

The Holistic Biomechanics Model: A New Perspective of the Human Body and its Kinetic Chains

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In this paper we will investigate what happens when we look at our human body's anatomy and biomechanics in a holistic way. It suggests that what has been missing in the whole of human body modelling is one that goes beyond a set of wholly mechanistic principles.

The model being introduced gives a new context to kinetic chain forces like flexion and its polar opposite, extension. It defines a set of four principles that those kinetic chain forces express. Furthermore, being a holistic model, these same principles will be shown to work together to build the various anatomical components of our human body.

Besides identifying these four principles-forces-elemental components, this paper's goal is to spur insights among the reader as they begin putting their own knowledge base within the context of this four-part holistic pattern.

Historical Context

From Palmer to Logan to DeJarnette to Goodheart, chiropractors throughout our history have tried to discern the play of something broad and often spiritual expressing itself in our body's dynamics. They were tapping into the natural scientist ideal that held great sway up until relatively recent times. This ideal was that nature – our human body included – showed us important truths of the cosmos. Today we look to the physicist-cosmologist instead.

This model will help us identify a set of four very tangible principles that are part of an easy to comprehend holistic pattern present in our human body. Part of its holistic power and even charm comes as it refreshes a scientific model that for well over 2500 years was exceedingly focused on nature's four elements. Though rarely appreciated today, it is widely recognized that a "four element model" is at the foundation of western civilization – its sciences in particular.

In honor of this natural scientist-natural philosopher tradition we will use the natural element terms of earlier scientists in the naming of our primary biomechanical and anatomy-building principles. As we will see, each of the four elements of nature do indeed speak to the power of its related biomechanical force and principle, and the kinetic chains it is involved in.

Though this four element tradition does include a discredited set of four bodily humors (and admittedly, leaches too), a case could be made that its four element model intuited important concepts that brought practical value for it to have lasted for over 2500 years. It's worth mentioning that medicine has made its share of wrong turns. And of course there are more than four elements to the periodic table of atomic elements. Clearly, the four elements are about something more primal than atomic elements.

Even though today's science and our modern sensibility would tend to dismiss any such model of the body (and the cosmos) built upon this four element way of thinking, I will present reasons that the pre-modern scientists' four element insight might very well offer an important and even necessary holistic counter to the overly reductive way of thinking that prevails in our time.

Because we will be using these elemental terms to delineate a set of proposed cardinal principles they will be capitalized in this article, as the *Fire*, *Air*, *Water* and *Earth* principles.

The significance of *Holistic*

Since this paper suggests that a single set of four principles *holistically* expresses itself throughout the cosmos, it is important to quickly note what *holistic* really means. Toward this end, let us see the relationship between the terms, *holistic* and *holographic*.

If you were to look at a holographic film plate you would see it covered with small squiggly lines. These squiggly lines express an “interference pattern”. This pattern is generated when the light of a laser beam hits the film plate after half of it has been scattered by the three-dimensions of the object in its path.

To the point of this article and the model it presents, if you were to fracture that holographic film plate and shined a laser through a small piece of it, you would still see the whole object’s image (with but a loss of detail). As it turns out, every piece of the film plate has the same curving lines – that image’s particular interference *pattern* – embedded into it.

Having the same roots as holographic, *holism* seeks to understand the world by comprehending in fuller ways the pattern that repeats on all the levels that build the world. This paper’s model is built upon the idea that a singular pattern of four principles is embedded within all the pieces of the cosmos. If that was the case, the elementary components that prop up each level of the cosmos could be seen as that level’s expression of those four pattern-building *holistic* principles.

It is worth mentioning here that science indeed does show us a variety of important foursomes operating in the cosmos: the four forces of physics, the four states of matter; the photon, electron, proton and neutron of the atom; the four genetic bases of life; and of course, the sun, air, water and terra firma of our planet’s nature. We will discover that there is something about four that lends it to generate all those many significant foursomes present in the cosmos.

Because nature’s four elements are very much “in our face”, they give us easy access to note the essence of any such holistic pattern which these foursomes may be expressing. As we will see in this article, nature’s four elements allow us to more easily identify the essential nature of each of those cardinal principles, which manifest as the elemental components propping up each cosmic level.

