

COMMENTARY

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## Reconnecting the Body in Eastern and Western Medicine

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### Overview: Ancient and Modern Systems

ACUPUNCTURE IS AN ancient healing art that has been practiced continuously for thousands of years in East Asia, has spread throughout the world during the 20th century, and nevertheless remains difficult to define. In 1960s Communist China, acupuncture underwent a transformation that standardized its practice under the influence of Western medicine,<sup>1,2</sup> while maintaining some of its distinct elements such as the insertion of acupuncture needles at discrete body locations known as “acupuncture points.” The result, “Traditional Chinese Medicine” or TCM style acupuncture, is now the dominant model in both China and the rest of the world, and is the official core curriculum taught at the majority of U.S. acupuncture schools.

However, the modernization of TCM left out some important aspects of “Classical” Chinese medicine that nevertheless survived in marginalized styles of acupuncture that were orally transmitted through family lineages. These “pre-TCM” acupuncture styles, along with Japanese, Korean, and Vietnamese traditions that developed from the classics, began spreading in the West before the Chinese cultural revolution and became established, first in Europe and then in the United States, through apprenticeships, select programs, and continuing education opportunities.<sup>3–6</sup>

In this article, we propose that some components of acupuncture missing from the TCM model are related to important 21st century advances in physiology and medicine, including systems biology, cross-system integration, matrix biology, and mechanotherapeutics. We further propose that understanding physiologic mechanisms underlying these “lost” components of acupuncture may yield important insights that could benefit medicine as a whole. It is important to clarify that this commentary does not seek to advocate a dogmatic fixation with ancient ideas for the sake of tradition. Rather, the overarching purpose is to emphasize the potential loss of valuable experience and information in the process of acculturation and modernization.

### Diagnostic Process in Western Medicine, TCM, and Classical Chinese Medicine

In Western medicine, diagnosis begins with the recognition of patterns in signs, symptoms, and physical findings, supplemented by laboratory tests and diagnostic imaging. This information is first classified into physiologic systems (e.g., symptoms such as cough are assigned to the respiratory system) and a differential diagnosis is created, based on a list of possible overarching pathologic processes (e.g., infectious, neoplastic, autoimmune) that may explain the disease presentation. Treatment is based on a prescription, usually pharmacologic, that fits the diagnosis, based on current clinical recommendations.

In TCM, the diagnostic process similarly begins with the recognition of patterns based on history and physical examination, and is increasingly informed by objective data provided by the prior Western diagnosis.<sup>2,7,8</sup> As in Western medicine, this information is organized into “organ systems” and although these do not strictly correspond to Western organs, they are roughly similar in concept as they refer to specific “domains” of the body (e.g., heart, lung, spleen) that have distinct physiologic attributes.<sup>9</sup> TCM also includes the evaluation of overarching “whole body” characteristics, namely *yin/yang*, hot/cold, excess/deficiency, and exterior/interior based on signs and symptoms. Similar to Western medicine, these are applied to individual organ systems to formulate a standardized TCM diagnosis (e.g., deficient *yin* of the kidney). Treatment “prescriptions” consist of recommended acupuncture points as well as guiding herbal medicinal formulas. Thus, although the end result may be different, TCM and Western approaches to diagnosis and treatment have many similarities, including organizing information based on an organ system framework.

In contrast to both Western medicine and TCM, Classical Chinese medicine views the body as an interconnected whole,<sup>2</sup> and the diagnostic process is based on body symptom patterns informed by direct experience through the senses, including palpation. Qualities such as local tissue

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“fullness,” “emptiness,” “stagnation,” and “congestion,” as well as induration, tenderness to palpation, hyperesthesia, local skin temperature, and moisture, are assessed to create a three-dimensional somatic “picture” of the patient, in addition to other signs and symptoms.<sup>3,10</sup> Assessment of what presents in the moment leads to highly individualized, flexible treatments, chosen from a wide variety of modalities, including acupuncture, massage, exercise, diet, and lifestyle recommendations. Thus, Classical Chinese medicine bases its treatment strategy on a diagnostic “impression” that encompasses the whole patient with an emphasis on palpation of the skin and underlying soft tissues, rather than arriving at a diagnosis based on an organ-based classification system as in Western medicine and TCM.

