Osteopathy from a VASCULAR and FASCIAL prospective!

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Objectives:

- Attendees will learn about a more expended osteopathic model in relationship to joint mechanics.
- They will also learn about new manual therapy techniques that utilize innate rhythms of the body to optimize vascular and lymphatic flow.

As we addressed in our previous lecture, the founder of osteopathy, Andrew Stills, D.O., concluded that the **unity of function** of the body depends on the circulatory system, the nervous system and the fascia. If we only look at the body as a *mechanical* unit, we will miss many aspects of its design and function as a whole. But to understand this broader picture, we have to review our basic protection hierarchy to understand what happens when an injury occurs. The body protects itself in the following order (the most important systems are first):

1. Vascular system (arterial/venous), Lymphatic system and Fascia
2. Central, Peripheral and Autonomic Nervous system
3. Organs (visceral motility)
4. Endocrine system
5. Musculoskeletal system

When an injury occurs to the body, there is a **three-dimensional** impact on the surrounding tissues, especially to the vascular and neurological structures in the area that was injured. Protection of the vascular and neurological system is the highest priority of the protection hierarchy, but these systems are often significantly altered in an injury nonetheless.

Because of these alterations, you will see joint or soft tissue restrictions in that area because of loss of the ***glide/slide mechanics*** in the damaged tissues. The area of greatest abnormality in the affected tissues and their associated rhythms is called the **epicenter** of the impact of the injury. The injury's affect on the tissues surrounding the epicenter steadily diminishes in three dimensions, like the waves radiating out from a rock thrown into a pond of water.

As a result, there will be ***three dimensional vascular stagnation***, or *hemostasis,* that develops in the affected arteries, capillaries and veins. The fluid or pressure dynamics in that area will be altered, and tension on the surrounding tissues will build up. The rhythms of the involved tissues will be altered as well, and the body will to start to compensate for the altered pressures and restricted fluid flow. These alterations of flow may occur in the cerebrospinal, lymphatic, vascular, and/or interstitial fluid systems of the body.

The *greatest* stagnation generally occurs in the venous flow; the venous "blue print" of the body is thus altered by the injury. If there is stagnation of venous flow, there may also be an indirect reduction of the arterial flow within that area; as a consequence, tissue healing is likely to be impaired in that area. The tensegrity (the balance between compression and tensile forces) of the involved restricted tissues may be diminished, as well as the mobility and motility of the affected tissues.

No Stasis = Function, while *Hemostasis = Dysfunction*

Blood Vessel Anatomy and Physiology

One classical principle of osteopathy states that a healthy state of the body exists as long as there is normal flow of body fluids (e.g., blood, lymph, interstitial, synovial,

and cerebrospinal). This dynamic interplay of fluid pressures is regulated by the central and autonomic nervous systems. The autonomic nervous system (ANS) affects fluid dynamics in part through affecting the tone and diameter of the blood vessel walls.

Looking at the anatomy of a blood vessel. The walls of arteries and veins have three specific layers from inside to outside:

- ***Tunica intima*** – a single layer of epithelial cells with an inner elastic membrane
- ***Tunica media*** – a mixture of elastic tissue and smooth muscle; thickest layer in arteries
- ***Tunica adventitia*** – comprised mainly of collagen (fascia) with an external elastic lamina, as well as nerves, larger vessels have small nutrient capillaries (vasa vasorum); it is the thickest layer in veins

One of the functions of the vascular elastic tissue is to *absorb* and *store* the kinetic energy of the moving blood. The elastic layer of the vascular tissue, the tunica adventitia, also helps in providing *proprioception* and *protection* against stretching forces. This outer layer, the fascia of the blood vessel is also responsible for transporting mechanical information (tension/compression) through the whole vascular system. This informational system is very fast and conducts with the speed of sound. Arteries and veins are innervated by the sympathetic nervous system (SNS), providing both motor and sensory innervation. The vasomotor nerves control the luminal diameter of the vessels, and subsequently controlling peripheral resistance. The afferent fibers are concerned with local and general vascular reflexes. Some parts of the nerve endings in the blood vessel walls are sensitive to *pressure*, *stretch* or *chemical* stimuli!

Blood Vessel Wall Dysfunctions

Blood vessels are especially sensitive to rapid distraction or compression forces, responding with a ***vaso-constrictive*** mode of the elastic membranes of the three tunicae. These hyperactive reflex responses of the tunicae may create stagnation in the blood flow of the surrounding tissues, e.g., in joints or viscera in or connected with the affected area.

We referred to this simplistic but useful model of the two major functions of muscles in our last lecture: **Muscles are MOVERS, or muscles are PROTECTORS**! Their *primary* function is to contract and move two or multiple bones, and then relax. But, if a muscle is contracted and not moving anything (in spasm), the muscle is protecting around something! We have to find out what structure the muscle is protecting around. To do so, you follow the hierarchy model, starting with the vascular system and working your way down to the musculoskeletal system, examining each area for restrictions of normal movement (glide/slide and/or motility). Once you have figured out what structures the muscle(s) is/are protecting around, you use the most appropriate technique that you know to treat the problem.