In summary, this model makes the case that nature’s foursome helps us to see how a set of first principles operate productively on each level of the world – in a cosmos-unifying, universe-generating way.

Identifying a top-down order

As we use nature to help us identify these four principles, the first thing to take note of is that there is a top and bottom to the four: Fire is up top – the sun of nature; Air is lighter and rises above the oceans’ waters; and fourthly, Earth – terra firma – is below our feet, at the bottom of it all.

Similarly, they relate in that order to science’s four states of matter in terms of density. In other words, Fire, relates to the plasma state (within the sun) and would come first (be up top); Air relates

to the gaseous state, Water to the liquid state, and finally Earth surely relates to the solid state of matter.

In another paper, *An Elegant Universe: Appreciating the Holistic Pattern that Unifies the Cosmos*, I explore the origin of these four principles, and their relationship to a set of primal geometric shapes (giving shape to the four earliest of numbers), which are easily observed to be operating in the cosmos. In that paper, the first of the four – the sun – is shown to relate to the geometric circle shape that the first number, *one*, embodies. Indeed, there is an implied “oneness” to a circle; a circle is all-enclosing, unifying, *one*-sided.

More pertinent to our current topic is Air, the *second* principle from the top. It speaks metaphysically of *Two*. This holistic model helps us to understand the second principle by looking at the *geometry of two* in the next base shape, *a line*. Much of what defines a line (vs. a line segment) are those *two arrows* at its two ends. Something abstractly metaphysical, yet very useful for the cosmos is generated between a line’s two arrows – *space*. Space, endless space, is generated by the growing distance between those oppositely directed two arrows.

For the cosmos to unfold there would need to be this space. The Big Bang works because that space is generated. And it all begins, arguably, with the metaphysics of Two and the line. On a more granular level of our world, the second principle speaks to the fact that every electron, atom, amoeba, ant, and zebra requires its elbowroom. Here’s the key point: the second principle of the cosmos, *Space* speaks to what Air, the second element of the Ancients, really expresses.

What makes nature on this planet so productive is that this elbowroom space around us has become a life-positive atmosphere, our planet’s *air*.

Let’s take a deeper dive into this significant realm of our lives, *space*. It has its three dimensions-planes-axes. As far as our body’s architecture, it’s moulded onto what we call the x, y and z axes of geometry. The biomechanics and kinetic chains moving through the body have to do with movements made through this three-pronged Air element dimension of our lives.

Much of what follows speaks to the relationship between those three dimensions of space and this proposed four element pattern. We will be noticing how the vector motions within each of those axes relate functionally to one of this model’s four principles. Significantly, too, we will come to discover that each axis works to strengthen the particular bodily physiology which resonates with that principle.

Later yet, I’ll be proposing the possibility that exercising motions put into a particular axis have the power to strengthen the physiological (health-giving) function of the principle resonating with that x, y, or z-axis dimension of space.

The x-axis and the Water Principle

To help us understand the relationship between a spatial dimension and these natural element terms, let us consider that although we don’t normally think of these three spatial axes in a hierarchical way, there might very well be such a hierarchy to how they function – similar to the sensible way we have seen nature’s four elements exist in a hierarchy from top to bottom.

As we begin our journey in this direction, let us imagine a group of individual amoebae and a group of individual humans being told to draw a line “from side to side”. We humans would undoubtedly draw it from right to left or in a horizontally opposite way. If you looked at the amoebae however, their lines would be drawn in all varieties of directions.

For amoebae in their watery environment, there is little to no differentiation of the x, y and z-axes. For an amoeba, every axis functions in the same side-to-sideness as our x-axis. What we call our right and left *sides* is, significantly, the remnant of the primitive, undifferentiated state within which amoebae live. Those undifferentiated “sides” of our lives define the x-axis of our lives, indeed of all lives.

There is a certain irony to the fact that we generally pay attention to our right and left sides as if they were the most differentiated – when clearly they are not. The y-axis of our body – our head up top relative to our feet at our bottom; the z-axis – our front relative to our back sides; both are very much more differentiated.

