṭṭhi*): where a cloth is tied around the head, and near the ear openings: It resembles a curled piece of toffee flake.

Occipital bone (*muddhaṭṭhi*): One in number. It resembles a lop-sided coconut with a hole cut at the end.

Sincipital bones (*sīśakapālaṭṭhi*): Nine in number. They resemble a dish made from an old gourd held together with stitches.

Soft bones (*muduaṭṭhi*): Sixty-four in number.

In total, there are exactly three hundred bones. In direction they extend throughout both parts of the body. In terms of location, they are distributed throughout the body. In delimitation, they are bounded internally by bone marrow, externally by flesh, and at their ends and roots by adjoining bones.

Bone marrow (*aṭṭhimiṇja*): This refers to the marrow (*miṇja*) contained within the various bones (*aṭṭhi*). In colour, it is white. The marrow inside each large bone (*mahantamahantānaṃ aṭṭhīnaṃ*) re-

sembles a large cane shoot moistened and inserted into a bamboo tube. That inside each small bone (*khuddānukhuddakāṇaṃ*) resembles a slender cane shoot moistened and inserted into a section of a bamboo twig. In direction, it extends in both parts of the body. In location, it is situated within the bones (*aṭṭhīnaṃ abbhantare*). In delimitation, it is bounded by the inner surface of the bones.⁴⁰

Functional Interrelations Among Organs

Once anatomical structures are identified at both discrete and composite levels, the texts imply functional interrelations among them. The osseous structures, for instance, are described in a hierarchical sequence, with a flexible framework, combined with other body parts such as flesh, sinews, and skin. These references indicate an awareness—albeit not systematised in modern physiological terms—of organ-to-organ coordination and interdependence.

Arrangement of the bones: The head bones (*sīsattḥi*) rest upon the neck bones; the neck bones rest upon the bones of the spine; the spine bones rest upon the hip bones; the hip bones rest upon the thigh bones; the thigh bones rest upon the knee bones; the knee bones rest upon the shin bones; the shin bones rest upon the ankle bones; and the ankle bones rest upon the bones on the back of the foot.⁴¹

When the upper body (*uparimaṃ sarīra*) is kept upright, the eighteen bones of the backbone (*piṭṭhikaṇṭakaṭṭhika*) become properly aligned. As a result, the skin (*camma*), flesh (*maṃsa*), and sinews (*naḥāru*) are not bent. When they are not bent, the pains that arise from bending do not occur. In the absence of such pain, the mind (*citta*) can become well concentrated, and the objects or grounds of meditation (*kammaṭṭhāna*) do not become disturbed.⁴²

In the bodies of ordinary people, the bones (*aṭṭhī*) are joined together at their ends (*koṭiyā*). In the case of a Pacceka-Buddha,

⁴⁰ Ibid.

⁴¹ Ibid.

⁴² Vipassana Research Institute. (n.d.). *Dīgha nikāya (aṭṭhakathā)*—*Silakkhandhavagga-aṭṭhakathā* – 2. *Sāmaññaphalasuttavaṇṇanā* – *Nīvaraṇappahānakathā*. Chattha Sangayana.

however, they are described as being suspended like a hook (*aṅku-sakalagga*). In the case of the Buddha, the entire skeleton (*saṅkha-lika*) is firmly bonded together (*ekābaddha*). Consequently, when looking back, the Buddha does not turn the neck (*gīvaṃ*) alone; rather, the entire body (*sakalasarīra*) turns, in the manner of an elephant.⁴³

When an ordinary being is conceived in the womb (*antokucchi*), the stomach (*āmāsa*) moves upward, and the abdominal membrane (*udarapaṭala*) shifts backwards. Because of the position of the backbone (*piṭṭhikaṇṭaka*), the being becomes bent, placing the jaws (*hanuka*) upon the folded fists (*muṭṭhī*), and remains in that posture like a monkey sitting in a tree hollow during the rain. The Bodhisattva, however, is described as exceptional: placing the back (*piṭṭhito*) against the mother's backbone (*piṭṭhikaṇṭaka*), he remains seated like a preacher of the *Dhamma* occupying the preaching seat, facing the east.⁴⁴

Physiological Functions of Individual Organs

Extending from inter-organ relationships, the references attribute specific physiological roles to individual organs and bodily components. The presentations of organs–products–locations combinations demonstrate an attempt to correlate morphology with function.

Blood, kidney, heart, liver, lungs: The stored blood (*sannicitalo-hita*) fills the lower part of the liver region (*yakanatṭhāna*) to the extent of a bowlful. By splashing little by little over the kidney (*vakka*), heart (*hadaya*), liver (*yakana*), and lungs (*papphāsa*), it keeps these organs moist; when this does not occur, beings experience thirst. As to delimitation, it is bounded by what pertains to blood.⁴⁵

⁴³ Vipassana Research Institute. (n.d.). *Dīgha nikāya (aṭṭhakathā)* – Mahāvagga-aṭṭhakathā – 3. Mahāparinibbānasuttavaṇṇanā – Nāgāpalokitavaṇṇanā. Chattha Sangayana.

