Paradigms

"Believing is seeing" is a way to describe paradigm, not "Seeing is believing". Thomas Kuhn coined the term "paradigm' to refer to the beliefs and assumptions from which one operates. We convince ourselves that our paradigm is "correct" because we interpret all evidence according to this particular point of view. An easy example is the paradigm that the earth was the center of the universe. In the middle ages when the sun was setting, people believed they were witnessing proof positive that the sun was moving below our horizon in the sun's rotation around the earth [geocentric paradigm]. The well established geocentric assumption influenced perception, the interpretation of the sensation. People "saw" of course the sun orbiting around the earth, as it lowered over the horizon at sunset. A paradigm shift is when belief systems change.

In the sixteen century, Copernicus proposed the heliocentric paradigm [earth revolving around the sun]. He said the appearance of the setting sun was the illusion caused by the movement of the observer. Being a clergyman, Copernicus knew his theory was against church doctrine. He kept it to himself until his dying days. The first copy of his book, *On the Revolutions of Celestial Spheres*, arrived to him on the day he died. The Church did ban this book, placing it on the papal index of forbidden books. In 1609 Galileo found convincing evidence of Copernican ideas with his invention, the telescope. After Galileo published his findings, the Pope demanded Galileo retract this "heretical idea." Realizing the Giordano Bruno was burned at the stake years earlier for supporting Copernicus, Galileo wisely agreed the Pope's demand. Yet in 1632 Galileo published *Dialogue*, defending the Copernician theory. He was placed under house arrest to the day he died.

Meanwhile Kepler explained the orbital movements of the earth with the help of Tycho Brache's accurate astronomical data. Seventy years later, Isaac Newton proved mathematically the heliotrophic model proposed 150 years earlier by Copernicus. The world took this long to come to a paradigm shift from geocentrism to heliocentrism.

Max Planck said long ago, "A new scientific truth does not triumph by convincing its components and making them see the light, but rather because its opponents eventually die."

Rene Descartes, a brilliant mathematician and philosopher, caused another paradigm shift into materialism. He believed in scientific truth, that "all science is certain, evident knowledge." This certainty was mathematical in its essential nature. He believed in radical doubt, his method was analytic. These are the characteristic of modern day science. His famous "Cogito, ergo sum" ["I think; therefore, I exist"] reinforced the concept of dualism [separation of mind and body/matter]. He believed that the material universe was nothing but a machine, following mechanical laws. He concluded that scientific knowledge could be used to "render ourselves the fathers and possessors of nature." Descartes extended this mechanistic view of matter to living organisms. Descartes had a profound effect on Western thought. We have ever since viewed our mind, our ego as isolated, existing inside our body.

Isaac Newton completed the Descartes's scientific revolution. Newtonian physics provided a consistent mathematical view of the world. This remained the foundation of scientific thought from the seventeenth century well into the twentieth century. Newton combined the work of Kepler and Galileo to formulate the general laws of motion, governing everything from rocks to planets. The Newtonian universe was one very large mechanical system, operating according to his precise mathematical laws.

Newton was able to combine Bacon's empirical, inductive method and Descartes's rational, deductive method. Newton knew that neither experiments without systematic interpretation nor deduction without experimental evidence was sufficient. But together, Newtonian methodology would be the basis of natural science to this day.

However, Albert Einstein rocked the scientific world in 1905. Einstein believed in nature's inherent harmony. It was his life's work to find a unifying theory in physics. His special theory of relativity proposed that time and space measurements were relative. Peter Russell explains that, if someone was traveling 87% of the speed of light past an observer, that observer would measure that someone's clock running half the speed of the observers. Likewise, the measurements of lengthen in that someone's universe would have shrunk to half of the observer's measurements. This is in contrast to an the Newtonian absolute time and three-dimensional space independent of material objects, that the space contains. The Newtonian universe looked at time, as well, as absolute and flowing at an even rate. Einstein intuited that measurements in space or time depended on the position or velocity of the observer. He further intuited that mass is nothing more than a form of energy, as succinctly described in his famous "E=mc2".

Einstein initiated a new way to look to look at electromagnetic radiation, which was to become quantum theory. In the 1920s, an international group of physicists collaborated to look at the subatomic world. They realized that subatomic particles had dual nature. Light would behave like a particle when looked at as particles [quanta or photons]. And they found that the subatomic units behaved like a wave when they looked for the wave qualities of the subatomic units. This is seen as a paradox, when we look at nature from Newton's paradigm. At the subatomic level, matter does not exist with certainty, but rather shows a tendency to exist. As well, atomic events do not occur with certainty at a definite time, but rather show a tendency to occur. This is why particles can be a wave at the same time. There are no real three-dimensional waves, like water or sound waves. These are probability waves, not of "things", but of "interconnections". These scientists realized that there are no basic building blocks in nature, but rather a complicated web of relations between various parts of the whole.