### Fragmentation Versus Integration: The Musculoskeletal System

In the West, organization of the body into anatomically separate physiologic systems dates back to the birth of modern medicine in the late 19th century when the function of the major “internal” systems (e.g., cardiovascular, respiratory, digestive) was elucidated and mapped out. Additional systems that have a more diffuse distribution throughout the body (e.g., nervous, endocrine, immune) were subsequently added with a growing understanding of how the body functions as a unit. Yet, throughout the 20th century and to this day, physiologic systems are mostly studied in isolation from each other, and this has dominated the organization of medicine and medical research along separate academic departments and medical specialties (e.g., cardiology, gastrointestinal, neurology).

One system that has notably remained separate and “outside” of internal medicine has been the musculoskeletal system. It has been mainly the purview of orthopedics, physiatry, and physical therapy. Although rheumatology also initially concerned itself with musculoskeletal tissues, the discovery of autoimmune diseases in the 1960s steered rheumatologic research and practice increasingly toward immunology and away from the musculoskeletal tissues themselves, which are consequently poorly integrated into internal medicine.<sup>11</sup>

Additionally, a general shift toward biochemistry and away from biophysics has contributed to this lack of integration. Early on in the evolution of physiology, physical measurements such as force, pressure, and volume were some of the few measurements that could be made. These were of central importance in developing the understanding of respiration, cardiovascular function, and skeletal muscle contraction. However, after the discovery of hormones, metabolites, and neurotransmitters, biochemical processes became increasingly studied *in vitro*, and conceptually dissociated from their physical, *in vivo* environment.<sup>12</sup>

The birth of biochemistry had remarkable and long-lasting results. Scientists began to view cells as “bags” where chemical reactions occur in a liquid medium, surrounded by “extracellular fluid” in which metabolic and gas exchanges take place. Lack of integration of physics and biochemistry throughout the 20th century has contributed to the current lack of understanding of the role of the musculoskeletal system in shaping the mechanical environment of the body. The understanding of how musculoskeletal tissue forces influence other tissues and physiologic systems has thus been obscured.

One significant outcome of these scientific developments is that, until recently, the role of connective tissue as a bridge between the musculoskeletal system and the rest of the body was mostly ignored. Connective tissue forms a body-wide network that surrounds and permeates all muscles, and interfaces with all other tissues and organs of the body.<sup>13</sup> As we begin to understand the central role of biomechanics in all of physiology, the transmission of mechanical forces through the connective tissue “matrix,” and its influence on all cellular and extracellular processes, is a current area of intense investigation.<sup>10</sup> Thus, connective tissue is now beginning to fill the gaps in the knowledge of how physiologic systems are integrated with one another, and how the body functions as an interconnected whole.

### Meridians, “Fat Greasy Membranes,” and Connective Tissue

In contrast to Western medicine, the notion that the whole body functions as a dynamic web was a central organizing principle of Classical Chinese medicine from its onset.<sup>14</sup> Classically derived styles of acupuncture acknowledge and explore the interconnectedness and multidimensionality of the human body and emphasize its organization into a multilayered complex network.<sup>2,15</sup>

A basic component of classical Chinese medicine that emerged early on was the concept of *qi*, an idea deeply rooted in Asian thought that reflects a model based on qualities and relationships rather than fixed entities.<sup>1</sup> Although often translated as “life force,” or “energy,” the idea of *qi* implies dynamic movement, transformation, and change.<sup>1</sup> In the human body, *qi* is thought to flow through an anatomical substrate termed “Jing Luo” or “Jing Mai,” often translated as “meridian network” and “meridian channel,” respectively. The existence of acupuncture meridians has been the subject of much debate, given that no scientific study so far has been able to demonstrate any anatomical or physiologic attributes that differentiate meridians from surrounding tissues.