⁴⁴ Vipassana Research Institute. (n.d.). *Majjhimanikāya (aṭṭhakathā)* – Uparipaṇṇāsa-aṭṭhakathā – 3. Suññatavaggo – 3. Acchariyaabbhutasuttavaṇṇanā – Chattha Sangayana.

⁴⁵ *Visuddhimagga* – Koṭṭhāsavavatthāpanakathā; *Sammohavinodanī-aṭṭhakathā* – Kāyānupassanāniddesavaṇṇanā.

Sweat, hair roots, pores: Sweat (*sedoti*) is the water element (*āpodhātu*) that trickles from the pores of the body hairs (*lomakūpa*) and from the openings of the pores of the head hairs (*kesalomakūpavivara*). In colour, it resembles clear sesame oil. Its shape corresponds to the form of the pore openings of the head hairs and body hairs. In direction, it belongs to both parts of the body. As to location, sweat does not have a fixed place where it is always present, as blood (*lohita*) does. As to delimitation, it is bounded by what pertains to sweat.⁴⁶

Gastric juices,⁴⁷ stomach lining, stomach: The gastric juice (*semha*) is located inside the body (*sarīrabbhantare*) and is said to measure about a bowlful. In colour, it is white, resembling the juice of *nagabala* leaves. Its shape corresponds to the place where it is found. In direction, it belongs to the upper part of the body. In location, it is found upon the stomach lining (*udarapaṭala*). Just as duckweed or green scum floating on water separates when a stick or potsherd is thrown into it and then gathers again, so too, when food or drink falls into the stomach (*udara*), the phlegm divides and then reunites. If it becomes weak, the stomach gives off a most unpleasant smell, like that of a ripe boil or a rotten hen's egg; consequently, belching and the mouth emit a foul odour resembling rotting ordure rising from the stomach. But when it is abundant, it holds the foul odour of ordure beneath the surface of the stomach.⁴⁸

Tears, eyes, eye sockets & bile, gallbladder: Tears (*assūti*) are the water element (*āpodhātu*) that trickles from the eyes (*akkhī*). In colour, they resemble clear sesame oil. Their shape corresponds to the place where they occur. In direction, they belong to the upper part of the body. In location, they are found in the eye sockets (*akkhikūpaka*). However, they are not constantly stored there as bile (*pitta*) is in the gallbladder (*pittakosaka*). Rather, when beings feel joy and laugh heartily, or feel grief and weep or lament, or consume unsuitable food, or when the eyes are affected by smoke, dust, or dirt,

⁴⁶ Ibid.

⁴⁷ Here, the translation of *semha* as gastric juices is based on the description followed. The lexicological references may suggest otherwise; Rhys Davids and Stede, *Pāli-English Dictionary*, s.v.

⁴⁸ Visuddhimagga – Koṭṭhāsavavatthāpanakathā; Sammohavinodanī-aṭṭhakathā – Kāyānupassanāniddesavaṇṇanā.

then—arising from joy, grief, unsuitable food, or changes of temperature—they fill the eye sockets or flow outward.⁴⁹

Grease,⁵⁰ palms, soles, nose, forehead, shoulders: Grease (*vasā*) is a melted unguent. In colour, it resembles coconut oil; it may also be likened to oil sprinkled on gruel. In shape, it resembles the thin film formed when a drop of unguent spreads over still water during bathing. In direction, it belongs to both parts of the body. In location, it is found mainly on the palms of the hands (*hatthatala*), the backs of the hands (*hatthapiṭṭhi*), the soles of the feet (*pādataḷa*), the backs of the feet (*pādapiṭṭhi*), the tip of the nose (*nāsapuṭana*), the forehead (*lāṭa*), and the points of the shoulders (*ṃsakūṭa*). It is not always present in a melted state at these places, but when these parts become heated by fire, by the sun, or by disturbances of temperature or bodily elements, it spreads there like the film formed by a drop of unguent upon still water during bathing.⁵¹

Spittle, tongue, cheeks: Spittle (*khelo*) is the water element (*āpodhātu*) mixed with froth within the mouth (*antomukha*). In colour, it is white, like froth. In shape, it corresponds to its location and may also be described as having the form of froth. In direction, it belongs to the upper part of the body. In location, it is found on the tongue (*jivhā*) after descending from the cheeks (*kapola*) on both sides. It is not constantly stored there; rather, when beings see certain kinds of food, remember them, place something hot, bitter, pungent, salty, or sour in the mouth, or when the heart (*hadaya*) becomes faint or nausea arises, spittle forms and flows from both cheeks (*kapola*) to settle upon the tongue (*jivhā*). It is thin at the tip of the tongue and thicker at its root, and it can moisten any chewable substance placed in the mouth without being exhausted.⁵²

⁴⁹ Ibid.