In this regard, it is worth knowing that in science, being undifferentiated is consistently noted to relate to being in a more primitive state. *The summarizing point: if there were to be a specific essential nature associated with each of the three axes of space, it could be argued that the x-axis would relate to a functionality that is more primitive relative to the functionality of the y or z-axes for that creature.*

It’s useful to appreciate that we derived this assessment by looking within a water environment. Intuitively we can also sense there is something that does relate water to this more undifferentiated-to-life, primitive-most x-axis. We note that even as a river flows ever-downward there is a sinuous x-axis sway embedded within it. Water’s wakes and waves are x-axis oriented as well. As we will see, the y and z-axes of the cosmos as it exists on an especially ordered version of it, nature on this planet, speak to something that is less “watery” and less primitive in their functionality.

As we move up from this low lying, earth-hugging Water element dimension of space, we reach nature’s air. Like the everyday empirical experiences we have of water which give us our sense of its x-axis play in nature, we have our natural experiences regarding air. While wind blows forward in one direction or another, air in nature moves in a more primal way, *upward*. Our experiences would tell us that there is a verticality to Air, a y-axis to its nature. Of course these seem like simple concepts, too simple to be valid and useful; but that indeed is the power of the four elements. As we explore our biped human body, we’ll be seeing the play of this vertical-building principle in us.

And now, Fire – the highest of the four; it would make sense that according to this model its axis of motion would involve the most refined of body physiologies, needs and personal goals. Each bird with its flapping wings that pump itself up in Air’s y-axis, does it all to move *forward* in the z-axis – to get it to where it wants to go. Interestingly, Fire’s z-axis is the one in which the sun’s fiery photons of light travel, always moving *forward*. Our own life is organized in this positive z-axis direction not only as we walk but as we use that most refined part of a body, our forward side, in specialized ways.

It would be reasonable to ask, what about Earth? There are two ways to handle this. First, in the cosmos’ scheme of things, Earth’s ideal is to create the densest of physicality. To the purposes of its ideal, no space exists between the parts of Earth’s dense hard granularity. Earth, then, is the antithesis to the spaciousness of Air.

The second way to handle this three dimensions:four elements issue is to note that while the Air kinetic chain goes upward in the y-axis; and the Fire kinetic chain goes forward in the z-axis, in our lives the Earth's kinetic chains go down and back, into -y axis and -z axis values.

Principles Build the Body's Primal Tissue Types

This holistic model presents evidence that the principle upholding each of nature's four elements find an expression in a specific tissue of the body. For example, the bones of our body could easily be noted to be an expression of the Earth Principle; they are hard with the solidity of Earth.

While the Earth Principle is about physicality and hardness, the Water Principle according to this model is about softness and *inter-connectedness*.

Water works powerfully for the purposes of life by *inter-connecting* cells, tissues, the whole of a body, and vast ecosystems together. Further, the soft environment water creates cushions and nurtures life. The stroma interconnecting and nourishing our organ tissues operate in this way. Our more noticeable *connective tissue* like ligaments, tendons, discs and fascia began with localized interweaving of body cells.

It is worth noting that water's own inner chemistry expresses the principle of Interconnectedness in its own powerful way. Besides covalent and ionic bonding there is the much weaker but essential to life bond called "the hydrogen bond". This hydrogen bonding connects one water molecule with up to four others. This goes on literally, ad infinitum. Apropos, through this process the oceans' waters exist in a real way as one giant *inter-connected* molecule.

For more on that and other aspects of this foursome that go beyond our human body – including the metaphysical logic for the how and why of this cosmic foursome, another paper written more of the foursome in that realm can be found at Academia.edu.

https://www.academia.edu/26239151/An_Elegant_Universe_A_Holistic_Model_Presenting_the_Primitive_Mathematics_Underlying_a_Unified_Cosmos

Now it's time to move to Air. With it we move up from Water – beyond connective tissue – to the self-empowerment of *muscles*. To better appreciate this proposed muscle : Air relationship, note that muscles are what life uses to move through space – what is called by the ancients, the Air element. What electrons do for atoms, muscles do for animals: they generate elbowroom, self-empowerment, spatial motion vigor. All evidence of the Air Principle in play

According to this model each of the muscles of a body region play a role in invigorating this principle as they move us through one of the three dimensions of space – the Air element of nature.

