

## Towards a Paramedical Interdisciplinary Definition of Fascia Supporting Practitioners Offering Fascia-Focused Therapies (Part 1)

Research Article

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### Abstract

Defining fascia in a manner that serves the needs of diverse allied professionals has proved elusive, leading to a cursory, incomplete view of the tissue. The continuity of fascia is its defining characteristic but not its sole feature. Rather than a definition that describes a passive dissectible tissue, an expanded meaning, informed by several years of dissections of Theil-embalmed and fresh from frozen cadavers, and up-to-date fascia-focused research is encouraged. This paper is not an attempt to define fascia exclusively. Still, it is instead a proposal aimed at the Federative International Programme for Anatomical Terminology to consider developing a new definition of fascia that emphasizes its pre-tensioned, highly sensory, omnipresent, active, and functional role in the body.

Fascia is a continuous, penetrating, interconnected web that orchestrates and fine-tunes the body's structure and functions. Any tensional change in one location can affect the fascial network via mechanotransductive processes. In addition, fascial tissues are richly innervated with sensory nerves that can stimulate the production of various neuropeptides and neurotransmitters that influence emotions, stress response, and pain perception. Such a broad range of activity highlights the importance of understanding the role of fascia in movement and manual therapies. Our proposal is offered to provide a satisfactory interdisciplinary account and explanation concerning fascia, specifically for fascia-focused therapists. A more nuanced description would be required for medical professionals, including surgeons and specialists involved in providing neural blocks; the authors will provide this description in our second paper (i.e., part 2). A two-part wholistic description of fascia supports communication among manual and movement practitioners and medical specialists.

In recent years, there has been an increased focus on the intricate role of fascia within the human body and its potential significance in various therapeutic modalities. Paramedical therapists, who work closely with individuals seeking rehabilitation and relief from so-called musculoskeletal issues, are vested in understanding the complexities of fascia. However, the current, widely accepted definition of fascia must fully capture its multifaceted nature and therapeutic implications. This article proposes a revised description of fascia tailored specifically for paramedical therapists, aiming to encompass the comprehensive functions of fascia and provide a more nuanced understanding of its relevance in clinical practice.

The sixth International Fascia Research Congress [IFRC], organized by the Fascia Research Society, occurred in Montreal, Canada, in September 2022. The IFRC seeks to share fascia research to inform better and unite medical, paramedical, and nonmedical specialists. The ongoing and increasing success of the IFRC reflects continuous growth in interest in the broad range of topics based on fascia science. This interest is not limited to medical experts but also involves a vast, disparate group, including movement and manual therapists, bio-scientists, veterinarians, and other paramedical specialists—and therein lies the problem.

With interest among practitioners offering fascia-focused therapies, including myofascial release, European neuromuscular therapy, fascia integrated technique, osteopathy and myofascial induction, a definition of fascia is needed that is specific to the requirements of all paramedical practitioners. A revised and expanded definition of fascia would give paramedical therapists a more holistic understanding of its properties and functions, enabling them to provide more targeted and effective treatments.

**Keywords:** Fascia; Connective Tissue; Anatomy; Nomenclature; Embryology; Manual Therapy; Movement Therapy; International Federation of Associations of Anatomists (IFAA); Anatomy pedagogy; Dissection.

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## Introduction

Fascia is commonly described as a connective tissue matrix that surrounds and supports the body's muscles, organs, and other structures [1]. However, this traditional definition overlooks the intricate web-like nature of fascia, which extends beyond mere physical containment [2]. Research has increasingly revealed the role of fascia as a dynamic and interconnected system affecting movement, proprioception, interoception, pain perception, and myofascial pain [3].

Paramedical therapists, including massage therapists, osteopaths, and movement and neuromuscular therapists, must recognize the crucial role of fascia in their practice [4]. However, the current definition fails to convey the complex interactions and continuity of fascia, muscles, and other physiological systems, thus limiting their understanding [5]. According to Neumann et al., changes to international standard anatomical terminology are necessary to "correct errors in existing terms: names should not be changed unless they are wrong; corrections of perceived errors should not be pedantic; and inclusion of every minor structure should not be attempted" [6].

