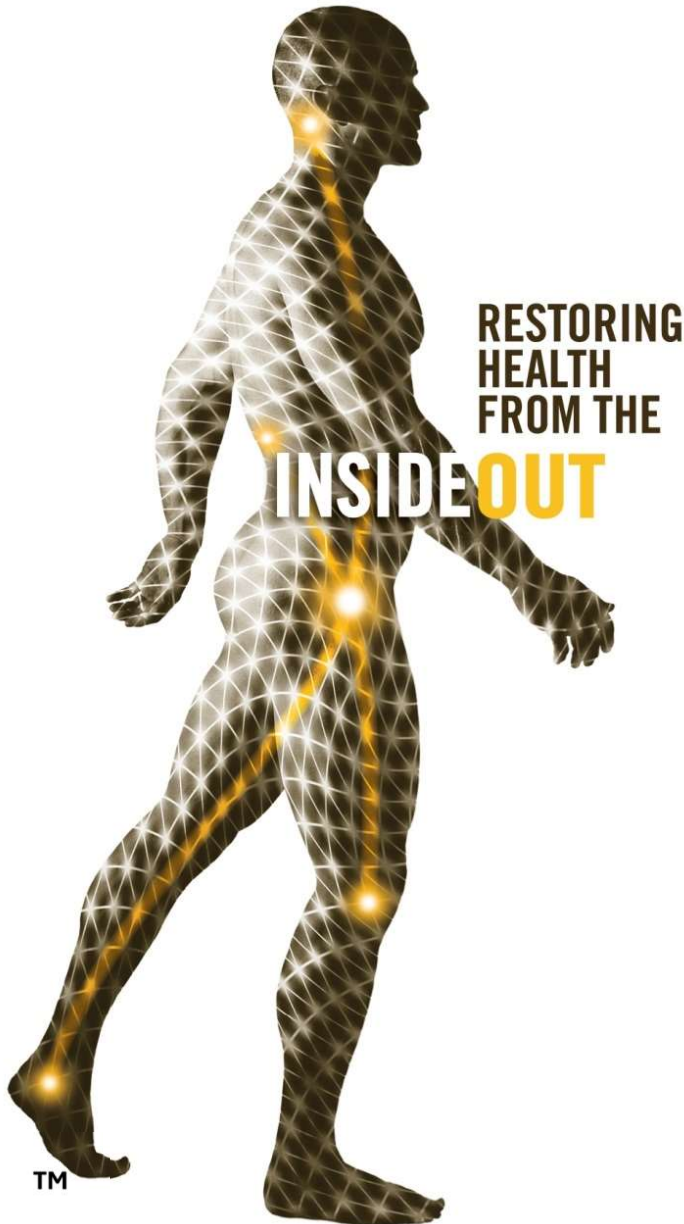




MATRIX REPATTERNING®
Advanced Therapeutic Solutions



Appendix



MATRIX INSTITUTE™
Empowerment Through Knowledge

Strategies for Success

General Tips:

- Follow the **Treatment Hierarchy** and the **Matrix Repatterning Flow Chart** to maximize effectiveness and efficiency.
- Begin treatment by combining the strongest responding primary restrictions in combination with the Treatment Hierarchy.
- **Don't be distracted** by what the client believes to be the cause of the problem, or what they were told (diagnosis). Their body will tell you where to treat first!
- Take **objective measures** before and after every session, (clients appreciate ongoing information of where they are at!)
- Perform a **full bio-electric scan** at every session, whenever possible.
- The following exceptions are structures which may not show up on the scan and **need to be vectored**: sphenoid, occ condyle, umbilical, meninges, palate, eye.
- Periodically **recheck the assessment for potential PRs**. For example, areas that are enlarged or cratered that may not have come up very strongly on your initial scan.
- Once done treating an area, allowing electrical current to flow more easily, scan the surrounding areas to check for **additional PRs which may have surfaced** (e.g. Tx to cervical spine may open up a primary in long axis of humerus).
- If 'shifting' or release during containment isn't felt within a minute, try treating another higher order PR and then go back.
- **Check the hands and feet!** Think of their size in the homunculus. Large PRs may be hiding!
- **Conditions associated with joint instability**: low back pain, knee pain and shoulder pain are very common. Besides structural injury, a common factor is instability. Demonstrate the effects of PRs on local instability, to help patients understand the importance of treating the source of the problem, which may be coming from many other areas.

Strategies for Success (continued)

Enhancing your skills at finding Primary Restrictions

- Perform a proper **Structural Assessment** (see checklist in binder) to find possible primaries and functional restrictions.
- Choose a prominent structural PR (i.e. significantly enlarged) as a **'gauge'** for determining optimal scanner strength.
- Use the **most pliable side of rib cage** to perform your scan.
- Once scanner placed, **allow a few seconds before checking the indicator.**
- You may want to ask the client to refrain from talking while you are scanning. *If you don't feel the ribcage is giving you a measurable response, try using a muscle belly such as the biceps, quads, glutes, etc.
- **Minimize electromagnetic interference:** remove or turn off devices, such as cell phones and smart watches.
- **Use the SafeZone or place a small (*neutralizing*) scanner** over the xiphoid area to compensate for electromagnetic interference.
- Check for **underwire bras**, and either advise avoiding them, or use a neutralizing scanner or the patient's hand to minimize its effect.
- **Check for hydration:** Make a habit of asking your client if they have consumed ample water – hydration can affect scanning. Observe their skin tone and lips for signs of dehydration. Dehydration can inhibit tissue electrical current. If they appear to be dehydrated, have them drink approx. ½-1 cup of water. The rehydration effects are quite quick!
- **Metallic objects may interfere with the scan.** Ask clients to remove large items of **jewelry**, especially metal watchbands, heavy bracelets or necklaces.
- **Stress may interfere with the bio-electric scan.** Check rib compliance and/or a range-of motion. Ask the client to take a couple of deep breaths and visualize a relaxing/stress free place (*mini vacation*) in their mind for about 30 seconds. Recheck the ribs and/or ROM. Have them notice the difference!
- **Calm your own mind** and trust yourself. This may involve closing your eyes or preparing/grounding yourself before the session. This will allow you to be more sensitive during assessment and treatment and reduce possible bioelectric interference with the process.

Matrix Repatterning: *The Structural Basis of Health*

By George B. Roth, B.Sc., D.C., N.D.

Dr. Roth is a graduate of the University of Toronto, Canadian Memorial Chiropractic College and the Ontario College of Naturopathic Medicine and has studied osteopathic medicine at Doctors' Hospital North, Columbus, Ohio. He is the developer of Matrix Repatterning and is the Director of Education at the Matrix Institute. Dr. Roth has presented seminars at numerous hospital and university-based symposia throughout North America. He is the co-author, with Kerry D'Ambrogio PT, of Positional Release Therapy (Elsevier, 1997), and the author of The Matrix Repatterning Program for Pain Relief (New Harbinger, 2005).

Introduction

As many clinicians in the field of physical medicine have realized, diagnosis and treatment focused solely on the area of symptoms, is often frustrating and fruitless. Symptoms such as pain, especially in chronic conditions, are often the result of secondary or compensatory mechanical stresses created within the body in response to a primary site of tissue injury. For example, the local pain associated with a fracture of the leg will be reduced once a cast is applied. Within a few days however, the patient may begin to experience pain and discomfort in other parts of the body, such as the knee, hip, lower back or neck, as these structures are forced to compensate for the loss of mobility originating in the immobilized limb. The altered ranges of motion may create patterns of strain in the secondary sites, resulting in abnormal movement, irritation, inflammation and pain. In addition, these compensatory areas of strain tend to be aggravated intermittently. Intermittent noxious stimuli are interpreted by the nervous system as potential threats to the organism, which are more likely to give rise to a conscious awareness of pain.