⁵⁰ Considering its functional context, translating *vasā* as “grease” appears inappropriate. In the present analysis, the conventional lexicographical translation has therefore been retained. However, the anatomical context suggests that particular attention should be given to the high concentration of eccrine sweat glands in the body regions mentioned in the description. The physiological conditions under which sweating becomes immediately noticeable at these sites should also be taken into account for a more accurate interpretation.

⁵¹ *Visuddhimagga* – Koṭṭhāsavavattāpanakathā; *Sammohavinodanī-aṭṭhakathā* – Kāyānupassanāniddesavaṇṇanā.

⁵² Ibid.

Snot, brain, head, nostrils, palate: Snot (*siṅghāṇikāṭi*) is an impurity that trickles down from the brain (*matthaluṅga*). In colour, it resembles the kernel of a young palmyra fruit. Its shape corresponds to the place where it is found. In direction, it belongs to the upper part of the body. In location, it fills the cavities of the nostrils (*nāsāpuṭa*). It is not always present there, but when beings weep or experience disturbances of the bodily elements caused by unsuitable food or changes of temperature, the brain (*matthaluṅga*) within the head (*sīsato*) turns into stale phlegm (*pūtisemha*). This then oozes downward through an opening (*vivara*) in the palate (*tālumatthaka*), fills the nostrils, and either remains there or trickles out. As to delimitation, it is bounded by what pertains to snot.⁵³

Fat, flesh, inner skin: Fat (*medoti*) is a thick unguent. In colour, it resembles sliced turmeric. In shape, it varies depending on the body type. In the body of a stout person (*thūlasarīra*), it resembles turmeric-coloured *dukūla* (muslin) cloth placed between the inner skin (*camma*) and the flesh (*maṃsa*). In the body of a lean person (*kisasarīrassa*), it resembles turmeric-coloured *dukūla* cloth laid in two or three layers upon the flesh of the shanks (*jaṅghamaṃsa*), thighs (*ūrumaṃsa*), the back (*piṭṭhimaṃsa*) near the backbone (*piṭṭhikaṇṭaka*), and the flesh covering the belly (*udaravaṭṭi*). In direction, it belongs to both parts of the body. In location, it permeates the whole body of a stout person, whereas in a lean person it is found mainly on the shanks and the other regions mentioned. As to delimitation, it is bounded below by the flesh (*maṃsa*), above by the inner skin (*camma*), and around by what pertains to fat.⁵⁴

Synovia, articulations: Synovia (*lasikā*) is the slimy substance found within the joints of the body (*sarīrasandhīna*). In colour, it resembles *kamkara* gum. Its shape corresponds to the place where it occurs. In direction, it belongs to both parts of the body. In location, it is found within the one hundred and eighty articulations (*aṭṭhisandhīna*), where it performs the function of lubrication (*abbhañjanakicca*). If it becomes deficient, the bones creak when a person moves, producing a sound like the snapping of fingers (*kaṭakaṭāyanti*). After

⁵³ Ibid.

⁵⁴ Ibid.

walking even one or two leagues, the air element (*vāyodhātu*) becomes disturbed, and the limbs begin to ache. But when it is abundant, the bones do not creak during movement, and even after walking a long distance, the air element remains undisturbed, and the limbs do not ache.⁵⁵

Urine, bladder, bladder cavity: Urine (*mutta*) is the urinary fluid. In colour, it resembles bean brine. In shape, it may be compared to the water inside a water pot placed upside down. In direction, it belongs to the lower part of the body. In location, it is found within the bladder (*vatthi*), that is, the bladder cavity (*vatthi puṭo*). Just as when a porous pot without a mouth is placed in a cesspool, and the liquid from the cesspool enters the pot even though no visible entry is seen, so too the urinary secretion (*muttabhāga*) from the body (*sarīra*) enters the bladder (*vatthi*) without an evident path of entry. Its path of exit, however, is evident. As to delimitation, it is bounded by the interior of the bladder.⁵⁶

Integration and Interdependence of Bodily Functions

From organ-specific functions, the discourse progresses toward systemic integration of bodily processes. Thereby, anatomical knowledge becomes embedded within a holistic vision of corporeal functionality rather than a purely reductionist account of parts.

Mind and heart: Since the mind (*citta*) has no physical form (*sarīra-saṇṭhāna*) or colour, it is described as “without body” (*asarira*). Because the mind (*citta*) exists in association with the heart (*hadyarūpa*), it is said to “abide in a cave” (*guhāsayam*).⁵⁷

Mind-consciousness and blood: In those who possess understanding, the heart is somewhat expanded, whereas in those without understanding it remains like a bud. Within it there is a hollow about the size of the bed of a *punnāga* seed. In this hollow about half a *pasata* measure of blood is stored, which serves as the support for

⁵⁵ Ibid.