The highest of the four elements, Fire, finds expression in our body as its nerves. Nerves are the most ethereal part of each body; electrical impulses fire through the body's networks of nerves. The body's efferent nerve force travels forward from our spine as they attempt to do for the body what fiery rays of the sun do for us on our planet – *create order*. Nerves create ordered muscle action so as to create orderly and (top-down) well-organized body motion. In the same way that our bones especially collect at our feet, those nerves collect most intensely at the body's top, the brain.

Our Body's Regions – Another Bottom to Top Affair

Let's build on the *anatomic* bottom-to-top layering from a primitive base to an ever-more refined top. Here, we will draw upon the intuition that ancient wise people had, this time in the Indian subcontinent. I do fear a bit that bringing the chakras of yoga into the discussion will set off some alarm bells for the academically trained. However my 35 years of research tells me they do much to serve as a useful guide toward helping us understand our body in deepest ways. We will be combining their seven chakra system of body centers with the four elements; briefly, to keep this paper short.

And so we begin with Earth. One of the anatomical places where we've noted Earth to be strong is our feet. The feet are dense with that earth element embodiment, *bone*. Meanwhile at the bottom of our spine is the coccyx – the root chakra of yoga. In a somewhat poetic way, this coccyx of ours is composed of *four*-fused bones. We will continue to see that Earth as the fourth element often presents itself in things composed of four parts. Still, with all that said, the root chakra should be thought of as *composed of all the bones that support us from below* – as Earth will do – from our feet to our hips in addition to this bottom-most portion of the body-proper, the coccyx of our spine.

Moving up from our tailbone, we reach the sacrum and the pelvis. While all spatial dimensions and their principles show up in this sacral region, there is a strong x-axis, watery nature to it. Indeed, it's not hard to recognize that the pelvis has a watery, primitive functionality in our body's own hierarchy of needs and goals.

While the pelvis has its watery x-axis nature, the lumbar vertebrae right above it clearly have more of a y-axis power. It extends the body *upward*. More and more we will find that each anatomic region of our human body embellishes one of these principles as they make particularly elegant use of its related axis.

We saw the Air Principle is about the elbowroom self-empowerment needed by every part of creation, which is given to us by our muscles. It is worth noting that our y-axis spanning lumbar spine has some of the strongest muscles of our body. As a side note it is worth noting that the sacroiliac joint – an important Water element joint – contains no muscles, but instead has some of the body's strongest ligaments. Ligaments are between bones (Earth) and muscles (Air) in the hierarchy of body tissues. Water is the principle of connectedness that clearly is embodied by our various connective tissues.

And next up we reach the thoracic spine with its ribs. And those distinguishing ribs: they protrude forwardly in the z-axis, the Fire axis in this model. We move from bones and fleshy tissues to the airy lungs, and too, to an organ that we know intuitively embodies something of Fire within it. Second to the brain, the heart embodies the power of nerves – that highest element – to maintain the heart's synchronous order of muscle contraction.

Again, so as to keep this paper short, know this: the body's top half gets its own Fire-Air-Water-Earth top down order. In a strange but reasonable way, the body seems to use this foursome pattern starting both at the bottom with Earth, and at the top with Fire. Sensibly, the cranium with its brain of nerve tissue would be a Fire center; the airy sinuses and pharynx of our face would be part of our Air center; the fleshy cartilage of the throat carry a lot of the weight of its Watery powers. We return to the thoracic cage with Earth and see now, this region's boney ribs in a new way – extensions of more Earth into a center. Poetically, this middle portion of us brings the two pole of the cosmos, Fire and Earth, productively together within us.

But before we segue into the greater topic at hand – body mechanics and kinetic chains – let’s quickly review the body’s four main tissue types: Bone, connective tissue, muscle and nerves. And to further note what they do functionally for us. Bones give our body physical places to anchor tissues and kinetic chains of body motion. Connective tissue not only show up as ligaments, but also as the spongy matrix that nourishes the development and function of dynamic, healthy organs, and in our discs as well. Muscles are the agent for our self-empowerment within the spatial dimensions of our lives. Nerves generate unity, order and organization within every discreet body part, “chakra region”, and throughout the whole of the body.

