

Application of Chiropractic Principles and Techniques to Equine Practice

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Anecdotal evidence and clinical experience suggest that chiropractic is an effective adjunctive modality for the diagnosis and conservative treatment of select musculoskeletal-related disorders in horses. Because of its potential misuse, chiropractic evaluation and treatment should be provided only by specially trained individuals. Formal research has to be conducted to further evaluate the use of chiropractic techniques in horses. Author's address: Veterinary Orthopedic Research Laboratory, Dept. of Anatomy, Physiology and Cell Biology, School of Veterinary Medicine, University of California—Davis, Davis, CA 95616. © 1997 AAEP.

1. Introduction

Practitioners have seen a recent proliferation in the use of chiropractic on horses. However, because veterinarians have not been formally educated in chiropractic principles or techniques in their traditional education, many practitioners do not understand the basic premise behind chiropractic or its indications or contraindications. Also, limited research has been done to evaluate the clinical use of chiropractic techniques on quadrupeds. Veterinary medicine, for the most part, has been forced to acknowledge the use of animal chiropractic and other nontraditional modalities by owners that have sought practitioners that utilize these techniques and have experienced their perceived therapeutic effects.¹ If veterinarians have not taken the time or effort to learn about these nontraditional techniques, then it is difficult for them to evaluate their use objectively or discuss the indications for a specific treatment modality. Therefore, owners often seek advice about alternative therapies or treatment from someone that is not their regular veterinarian

and often without his or her knowledge. In addition, some so-called equine chiropractors are not professionally trained nor licensed in either chiropractic or veterinary medicine. The purpose of this article is to describe the principles, indications, and contraindications for equine chiropractic evaluation and treatment.

2. What Chiropractic Has to Offer to Veterinary Medicine

Veterinary medicine is faced with some limitations when dealing with animals that have no obvious localized pain or have vague, unspecified lameness. Lameness is usually characterized as affecting three different body regions: front legs, hindlegs, or the back, which may involve any structure from the head to the tail. However, neck or back problems and leg injuries are often interrelated. An example of this relationship is an acute or chronic lower limb injury that causes the horse to carry the affected leg abnormally. The abnormal weight bearing and altered gait can subsequently overwork or injure proxi-

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mal limb musculature and neck or back muscles. Similarly, spinal injuries can in turn cause increased concussive forces, lower limb lameness, or gait abnormalities as the horse tries to protect its sore neck or back. Horses may also appear to have back pain with a primary neurologic disorder, colic, or even dental problems.^{2,3} The diagnostic dilemma facing veterinarians is to decide whether the leg injury, or the spinal injury, is the primary or initial cause of the horse's clinical problem. Unless the primary cause of the neck or back pain is identified and treated, most horses will have recurrent back pain when returned to work after a period of rest or a trial of anti-inflammatory medications.

The prevalence of back problems in horses varies greatly (from 0.9% to 94%), depending on the specialization or type of practice surveyed, i.e., general practice, 0.9%; Thoroughbred racehorse practice, 2%; veterinary school referrals, 5%; mixed equine practice (dressage, show-jumpers, eventing), 13%; spinal research clinic, 47%; or equine chiropractic clinic, 94%.⁴ Chiropractic provides expertise in the evaluation of joint and spinal-related disorders and can provide an additional means of diagnosis and early treatment options in certain types of gait abnormalities or performance problems, especially conservative treatment of mechanically related musculoskeletal disorders. Prepurchase examinations using chiropractic examination techniques can also help identify horses that have chronic underlying neck or back problems.⁵ Chiropractic addresses subclinical conditions or abnormal biomechanics that may progress to future debilitating musculoskeletal injuries (Fig. 1). Chiropractors are also trained in the use of physiotherapy techniques, such as heating and cooling modalities, muscle stimulation, transcutaneous electrical nerve stimulation (TENS, a form of electrically induced pain relief), and therapeutic ultrasound. Strength training exercises, massage, stretching techniques, and other forms of musculoskeletal and nerve rehabilitation are also taught in chiropractic school and used clinically in most human chiropractic practices. Equine chiropractic is a complementary modality that can be used in veterinary medicine for the diagnosis, treatment,

and potential prevention of select musculoskeletal disorders in horses.