⁵⁶ Ibid.

⁵⁷ Vipassana Research Institute. (n.d.). *Khuddakapāṭha-aṭṭhakathā* – Dhammapada-aṭṭhakathā – 3. Cittavaggo – 4. Saṅgharakkhitabhāṇeyyattheravattthu. Chattha Sangayana.

the occurrence of the mind element and the mind-consciousness element.⁵⁸

The *bhikkhu* should radiate light and seek out (*pariyesitabba*) another's mode of consciousness by observing, with the divine eye, the colour of the blood associated with the material heart that serves as its support. When consciousness accompanied by joy is present, the blood appears red like a banyan fig fruit; when consciousness accompanied by grief is present, it appears dark like a rose apple fruit; and when consciousness accompanied by serenity is present, it appears clear like sesame oil. In this way, by observing the colour of the blood in the physical heart –recognising, for example, “This state is produced by the faculty of joy; this by the faculty of grief; this by the faculty of equanimity”—he should investigate another's mode of consciousness and thereby consolidate his knowledge of the penetration of hearts.⁵⁹

Pus and blood: Pus (*pubbo*) arises from decayed blood (*pūtilohitavasa*). Wherever blood stagnates and deteriorates in some part of the body (*sarīrappadese*)—for example, where the body has been injured by stakes or burns, or where boils, carbuncles, and similar lesions appear—pus may be found. As to delimitation, it is bounded by what pertains to pus.⁶⁰

Blood circulation: Blood is described as of two kinds: stored blood (*sannicalohita*) and circulating blood (*saṃsaraṇalohita*). Except in the fleshless parts such as the head hairs (*kesa*), body hairs (*loma*), teeth (*danta*), nails (*nakhā*), and the hard, dry skin (*thaddha sukkahamma*), the circulating blood permeates the whole body by moving through the network (*jālā*) of vessels (*dhamanī*).⁶¹

Heat and sweat: When the body becomes heated—by the heat of fire, the heat of the sun, or changes in temperature—sweat (*sedoti*)

⁵⁸ *Visuddhimagga* – Koṭṭhāsavavattthāpanakathā; *Sammohavinodanī-aṭṭhakathā* – Kāyānupassanāniddesavaṇṇanā.

⁵⁹ *Ibid.*

⁶⁰ *Ibid.*

⁶¹ *Ibid.*

trickles from all the pore openings of the head hairs (*kesalo-makūpavivara*) and the body hairs (*lomakūpavivara*).⁶²

Social Settings Shaping Anatomical Knowledge Production

Attitudes toward the human body, medicinal practices, cremation practices, battles and military engagements, provide platforms to shape both the accessibility of anatomical observation and its interpretive framing. Simultaneously, medical needs within monastic and lay communities necessitated practical knowledge of the body. Thus, anatomical discourse functioned at the intersection of healthcare and pedagogy spheres.

Medical practice (*vejjasippa*) during this period was conceptualised as an act grounded in compassion (*mettā*) and directed toward the welfare of living beings (*hitapaṭisaṃyutta*).⁶³ Chronicler literature records several instances in which kings themselves are depicted as performing surgical procedures on both humans and animals. For example, King Buddhādāsa (337–365CE) is described as intervening in cases of repeated womb disorders (*mūḍhagabbha*) affecting a *caṇḍāla* woman.⁶⁴ Another narrative recounts his surgery on a patient who had allegedly consumed water contaminated with “frog eggs” (*maṇḍukabīja*), by splitting (*phāletvā*) the skull (*matthaka*), removing the frog, and then fixing (*ghaṭetvā*) the skull (*kapāla*).⁶⁵ The chronicles also portray him undertaking surgical treatment on animals, including a detailed account of an operation on (*phāletvā*) a snake’s stomach (*udara*), and then applying the medicine (*bhesajja*).⁶⁶ Similarly, accounts of King Parākramabāhu I (1153–1186 CE) describe arrangements for a treatment on canker sore (*ab-buda*) that formed on a crow’s cheek (*kapola*).⁶⁷ Although such narratives

⁶² Ibid.

⁶³ Vipassana Research Institute. (n.d.). *Vinayapīṭaka (aṭṭhakathā)* – Mahāvagga-aṭṭhakathā – 8. Cīvarakkhandhakam – Jīvaka-vatthukathā. Chattha Sangayana.