Each Axis Has a Physiological Function, a Power

According to this model, motions put into a particular principle’s axis help strengthen the physiology of the body tissue related to it. As we begin analyzing this notion, let us look at the kinetic chain oriented to the most primitive of these axes: Water’s x-axis chain.

To appreciate the Water Principle’s power working in the x-axis, let’s return to the primitive amoeba as our starting point. Amoeba receive their nutrients as the passive diffusion of water brought in nutrients from the seas. We saw earlier how in this undifferentiated watery environment, every axis to the amoeba functioned as an x-axis – where this water motion was very present.

As life got bigger, canals formed to guide those nutrient-filled waters to its many cells. As it got bigger yet, a digestive system evolved to draw nutrients out from the foods brought into itself with that water; an immune system developed to keep those waters clean of parasites; kidneys to keep those internal waters osmotically balanced; a heart for pumping what came to be nutrient-filled blood. Life eventually came onto land and the easy inflow of oxygen dissolved in water required lungs to draw it in. Here’s the point: all our visceral organs are an embellishment of the Water Principle. They are all working to connect cells to their biological needs.

The x-axis of life, and of our own body, resonates with the Water Principle’s nutrient-giving, life-positive function. On the *local level* of the body – where each of our cells lives – blood pressure is very low. The reason why walking (and exercise in general) is valuable to a body is because motion is generated in this x-axis with each right, then left stride of our legs and its concurrent shoulder-arm motions. These motions do much to move nutrients into the local environments of a body. This has become more recognized by researchers, which is why people are told to get up and walk around the office every half hour or so.

While kinetic chains are constantly involved in all our right and left sided motions, overlaid onto them is the y-axis of the Air Principle. This kinetic chain can be thought of as the most important one; it rules this whole Air Principle portion of our human condition – the whole of that three dimensional space through which our muscles move us. And in fact, the y-axis kinetic chain is the one that requires the most muscular empowerment to overcome gravity for our bipedal body. Our strongest muscles are oriented to work in kinetic chains involving this y-axis. It seems fair to suggest that the robustness of a body region is increased when its own y-axis muscles are activated.

The back-to-front z-axis would, accordingly, be Fire’s axis. We saw how the Fire Principle whether as the sun or as our nerves, acts to create higher level order. This order is generally oriented in a back-to-front way. For example we walk and do many of the tasks of our life in the context of this

forward going positive z-axis. The sun's light goes forward, its own order-empowering energetics is photosynthesized by plants as it continues moving forward through time.

This model suggests that all principle-strengthening kinetic chains can be tapped into therapeutically by moving in specific ways. In this case, slowly done z-axis lunge-like maneuvers help a body region to become more organized, including through improved neurovascular order being generated in local tissues, and as a healthy lordotic order reinforced in our neck and lower back.

It's fair to say that the evolution of these x, y and z-axis kinetic chains have been occurring since our hominid time began, requiring two feet to make such matters work. Because of this, the feet are amazingly important in these kinetic chains.

The Foot Template

As far as the feet, this model suggests that significant fundamental and base truths of the body get shown to us in the solid reality of bones. Bones as they present themselves to us, have been slowly evolving, molded to an anatomy that fits the bill. Because the feet are at the bottom of all those kinetic chains, what we see at this lowest of the body's horizontal levels is how the body has evolved a successful way of channeling and balancing a set of biomechanical forces-cosmic principles as it moves in an empowered way through space.

As we understand their actions in the feet, we will find that the pattern they create at their foot-level help us to identify how these principles work on each of the body's horizontal levels, its transverse planes. These horizontal levels make up all parts of our vertical (y-axis oriented) body. While there are sagittal planes and frontal planes, it is within these more *undifferentiated* (right:left/medial:lateral composed) transverse planes that the distinct regions of the body find their base of operation.

It's useful to add that the nature of the feet offer us an easier way to notice the body's transverse plane template because they have very little vertical height. The consequence of this is that the full functionality of each foot is squeezed down into its short but stout anatomy.

With each foot being a distinct and unified set of bones, if there is a pattern that is present in each of the body's transverse levels, by looking at the foot's very discreet unified anatomy we might find ourselves better able to recognize any such body-spanning pattern.

This model proposes that once we understand this template, if we are doctors we can apply that template for therapeutic gain at problematic body levels of our patients.

