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## **An Adjunctive Approach to Diagnosing Joint Disorders in the Horse**

*The danger is not the unanswered questions, it is the unquestioned answers.*

### **Introduction**

This adjunctive approach utilizes accurate observation and correlation of specific biomechanical and neurologic information for the evaluation, diagnosis, and forensics of joint disorders. Lameness and joint disorders are not always the only diagnosis; they are frequently not degenerative or progressive disease processes. They are often signs of syndromes. They are usually manifestations of other problems. Biomechanical pathologies are usually the result of neurologic dysfunction and/or compensation.

*It is the victim of the crime that cries out and gets treated, while the criminal is silent and goes unnoticed.*

Why is it that wild horses can careen through impossible terrain at speed and yet a supposedly well-trained and fit dressage horse cannot do an extended trot across the diagonal in deep sand without pulling a suspensory? Why can a seemingly normal gallop result in a catastrophic breakdown injury?

Normal neurologic function, if balanced, allows animals to avoid, to compensate for, and to recover from injury, and to resolve asymmetry *while maintaining necessary activity*. Animals have been doing this since the beginning of evolution. Horses, for 55 million years, have been selected for their ability to do this by the best designed predator, the cat. Gaiting and righting studies that are the basis of our understanding of the neurology of quadrupeds have utilized cats. The species that are the prey of cats must have comparable functioning reflexes to be able to escape the predator.

Chiropractic and acupuncture specifically and accurately address the neurologic networks and functions that govern the order and sequence of response to environmental stressors to avoid injury, compensate for dysfunction, and to eventually allow recovery.

### **Biomechanical & Neurologic Forensics of Joint Disorders and Injury**

Why do some horses injure themselves? Why do some injuries not heal? What are the biomechanical and neurologic predispositions that allow injury to occur and prevent complete healing or effective compensation?

The effect of gravity is either the most destructive influence or greatest therapy, as it is constant, and the neurologic mechanism of the body dedicates the majority of its functions to addressing it.

Appropriate response to gravity, or balance, is the key to returning to homeostasis and full recovery from injury. Appropriate interaction with gravity governs neutral and sleeping postures, feeding stance and function, gait initiation and movement; these dictate the majority of the structural and functional requirements of the body, as they are the majority of its activities. If any of these functions are asymmetrical or unbalanced, then Wolff's Law (the tissues will respond to the forces put on them) will manifest asymmetrical and often excessive tissue response and the animal will have a predisposition to an injury, an "inappropriate" healing response, such as DJD, or a compensation that causes lameness.

Joints are designed to bear weight, and to move. There are histologic anatomic studies showing the different cellular development in different areas of the joint needed for these *different* jobs. If dysfunction in posture, balance, and movement mismatch these structures to their function, pathology or poor performance will be the result. You have to use the right tool for the job. There are feedback mechanisms and relationships that work to rebalance the system.

## Modifiers of Balance of Function of the Nervous System

## Chicken-Or-Egg Relationships

- ♦ Stomatognathic System Function
- ♦ Neutral & Sleeping Postures
- ♦ Feeding Stance
- ♦ Gait Initiation
- ♦ Movement

Stomatognathic system function is the interaction of the upper cervical region with the mouth, the TMJ, the larynx, the hyoid, and the sternum with righting mechanisms.

Neutral postures and feeding stances constitute the majority of the activities of the animal. Therefore, Wolff's Law responds in healing and compensation to the requirements of these postures.

Gait initiation and movement also stress the system and influence the nervous system's direction of growth and healing.

Elite athletes, horses that don't get injured, or horses that recover from injury effectively, all have the neurologic "programs" and environmental opportunity to use the intrinsic mechanisms of the nervous system to evaluate, compensate for, and return to normal from environmental, mechanical, and physiologic stressors. Those who don't recover are unable to get the proper "programs" in their nervous systems because of environmental influences or the "programs" themselves are dysfunctional.