The Newtonian objective description of matter was no longer valid. The properties of an atomic object can only be understood in its interaction with the observer. This means their distinction between "I' and the "world", between the observer and the observed, cannot be made when dealing with atomic matter.

Many Eastern traditions have agreed with this notion of non-duality. Just like the quantum physicist, Eastern practitioners believe that we are not separate, but part of the whole of life, a fabric of interrelatedness, interwoven as one. It is just that we perceive ourselves as separate, given the prevailing paradigm of materialism. Eastern traditions believe this separateness is an illusion. Through contemplative practices, such as meditation, one can peek beyond the veil of illusion into reality. This difficult pursuit delves into the areas of our minds, self, ego, consciousness, energy, as they relate to our body and the world.

Western Medicine has adopted the Newtonian-reductionistic-materialistic paradigm to modern biology. Louis Pasteur contributed to medicine with the doctrine that specific diseases are caused by specific microbes. His germ theory of disease fit well with the view that the body as a machine can have a breakdown traced back to the malfunctioning of a single mechanism. Today the science of cellular and molecular biology is the foundation of medicine. The doctor intervenes with medication or surgery to correct the malfunction of a particular mechanism. The science of chemistry has been very successful in many areas of medicine, as exemplified by penicillin in the 1950s. Consequently, medical research has looked for other chemical "silver bullets" for present day diseases such as cancer, heart disease, and AIDS. But USA's ranking of 37th by the World Health Organization in terms our incidence and mortality rates of these diseases shows how unsuccessful we have been.

Louis Pasteur admitted on his death bed that he emphasized the wrong thing. Rather, "the terrain not the germ" was important in the treatment of disease. He meant that the body, the terrain, as a whole with all of its marvelous defense mechanisms, needed to be optimized. Microbes are always within our bodies, and our environment. This holistic paradigm believes that people with inefficient immunity systems fall prey to these germs. Medicine could look at a person as a whole, not look for some

specific chemical "silver bullet" to destroy some specific germ "invading" our body. It seems that Pasteur had shifted at the time of his death from the Newtonian-reductionistic-materialistic to the Einstein-holistic paradigm.

There are many disciplines that are working within the Einstein-holistic paradigm to work with one's body-mind-spirit as a whole, to optimize its defense mechanisms so they can protect us against germs, cancerous cells, chemical and electromagnetic pollution. Eastern medicine has developed with this in mind for many thousands of years, exactly because of a similar paradigm. It has always viewed health and wellness directly caused by one's life-style, meaning diet, exercise, contemplative practices, energy techniques, natural healing herbs and minerals. Subtle energy disciplines such as acupuncture, shiastu, yoga, tai chi, meditation, and qi gong, have evolved over many centuries because they work. But they do not fit into the prevailing Western medicine paradigm.

Physical therapy has evolved under the same materialistic-reductionistic paradigm. Western medicine's use of physical therapy greatly increased in the 1940s and 50s out of the need to rehabilitate veterans from World War II and the victims of the polio epidemic. Physical therapists were part of the ancillary support team in fixing the "broken parts" of these soldiers. With goniometers and manual muscle tests in hand, we evaluated the parts, the muscles and soft tissue, then "treated" them. We now are skilled at mobilizing and manipulating dysfunctional joints as well as releasing soft tissue restrictions and trigger points. We have ambulation assistive devices [parallel bars, canes, walkers, orthotics, prosthetics], and we have some computerized endurance builders [treadmills, stairmasters, stationary bikes]. We put it all together under the umbrella of gross motor function.

We see our patients as having pain, strong or weak muscles, soft tissue restrictions, and joints that are either struck, sticky, or just do not slide or glide very well. We still look at the parts, treat the parts, assuming that if the parts work better, the patient's function will improve. As with the rest of medicine, this viewpoint works well in some cases. The materialistic-reductionistic paradigm has convinced us that this methodology is always correct and the only way that makes "sense".

I had the good fortune to practice pediatric-developmental physical therapy at the start of my career in the early 1970s. The traditional training I received in PT school did not prepare me for this specialty, but my clinical affiliations did. We could not use the concept "strength" in any practical way with cerebral palsy children with spasticity and athetosis and teens with closed head injury. My training in Neurodevelopmental Therapy [NDT] was a practical approach to these patients. I later worked with adults with neuromuscular degenerative diseases [ALS, Spinal Muscular Atrophy, Multiple Sclerosis, Muscular Dystrophy]. I was fortunate to have a clinical supervisor, Susan Harryman, who made me look at the patient, not as parts making up a whole, but rather as a whole, with a quality of muscle tone, primitive reflexes, righting and equilibrium reactions. What I could offer was movement therapy. How could I facilitate these clients to use whatever awareness, tonal and balance mechanisms that they had at the moment, to position and move themselves in gravity, on the floor, at home, in school, in the community, and at work.

I remember trying to look at the neurophysiology at the time [Roberts, Matthews] to support my view of movement therapy. I remember thinking that the neurophysiologists were in a completely different world. It always was a question of practicality. I could not use their work to my patients' advantage. Their paradigm was too mechanistic to apply to my movement therapy.