We recognize four different acute/chronic **Blood Vessel Wall Dysfunctions**:

- Traumatic injuries – compression and/or traction on blood vessels
- Chemical/Nutritional/Poisons/Radiation – creates a local or global vasculitis
- Sympathetic Overdrive/Shock
- Neurological irritation – chronic muscle compression

Fascia

The fascia, or connective tissue matrix, should not be forgotten in this functional picture. We believe that the fascia completes the story of how the tissues in the body are working together with ***unity of function***. Fascia consists of collagen, elastin and reticulin fibers, along with the "gluey" ground substance made of proteins. This membranous tissue is everywhere in the body and envelopes all organs, blood vessels and nerves, as well as every bone and muscle. It supports, lubricates, and communicates information

across the entire body. You may see the fascia as the "*mechanical brain*" of the body, as it communicates information throughout the body through tension/compression forces, helping with mechanical and spatial organization. It transfers mechanical information with the speed of ***sound***, three times more quickly than the nervous system. So, might a vascular wall dysfunction result from vascular and/or neurological dysfunction of the fascia? Might injuries to the little blood vessels and nerves of the fascia itself, so the fascia is in a contractile, dysfunctional mode, lead to vascular wall dysfunction?

Mechanical Dysfunctions

A healthy joint in osteopathy is defined as having a "springy" end feel when the joint is moved into its normal physiological barrier to further movement. This end feel is springy because the *glide* and *slide* mechanism is supported by the joint capsule (and ligament) connective tissue/fascia (arthro-kinematics). Joint dysfunction is defined as a ***loss of glide or slide*** in the joint. When we have a strain or sprain of a joint capsule, there is an apparent mechanical joint restriction, with a *reduced* glide/slide mechanism. This dysfunction has generally been thought of as mechanical, e.g., a sub-luxated joint must be mechanically reduced. But we have found in our practice that many joint restrictions may be relieved through treatment of restrictions in the joint's vascular supply and/or disruptions of the joint's innervation. We are treating the two highest levels of the protection hierarchy of the body; such treatment frequently resolves mechanical restrictions, because they were a result of the musculoskeletal system protecting the more important structures (blood supply) of the body.

Conclusion

Might mechanical restrictions in joints may be based on *vascular restrictions* instead of mechanical dysfunctions!

Vascular Normalization Techniques (Neuro Cardio Vascular Techniques)

We are able to utilize different vascular reflexes in the body to help restore vascular flow in restricted blood vessels. For the main blood vessels restrictions in the body closest to the heart, we use the *Heart roll* reflex to open up the aorta, cranial and caudal vena cava, the pulmonary blood vessels, the subclavian and the femoral artery and vein.

During the *gait* cycle, when moving from supination (swing phase) to pronation (heel strike and stand phase) until push off, four bones in the tarsus (the talus, the calcaneus, the central tarsal bone and tarsal IV) and four bones in the carpus (the radial and ulnar carpal bones and carpal bones III and IV) make a "figure eight" through the center of these four bones in the foot or hand. In that center is located a **vascular reflex point** which can be used to help open up vascular restrictions from an injury in the extremities. It will restore, in three dimensions from the epicenter on out, the venous or arterial flow to or from the heart, and it taps into the "unique vascular blue print" of the person or animal.
These *Talo-Calcaneus* reflex, (TC reflex) and the *Radial-Ulnar* reflex, (RU reflex) may be used as a diagnostic or treatment tool.

In using the reflexes, we divide the body in **four quadrants** of vascular flow:

- ABOVE the DIAPHRAGM:
1. Use the **Right RU reflex** to influence the right side of the upper body, including the right arm, right shoulder and viscera above the diaphragm, and the cervical/cranial drainage of the right side of the head.
2. Use the **Left RU reflex** to the influence the left side of the upper body, including the left arm, shoulder and viscera above the diaphragm, and the cervical/cranial drainage of

the left side of the head.

- BELOW the DIAPHRAGM:
1. Use the **Right TC reflex** to influence the vascular flow up the right side of the caudal part of the body, including the right leg, hip, right kidney, and the viscera below the diaphragm.
2. Use the **Left TC reflex** to influence the vascular flow up the left side of the caudal part of the body, including the left leg, hip, left kidney, and the left side of the viscera below the diaphragm.

- CRANIUM:
1. Intrinsic cranial vascular flow maybe regulated by reflexes associated with either the hyoid apparatus or the inion.

Use of TC and RU Reflexes:
• Draw in the **TC or RU reflex point** with your finger and hold with gentle energetic pressure until the carpal or tarsal bones release. When they totally release, they will pick up the "Figure eight" rhythm between all four of them.

• Next, holding the reflex point drawn in with one hand, use the reflex point to scan for the **epicenter** of vascular restriction. To do this, your other hand's palm moves over the affected area until you have found the epicenter: Your hands will "connect" when you have found the correct spot – your scanning hand's palm will warm up or get stuck ("Velcro" feeling) when you have located the epicenter.
• As soon as you **energetically** connect, the carpal or tarsal bones "lock up," and the "figure eight" rhythm will disappear temporarily.
• Hold the energetic "lock" between the two areas until the two areas start to "soften" from the epicenter of the restriction on out, as well as in the four carpal or tarsal bones. This process takes approximately 30 to 60 seconds.
• The "figure eight" rhythm will come back in the reflex area, and the carpal/tarsal bones will start to articulate with each other again, as the restricted area starts to release because of relaxing of protective muscle spasms.
• At the restricted area, follow the **"vascular wave"** starting from the epicenter of the vascular restriction, three dimensionally on out, in all the different tissues, until it dissipates, and joint arthro-kinematics and/or tissue movements and tensegrity are restored.