⁶⁴ Wilhelm Geiger and C. Mabel Rickmers, eds., *Cūlavamsa: Being the more recent part of the Mahāvamsa* (Delhi: Motilal Banarsidass Publishers, 1996), chapter 37, verses 140–141; Chandra Wikramagamage, ed., *Mahāvamsa* (Dehiwala: Buddhist Cultural Centre, 2015), chapter 37, verse 140.

⁶⁵ Geiger and Rickmers, *Cūlavamsa*, chapter 37, verses 142–144; Wikramagamage, *Mahāvamsa*, chapter 37, verse 144.

⁶⁶ Geiger and Rickmers, *Cūlavamsa*, chapter 37, verses 112–122; Wikramagamage, *Mahāvamsa*, chapter 37, verses 118–122.

⁶⁷ Geiger and Rickmers, *Cūlavamsa*, chapter 78, verses 49–54; Wikramagamage, *Mahāvamsa*, chapter 71, verse 50.

may contain literary embellishments, they nevertheless indicate contemporary social perceptions of surgery. These accounts suggest that healing was regarded as meritorious and ethically commendable; that surgical intervention was accepted as a legitimate therapeutic method; and that surgical practice was not socially degraded but, on the contrary, associated with royal virtue and moral responsibility.

Warfare constituted another significant context in which practical anatomical knowledge would have been cultivated and applied. The treatment of battlefield injuries necessitated familiarity with bodily structures, wound management, and surgical extraction techniques. The *Cūḷavaṃsa*, in its description of the military preparations of King Parākramabāhu I for his campaign against Rāmañña, details the inclusion of medical supplies among the provisions: medicines preserved in cow horns for venomous arrow wounds, remedies for poisoned water, iron pincers for extracting deeply embedded arrowheads when the shaft had broken, and the presence of skilled physicians accompanied by attendants.⁶⁸ Such references demonstrate that medical care was institutionally integrated into the military organisation. The explicit mention of specialised instruments—particularly iron pincers designed for removing lodged arrowheads—implies practical familiarity with bodily penetration, tissue resistance, and wound trajectories.

Access to the dead body represents another important avenue through which anatomical knowledge could have been developed. Literary and commentarial sources indicate that corpses were commonly deposited in designated open grounds for disposal, exposing them to natural processes of decay. Simultaneously, the Buddhist contemplative tradition institutionalised the use of human corpses as objects of meditation, particularly within cemetery contemplations (*asubha-bhāvanā*), which required detailed observation of bodily decomposition.⁶⁹ These two practices—public corpse exposure and meditative engagement with decaying bodies—would have facilitated systematic familiarity with skeletal structures and their interrelations. Observers would have encountered various stages of decomposition as described in the canon: a skeleton (*aṭṭhikasāṅkhalika*) partially covered with

⁶⁸ Geiger and Rickmers, *Cūḷavaṃsa*, chapter 76, verses 49–52.

⁶⁹ Nyanatiloka, *Buddhist Dictionary*, 30.

flesh (*maṃsa*) and blood (*lohita*), bones held together by tendons (*nhārusam-bandha*), and later, disconnected bones scattered in different directions—hand bone (*hatthaṭṭhika*), foot bone (*pādaṭṭhika*), ankle bone (*goppakaṭṭhika*), shin bone (*jaṅghaṭṭhika*), thigh bone (*ūruṭṭhika*), hip bone (*kaṭṭhika*), bone of the backbone (*piṭṭhiṭṭhika*), rib bone (*phāsukaṭṭhika*), neck bone (*gīvaṭṭhika*), jawbone (*hanukaṭṭhika*), skull bone (*sīsakaṭṭhika*), etc.⁷⁰

Philosophical Settings Shaping Anatomical Knowledge Production

In several instances, foundational philosophical commitments within Buddhist thought rest upon anatomical knowledge. According to the Theravāda Buddhist tradition, the path leading to the realisation of *Nibbāna* is the practice of the four foundations of mindfulness (*satipaṭṭhāna*).⁷¹ The first of these is contemplation of the body (*kāyānupassanā*), which entails a systematic deconstruction of the notion of a unified “body” into functional and anatomical constituents. Through this analytical process, the body is apprehended not as a coherent, personal entity but as a collection of impersonal components, thereby undermining attachment and the perception of selfhood.

Within this framework, the body is conceptualised as composed of four primary elements (*mahābhūta*): earth (*pathavī*), denoting solidity and hardness; water (*āpo*), signifying cohesion and fluidity; fire (*tejo*), indicating temperature and transformative heat; and wind (*vāyo*), representing motion and pressure. Contemplation further extends to the four body postures (*iriyā-pathapabba*)—walking, standing, sitting, and lying down—through which embodied existence is observed in its dynamic and ordinary manifestations. Impermanence is emphasised through the meditation on decay (*navasivathikapabba*), in which the practitioner contemplates a corpse in successive stages of decomposition, traditionally through direct observation in a cemetery setting. These philosophical formulations render anatomical knowledge integral to Buddhist soteriology. Rather than constituting an autonomous biomedical discipline, anatomical understanding functioned as an embed-

⁷⁰ Vipassana Research Inst. (n.d.). *Majjhimanikāyo* – Mūlapaṇṇāsapāli – 1. Mūlapariyāyavaggo – 10. Mahāsatiṭṭhānasuttaṃ – Kāyānupassanā navasivathikapabbam. Chattha Sangayana.