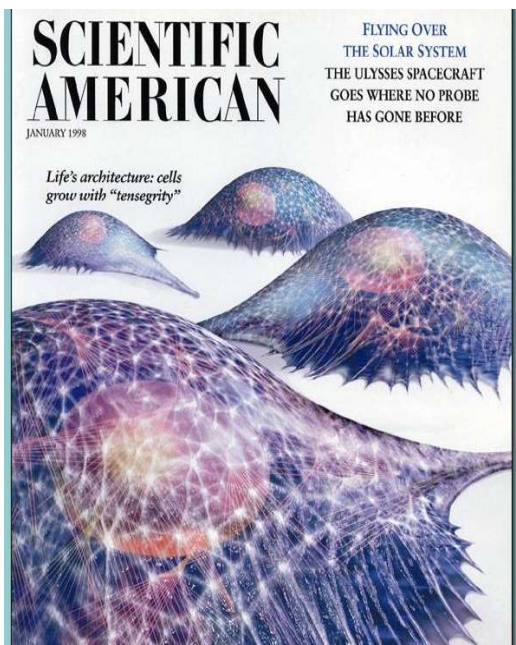
A primary site of tissue injury often results in a source of restriction similar to the casted leg example. This may become a constant source of irritation, to which the CNS tends to adapt as 'background information'. As such, it may eventually drop below the threshold for conscious pain perception. In summary, both mechanical compensation and neurological adaptation often obscure the primary site of injury.

Matrix Repatterning incorporates objective and reproducible methods, based on a scientific foundation of structural pathophysiology. It is a revolutionary manual approach, which addresses the *primary* sources of structural imbalance and dysfunction at the cellular level, in an efficient and effective manner. Treatment is gentle and painless, and results in global biomechanical reorganization, encouraging the body towards normal, pain-free function.

The Tensegrity Matrix

Recent research suggests that the structural and biomechanical properties of the body are key factors in how it functions in health and disease. With improved imaging technology, an emerging field of scientific exploration has revealed a clearer understanding of cellular and tissue ultrastructure. These discoveries, which have focused on histology, cellular physiology, microbiology and biophysics, have challenged our previous concepts of structure and function. This revised model of organic structure explains some of the complex interrelationships, which exist between each and every component of the body. It extends the basic concept of tissue response to injury, beyond the level of joint, muscle and ligament, to include the deeper framework of the body, right down to the cellular and molecular levels.

It is now known that the internal structure of each cell (cytoskeleton), as well as the tissues lying between the cells (extracellular matrix or ECM), is composed of protein and polysaccharide filaments forming a continuous framework, which we refer to as the *Tensegrity Matrix*.^{4,7} These structures are, in turn, constructed of molecular elements, such as carbon, which have specific structural, mechanical and electronic properties. The application of the concept of tensegrity to biological systems, elaborated by Stephen Levin, M.D.² and Donald Ingber, M.D., Ph.D.³, among others, holds that the body tissues are composed of interconnected *tension icosohedra* (complex triangular trusses), which inherently provide a balance between stability and mobility. This structural model explains many of the observed phenomena related to body support, movement, response to stress and trauma, as well as the effects of therapeutic interventions. According to Ingber, a key investigator who has elaborated on the mechanical and physiological properties of the cytoskeleton, this model explains the biomechanical properties of the entire body.



**Figure 1: The Architecture of Life,
D. E. Ingber, Scientific American, Jan. 1998**

“Molecules, cells, tissues, organs, and our entire bodies use “tensegrity” architecture to mechanically stabilize their shape, and to seamlessly integrate structure and function at all size scales. Through use of this tension-dependent building system, mechanical forces applied at the macroscale produce changes in biochemistry and gene expression within individual living cells. This structure-based system provides a mechanistic basis to explain how application of physical therapies might influence cell and tissue physiology.”³

*Donald E. Ingber, M.D.,
Ph.D.*

"The word 'tensegrity' is an invention: a contraction of 'tensional integrity'. Tensegrity describes a structural-relationship principle in which structural shape is guaranteed by the finitely closed, comprehensively continuous, tensional behaviors of the system and not by the discontinuous and exclusively local compression member behaviors. Tensegrity provides the ability to yield increasingly without ultimately breaking or coming asunder."

Buckminster

Fuller, 1961₁

Note: Kenneth Snelson, a student of Buckminster Fuller, is credited with the first demonstration of the application of

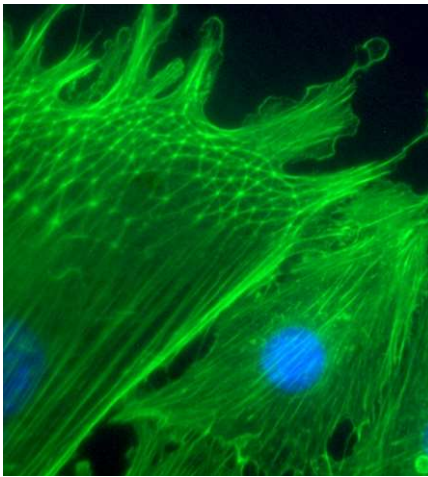


Figure 2: Cytoskeleton Showing Tensegrity Structure

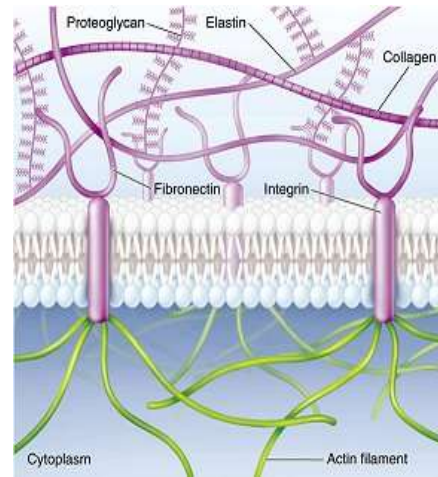
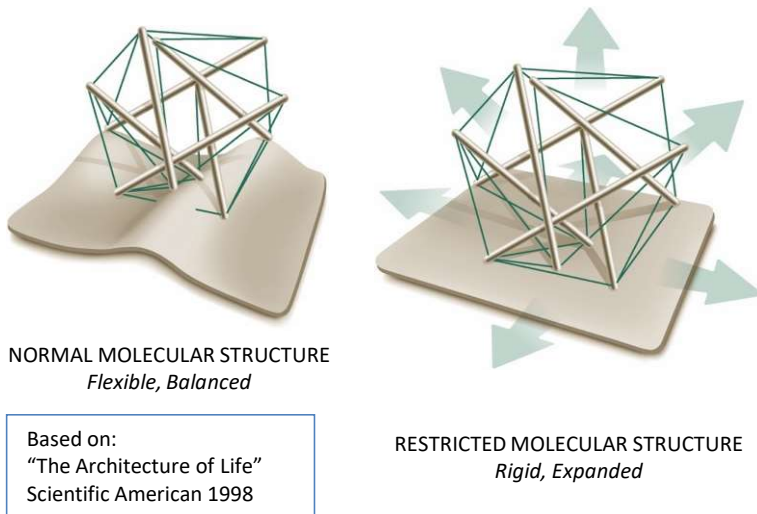


Figure 2a: Extracellular Matrix

The tensegrity matrix is the underlying structure of biological tissue at the molecular level. It explains the biomechanical, electrical and physiological properties of life on this planet. Mechanical stress due to physical injury, as well as electrical or neurological stimulation, may alter the physical properties of the cellular and intercellular elements of the matrix, causing it to change from a flexible state to an expanded and rigid state. Thus, the apparent hypertonicity or fibrosis of muscle and fascia, as well as the enlargement of bone, which has now been documented as a consequence of injury (see: Figure 4, below), can be seen as an altered electro-mechanical relationship at the molecular level (see: Figure 3).