Such changes are indeed necessary for the term fascia. An online search using Google Scholar, Medline, PubMed, and other databases such as that of the Fascia Research Society (<https://fasciaresearchsociety.org>) reveals a wealth of words and phrases for defining fascia: three-dimensional continuity [7], permeates [8], ubiquitous [9], unified [10], structural matrix [11], and omnipresent [12].

Currently, the term "fascia" (to tie, to bind, or a bandage) does not have a set meaning across various scientific and clinical paramedical disciplines, and numerous authorities agree that a scientifically precise definition is lacking [7]. Furthermore, multiple sources have highlighted the need for consensus on a modern definition rather than the continued use of the 15th-century characterization and description of fascia as a "band that ties" [8]. Beyond the fact that there is no agreement concerning the definition of fascia, evidence suggests that confusion and contradiction exist regarding what fascia is, what it is not and what it can and cannot do [9]. Recent commentary by Neumann et al. highlights that the orthodoxy and relevance of the term "fascia" should be open for further discussion [6]. This call is neither trivial nor pedantic. Fascia has been the focus of much research and interest in recent years, with a growing range of practitioners offering fascia-focused therapies such as myofascial release, European neuromuscular therapy, structural integration, myofascial manipulation, fascia integrated technique, and myofascial induction, which are all becoming increasingly popular. Despite this growing interest, there needs to be an accepted definition of fascia specific to the needs of practitioners offering fascia-focused therapies, underscoring the need for a more inclusive definition of fascia [11]. Many terms used as an integral part of the language of anatomy indicate very little about the physiology or metabolic role of a named structure.

As a case in point, the term fascia, being of Latin origin with Indo-European influences, describes a ribbon or a band (Figure 1). The term was first proposed in the 15th century, likely as a reflection of the resemblance of fascia to a bandage [7]. One of the earliest recorded uses of the term "fascia" in its modern ana-

tomical sense was by the Italian anatomist Andreas Vesalius (also known as Vesal) in the 16th century. Vesalius used the term to describe the connective tissue layers surrounding muscles [22]. This approach raises a question concerning the precise use of words in anatomy, specifically pertaining to the topic of so-called layers in human morphology. A question open to discussion is, "Do layers exist in human anatomy, or do anatomists cut layers into existence?" The word layer is convenient, referring to layers in human connective tissue; however, it reflects a 17th-century model of "parts" rather than a more realistic view of continuity [4]. The term layer is undoubtedly suitable in geology, in which it refers to strata of rock, sediment, and soil that can be visually identified as distinct horizontal bands or sheets [23].

These layers can provide valuable information about the geological history of an area, including the types of materials that were present and the environmental conditions over time. Although anatomists use layers as a convenient term to describe the organization of tissues, they are not discrete strata like those described in geology [23]. Instead, they are continuous sheets or planes that are interconnected and not easily separated unless by dissection [24].

Geological layers are often formed through external processes such as erosion, sedimentation, and tectonic activity. In contrast, the structures of the human body are shaped through internal, tensegrity-informed embryonic processes, including cell differentiation, tissue growth, and organ development [25]. As a result, the organization of the human body is more complex and interconnected than the relatively simple layering seen in geology [23, 25]. A prominent argument against the possibility of layers in the human body is the study of stratigraphy [23]. Stratigraphy studies layered materials [strata] that were deposited over time. The fundamental law of stratigraphy, the law of superposition, states that lower layers are older than upper layers unless the sequence has been overturned [23].

Because this article relates to definitions, it is essential to mention the use of the term fascia and the associated term "fascism." Both terms have a common root in the Latin word "fascis," which refers to a bandage or bundle of rods tied together with a band or "wrapped around" [26].

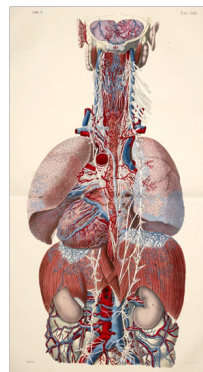
In ancient Rome, such a bundle of rods represented the crushing weight of the authority of magistrates. Over time, the word fascis became associated with the idea of strength through unity, as the rods were stronger when bound together than when separated, a concept that induced respect and fear [26].