3. Who Practices Equine Chiropractic?

Chiropractic evaluation and treatment of horses requires a thorough knowledge of the musculoskeletal system, specifically spinal anatomy, neurophysiology, biomechanics, and musculoskeletal pathology. Licensed professionals that have pursued additional formal training in equine chiropractic principles and techniques are best qualified to treat horses chiropractically. The primary organization involved in training veterinarians and chiropractors in animal chiropractic is the American Veterinary Chiropractic Association. However, many untrained individuals claiming to be equine chiropractors do not have any formal schooling or training in the basic principles and techniques of chiropractic. Untrained individuals also often have a limited knowledge of equine musculoskeletal anatomy, physiology, biomechanics, or potential pathology.

Most state chiropractic and veterinary medical boards do not allow chiropractors to treat animals unless they are working under the direct supervision of a veterinarian. This means that both the veterinarian and the chiropractor must work together in the evaluation and treatment of the horse. However, this does not happen very often in reality, especially if the person is not a licensed professional. It is strongly recommended that owners and referring veterinarians seek out *licensed professionals* that have had *specialized training and experience* in the chiropractic evaluation and treatment of horses.

4. Manual Therapy and Chiropractic: A Few Definitions

A. Chiropractic

The word chiropractic is derived from the Greek words *cher*, meaning hand, and *praktike*, meaning business or to practice. Therefore, chiropractic literally means to use the hands to diagnose, treat, and help prevent disease. The purpose of chiropractic is to optimize health through the body's inherent healing ability as affected by and integrated through the nervous system.⁶ The practice of chiropractic focuses on the relationship between structure (primarily the spinal column) and function (as coordinated by the nervous system) and how that relationship affects the preservation and restoration of health. Chiropractors use specific, controlled forces or thrusts applied by their hands or specialized instruments. Forces are applied to a specified articulation or anatomic region to induce a therapeutic response by means of induced changes in joint structures, muscle function, or nerve reflexes. The principle common to all chiropractic theories is that joint dysfunction affects the normal neurological balance found in healthy individuals.

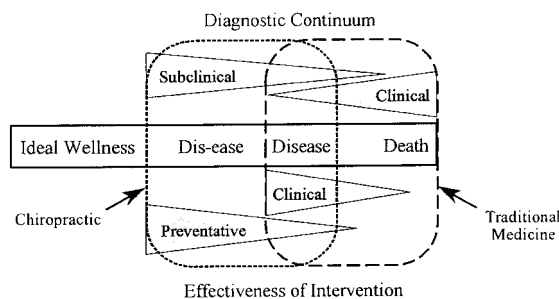


Fig. 1. Diagram representing the spectrum of health, diagnostic continuum, and the effectiveness of therapeutic intervention. The outlined regions enclose the perceived realms of chiropractic and traditional medicine.

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B. Manual Therapy

Manual therapy is the application of the hands directly to the body with the goal of treating articulations or soft tissues. Chiropractic is a form of manual therapy.

C. Mobilization

Mobilization is movement applied singularly or repetitively within or near the physiological range of joint motion, without imparting a thrust or impulse. Mobilization is used to restore joint mobility, but it does not elicit the same mechanical or biological sequelae as manipulation or chiropractic adjustments.^{7,8}

D. Manipulation

Manipulation is a manual procedure that involves a directed thrust to move a joint past the physiological range of motion, without exceeding the anatomical limit (Fig. 2). Manipulation involves both long- and short-lever contacts. Chiropractic is a form of manipulation that uses short lever, high velocity, low amplitude, controlled thrusts.

E. Adjustment

An adjustment is any chiropractic procedure that uses specific and controlled force, leverage, direction, amplitude, and velocity, which are applied to a specified anatomical region, bone, or joint to produce a desired therapeutic response (i.e., restore joint motion and reduce pain). Adjustments influence both mechanoreceptor and nociceptor function by means of mechanical and biological mechanisms.⁸ The therapeutic dosage of chiropractic adjusting is controlled by the number of vertebral levels adjusted, the amplitude of the applied force, and the frequency of adjustments.