NORMAL MOLECULAR STRUCTURE
Flexible, Balanced

RESTRICTED MOLECULAR STRUCTURE
Rigid, Expanded

Based on:
"The Architecture of Life"
Scientific American 1998

Figure 3: Normal and Restricted Tensegrity Structure

Primary Restrictions

When the force of an injury – either strain or impact – enters the body, it is rapidly transmitted throughout the tensegrity matrix and thus throughout the body. Moderate forces are easily dissipated due to the elastic properties of the matrix. Excessive force however, beyond a certain threshold, may be absorbed by the tissues and cells, causing the molecular elements to be raised to a higher energetic state (see: Figure 3, above). In certain parts of the body, which are higher in density due to the presence of water (fluid-filled viscera) or the hydroxyapatite crystalline matrix of bone – the mechanical energy is more readily transferred to the molecular structure of the tissues. The dense matrix of these tissues results in a focusing effect of the mechanical energy of the injury. Research conducted by investigators at the University of California, have discovered that injury to bone, causes certain glue-like collagen strands between the trabeculae to uncoil, resulting in a *permanent* enlargement of the structure (see: Figure 4, left).⁹

Water is the densest substance in the body. Fluid-filled internal organs (such as the heart, liver, spleen and kidneys) tend to absorb much of the force of injury, leading to so-called ‘internal injuries’. Visceral structures react like water balloons, rapidly expanding with impact and transferring these forces to surrounding structures, such as the spine, rib cage, pelvis and cranial vault.

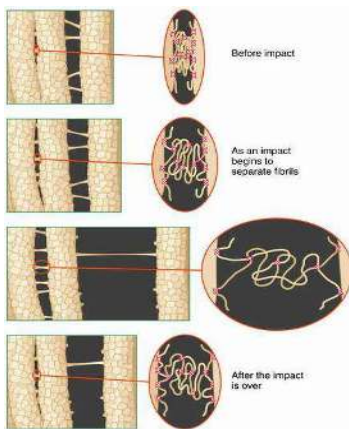


Figure 4 – Response of the fascial elements of bone to impact injury



Figure 5 – Strain Patterns

Cells are bound to each other through binding sites located on the cell membrane and are connected to surrounding cells by the extracellular matrix (ECM)⁷. Therefore, a source of restriction due to injury in one part of the body is instantaneously transmitted to surrounding structures. The tensegrity matrix represents a continuous kinetic chain, which explains how patterns of tension arising from one primary restriction, create tension and aberrant motion in structures throughout the entire body. This results in biomechanical dysfunction and increased strain on pain sensitive structures, such as fascia, muscles and joints. The resulting *strain patterns* are illustrated in Figure 5. The primary restriction – the ultimate source of the dysfunction – however, is often painless after the acute phase and only becomes painful upon direct stimulation (tender or trigger points).

The Resistance Barrier

The resistance barrier is the background state of tone of the tissues of the body, which is a direct extension of the inherent state of the tensegrity matrix. The resistance barrier is detected by manual pressure or stress on a part of the body and may be determined by the degree of “give” in any one particular area. The manual pressure is applied gradually until the practitioner notices a slight opposing resistance or counter-pressure into the testing hand, almost as if the body is pushing back. This perceived barrier is in direct proportion to any and all primary restrictions in the body due to the interconnected nature of the matrix. A change in the resistance barrier will occur when an electromagnetic field is positioned over a primary restriction (see: **Scanning**, below), or when treatment is completed. The resistance barrier is also the appropriate interface required to generate the treatment process, which culminates in a resolution of a certain amount of tissue resistance (see: **Release**, below).

Electrical Properties of the Body

Each cell in the body generates electrical energy in the form of a differential charge across the cell membrane. The tissues of the body (intracellular and extracellular elements) are efficient semiconductors. Under normal conditions, electrical current measured in microamps, is conducted throughout the body, and appears to be an essential element of cellular homeostasis and metabolic well-being. The use of ECG (electrocardiography) and EEG (electroencephalography) to assess the function of the heart and the brain, respectively, makes use of these properties. In bone, osteocytes undergo deformation associated with movements, such as compression, flexion and torsion. Pressure gradients, caused by these tissue stresses, create a flow of extracellular fluid around the osteocytes, resulting in piezoelectric effects and the formation of electric fields called “streaming potentials.”⁸

In addition, the nervous system may be viewed as a system of hard-wired electrical circuits, or ‘phone lines’ which communicate electronic information throughout the body. The fascial system, which is comprised of the cellular and extracellular matrix and now appears to be able to transmit information in the form of electrical and even photonic signals,⁷ may be considered to be analogous to the internet. Various influences, such as injury, chemical imbalance and even neurological overstimulation due to stress, may lead to changes in the electrical properties of tissue.⁶ The molecular and cellular changes at the site of primary restrictions appear to produce reduced electrical conduction and increased electrical resistance and/or capacitance.¹⁰ These changes result in local areas of static electrical charge and increased tissue resistance and rigidity.



Scanning

Nerves are essentially electrical circuits, and therefore areas of the body with more of these circuits will generate a stronger electrical field. The hand contains a large concentration of nerve endings and therefore it produces a relatively strong electrical field. This may be one of the reasons we automatically place our hand on an injured area, such as a bumped knee or elbow, without even thinking about it. Placing the hand or a biocompatible electromagnetic field over a part of the body appears to introduce a normalizing influence, which results in a reduction in tension in the area of injury. This may be due to the principle of **induction**, defined as the generation of electrical current in a structure by the approximation of an electrically active field₁₁. The stronger field is said to *induce* current in the adjacent structure. *Scanning* utilizes this principle to determine the location of the primary restrictions.

In the Matrix Repatterning scanning procedure, one hand is used to monitor the tissue resistance in an area of the body, referred to as the **Indicator**, while the other hand is systematically placed on a series of other locations. Alternatively, a **MatrixMag™ Scanner**, which produces a specifically modulated magnetic field (similar but stronger than the field generated by the hand) may be used to scan the body. The response of the Indicator (see below) is used to verify the location of the primary restrictions.

The **Bio-Electric Assessment** is a systematic scanning procedure used by Matrix Repatterning practitioners to determine the presence of any current or persisting primary restrictions. It involves the testing of approximately 36 anatomical sites.

Indicator

The *indicator* is any part of the body used to verify the location of a primary restriction. Various parts of the body may be used as an indicator to test the rest of the body, based on convenience for the practitioner and/or comfort for the patient. Common areas include the rib cage, the shoulder girdle, or any large muscle belly. Since the fascial system of the body is interconnected, via the tensegrity matrix, as a continuous fabric or *kinetic chain*, when the scanning hand or MatrixMag™ Scanner is placed over a primary restriction, that source of tension is temporarily reduced, resulting in a slight relaxation of the entire body. Monitored at the indicator site, this results in a sense of greater 'give' or depth of excursion.