While the words "fascia" and "fascist" have a common Latin root, they are not related in meaning, especially as the classical Latin term specifically meant a band of material [26]. However, some people could take offence to the word "fascia" due to its shared etymology, and, therefore, it should be emphasized that their meanings and contexts are distinct [26, 27]. Fascia reflects strength through unity and the binding of disparate elements, suggesting that ligaments are fascia. Anatomists adopted the term "fascia" due to its function as a band binding together or wrapping around so-called individual components into a stronger whole [27]. As such, it is essential that the term "fascia" continues to be used appropriately in the context of anatomy and paramedical fields, where it is relevant and to avoid using it in a way that

**Figure 1.** Postcard, 1937, showing fascies-like decorative element [60cm in length with double-headed axe jointed to rods, all in iron] found in 1898 in “Tomb of the Lictor” at the Etruscan site of Vetulonia]. Courtesy T. C. Brennan.



**Figure 2.** Anatomical Images such as this one display organs and vessels void of their associated fascia. Image used under license from British Library Images for Clinical Anatomist Sharkey, J.



might be construed as insensitive or offensive.

It has been proposed that while avoiding synonyms and eponyms, a proposal to identify location-specific fascia by using modifiers such as "osseofascial" (bone), "neurofascial" (nerve), or "hemafascial" (blood) could resolve the problem of developing an appropriate definition [28]. Historically, each local fascia was named after the anatomist who provided the first accurate anatomical description; for example, Scarpa's fascia, located in the abdomen, was named after Antonio Scarpa, an Italian anatomist [13]. Colle's fascia was named after Irish surgeon Abraham Colle from Dublin [14]. Camper's fascia was named after Petrus Camper, a Dutch physician and anatomist [15]. Denonvilliers' fascia was named after Paul Denonvilliers, a French surgeon [16]. Luschka's fascia was named after Hubert von Luschka, a German anatomist [17] and Gallaudet's fascia, the superficial investing fascia of the perineum, was named after American anatomist Bern Budd Gallaudet. In contrast, Gallaudet and Waldeyer's fascia is located between the pelvic diaphragm's mesorectal parietal and presacral fasciae [18].

Most literary anatomical textbooks from the 15th century to the modern era are littered with artistically embellished, antiseptic, isolated parts void of their fascia (See Fig. 2).

Good reasons existed for the focus on isolated parts and the epistemological and subsequent metaphorical descriptions that unfolded because this approach was an essential and fundamental way for artists and anatomists, such as Leonardo da Vinci, to appreciate, view, and investigate discrete structures or body parts; omitting the integrated unifying role of fascia allowed a better

view of each part [19, 20]. Nevertheless, body parts need the neural and vascular-rich fascia “body” to survive, although modern techniques, including cryopreservation, can prolong the survival of organ parts outside the body. Without the possibility of unification with the body, a part cannot exist [21].

The topic of parts is complex and integrated into religion, art, science, and politics. Having been associated with the arts for many years, anatomy is recognized as the oldest of the medical sciences [19]. Once perceived as simply a fragment of the whole, fascia has come to be viewed as the tissue that connects the whole [7]. Further, instead of local, individually separated fasciae set apart and distinct from one another, a whole unified system has come to light [2]. Thus, the need arises to negotiate a diplomatic solution informed by a syntax that does justice to the actual reality of form yet respects the honest efforts of pantheons of anatomy past [4]. To quote da Vinci “You will become acquainted with every part and every whole by means of a demonstration of each part”.

In the modern era, anatomists are more informed regarding the unified nature of this omnipresent connective tissue sculpted and morphed from the embryonic origami, the mesenchyme [11]. Tensegrity construction principles provide a unified systems conception of living form and function from micro to macro [24]. The tensegrity model offers a novel substitute for the established biomechanical view of one muscle, one action, origins, and insertions while combining fascia science with tensegrity research has been referred to as “Fasciategrity” [10]. Fasciategrity provides a new image of living constructs as self-developed, self-constructed, self-emerging, self-stressed, unified systems within systems.