"Klutzes" and chronically lame horses have neurologic deficits, balance and gaiting mechanism problems, and environmental influences that result in asymmetry and inappropriate loading of joints. These preclude normal function and healing.

The neurologic mechanism of response to gravity and environmental stressors is an integrative function of balance and righting mechanisms and patterned responses.

**Balance and righting mechanisms** receive their input through proprioceptors of the feet and joints, upper cervical mechanoreceptors, TMJ and hyoid function, and labyrinthine reflexes. *90% of input to the brain comes from mechanoreceptors, joint receptors, and stretch receptors... 80% of that 90% comes from C2 forward!*

Dentistry and farriery are of ultimate importance in establishing the neurologic balance necessary for function and healing, as *the teeth and feet are the interface of the nervous system with gravity.*

**Patterned responses** are a function of recently researched central pattern generators (CPGs) located in the spinal cord at different levels. An excerpt from a recently presented discussion at an Applied Kinesiology seminar by Drs. Carl DeStefano and Dan Martin describes the function of these CPGs.

"Stimulation of these CPGs causes walking, trotting, and galloping patterns in animals. It is theorized by researchers that there are many CPGs located in different levels of the cord orchestrating patterns of movement so that groups of muscles can be fired in a patterned way to perform stereotypical commonly employed movements. Initiation of CPG activity is from the mesencephalic locomotor region and the limbic motor system. Increases in frequencies of firing from these regions to spinal CPGs increases gait speeds and changes gait patterns."

"If firing of CPGs is inappropriately timed then joints will be inadequately protected at crucial moments and will be susceptible to trauma and injury. By understanding those mechanisms that interfere with the normal reflexogenic properties of central pattern generation, we can be more effective in permanently correcting the muscle paresis that is the precursor of joint instability and injury."

Inappropriate stimulation of CPGs or dysfunction of the CPGs themselves can create the postural defects and gaiting mechanism problems that result in injury and chronic lameness.

### 3 Basic Patterns of Neurologic Organization from CPGs

- ♦ Lateral Flexion Pattern – Spine in lateral flexion convexity, right or left
- ♦ Contralateral Gait Pattern – Spinal torque with diagonal pair of legs in advance, right or left
- ♦ Pacing Gait Pattern – Lateral pair of legs



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*Singly or in combination, these create most of the common movements.*

***Foot size differentials are important in evaluating all patterns as they indicate proportionate static weight bearing.***

Lateral flexion patterns are associated with response to stressors and injury, including emotional reactions and may be maintained after the stressors have resolved. This chronic uneven weight bearing can create overuse lameness.

Contralateral gait patterns are frequently associated with feeding stances, and if inappropriately maintained after mechanical corrections have been made, can be related to food allergies and chemical sensitivities.

Pacing gait patterns are associated with balance and central integrative functions and may be inappropriately maintained in animals who have midline surgical incisions, scars on the head and neck, and dental trauma.

Inappropriate initiation, maintenance, or dysfunction of these patterns can be diagnosed and corrected to allow the nervous system to rebalance, compensate, and progress through healing. If these neurologic dysfunctions are *not* corrected, then gravity becomes a destructive force in the healing process as opposed to an assistance.

***If you fight with gravity, you will lose.***

## **Chiropractic and Acupuncture Approach to Diagnosis of Joint Disorders**

“Soft” science vs. hard facts: Chiropractic, acupuncture, and many other “alternative” medicine modalities are often considered “soft” medical sciences with unproven or specious bases in theory or anatomic and physiologic fact. In reality, they are based on accurate physics, biomechanics, and neuroscience that has only recently been elucidated and integrated into the understanding of functional biomechanics and neurology.