Figure 6 – Use of MatrixMag™ Scanner and Indicator

Treatment is applied to the identified tissues associated with the primary restriction. This involves a gentle form of manual pressure, along specifically determined mechanical vectors. The so-called release process appears to be the result of the generation of piezoelectric current and the resulting release of the static or stored electrical charge in the area of treatment. This allows the molecular structure of the cells and the extracellular matrix to return to the relaxed state. In addition, the use of electromagnetic stimulation, supplied by a device such as the MatrixPulse™ Scanner, can facilitate the release of locally stored electrical charge at the site of tissue injury. As each of several vectors of restriction is released in this manner, the injury or primary restriction is restored to a normal state of tissue tone. The therapeutic process involves the identification of any and all primary restrictions accumulated over a lifetime, and their systematic treatment in priority sequence. This typically leads to a restoration of optimal biomechanical and physiological function, resulting in an improvement in overall well-being.

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Breakthrough Discoveries to Help Your Most Difficult Cases

Solving the Challenge of Unstable Joints

By Dr. George Roth, DC, ND

- Like most of you, I have often wondered why some patients seem to re-injure themselves repeatedly. They seemed to get some temporary relief, but still came back again and again with the same or similar issues, which I found this very frustrating. In this article, I would like to share with you some of the results of my ongoing and unrelenting exploration into the underlying mystery of how the body responds to injury at the deepest levels, and the breakthrough discoveries I have made in my 40+ years in practice. This culminated in the development of a gentle, science-based treatment system which has allowed practitioners from around the world provide their patients with real solutions to many challenging conditions, helped them overcome pain and allowed them to enjoy a more active and abundant lifestyle.
- Among this challenging group of patients, the most common conditions seem to be low back, knee, and shoulder pain. In your own practice, you may have recommended some sort of stabilizing device to manage these types of cases. The so-called 'back brace' (pelvic or lumbar support) is commonly prescribed for low back pain sufferers. Knee braces, whether in the form of a simple elastic bandage or an elaborate 'Robocop' affair, complete with stainless steel hinges and reinforced stays, is often part of the standard approach, as are similar devices for wrist and ankle pain. Multicolored, neon sports tape is often used on shoulders, hips or thighs, in order to reduce pain in various occupation situations and sports.
- These devices come in all shapes, sizes, colors and designs, but they all have one thing in common: they are designed to stabilize and limit movement in these joints, which have somehow lost their ability to function in a normal, pain- free manner. Interestingly, these same joints appear to be very susceptible to degeneration the development of OA ¹. The question I have asked myself over the years is: *Why do these joints become unstable in the first place?*

A Surprising Result

About 20 years ago, a patient in his mid-20's came to see me regarding a condition of low back pain. He also happened to mention that he was scheduled for surgery to repair the ACL in his right knee. As part of my examination, I checked his knee stability. I noticed that it was extremely unstable using the anterior drawer test, but thought nothing more of it. I proceeded to treat him using the new technique I had been developing, called Matrix Repatterning (MR). I found several injury patterns associated with the lower extremities, the pelvis, the thoracolumbar spine, and rib cage, and treated these accordingly. For some reason, I rechecked the drawer test after the second treatment and noticed that the knee seemed to be much more stable.

After a series of about four sessions, the patient reported that his back pain was gone. During one session, he mentioned that his knee also felt much better. "As a matter of fact," he added, "when I went back for my pre-op

examination with the surgeon, he checked my knee and couldn't find anything wrong with it anymore. He said that he didn't know why I was told I needed surgery in the first place!"

That case got me thinking. *How had his knee regained stability? Did my treatment have anything to do with the improvement?* I started monitoring knee stability in my patients and noticed that it often improved when I treated certain areas of the body. Slowly, a pattern began to emerge demonstrating a rather consistent association with injuries in other areas of the body that somehow seemed to be associated with knee instability. Once these areas of focal tissue injury, which I refer to as *primary restrictions*, were resolved, unstable knees would become stable. ... and stay that way. At the time, other than observing this rather startling clinical manifestation, I had no way to explain the mechanism of improvement.

A New Theory of Joint Stability Emerges

Matrix Repatterning is based on the concept that certain injuries alter bone size and shape. For example, if you compare the size of your knees, by placing your thumb and fingers on either side of distal femur, you may observe that one is wider than the other. I noticed these changes over 40 years ago. Research at the University of California verified this phenomenon in 2005 ². Additional research has shown that collagen, which forms the framework of bone, is a semi-conductor, which is also altered with injury ³. These structural and bio-electric changes resulting from injury, which we refer to as *Primary Restrictions* (PR's), form the basis of this treatment approach.

As part of our protocol, we use a specialized magnetic device (Matrix Scanner¹). When it is applied to an area of injury, it normalizes its bio-electric properties, causing it to relax. This can immediately be detected at another test site on the body, allowing the practitioner to determine the precise location of every injury in the body, even the ones the patient has forgotten.

Several years later, a podiatrist came to see me for his chronic knee pain. As I performed my initial assessment, I was able to demonstrate how his knee instability was directly associated with an injury to his pelvis. As I positioned the Scanner over his pelvis and thoracolumbar spine, he was quite astonished that I was able to immediately restore his knee stability. "How was that possible?" He asked.

I considered the evidence:

1. The knee was initially profoundly unstable.
2. I temporarily neutralized the restriction in the pelvis, using the scanner.
3. The knee instantly stabilized.
4. I removed the scanner.

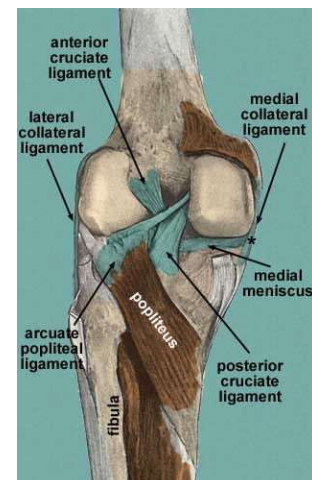


Figure 1: Knee stability provided by popliteus muscle.

¹ Matrix Scanner: Proprietary Device (magnetic field device), used to localize areas of reduced electrical conductivity associated with tissue injury. The applied magnetic field appears to induce electrical current in the affected area, reducing local tissue restriction. Due to continuity of fascial structures via the cytoskeleton and the extracellular matrix (ECM), this change in tissue tension allows the practitioner to determine the precise location of primary restrictions (PR's).

5. The knee once again became unstable... instantly.

I thought: *what works that fast in the body?* Could it be a neuromuscular response? What muscle could possibly be affecting stability of the knee? How was this response being mediated?

Recent studies have postulated the popliteus as an important dynamic stabilizer of the knee ^{3, 4}. It is intricately attached to several internal structures of the knee, including the lateral meniscus, the posterior capsule of the knee, the PCL and the MCL ^{4, 5}. I decided to investigate the possible role of this muscle on the function of the knee. I was also interested in the possible role that Matrix Repatterning might have in restoring stability to the knee, and thus promoting healing of this joint.