To begin our cracking of the *four element kinetic chain* code, we will look to the lowest of the four principles, *Earth*. And so let us ask: if there were an Earth portion of the feet, which of its four transverse plane sides would it be?

To get there, consider this: in our holistic model, patterns repeat over and over again (like the interference patterns within a holographic film). In this broad holistic context, notice that while we saw our bones expressing the Earth element, might there be a location or region of our skeletal system where Earth expresses itself most strongly? Clearly our feet would be it – whether due to the density of bone tissue making up its transverse plane, or that it's at the Earth-bottom part of us.

Because holism reminds us that patterns keep repeating, we can go further yet and imagine that within each foot, the heel is where that Earth Principle's power is even more focused and concentrated. This localization of Earth there brings forth the power of each heel – conveyed as something important with the term “heel strike” as an important part of our human gait. For a variety of biomechanical reasons, including the fact that they are more directly under our spinal column, our heels are especially useful in their ability to transfer (and ground out) body-generated forces to the greater earth below them.

Each body region has its Earth side

With this logical construct for the heel being the “Earth-side” of the foot, we are given the first portion of our horizontal planes' four-sided code. Once you understand the four parts to this code it will make sense, natural sense, to extend this bit of knowledge to appreciate that *the backside of each transverse level* of the body is where the Earth Principle is operating strongest within that body plane.

The backside of the pelvis – especially at its ischial tuberosities would be the Earth of that region. Moving up from the pelvis we have the squat (earthy) bones of our spinal column on the tall backside of our abdomen and chest and throat. The flat backside of our shoulder blades, the wide transverse process of atlas, and the occipital bone on the backside of the skull are similarly hypothesized in this model to be places where Earth as a principle is meant to operate, and to be strong for the purposes of its level of the body.

As suggested earlier, each principle gives something of itself for building a particular tissue of the body as well as for the “dimensionalizing” of space. Ultimately, according to this model, each is also meant to be a life-positive force meaning that it induces physiological processes that help the larger body to stay healthy and resilient.

Earth's life-positive force works through our bones. Beyond being embodied in us as bone, this model points out that *alignment* of body tissue is an important part of what Earth (as a principle) gives to a region. A body region's backside serves somewhat as a primitive pulley's wooden wheel, with its rope pulled back and down to the feet below. Tissues forward in that transverse body plane are drawn back in the process, aligning them toward the back; ultimately improving their functionality.

This Earth component of health – the positive affect of skeletal structure in good alignment – is generally very underappreciated. Still, we can sense that what begins as proper skeletal alignment (toward the backside) carries over into good posture. Something intuitively tells us that this backward-pulling of a body toward good posture is valuable for humans to have.

This model suggests further that we can find Earth doing its job on the smallest of body levels as the *cytoskeletal* fibers which give important internal physical structure to each cell. We will come back to this later when we discuss the possibility of using this model to come up with new ways of lowering the level of tau proteins and amyloid plaques in the brains of Alzheimer's patients, which come from a breakdown in these cytoskeletal fibers.

On a molecular level, a future paper will speculate on how these principles are expressed in the organic chemistries of life. For example, protein has Earth's physicality force strong in it (as does

carbon in general). Proteins are the building block “earthy” parts of a cell. With that said, in the inter-twining holistic nature of it all, collagen and elastin could be seen as the proteins in connective tissue fibers, which are “Water Principle-framed”, meaning these proteins work with Water’s connective force behind them. That said, it should be noted that the body’s mesenteric fibers act as connective tissues in maintaining organ health as they help pull our organs in this Earth-directed, *toward-the-back-side*, way.

Musculoskeletal: Air and Earth

It’s worth noting that as far as the kinetic chain analysis of the body, we deal most intensely with the muscles and bones of the body (as opposed to its connective tissue and nerves of Water and Fire). This leads us to the realization that the musculoskeletal system in this model is an Air-Earth system.

With that said, let us visualize what happens when we move from the three dimensions of a body to one where it is horizontal in two dimensions, *transversely flat*. Imagine here that the Air Principle’s height-giving y-axis had been a vertical pole that collapsed. The higher portions now becoming *laterally* present. In this collapse, the base of the pole should be seen as functioning as the origin of the x-axis and the previous higher y-axis values seen as larger |x-axis| values.