### **Chiropractic Approach**

The traditional chiropractic approach is to find the “subluxation”, fix it, and the body will correct itself and heal. “*Subluxation*” = *A dysfunctional motor unit of two bones demonstrating a movement and neurologic abnormality. The effects can be segmental and/or central.*

Given the above information about righting mechanisms and CPGs, the previously misunderstood preoccupation of traditional chiropractic with upper cervical adjusting and philosophical holistic concern for all environmental stressors may seem more accurate. Sophisticated chiropractic addresses the nervous system’s prioritization to **1.** Minimizing dural torque and tension, **2.** Staying upright and balanced, **3.** Responding to external stressors, and **4.** Responding to internal stressors.

The chiropractic approach also involves a holistic approach to environmental influences.

### **The Five “T”s**

- ♦ ***Teeth***
- ♦ ***Toes***
- ♦ ***Tack***
- ♦ ***Training***
- ♦ ***Turnout***

If all of these are correct, and the animal has an appropriate diet, the need for chiropractic care is greatly reduced.

There are approximately 120 varieties of chiropractic technique, all with different diagnostic protocols. Some evaluation methodologies address the mechanical aspects of spinal and joint function through measurement and evaluation of weight bearing and measurement of passive range of motion. Others evaluate specific neurologic capabilities, both of peripheral and central integrative functions. General chiropractic diagnostic protocol includes the observation and the evaluation of: anatomic symmetry, range of motion, joint motion, neutral posture, foot placement, feeding stance, gait initiation. Different techniques have very specific testing procedures to evaluate neurologic function. The goal of all techniques is to find the neurologic and kinesiological dysfunctions that result in weight bearing asymmetries, abnormal gaiting patterns, inaccurate perception of pain, proprioceptive deficits, or maintenance of inappropriate compensatory mechanisms which are the causes of lameness and joint disorders.

## Acupuncture Approach

The Traditional Chinese Medicine approach involves extensive observation of all clinical signs correlated with specific neurologic function tests to evaluate central and segmental integrative neurology as it relates to joint pathology.

Through careful observation of multiple system manifestations of autonomic balance changes and peripheral neurologic sensitivity changes, acupuncture diagnosis is very accurate in evaluating dysfunction of central integrative neurology as well as specific spinal segmental and peripheral joint pathology. Though traditional language seems obscure, it very accurately describes specific combinations of signs and symptoms and allows very accurate distinctions of complex syndromes. Acupuncture diagnosis consists of evaluation of excesses and deficiencies of mechanical and physiologic function as manifest through the functional neuron pools designated as meridians. Integrative function can be interpreted through “**Five-Element Theory**” evaluation of balance. Autonomic function can be assessed by experienced practitioners with pulse diagnosis. Sophisticated “Ting” point evaluation assesses biomechanical balance and its influence on function very accurately.

Traditional Chinese Medicine evaluates parasympathetic/sympathetic function (**Yin/Yang**) as it relates to sensory and motor function. It is a very complex system that evaluates central integrative neurology effectively and has accurate prognostic value.

### Yin Correspondences

- ♦ Gravity
- ♦ Balance Mechanisms
- ♦ Parasympathetics
- ♦ Internal Homeostasis
- ♦ Stabilizing Muscle Groups

### Yang Correspondences

- ♦ Movement Against Gravity
- ♦ Withdrawal Reflexes
- ♦ Sympathetics
- ♦ External Reactions
- ♦ Mobilizing Muscle Groups

Each “meridian” has Yin/Yang organ functions and muscle groups that the points modify. The activation of these functions is posturally dependent and “excesses” and “deficiencies” are modified by postural reflexes which can be controlled using environmental influences and treatment.

## Conclusion

Hopefully, this more scientific approach to the adjunctive therapies’ role in the diagnosis of joint disorders and the correlation of their theory and application to scientific fact will allow those who already use them to be more accurate. For those unfamiliar with these modalities, the science based path to their use is being opened by cutting edge research, and an open minded attitude toward their potential power to help heal is an opportunity to relieve suffering and have successful outcomes.