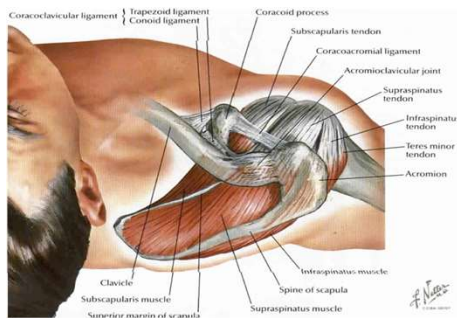


Figure 2: Shoulder stability provided by supraspinatus muscle.

The typical clinical approach to an unstable knee is through exercise of large muscle groups, or if all else fails, surgery for the so-called “torn ACL or PCL”. The purported incidence of actual tears of these ligaments appears to be much less than indicated by radiological reports. Surgical reports often contradict the findings of radiologists in these cases ⁶. In addition to the role of the popliteus, I have also discovered that anterior instability of the knee is often accompanied by reduced tone of the medial hamstrings (semimembranosus, semitendinosus), which correlates with a positive anterior drawer test. Additional muscular and fascial associations appear to mediate ankle stability (tibialis anterior). In the shoulder, a similar mechanism has been identified regarding the possible role of the supraspinatus

and teres major and/or minor as stabilizers of the gleno-humeral joint (see: Figure 1 and 2) ⁷.

Joint Instability as a Symptom of *Core Injury*

As I reviewed the areas containing the primary restrictions that seemed to be associated with joint instability, I noticed that they were invariably located in the cranium, spine, rib cage, or pelvis – the so-called *core structures* of the body. Treatment of these areas usually resulted in restoration of stability in the involved joints, which appeared to occur primarily in *peripheral* joints. The one exception was the lumbar spine, which is in the core region. But this one exception, proved to be a key to my understanding of this important mechanism.

I postulated that instability in the peripheral joints may protect the *core* structures (especially the spinal cord) from additional mechanical strain and potentially debilitating or even life-threatening damage. The knee, ankle, shoulder and wrist joints, completely dependent on soft tissue for stabilization, could serve the role of “*sacrificial joints*” (See Figure 3). This term is adapted from the concept of *sacrificial gears*, which have been used with industrial machinery, such as printing presses, where specific gears constructed of less robust materials, are situated at non-critical

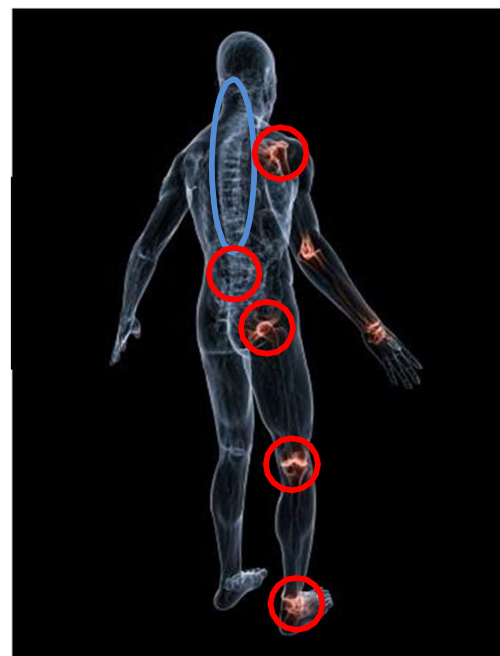


Figure 3: Sacrificial Joints (red), Core Structures (blue).

points in the device. These are deliberately designed to fail and disintegrate should the machinery become severely compromised, thus protecting more critical components.

But, what about the lower lumbar spine? The spinal cord is a key core structure that must be protected, however as we know, the spinal cord ends at the level of L2 or L3. Thus, the neurological structures of the lower lumbar spine (cauda equina), composed of separate, myelinated nerve tracts, are much less vulnerable to serious damage. Thus, the *lower* lumbar spine is less vital to the survival of the organism, which still fits with my hypothesis. Lumbar stability appears to be related to the influence of multifidus and rotatores tone, as confirmed in recent studies ⁸. Correcting primary restrictions in key core structures, tends to turn these muscles back on, thus restoring stability and allowing for improvement articular in stability and potential resolution of lumbar dysfunction.

Turning Joint Stability Back On, Like Flipping a Switch!

Remarkably, treatment of primary restrictions in these core structures, using Matrix Repatterning, appears to immediately restore stability in these joints. *What might account for this response?* It is my current theory that there may be a feedback mechanism, mediated via spinal reflexes or mechanical-electro-chemical signals generated within the extracellular matrix (ECM) ⁹⁻¹². These systems may be able to monitor potentially threatening injuries and respond by triggering inhibitory or excitatory efferent neurons (spinal/neurological level), or via the production of electro-chemical signals to activate specific tonal structural proteins within the ECM. Whatever the mechanism may be, it appears to allow the body to rapidly modulate stability of the peripheral, appendicular joints, as well as – notably – the lower lumbar spine.

Practitioners trained in Matrix Repatterning, have confirmed that joint stability is often restored almost immediately after the underlying primary restrictions are addressed. In this way, they have been able to help many conditions associated with joint instability, resulting in significant clinical improvement. Further research is required to assess the effectiveness of this approach on the possible reversal or prevention of degenerative changes associated with these joints.

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About the Author:



Dr. Roth is a graduate of the University of Toronto, Canadian Memorial Chiropractic College and the Ontario College of Naturopathic Medicine and has studied osteopathic medicine at Doctors' Hospital North, Columbus, Ohio. He is the developer of Matrix Repatterning and is the Director of Education at the Matrix Institute in Toronto. Dr. Roth has presented seminars at numerous hospital and university-based symposia throughout North America. He is the co-author, with Kerry D'Ambrogio PT, of Positional Release Therapy (Elsevier, 1997), and the author of The Matrix Repatterning Program for Pain Relief (New Harbinger, 2005). His work is also featured in the Brain's Way of Healing, by Dr. Norman Doidge, (Penguin, 2015).

For more information: www.matrixinstitute.net

Cranial Vault Procedures:

Clinical context

Injury may produce mechanical stress on structures associated with neurological, vascular, endocrine and CSF systems:

Neurological: Vestibular, ocular, auditory, olfactory, autonomic, motor, sensory, cognitive, emotional

Vascular: Headache (migraine, etc.), hypoxia

Endocrine: Pituitary, hypothalamus

CSF Circulation: Ventricular, sinus drainage

Assessment

1. Structural: Symmetry, contour, tenderness
2. Bio-electric: Size & shape of PR, locate centre
3. Mechanical (Vector): Depression (tangential toward centre of depression, circumferential/multi-directional)

Treatment

Inferior Vault Pattern:

1. Cranial base lateral (ZYG, FRO)
2. OTR, TEM, OCP
3. Upper cervical
4. Cranial base anterior (ZYG, FRO)
5. SPH

Superior, Lateral, Anterior, Posterior Vault Pattern:

1. Vector:
 - direction priority
 - track to periphery
2. Containment
3. Next vector(s)
4. Centralize

Vestibular/Ocular-Motor Screening (VOMS) for Concussion

Vestibular/Ocular Motor Test:	Not Tested	Headache 0-10	Dizziness 0-10	Nausea 0-10	Fogginess 0-10	Comments
BASELINE SYMPTOMS:	N/A					
Smooth Pursuits						
Saccades – Horizontal						
Saccades – Vertical						
Convergence (Near Point)						(Near Point in cm): Measure 1: _____ Measure 2: _____ Measure 3: _____
VOR – Horizontal						
VOR – Vertical						
Visual Motion Sensitivity Test						

Instructions:

Interpretation: This test is designed for use with subjects ages 9-40. When used with patients outside this age range, interpretation may vary. Abnormal findings or provocation of symptoms with any test may indicate dysfunction – and should trigger a referral to the appropriate health care professional for more detailed assessment and management.