However, others have proposed that, rather than being distinct structures, acupuncture meridians represent the same web-like anatomical matrix, which is now viewed as key to the modern understanding of the body as an interconnected whole.<sup>5,16–18</sup> The written characters for Jing Luo and Jing Mai include the words silk, net, network, fabric, underground watercourse, flesh, river, and tributaries, which suggest a network of blood vessels connected by silk-like connective tissue fabric.<sup>18–20</sup> The Nan Jing describes “fat, greasy membranes” as the “space between the organs, bones, and flesh through which the *yang qi* streams.”<sup>21</sup> The description of the acupuncture meridian network connecting the surface of the body with internal organs, the upper with the lower parts of the body, and the superficial with the deep is also a fitting description for the network of connective tissue.

While it is clearly not possible to prove that this interpretation of the classics is correct, increasing evidence supports a role for connective tissue in the mechanism of acupuncture.<sup>22–25</sup> According to classical theory, promoting the even flow of *qi* throughout the body is the key function of acupuncture, massage, and the internal exercises known as *tai chi* and *qigong*. Areas in which this flow is impaired are believed to become “stagnant” or “blocked.” Transposing this image into the context of connective tissue

suggests that Classical Chinese medicine recognized the intrinsic connection between physical and internal medicine. In that philosophy and approach, integration of musculo-skeletal and other body systems was present from the start.

Although the concepts of *qi* and the meridian network have remained central in Chinese medicine over the centuries, their importance in the diagnostic and treatment process was reduced during the 20th century transition to TCM. Western-like diagnoses based on organ system dysfunction and treatments based on discrete acupuncture point formulas were emphasized. The meridian network concept was commonly reduced to 14 main channels, focusing on the 12 channels associated directly with each organ system located in anatomically defined specific areas (e.g., heart meridian on the medial aspect of the arm) and 2 extra channels that run along a sagittal plane, traversing the body front and back.

Notably, the simplification of Classical Chinese medicine as TCM has led to the so far unsubstantiated notion that these 14 acupuncture meridians and their associated points have distinct properties. This has contributed to skepticism surrounding acupuncture in the West. In contrast, the ancient Chinese concept of a diffuse, web-like matrix permeating and connecting all parts and components of the body resonates well with the modern understanding of matrix biology and the emerging view of the body as an integrated system.

### Putting the Body Back Together in Both Western and Eastern Medicine

In Western medicine, the current growing awareness of the importance of biophysics spurred the growth of mechanobiology and mechanotherapeutics. These disciplines incorporate tissue forces back into biochemistry, cell and molecular biology, as well as whole body physiology.<sup>12</sup> In parallel, the recent explosion in the understanding of systems biology is breaking down conceptual barriers between classical organ systems, leading to a more unified view of physiology based on cross-system integration.<sup>26</sup>

Although there has been some recent progress in this area (e.g., neuro-immune interactions), there remain large gaps in the understanding of how physiologic systems influence one another. Connective tissue is poised to fill some of these gaps, as not only does it interface with all other body systems but its musculoskeletal function also places it in a central position in understanding how body movements and physical-based therapies influence immune, vascular, and nervous systems, among others.<sup>27</sup>

In East Asian medicine, classical concepts such as *qi* and meridians, and physical-based modalities such as massage, *tai chi*, and *qigong* have endured despite the dominant 20th century language of TCM. Although there is little practice-based research in this area, many acupuncturists trained in the West practice styles of acupuncture that heavily rely on palpation and detection of physical tissue characteristics (such as tension, stiffness, hollowness) in their evaluation of patients and selection of needling locations, rather than, or in addition to, standard acupuncture points. In doing so, acupuncturists aim to detect patterns of imbalances not only in the functioning of internal organs but also in the three-dimensional shape and consistency of the body created by musculoskeletal tissues.<sup>28–30</sup>

Western medicine is beginning to recognize the body's interconnectedness and the importance of mechanical forces in shaping the physical body, and its dynamic function as a mechanosensitive whole body system. This insight was captured beautifully in some of the earliest classical acupuncture texts that have fortunately survived to this day,<sup>19</sup> but is missing from modernized TCM. In this context, classical acupuncture's way of assessing the physical body could, if better understood, make a significant contribution to medicine as a whole.

We are currently at a juncture where Eastern and Western medicine have the potential to “cross-pollinate” each other and heal some of the fragmentation in understanding of the body that has handicapped both throughout the last half of the 20th century. It is up to researchers from both communities to join forces and tackle these challenging and important questions.

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