⁷¹ Nyanatiloka, *Buddhist Dictionary*, 196.

ded and instrumental domain of knowledge, serving contemplative and philosophical objectives.

The practical materialisation of these philosophical foundations is evident in commentarial narratives describing meditation techniques. One method involves commencing contemplation from the tip of the toes (*pādaṅguli*) as the starting point and the skull (*sīsakaṭāha*) as the endpoint, mentally traversing the body's components from beginning to end and then in reverse order.⁷² Another method begins with head hair (*kesā*) as the initial point and proceeds to the brain (*matthaluṅga*) as the terminal point, encouraging systematic contemplation of intervening parts without attachment.⁷³ Anatomical descriptions also contribute to philosophical discourse by cultivating detachment from the body. The human body—described as two fathoms in length (*byāmamatte kaḷevare*)—is portrayed as devoid of intrinsic value when compared to pearls (*mutta*), gems (*maṇi*), precious stones (*veḷuriya*), sandalwood (*candana*), saffron (*kuṅkuma*), camphor (*kappura*), aromatic powders (*vāsa-cuṇṇa*), and other prized substances. Its constituent parts—beginning with head hair (*kesā*), body hair (*lomā*), nails (*nakhā*), teeth (*dantā*), and continuing through to urine (*muttanti*)—are characterised as foul-smelling, repulsive, and aesthetically unappealing.⁷⁴ Through such meditative and discursive strategies, anatomical knowledge was incorporated into Buddhist philosophical reflection to cultivate insight, dis-passion, and liberation.

Epistemic Notions of Anatomical Knowledge

The commentarial literature and the island's chronicles indicate multiple epistemic bases for anatomical knowledge in fifth-century Sri Lanka. These include foundational doctrinal reasoning, direct observation—particularly through exposure to injured or deceased bodies—and involvement in surgical practice. Such forms of exposure suggest a degree of pedagogical systemat-

⁷² Vipassana Research Institute. (n.d.). *Samyuttanikāya (aṭṭhakathā)* – Mahāvagga-aṭṭhakathā – 3. Satipatṭhānasamyuttaṃ – 1. Ambapālivaggo – 10. Bhikkhunupassayasuttavaṇṇanā. Chattha Sangayana.

⁷³ Vipassana Research Institute (n.d.). *Samyuttanikāya (aṭṭhakathā)* – Mahāvagga-aṭṭhakathā – 7. Iddhipādasamyuttaṃ – 2. Pāsādakampanavaggo – 10. Vibhaṅgasuttavaṇṇanā. Chattha Sangayana.

⁷⁴ Vipassana Research Institute. (n.d.). *Samyuttanikāya (aṭṭhakathā)* – Mahāvagga-aṭṭhakathā – 10. Ānāpānasamyuttaṃ – 9. Vesālīsuttavaṇṇanā. Chattha Sangayana.

isation rather than incidental familiarity. Furthermore, the consistency of anatomical references across textual traditions, when considered alongside later material findings, points to the existence of an established and coherent knowledge tradition.

An observational understanding of bodily disorders is evident in explanations concerning the causes of death (*kālaṅkiriya*). Life is described as a continuous process sustained by inhalation (*assāsa*) and exhalation (*passāsa*), occurring as air passes through the nostrils (*nāsikavāte*). The cessation of this process marks death. A range of causative conditions is enumerated. These include adverse reactions to food (*bhatta*), disturbances of bile (*pitta*) or phlegm (*semha*), envenomation by snakes (*ahi*), scorpions (*vicchiko*), or centipedes (*satapadī*), and accidental trauma such as stumbling and falling (*papata*). Additional causes comprise irregularity in the four bodily postures (*iriyāpatha*), excessive cold (*atisītena*) or heat (*atiuṇhena*), dysfunction of the four primary elements (*mahābhūtānampi*), severe fever and related disorders (*atisārādivasena*), rupture of limb-joint ligatures (*sandhibandhana*), and deprivation of physical nutriment (*kabaḷikārāhārampi*) at the appropriate time (*yuttakāle*). These are explicitly identified as conditions leading to death (*marāṇa*).⁷⁵ This explanatory framework reflects an attempt to correlate observable physiological processes with pathological states and environmental factors, suggesting a structured understanding of causation rather than purely metaphysical interpretation.