Equipment: Tape measure (cm); Metronome; Target w/ 14 point font print.

Baseline Symptoms – Record: Headache, Dizziness, Nausea & Fogginess on 0-10 scale prior to beginning screening

- **Smooth Pursuits** - Test the ability to follow a slowly moving target. The patient and the examiner are seated. The examiner holds a fingertip at a distance of 3 ft. from the patient. The patient is instructed to maintain focus on the target as the examiner moves the target smoothly in the horizontal direction 1.5 ft. to the right and 1.5 ft. to the left of midline. One repetition is complete when the target moves back and forth to the starting position, and 2 repetitions are performed. The target should be moved at a rate requiring approximately 2 seconds to go fully from left to right and 2 seconds to go fully from right to left. The test is repeated with the examiner moving the target smoothly and slowly in the vertical direction 1.5 ft. above and 1.5 ft. below midline for 2 complete repetitions up and down. Again, the target should be moved at a rate requiring approximately 2 seconds to move the eyes fully upward and 2 seconds to move fully downward. Record: Headache, Dizziness, Nausea & Fogginess ratings after the test. (Figure 1)
- **Saccades** – Test the ability of the eyes to move quickly between targets. The patient and the examiner are seated.
 - **Horizontal Saccades:** The examiner holds two single points (fingertips) horizontally at a distance of 3 ft. from the patient, and 1.5 ft. to the right and 1.5 ft. to the left of midline so that the patient must gaze 30 degrees to left and 30 degrees to the right. Instruct the patient to move their eyes as quickly as possible from point to point. One repetition is complete when the eyes move back and forth to the starting position, and 10 repetitions are performed. Record: Headache, Dizziness, Nausea & Fogginess ratings after the test. (Figure 2)

- **Vertical Saccades:** Repeat the test with 2 points held vertically at a distance of 3 ft. from the patient, and 1.5 feet above and 1.5 feet below midline so that the patient must gaze 30 degrees upward and 30 degrees downward. Instruct the patient to move their eyes as quickly as possible from point to point. One repetition is complete when the eyes move up and down to the starting position, and 10 repetitions are performed. Record: Headache, Dizziness, Nausea & Fogginess ratings after the test. (Figure 3)
- **Convergence** – Measure the ability to view a near target without double vision. The patient is seated and wearing corrective lenses (if needed). The examiner is seated front of the patient and observes their eye movement during this test. The patient focuses on a small target (approximately 14-point font size) at arm's length and slowly brings it toward the tip of their nose. The patient is instructed to stop moving the target when they see two distinct images or when the examiner observes an outward deviation of one eye. Blurring of the image is ignored. The distance in cm. between target and the tip of nose is measured and recorded. This is repeated a total of 3 times with measures recorded each time. Record: Headache, Dizziness, Nausea & Fogginess ratings after the test. Abnormal: Near Point of convergence ≥ 6 cm from the tip of the nose. (Figure 4)
- **Vestibular-Ocular Reflex (VOR) Test** – Assess the ability to stabilize vision as the head moves. The patient and the examiner are seated. The examiner holds a target of approximately 14 point font size in front of the patient in midline at a distance of 3 ft.
 - **Horizontal VOR Test:** The patient is asked to rotate their head horizontally while maintaining focus on the target. The head is moved at an amplitude of 20 degrees to each side and a metronome is used to ensure the speed of rotation is maintained at 180 beats/minute (one beat in each direction). One repetition is complete when the head moves back and forth to the starting position, and 10 repetitions are performed. Record: Headache, Dizziness, Nausea and Fogginess ratings 10 sec after the test is completed. (Figure 5)
 - **Vertical VOR Test:** The test is repeated with the patient moving their head vertically. The head is moved in an amplitude of 20 degrees up and 20 degrees down and a metronome is used to ensure the speed of movement is maintained at 180 beats/minute (one beat in each direction). One repetition is complete when the head moves up and down to the starting position, and 10 repetitions are performed. Record: Headache, Dizziness, Nausea and Fogginess ratings after the test. (Figure 6)
- **Visual Motion Sensitivity (VMS) Test** – Test visual motion sensitivity and the ability to inhibit vestibular-induced eye movements using vision. The patient stands with feet shoulder width apart, facing a busy area of the clinic. The examiner stands next to and slightly behind the patient, so that the patient is guarded but the movement can be performed freely. The patient holds arm outstretched and focuses on their thumb. Maintaining focus on their thumb, the patient rotates, together as a unit, their head, eyes and trunk at an amplitude of 80 degrees to the right and 80 degrees to the left. A metronome is used to ensure the speed of rotation is maintained at 50 beats/min (one beat in each direction). One repetition is complete when the trunk rotates back and forth to the starting position, and 5 repetitions are performed. Record: Headache, Dizziness, Nausea & Fogginess ratings after the test. (Figure 7)

Systems of Motion:

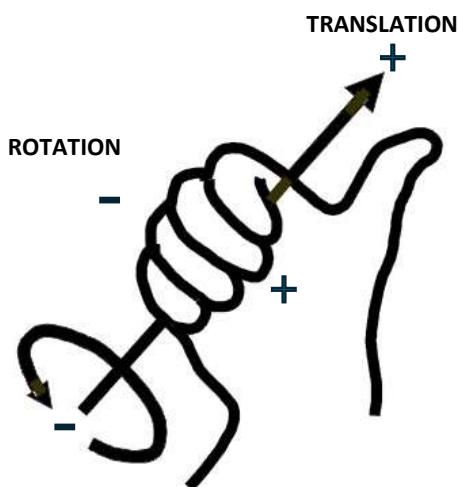
Several systems of motion are outlined below. The BIOMECHANICAL SYSTEM of describing motion is utilized throughout this manual. This system reduces the ambiguity inherent in other methods of describing anatomic motion and the application of therapeutic force. This system is easy to use once familiarity is gained. Below is a comparative chart listing the biomechanical system along with the anatomical system and the colloquial description.

Biomechanical System*	Anatomical System	Colloquial Description
+ X translation	left horizontal translation	left lateral slide
- X translation	right horizontal translation	right lateral slide
+ Y translation	cephalad coronal translation	axial distraction/elevation
- Y translation	caudal coronal translation	axial compression/depression
+ Z translation	anterior sagittal translation	forward slide or glide
- Z translation	posterior sagittal translation	backward slide
+ X rotation	anterior sagittal rotation	forward bend, flexion
- X rotation	posterior sagittal rotation	backward bend, extension
+ Y rotation	left horizontal rotation	left rotation
- Y rotation	right horizontal rotation	right rotation
+ Z rotation	right coronal rotation	right lateral flexion
- Z rotation	left coronal rotation	left lateral flexion

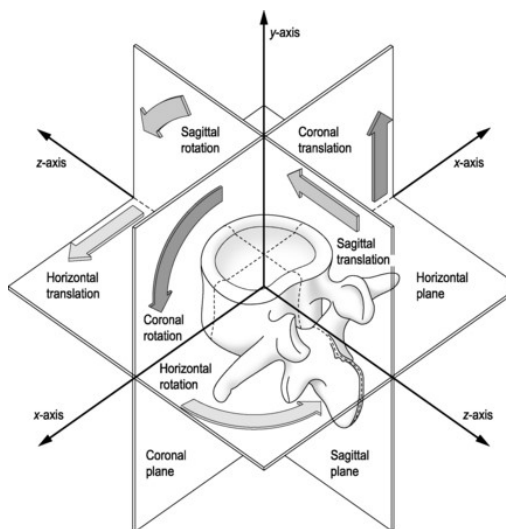
*Please note that motion within a structure (i.e. intraosseous lesions) is denoted with the addition of the word '*intrinsic*' before translation or rotation. For lateral structures, reference is made to the right side of the body and/or the distal portion of a structure. When bilaterally symmetrical structures, such as the hip, pelvis or shoulder, are referred to, the biomechanical motion described, is based on its relationship to the right side of the body. Thus, 'internal, or left rotation' of the right shoulder would be listed as +YR, whereas 'internal, or right rotation of the left shoulder, would be listed as -YR.

