

Myoskeletal ... Machinery of Life?

By Erik Dalton, PhD

The human body is not a machine; indeed, it is very plastic. This plasticity is what gives a dancer grace and an athlete power of movement. Like a machine, however, the body is comprised of many parts - each working for the benefit of the others.

Smooth functioning of each part is required for the optimal efficiency and well-being of the entire organism. Proper functioning requires structural balance of all myoskeletal tissues forming from the mesoderm: ligaments, fasciae, muscles, joint capsules, intervertebral discs, bones, etc. This article discusses the mysterious beauty of the body's self-regulatory mechanisms and the reciprocal nature of structure and function.

Self-Regulatory Mechanisms

For the body to sail smoothly through life, it must have a way of repairing, regulating and protecting itself. Unlike a machine, the human body has self-regulatory mechanisms that allow it to adjust to environmental stresses while maintaining homeostasis in all systems: myofascial, skeletal, nervous, circulatory, endocrine, etc. These mechanisms attempt to keep the body in balance regardless of what works upon it or what happens around it; thus, the human body has built-in devices to protect it from disease and other outside forces that may jeopardize its health. It has the ability to produce specific antibodies after exposure to an antigen through a process called active immunity. Through complex interactions, the body is able to detoxify ingested, absorbed, inhaled or injected drugs, and foreign substances. Likewise, when physical injury occurs, local myofascial structures tighten (protective muscle spasm) allowing the body to compensate and continue on its journey safely, healthfully and productively. Regrettably, the compensations often spread and are soon reflected in every step we take.

Innate Intelligence

So, the body is not a machine. It is a dynamic mechanism capable of continually repairing and replacing worn-out and injured cells. It works to heal dysfunctional joints and soft tissues, including visceral structures. D.D. Palmer, the father of chiropractic, once noted, "the body is always working toward order" in a process guided by an underlying "innate intelligence." Through years of acute observation, many manual therapists have become aware of this innate intelligence and learned to view the body itself as the primary healer, offering their hands and skills only as tools to assist the process.

From this perspective, the therapist's job - and ultimate intent - should be simply to guide the healing process. There is no need to control the process or force one's will upon it. Albert Einstein offers a beautiful summation, "All means prove a blunt instrument if they have not behind them a living spirit."

Structure and Function

An important guideline for all manual therapists specializing in pain management is to develop a basic understanding of the reciprocal interrelationship between structure and function. Simply stated, structure affects function; function affects structure. It is not necessary to look very deeply to see that functional demands require specific structures. A jet is cumbersome on the ground, and the wheelbarrow was not designed to fly. For the jet to function in the air, it needs wings, navigational instruments, rudders, and the like. Yet having that structure makes it perfectly suited for the function of flying, so structure also determines function.

The body's myoskeletal system was not designed to simply lug around 30 feet of intestines, 60 miles of blood vessels, the heart, lungs, sex organs, etc. It exists so people can accomplish tasks and effectively communicate physically and emotionally. The myoskeletal system should therefore be considered a major part of the "machinery of life." With this understanding, it can be said that there are neurological as well as myoskeletal components present in every dysfunction or disease, although all aspects may not be immediately obvious (e.g., with such conditions as fibromyalgia, chronic fatigue syndrome or visceral disorders). In fact, prolonged myoskeletal dysfunction will eventually "burn" a memory pattern within the central nervous system so that even after the initial irritating myoskeletal obstruction is removed, the original symptoms continue and may actually grow in severity.

When working from a structural model, the trained manual therapist is often able to identify and treat dysfunction in patients who have no symptoms and by some standards would be considered healthy; this is done by identifying strain patterns before they become pain patterns.

Structure and Function: The Relation to Gravity

When studying human structure, it becomes apparent that structure and function of the musculoligamentous system are particularly influenced by, and responsible for, static and dynamic postural alignment. Postural (tonic) muscles are structurally designed to resist fatigue and function in the presence of prolonged gravitational exposure, such as standing upright. When their capacity to resist stress is overwhelmed, tonic muscles become irritable, tight, and often shortened; through reciprocal innervation, their antagonists become weak and inhibited. As typically weak muscles, such as rectus abdominis, gluteals, deep neck flexors, and lower shoulder stabilizers, begin to lose the battle with gravity, weight is transferred to deep ligamentous and bony myoskeletal structures. The antigravity function of the body's myofascial system is lost.

This persistent gravitational loading ultimately results in the formation of predictable asymmetrical postural patterns in the neuromyoskeletal system. Dr. Ida Rolf made this relationship of structural alignment to gravity one of the keynotes of Rolfing, and it remains a definitive feature of all forms of structural integration.

A person's posture (structure) has much to do with the ability to perform efficiently. When the viscoelastic deformation properties of muscle are unable to resist postural stresses, predictable pathophysiologic changes occur. These changes are both functional and structural. The elastic component represents the transient functional change in connective-tissue length, occurring in response to stressors such as forward-head postures (i.e. Dowager's humps). The viscous component, on the other hand, is responsible for the more permanent deformation of connective tissue that occurs with static, long-term postural change as witnessed in the scoliotic population.

Musculoligamentous structures are easily recognized in clients exposed to prolonged gravitational stress. Symptoms arising from these common myofascial strain patterns have certain associated palpable characteristics that include the following:

- Hyper/hypo mobility
- Edema or bogginess
- Myofascial trigger points
- Muscle Spasm
- Muscle testing weakness
- Recurrent myotomal and sclerotomal pain patterns.

Eventually, prolonged postural stress leads to predictable functional changes, such as a loss of flexibility, shallow breathing patterns, chronic fatigue, and digestive or hormonal disorders.

Therapists must learn to identify the subtle palpable changes and postural-pattern clues when assessing for neck, back and extremity pain. As myofascial structures undergo sustained changes in length and strength, new collagen realigns the connective tissues in response to vectors of stress. Often this process perpetuates postural problems by amplifying the biomechanical stress of gravity. Although these postural patterns are compensated, without proper manual therapy and home retraining exercises, they can easily de-compensate and quickly manifest as primary pain-generators.

Conclusion

Manual therapists often filter the results of the client's history, palpatory findings, and all other pertinent tests through a philosophic lens formed via the scientific scope of basic science and clinical experience. Impaired or altered function of the neuromyoskeletal system leads to stress and pain which may alter performance of internal organs, the hormonal system, and psychoimmunological functions. Fortunately, the body is not a machine and possesses the innate ability to heal - with a little help from friendly hands.

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