Resonant to the collapse of the y-axis as described above – with the horizontal translation of its energetics into the transverse plane – this model suggests that the *outer sides* of a body region are where the Air Principle is strongest. From this we might intuit that from those outer, or lateral sides the muscular self-empowerment force of Air is especially strong in us.

Picture all that “elbowroom-oomph” created by jumping jacks, generated at that outer side of the body. And those birds – filled with Air element power – their wings are at the ready, on their own outer sides as well.

Chinese medicine calls this Air energy “chi”. Every cell of the body needs its chi – its elbowroom – to be empowered. Without this chi, without a requisite amount of elbowroom, an entity cannot function well; the outer world, in a sense, collapses in upon it. The phrase, “pulling oneself up by your bootstraps” is expressive of the Air Principle being turned into a chi-generating, muscle-building life-positive force. Arguably, we have greater resiliency against the stressors of our life when we have an abundance of this elbowroom vigor.

Pertinent to our kinetic chain analysis, it’s worth noting that it takes muscular oomph to channel kinetic forces *away* from the medial side of the body and into the outer Air side of it. Put another way, if we were to become weak and collapse downward we tend to collapse *inwardly* – into our *medial* knees and ankles.

Here’s the practical biomechanical upshot: muscular robustness of a body level is increased when the forces generated by that exercise or movement are rooted down into those outer, Air sides of the feet. An easy to learn exercise that helps in this way will be discussed shortly.

Now that we’ve got the two most important kinetic chains configured into a body portion, let’s look at the remaining two: Water and Fire. As we move in this direction, let’s start investigating the physical shape different principles might take. While Earth lends itself toward making things flat and hard (think flat, squat-like vertebrae), Water pushes things to be curvaceous, fleshy and soft.

Evidence of the Water Principle at work shows up in parts of us that are shaped likewise. In the foot we see those curved arches at the inner sides of each foot. As far as water's fleshiness in the feet, consider our big toes. Our big toes, like our arches, define our foot's medial side. Within the whole of the body, the kidney meridian of acupuncture travels up its anterior medial side. The bladder meridian travels up the spine just right and left of center. These close-to-center places are expressive of where the x-axis begins. This model suggests that it is just right and left of the x-axis' 0 point origin that the power of the Water Principle is strongest.

A point to be made here is that there is a medial side to each transverse level of the body (beyond just the ones made more evident by our two legs and feet – with its *medial* knees and *medial* ankles). Our sex organs, bladder, spinal discs, the two lobes of the thyroid and our tongue are positioned in a region's more medial locations. This model suggests these are places that are naturally strong with the Water force of Nature.

The last side of the foot's transverse plane is its forward side. We saw earlier that like the sun's rays, the Fire Principle's vector in this model is the positive z-axis direction. Most creatures move forwardly in this z-axis vector, and in so doing, tap into the power of the Fire Principle. This forward-focused motion organizes the action of muscles; even as birds muscularly flap those wings on their *outside* for vertical lift, they are flying *forwardly*.

Kinetic chain-wise, we can note that there is a lot of Fire Principle force in our quadriceps and psoas muscle activities. Further, the forward head-shoulder postures that we often see in runners (and cyclists) comes from this Fire kinetic chain not being balanced by the Earth Principle's kinetic chains.

ADDED FOR SORSI:

Let us look at the cranium with this four element code in mind, perhaps seeing where it fits into DeJarnette's cranial model. Here it is worth mentioning that just as musculoskeletal related the Air and Earth systems, the cranium helps us see the unity of Fire and Water body systems. De Jarnette appreciated this with his focus on the CSF, which is a nutritive Water element agent within Fire's nervous system. More broadly in the body, this Fire-Water confluence creates the power of the neurovascular.

The Holistic Biomechanics Model broadens out the context for flow of DeJarnette's choroid produced, ventricle filled, vitality agent for the brain - its CSF. According to this model, the somewhat primitive CSF pumping system has the task of drawing the power of Water into the brain. According to HBM, Water connects cells to their biological needs, nourishment in particular.