The Fasciategrity model encourages a move away from a “musculoskeletal system” with muscles described as being “attached to” bone and moves us towards a unified system, continuous, soft matter construct that naturally expresses nonlinear behaviour where disruption to one location can impact locally and globally [10].

Fascia is a complex and dynamic contractile tissue playing a crucial role in posture, pain perception, and motion; however, a more detailed understanding of fascia is needed to support the development of effective fascia-focused therapies [9].

For consideration, we propose not a definition per se but rather two paramedical interdisciplinary descriptions of fascia, a short and long version, informed by the latest clinical anatomy and physiology research.

We present these descriptions for consideration by the Federative International Programme for Anatomical Terminology, the authority charged with defining fascia.

Our proposed short version is "Fascia is a pre-tensioned, dynamic, unified, uninterrupted, complex, body-wide network of fibrous, cellular, and adipose tissues surrounding, penetrating, supporting, and compartmentalizing all structures from the cellular level to the organ and organ systems level of the body."

Our proposed extended version is "Fascia constitutes a variety of morphologically specialist tissues from liquid to osseous composed of a variety of collagen and elastin fibres embedded in a ground substance constituted by bound water, glycosaminoglycans, and other extracellular matrix molecules on a spectrum of softness (e.g., leptomeninges) to stiffness (e.g., bone). Fascia is crucial in transmitting forces, maintaining posture, regulating fluid balance, and providing sensory feedback. Human Fascia is a continuous and ubiquitous three-dimensional web of pre-tensioned connective tissue permeating and supporting every cell, tissue, and organ of the body, providing structural integrity and tensional balance. Fascia is composed of collagen, elastin, and

ground substance and is richly innervated and vascularized. Fascia is not a passive container but a dynamic complex tissue constantly remodelling in response to mechanical and biochemical stimuli, modulating muscle function, bone health, fluidic dynamics, joint stability, posture, pain, interoception and proprioception. Moreover, Fascia plays a crucial role in intercellular communication, emotions, immune defence, and inflammation regulation."

These short and long descriptions consider the recent advances in fascia research, emphasizing the dynamic, unified nature of Fascia [29]. In addition, a new classification of Fascia into functional hierarchical categories supports these newly proposed descriptions [30]. The new functional classification includes gliding, restraining, containing, force transductive, communicative, septal, invaginating, and osseofascial [30] [see Fig. 3].

## Conclusion

The science of human anatomy is fluidic and constantly changing as we learn to appreciate better this ubiquitous tissue we call fascia. The call for recognizing the continuity of fascia is not new, as evidenced by the writings of Dr. John D. Goodman, M.D., published in 1923. It is well-recognized and accepted that anatomists and scientists have made efforts over many years to refine anatomical knowledge, including accurately defining specific anatomical terms and structures. It is our responsibility to continue to do so. The proposed descriptions in this short paper, supported by the new functional classification of fascia, provide a platform for interdisciplinary communication. Fascia is a seamless process giving continuity to the body, from the superficial to the deepest organs, in a continuous network of tensional and compressional forces called mechanotransduction. This means that a dysfunction in one part of the fascial system can affect distant regions or disrupt the whole-body balance, resulting in pain some distance from the true source of the insult. This proposal highlights the importance of fascia in homeostasis and providing sensory feedback and interoception, an essential aspect of fascia-focused therapies.

**Figure 3. This cadaveric image displays many of the functional aspects of fascia reflecting the gliding surface of a myofascial structure with its neighbors, the force transductive nature of the microvacuolar fibril network clearly demonstrated (as described by Guimberteau in *Strolling Under The Skin*:<https://www.youtube.com/watch?v=eW0lvOVKDxE>), and the deep fascial compartment constraining and compartmentalising.**

Image: Sharkey, J 2023





The authors hope this paper, and the proposals contained within, will help the move toward a more inclusive definition of fascia within the paramedical interdisciplinary communities of manual and movement therapists.

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