Evidence of the systematic nature of surgical training is explicitly articulated in the commentarial tradition. In describing students apprenticed to a surgeon (*sallakathaantevāsike*), a pedagogical analogy is noted, involving the use of a scalpel (*sattha*) on a lotus leaf placed in a dish of water. A student who is overconfident cuts the leaf into two or submerges it; another, lacking confidence, refrains from touching it; the competent student demonstrates a balanced and controlled stroke. This illustration implies not only technical skill but also graded instruction and evaluative criteria within surgical training.⁷⁶ Certain surgical procedures (*satthakamma*) were, however, subject to

⁷⁵ Vipassana Research Institute. (n.d.). *Visuddhimagga* – Visuddhimagga-1 – 8. Anussatikammaṭṭhānaniddeso – Marāṇassatikathā. Chattha Sangayana.

⁷⁶ Vipassana Research Institute. (n.d.). *Visuddhimagga* – Visuddhimagga-1 – 4. Pathavikasiṇaniddeso – Nimittābhimukhapāṭipādanam. Chattha Sangayana.

restriction. Operations such as cutting (*chindana*), splitting (*phālana*), piercing (*vijjhana*), or drilling (*lekhana*) of abscesses (*vatthi*) located two inches (*dvaṅgula*) inside the anus (*vaccamagge*) were prohibited. In such cases, the use of a knife (*satthaka*) or small knife (*satthikāya*) was not allowed, whereas alternative therapeutic measures—application of alkaline substances (*khāraṃ*), or oil (*telam*), or binding (*bandhitum*) with a string (*rajju*)—were permitted.⁷⁷ Similarly, in the case of scrotal diseases (*aṇḍavuḍḍhirogepi*), surgical intervention by splitting (*phāletvā*) the scrotum (*aṇḍa*) and exteriorising the testicles (*bījāni*) was prohibited. Instead, cauterisation (*aggitāpana*) and medicinal applications (*bhesajjālimpana*) were allowed.⁷⁸ These references demonstrate both familiarity with invasive procedures and an understanding of the ethical and regulatory framework governing their application.

Commentarial sources also refer to function-specific surgical instruments. The term *potthanikaṃ* is defined as a knife (*satthaka*) used for separating (*chedana*) flesh (*maṃsa*).⁷⁹ An axe-like instrument (*pharasu*) employed for venesection (*sirāvedhana*) by physicians (*vejjā*) is mentioned as a major article (*garubhaṇḍa*) acceptable to the Saṅgha.⁸⁰ Such references suggest the recognised presence of specialised surgical tools within the medical milieu. Although chronologically later than the period under consideration, archaeological remains from the Alahana Parivena Hospital at Polonnaruwa (twelfth century CE) provide material correlates that strengthen this case. Excavations at this monastic hospital complex have yielded objects identified as surgical appliances. Some of these instruments closely resemble modern surgical tools such as probes (Figure 1), scissors (Figure 2), a lance (Figure 3), forceps (Figure 4) and a scalpel (Figure 5), and their probable functions can be reasonably inferred by analogy with contemporary usage.⁸¹

⁷⁷ Vipassana Research Institute. (n.d.). *Vinayapiṭaka (aṭṭhakathā)* – Mahāvagga-aṭṭhakathā – 6. Bhesajjakkhandaṃ – Guḷāḍianujānanakathā. Chattha Sangayana.

⁷⁸ Ibid.

⁷⁹ Ibid.

⁸⁰ Vipassana Research Institute (n.d.). *Vinayapiṭaka (aṭṭhakathā)* – Cūlavagga-aṭṭhakathā – 6. Senāsanakkhandhakaṃ – Avissajjiyavatthukathā. Chattha Sangayana.

⁸¹ Arjuna Aluwihare, “Surgical Instruments at the Alahana Parivena Hospital in Polonnaruwa,” *Journal of History, Art and Archaeology* 2, no. 2 (2022): 149–58, on 150–51; Anuradha Seneviratna, *Polonnaruwa: Medieval Capital of Sri Lanka. An illustrated survey of ancient monuments* (Colombo: Archaeological Survey Department, 1998), 179–81.



Figure 1: probes which may have been used to sound cavities and in the delineation of fistulae and sinuses. Reproduced from Aluwihare (1998).



Figure 2: (a) large scissors to cut cloth for bandages and dressings; (b) smaller scissors, probably fitted with wooden handles, and perhaps used for cutting tissue. Reproduced from Aluwihare (1998).



Figure 3: a lancet, used for “stabbing” open tissue very quickly to drain pus from an abscess or to cut through the perineum (between the anus and the scrotum) for stones in the urinary bladder. Reproduced from Aluwihare (1998).



Figure 4: (a) forceps with strong jaws might have been used for removing dead bones; (b) forceps with more delicate structure that might have been used to handle tissue like skin or intestine. Reproduced from Aluwihare (1998).