Suggested Listings for Structural/Biomechanical Lesions (Examples):

- + X rotation = + XR
- - Z translation = - ZT
- + Y intrinsic translation = + YiT



Biomechanical System of Motion



Anatomical System of Motion

Right-Hand Rule: In mathematics and physics, the right-hand rule is a convention and a mnemonic, utilized to define the orientation of axes in three-dimensional space and to determine the direction of the as well as to establish the direction of the force on a current-carrying conductor in a magnetic field.

Matrix Repatterning Clinical Complexes

Each of the following major injury patterns (**Bold, underlined**) is followed by a list of likely areas of concomitant involvement. It is recommended that these additional areas be evaluated when the presence of one or more of the other areas are detected during your assessment. In addition, always consider the influence of umbilical/meningeal (**UMB/MNG**) torsion, for any of the patterns listed below.

Cranium:

- Cranial Base
- Cranial Vault
- Cervical Spine
- Maxilla, Mandible, Dental

Oral-Facial:

- Cranium (Cranial Base)
- Cervical Spine

Cervical Spine:

- Cranium (Cranial Base)
- Thoracic Spine, Rib Cage
- Shoulder Girdle
- Maxilla, Dental (upper)
- Visceral Fascia
- Upper Extremity

Upper Extremity, Carpal Tunnel:

- Wrist, Hand
- Cranium
- Cervical Spine
- Shoulder Girdle
- Thoracic Spine, Rib Cage
- Visceral Fascia

Thoracic Spine, Rib Cage:

- Cervical Spine
- Shoulder Girdle
- Upper Extremity
- Oral, Facial, Dental
- Visceral Fascia

Lumbar Spine:

- Thoracolumbar Spine
- Pelvis
- Lower Extremity
- Mandible, Dental (lower)
- Visceral Fascia

Pelvis:

- Ilium, Ischium, Pubis, Sacrum
- Lumbar Spine
- Thoracolumbar Spine
- Pelvic diaphragm, Visceral Fascia

Lower Extremity:

- Foot, Ankle, Knee, Hip
- Pelvis
- Lumbar Spine
- Thoracolumbar Spine
- Visceral Fascia

Concussion:

- Cervical Spine
- Oral, Dental
- Meninges
- Visceral Fascia

Explaining Matrix Repatterning

Analogies:

- 1. Plastic Water Bottle:** A plastic water bottle maintains its shape when thrown around and hit because that bottle shape is designed into the fabric of the water bottle. If the force of impact is hard enough, the bottle changes its shape and is now a new tension pattern. It will maintain this new squashed shape unless you find just the right wrinkles and press on them at just the right angles; a gentle pressure, much less than the force that caused the distortion, will facilitate the release of tension back to the shape the bottle is designed to be. This is similar to your perfectly designed balanced body is in your DNA, and it is always trying to get back into balance. Your current tension pattern is a result of a lifetime of impact injuries that have changed the shape of you. That tension is holding you there. A CMRP finds those places that just need gentle pressure at just the right angles to facilitate your body to go back into the shape it is designed to be in.
- 2. Violin:** Think of yourself as a violin. All body workers use a variety of techniques to help to get your body into balanced alignment and tension, similar to tuning the violin strings. Body workers identify where you are out of tune and re-tune your strings. Matrix Repatterning Practitioners work to find the structural imbalances in the body of the violin that is causing it to go out of tune. When you fix the violin, the strings don't go out of tune as much or as often. Similar to how a violin might sound in the middle of repairing it, you may have aches, pains, or unwell feelings in the middle of the process.
- 3. Boat tied to a dock with different lengths of rope:** The wind and the waves will only pull the boat as far as the shortest rope “ow ow ow”. When we untie that rope, the boat becomes freer, but then the next shortest ropes will be pulling and limiting movement. Matrix allows for all lengths of rope to be restored to their proper lengths.
- 4. Rivers of Tension:** Picture rivers of tension flowing down your legs and out your feet, down your arms and out your hands, carrying away and releasing tension from your body. These rivers have “log jams” of tension slowing the release of tension. By finding these areas of tension, or log jams in the river and releasing them, we increase the flow of the river so your body can release excess tension more efficiently during movement and at rest.
- 5. Forest Fires:** These areas of tension, or Primary Restrictions, are like forest fires burning in your body. If we can identify where they are and put the fires out in quick succession, then they won't have time to spread back again to your previous tension pattern. By doing the first few treatments in quick succession, we can prevent this, and then, we can take more time in between subsequent treatments to put out the smaller brush fires. This way we are more likely to progress forward, correcting the problems as we go, rather than 3 steps forward and 2 steps back.

6. **Firefighters Hose:** Picture the normal flow out the hose. Now picture how the flow is affected as people step onto the hose. The flow is powerful, so it doesn't stop completely, but it slows down with every person standing on the hose. As Matrix Repatterning practitioners, we are nudging those people off the hose so you can release tension more effectively and you can balance and heal yourself with ease.

7. **You are an electrical system.** When there is a fault in an electrical system, an electrician may send a micro-current through the system and the problem areas will light up. Using an indicator response with our hand on your body, we are feeling for those "lit up" areas that are holding more tension and interfering with communication flow.

8. **Park Bench:** When we release a primary restriction, it makes more space for your tissues, nerves and vessels. It's like sitting on a park bench, squished with too many people for way too long, then some big guy gets up and everyone can reposition themselves with more elbow and shoulder and hip room. It may be uncomfortable at first until you get everything unkinked and stretch and wiggle a bit to get settled in your ultimately more comfortable space.

Explaining the Process:

1. **Matrix Repatterning heals from the inside out.** All health care practitioners aim to help create the environment for you to heal yourself, whether with pharmaceuticals, heat or cold applications, cognitive therapies, manual techniques, or surgery: putting your body back into good balance and alignment. Matrix Repatterning is gentle, facilitating the release of tension to balance and align from the inside out, by listening to your body with our hands, following and releasing the way your body wants to, rather than forcing it to go the way we think it should be.

2. **Gently not forcefully, to the source.** Matrix Repatterning practitioners listen to the body and learn the language of the body to respond and facilitate the release of tension rather than force the body to where we want it to go. I could stretch and knead and beat the tension into submission, but it will go right back to where it was before, with the same tension patterns, with the same areas problems that ache and pain. It may take a day or two, or a month. Matrix Repatterning looks for the root cause, the sources of tension causing the problem, and facilitates your body's correction, so it stays well for the long term.