Each principle is emboldened to work in one of the four transverse sides of each half of the body. The medial nature of the parietal bones, with the sagittal suture between them, relate to the Water Principle. They are the continuation of the medial location of our most water-strong toe, the big toe; While Earth like flat, Water generates curves as in the medial arches of our foot; Water's power is strong in the medially placed kidney and bladder acupuncture channels.

The lateral ventricles lie deep to this area. We will find that motions put into the x-axis helps these ventricles to better pump their CSF.

The following are some clinical applications of Four Element Holistic Biomechanics.

1. Walking: Tell your patients to avoid thick, soft-heeled shoes. After explaining about the power of the Earth Principle, I tell my patients that humans evolved in part as we engaged the hard ground with our heels – apes and other primates do not use the heels so significantly, relying more on their forward foot parts. A good heel strike continues to be important, but has been denigrated by our wonton tendencies to wear soft shoes. While hard leather sandals and shoes were generally the staple for human feet when our predecessors were not barefoot, our feet today are generally engaging soft bottoms. Our modern way of shoe-wearing can almost be seen as an experiment to see how little of the Earth Principle we can get into our lives and still function reasonably well. The thicker a soft sole and heel is, the more these forces are dampened out.

A hard well-grounded heel helps on a variety of levels. It creates increased proprioception and body awareness that the neuromuscular system uses to its advantage. In a related way it gives the bones of the body a discreet, singular granular place to align themselves. Interestingly as well, it generates piezo-electric currents that travel up the bones to increase bone density. I like to tell my patients (especially women who worry about osteoporosis) that there is some poetry here in the sense that when the Earth within us (our heel) engages the greater Earth below us (the ground), the life-positive power of Earth is translated (as piezo-electricity currents) into our body; our own Earth becomes stronger, meaning our bones become denser.

There is reason to think that the power of Earth goes further than just making bones stronger and more sturdy. This lack of Earth force into our lives as we moved away from barefoot or traditional leather sole and heel shoes to soft synthetics has softened us (as Water will tend to do). We are becoming softer, less sturdy as individuals. Perhaps fibromyalgia, anxiety, cancer and Alzheimer's have a relation to this lack of Earth Principle operating in our lives. As mentioned earlier, the telltale tau amyloid plaque found in the brains of Alzheimer's patients is the breakdown in the structural *cytoskeletal* tubulins of neurons.

2. Posture: I find that sharing this information about there being an Earth side of the body gives my patients a greater sense of the how and the why for maintaining good posture. I tell them that every level of the body does best when its own backside is muscularly drawn backwardly. Bad posture comes as we collapse forward, good posture comes as we *align ourselves to the back*, or Earth side, is an easy concept for most to understand.

3. Exercise/Staying active: It is almost always hard to motivate our patients to be physically active. Many of my patients can pick up on the idea that muscles are how we “pull ourselves up by our bootstraps”. Positive changes in their own musculoskeletal health are revved up after I give them an exercise that focuses on their Air side’s kinetic chain. Here I have them bend their two elbows and put their two thumbs behind each side’s acromial process, creating “two wings”.

I tell them to put on some music and elevate each wing on alternative beats. I often recommend keeping both arms above the horizontal. As the right arm’s wing rises higher, its Air muscle (the deltoid) is activated; the right foot’s Air (or lateral) side concurrently pressed beat-wise actively into the ground. Bouncing gently with bilateral beat-focused knee flexions (the Air joint of the leg) helps. Doing this for the length of a song or two does much to improve the muscular robustness of the body – which is a good idea for most people today.

In conclusion, the holistic four element biomechanical model presents a way to appreciate, better use, and even heal our human body. It’s a model set in terms of a foursome of cosmos-spanning principles that nature helps us to both recognize and understand. This holistic model blends science’s yearn for the truth with the Ancients’ four element concept of *principles*, which they saw as propping up each level of the cosmos, including nature and our human body.

If this holistic model interest you, there is a paper, *An Elegant Universe: Appreciating the Holistic Pattern that Unifies the Cosmos* that you might enjoy, available at Academia.edu:
https://www.academia.edu/26239151/An_Elegant_Universe_Appreciating_the_Holistic_Pattern_that_Unifies_the_Cosmos

I enjoy feedback regarding either of these papers; you can email me at drwalsdorf@gmail.com.
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