Figure 5: a scalpel used for starting to cut open the skin in non-emergency operations such as the removal of lumps under the skin, problems in the abdomen, and so on. Reproduced from Aluwihare (1998).

Consolidation and Conclusion

The present study demonstrates that anatomical knowledge in fifth-century Sri Lanka was articulated through a multi-layered framework rather than through isolated descriptions of bodily parts. References to the human body encompassed: (a) individual organs and their physiological roles; (b) composite anatomical systems; (c) functional interrelations among organs; and (d) broader notions of integration and interdependence within the living body. Such thematic diversity indicates that anatomical reflection had progressed beyond fragmentary observation toward a structured conceptualisation of bodily organisation. Individual organs were not merely named but characterised with notable descriptive narrations. Textual accounts refer to their colour, shape, location, and—at times—their structural or functional connections with other organs. Major organs such as the heart, liver, spleen, lungs, stomach, intestines, and kidneys appear in this manner, suggesting sustained familiarity and observation. Significantly, references to embryonic development also occur, with descriptions that approximate observable stages of physical formation. Although these accounts do not conform to modern embryology, they reflect an effort to correlate doctrinal exposition with empirical bodily processes.

Rudimentary understandings of systemic operations can be discerned. These explanations remain preliminary when assessed against contemporary biomedical knowledge. However, their intellectual context must be evaluated as the sources under examination are not medical or surgical manuals but Buddhist exegetical works, composed primarily for doctrinal and contemplative purposes. Within these constraints, the anatomical insights they preserve are noteworthy and should be evaluated in light of their genre and historical milieu.

The development of anatomical knowledge appears to have been shaped by broader social and intellectual conditions. Medicine was socially recognised as a compassionate vocation, consistent with Buddhist ethical ideals. Royal patronage and recorded instances of surgical intervention suggest that practitioners held an acknowledged social position. Military encounters may have provided opportunities for internal observation and necessitated surgical expertise, thereby indirectly contributing to anatomical familiarity. At the same time, philosophical practices—particularly contemplation of the

body in the context of *asubha bhāvanā* (meditation on the unattractive aspects of the body)—encouraged systematic attention to bodily structures. In the Sri Lankan historical setting, therefore, anatomical inquiry was not confined to biological curiosity but was situated at the intersection of philosophical reflection, ethical cultivation, and practical engagement.

The epistemic dimensions of the evidence further suggest organised training and embodied practice. References to surgical procedures and to physical implements indicate that anatomical knowledge was not purely speculative but grounded in experiential familiarity. Taken together, the findings reveal a coherent—though pre-modern—anatomical outlook that integrated organ-specific description, systemic interrelation, and socio-philosophical orientation. These insights contribute substantively to the global historiography of anatomy by situating Sri Lanka within broader early medieval discourses on the human body.

Notwithstanding these contributions, certain limitations must be acknowledged. The primary materials analysed in this study consist of Buddhist exegetical narratives. Consequently, the findings do not represent the full spectrum of medical and surgical knowledge in ancient Sri Lanka. Anatomical details may have been more extensively articulated in technical medical treatises that were not the focus of the present investigation.

Future research would benefit from a comparative positioning of these findings alongside dedicated Sri Lankan medical works and contemporaneous South Asian medical compendia. Such a comparison may clarify convergences, divergences, and possible channels of transmission, thereby enabling a more comprehensive reconstruction of the anatomical sciences in the region. The significance of this study extends beyond adding empirical data to the history of anatomy. It highlights an intellectual tradition in which anatomical reflection was embedded within ethical, contemplative, and social frameworks. In particular, Buddhist discussions associating mindfulness with corporeal elements such as the heart and blood invite renewed engagement with current interdisciplinary debates on embodiment and cognition.⁸² While

⁸² Dwivedi Krishna, Kanthi Amit and Pandey Mangesh, “An alternative perspective on heart-brain information processing: a narrative review,” *International Journal of Community Medicine and Public Health* 12, no. 3 (2025): 1541–1548; Dominik Wujastyk, *The Roots of Ayurveda: Selections from Sanskrit Medical Writings*; Yakupitiyage Karunadasa, *Early Buddhist Teachings: The*

such connections must be drawn cautiously, they suggest that pre-modern Sri Lankan thought offers conceptual resources that may enrich contemporary reflections on the relationship between physiological processes and consciousness.

Further advancement of this line of inquiry would require interdisciplinary collaboration among historians of medicine, philologists, archaeologists, and medical scientists. Expanded textual analysis, integration of archaeological evidence (including surgical instruments), and systematic comparison with regional medical traditions would strengthen the evidentiary base. Such efforts would not only refine our understanding of fifth-century Sri Lankan anatomical knowledge but also situate it more firmly within the wider landscape of global medical history.

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