3. When an injury occurs, the cells in the tissue expand, which increases the space between the molecular structure. When that happens, the communication inside and between those cells is reduced. It then sends an alarm to the body, screaming something's wrong. Our bodies are smart in a way but don't necessarily know what to do with the information. This results in 'misinformation' causing some muscles to tighten and others to loosen inappropriately. This creates painful tension or instability. This is an imbalance in your system, which can aggravate the problem. Now, I'm going to scan your body using magnetic field therapy through these magnets. These magnets are designed to emit continuous free flowing electrons. When a part of your body accepts these electrons, the body inevitably relaxes because the communication is restored. That's the body's way of telling us its being restored or normalized. This is how I know where I would need to work. I'm going to use the rib cage as my guide. I will let you know as I go along where I find areas that accept these electrons (Use clients actual tone issues here).
4. We now know that when the body experiences a blow or a strain the force is absorbed- mostly by bone. We have seen on high powered microscopes how the bone cells expand, thereby creating changes in actual bone size. This change can affect the surrounding soft tissue, the other bones and even the deeper fascial layers throughout the body. The ramifications of these changes can be profound.
5. Matrix Repatterning is the only technique that can locate these boney changes and correct them. It is done gently with a skilled practitioner's hands applied in specific vectors. We use special magnets to help us locate and correct these primaries (as we call them). (See pictures from the American Chiropractor magazine 5/23 by Dr Roth)
6. Matrix Repatterning is the reshaping of bone. Structure determines function. Matrix Repatterning effects bone and fluid filled organs. Over time or through repetitive impact the building blocks of bone expand and contract and if there is enough impact the bone will expand. We now have scientific evidence to prove this. Think of the cells as the building blocks of bone like the shape of a soccer ball. When there is too much contact the soccer ball changes shape to be like a football and the covering of the cell becomes stretched and "tight". Furthermore, there is a loss of communication within the cell and between cells.
7. It's like playing broken telephone where there is a disconnect between lines of communication. This creates tension at that area and since we are connected from head to by fascia which is like saran wrap, another area of the body may be effected. For example, if you played soccer when you were younger and had repeated kicks to the shin, you could wake up after the age of thirty and wonder why your shoulder has lost some range of motion. Release the tension in the shin and now that shoulder is moving properly again. The area that is symptomatic may not necessarily be the source of the problem. With Matrix Repatterning we want to find the cause and treat the cause, and this occurs at the foundation of the body at the cellular level. Healing from the inside out.

Containment/Release in Matrix Repatterning

Containment/release is the manual aspect of Matrix Repatterning, which consists of maintaining a dynamic (adaptive) contact with the barrier as it shifts and collapses. This is facilitated by the use of the MatrixMag™ Scanner.

Part 1: What do therapists say a containment release feel like?

- It's like surfing. Staying on top of the wave which is the barrier/resistance at the same time as feeling it move under your hands. Follow the wave!
- A deep sense of relaxation on your part
- A self recharge!
- A house of cards collapsing under your hands
- A falling away
- Melting clay/butter
- Laser beams meeting at the intersection of the vectors of containment and going through you in a circular fashion.
- A buzzing/tingling along with a melting and shifting
- A line of bubbles flowing

Part 2: What do patients say they feel during a release?

- a sense of relaxation
- sleepy
- very comfortable
- warmth
- cool
- tingling
- sparks like sparklers
- bubbles
- stomach gurgling
- emotional release or memory recall
- shifting or repositioning of tissues elsewhere in the body
- decreasing pain
- exacerbation of symptoms
- twitching
- temporary increasing tension or discomfort in another area of the body*

Part 3: If the patient is feeling throbbing, pulsing, discomfort, pain, tension or pressure somewhere during a release, it may be helpful to:

- cue the patient "breathe into the area"
- suggest the patient slightly re-position themselves on the table to ensure comfort and relative neutral spinal and joint position
- if convenient have them move, wiggle, flex, extend, then return to the previous position
- put an extra scanner on the area of discomfort to facilitate release of tension from that

area

- shift your hand position/vector
- take a break
- place your scanner slightly “downstream” from the containment hand placement
- re-scan: the priority primary restriction may have changed
- reassure the client that this is sometimes part of the process

Part 4: Helpful Hints to feel Containment

- Place the hands in the starting position determined by the scan and vector tests. Allow your hands to rest comfortably supporting the contour of the area like cradling a newborn baby's head. Pause at the skin, then the fascial tissues, then the muscles, nerves, arteries, and veins, and then the bone. Listen to each layer; let each part talk to you.
- Gently sink in until you feel the barrier. This is where you match the pressure of the body pushing back into your hands (remember that there is a gray area to feel this barrier. Not too hard, not too light).
- Hold the barrier and use “Active Containment” / “toggle” until you feel a connection within or a beginning of a release. This may require a slight repositioning of the hands to locate/re-acquire the barrier.
- It may help to close your eyes and visualize the structure (bone, viscera) and the surrounding tissues (all the different tissues from superficial to deep, whatever is under your hands depending on their placement. This could be like working your way through a room at a party to get to the person you want to talk with.

Things to remember! Nuggets for success

- Perform a proper structural assessment (see checklist in binder) to find possible primaries and functional restrictions.
- Follow the hierarchy for ease of flow and efficacy.
- Use the side of least resistance in rib cage to perform your scan.
- Once scanner placed, allow a few seconds before checking the indicator.
- Begin treatment using the strongest responding primary on indicator, (of course keeping in mind the hierarchy). Don't be distracted by what the client wants! Their body will tell you where to treat first!
- Take objective measures before and after every session. Clients appreciate ongoing information of where they are at! This also helps them focus on progress as opposed to pain.
- Perform a full bioelectric scan (BES) regularly (every session if possible).
- The following are exceptions to BES: sphenoid, occipital condyle, UMB, MNG, palate, carpal tunnel (these need be vectored as part of their scan).
- Periodically repeat the structural assessment for potential primaries, as these may become more obvious after a certain number of treatments (additional layers).
- If a release during containment isn't felt within a minute, try treating another higher order PR and then go back.
- Once done treating an area, scan the surrounding areas to see if you've opened the gates to allow energy to be released throughout, revealing additional PRs.
- Check hands and feet! Large primaries may be hiding! Think of their placement in the homunculus!

Enhancing your Skills at Finding Primary Restrictions

- Select the appropriate scanner strength based on the body's response using the indicator, for example, an area where you suspect an injury such an enlarged area.
- Select the most pliable side of the ribcage to use as an indicator. You may want to ask the client to refrain from talking while you are scanning. *If you don't feel the ribcage is giving you a measurable response, try using a muscle belly such as the biceps, quads, glutes, etc.
- Place a small scanner in the xiphoid process area to help with energetic flow (and can help to neutralize metal in underwire bras)
- Make a habit of asking your client if they have consumed ample water – hydration can affect scanning. Dehydration can cause electrical resistance to the scanners free flowing electrons. If they have not consumed water, have them drink approx. ½ cup of water. The hydration effects are quite quick!
- Turn off and remove cell phones or other devices, such as smart watches and, have the SafeZone within range.
- Ask clients to remove jewelry and wear clothing without metal (zipper, belts, underwire bras). Also ask clients to removed extra items from their pockets.
- Ask the client to go to their “happy place” by visualizing a relaxing/stress free place in their mind or you could also suggest they breathe deeply several times prior to your scan.
- Calm your mind and trust yourself (may involve closing your eyes or preparing/grounding yourself before the session).