What worked was a process of slowly moving patients into increasingly more challenging postural and movement activities in a variety of useful places, positions and situations. This would call on their weight-bearing, balance, and volitional movement systems to work with gradually increasing efficiency. Clients have to realize the successes and limitations of motor skills in very specific kinesthetic terms.

I applied this movement therapy to adults with neurodegenerative disease. These patients happened to have musculoskeletal pain as well. I slowly realized the inefficient posture and faulty movement pattern not only impacted gross motor function, but also caused orthopedic pain. I began to see that excessive, uneven, or repetitive mechanical stress upon the soft tissue and joints can cause inflammation, pain, and eventually structural degeneration. Normalizing movement as much as possible would lessen the abnormal mechanical stress to vulnerable structures. Then the body could begin to heal itself, when it did not have to keep playing "catch up". I believe that developing kinesthetic awareness and optimizing motor skills work on the cause of pain, dysfunction, and motor inefficiency .

In the early 1980s, I started practicing Hatha Yoga separately, while working as a physical therapist. It was not until the mid 1980s that I realized Hatha Yoga was physical therapy. My yoga teacher, John Schumacher, asked me to teach an anatomy and kinesiology course for his yoga students. It was then that I realized the subtle actions and images of yoga were the same as arthrokinematics in manual therapy, with the huge difference that the former was active and conscious, and the latter was passive and unconscious. It dawned on me how powerful the focusing on sensation and images in Hatha Yoga is to develop motor skills. It was very effective to teach my PT patients yoga in terms of the foundations of posture / movement, the center of movement, and the direction of movement. I realized that people with supposed normal nervous systems also had inefficient posture and faulty movement. Typically people were unaware of how they were perpetuating their pain and dysfunction.

Yoga could break down the movement into simple accessible developmental steps of the foundation, center, and lift. Just like the developmental paradigm of facilitating kids to sit before they stood, basic awareness of breath, lengthening limbs, and finding a neutral pelvis came first. Yoga is whole body postures and movements [asanas], that are biomechanically sound and very teachable. The therapeutic aspects of Hatha Yoga are many. First , the yogi can reduce the damaging mechanical stresses of faulty posture and movement. The more skillful posture and movement stimulates many measurable effects such as reducing tension, increasing range of motion, improving balance, promoting circulation, lessening pain, increasing endurance, and efficiency through whole body movement.

I believe that yoga is skillful, conscious movement.

I see physical therapy clients / yoga students as having specific postural or movement vulnerabilities due to repetitive, uneven, or excessive mechanical stress. The body responds with pain, inflammation, soft tissue microtears, muscle guarding, compensatory movement, restricted movements, joint compression, and structural changes. These, of course, result in inefficient posture and faulty movement, in other words, decreased gross motor function.

Yoga describes physical attributes with the gunas. Tamas means dull, relaxed, heavy. Rajas means tense, active, muscular. Sattva is spacious, light, energetic, the balance between tamas and rajas.

Movement behavior can be described with the gunas. Most people are tamasic in their everyday movement behaviors. They hyperextend their knees, anteriorly rotate their pelvis, overarch their lumbar spine in stance, compressing many of the joint structures. They slump sit , compressing the back of their disks. They tense their occipital ridge, and top shoulder blade muscle, chronically holding their heads forward of their dull spines. When called to "exercise", they are too muscularly tense in a rajasic quality.

A major reason for this unskillful gross motor movement is a lack of kinesthetic awareness. People tend not to be conscious of their sensation; therefore, unable to interpret sensation There are intense sensations that are appropriate and therapeutic and then there are subtle sensations that are signals of the beginning of inflammation and injury. Our culture is very visual, with our attention pulled out of our bodies into our highly stimulating environment. Yoga can redirect someone back into their body.

People need to take responsibility for their musclo-skeletal predicament. They have to realize how they are perpetuating their condition. Initially I ask them what activities and movements make their symptoms worse, what makes them better. Depending on one's specific vulnerabilities, I believe everyone has movements that are relieving, and those that are provocative. I believe that provocative movements, done poorly, will injure someone, whereas provocative movements done well, facilitate healing. Both relieving movement and good quality provocative movement raises one's threshold to handle all movement. It stands to reason that if people stop inflaming and injuring themselves, then their body can process the current inflammatory state, raising their threshold to all future mechanical stresses.

To me, skill of movement demands a foundation of grounding or rooting in the earth, from a neutral center, that moves as well in upright or the intended direction of momentum. This demands an awareness of sensation for monitoring, clear mental images of the movement for intention, and conscious breathing. In stance for example, skill is moving energy from the center outward down through the legs through the feet in the earth [grounding], controlling the center towards neutral, so to lift from the root [in between the sit bones] through the centers up through and beyond the crown of head.

Yoga is not just the arbitrary time spent practicing on your mat, but conscious, skillful movement throughout the day.

Stan Andrzejewski