5. Physiology of Joint Manipulation

A spinal motion segment is a functional unit of the spine and includes two adjacent vertebrae and the associated soft tissues that bind them together. Injury or alteration of a spinal motion segment may cause altered proprioception, muscle hypertonicity (i.e., protective muscle guarding), altered meningeal tension, altered intervertebral disk and joint biomechanics, or increased tension and stress in the joint capsules and adjacent ligaments.^{7,8}

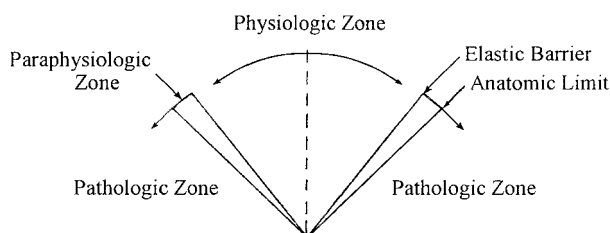


Fig. 2. Diagram of the three zones of joint motion.

Joint motion can be categorized into three zones of movement: physiologic, paraphysiologic, and pathologic (Fig. 2). The physiological zone of movement includes both active and passive ranges of motion and is the site where mobilization and low-force or nonforce adjustments are applied. The paraphysiologic zone of movement occurs outside the joint's normal elastic barrier and is the site of joint cavitation. The normal elastic barrier of the joint is a semirestrictive anatomical barrier between the physiologic and paraphysiologic ranges of motion. The pathological zone of movement lies outside the limits of normal anatomic joint integrity and is characterized by joint injury (e.g., sprain, subluxation, or luxation).

The purpose of chiropractic adjustments is to restore normal joint motion, stimulate neurologic reflexes, and to reduce pain and muscle hypertonicity. Successful manipulation requires the proper technique and heightened psychomotor skills.⁷ The proper chiropractic technique includes precise patient and doctor positioning and joint manipulation. The specific requirements of adjusting include correct direction, force, amplitude, and velocity of the applied thrust. A thorough knowledge of vertebral anatomy and joint biomechanics is required for proper chiropractic evaluation and treatment. During a successful adjustment, a release or movement of the restricted articulation is palpable. An audible cracking or popping sound may also be heard during adjustment, as the applied force overcomes the elastic barrier of joint resistance. The rapid articular separation produces a cavitation of the synovial fluid. Radiographic studies postadjustment have shown a radiolucent cavity within the joint space (i.e., vacuum phenomenon) that contains 80% carbon dioxide and lasts for 15–20 min.⁹ A second attempt to recavitate the joint will be unsuccessful and potentially painful until the intra-articular gas has been reabsorbed (i.e., refractory period).

6. Pathophysiology of Spinal Segmental Dysfunction

Spinal segmental dysfunction (i.e., chiropractically defined as subluxation) is a spinal lesion characterized by (1) asymmetric or loss of normal joint motion in one or more planes; (2) altered point tenderness or diminished pain threshold to pressure in the adjacent paraspinal tissues or osseous structures; (3) abnormal paraspinal muscle tension; and (4) visual or palpatory signs of active inflammatory processes or chronic tissue texture abnormalities (i.e., edema, fibrosis, hyperemia, or altered temperature).⁸ Segmental dysfunction is the primary dynamic spinal lesion that chiropractic addresses.

The vertebral subluxation complex is a theoretical model of spinal segmental dysfunction that incorporates the complex interaction of pathological changes in nervous, muscular, articular, ligamentous, vascular, and connective tissues. These altered physi-

ologic and biochemical processes influence the neuromusculoskeletal system in the following ways: altered joint mobility (hypomobility, hypermobility), altered neurologic reflexes and pain sensation (inhibition, facilitation), altered muscle function (hypertonicity, atrophy), connective tissue changes (fibrosis), and vascular alterations (ischemia, hyperemia). Additionally, the inflammatory process influences all these components to produce biochemical and cellular changes that result in distinct spinal histopathology.

Hypomobility of a spinal motion segment is characterized by abnormally reduced joint mobility caused by altered joint biomechanics (Fig. 3). Hypomobility may be caused by altered intervertebral disks, local edema or inflammation of tissues, muscular contractions, or capsular or periarticular adhesions. Reduced or asymmetric motion in one spinal motion segment may induce compensatory hypermobility in adjacent spinal segments.

Hypermobility of a spinal motion segment is characterized by abnormally excessive joint mobility caused by intra-articular damage, injuries to the joint capsule, or ligamentous laxity. The increased joint mobility results in altered joint stability, joint derangement, and secondary muscle hypertonicity. Hypermobility is generally considered a contraindication for chiropractic adjustments but can be managed with other forms of therapeutic intervention.

Multiple theories have been proposed and tested over the years to explain the pathophysiology of spinal segmental dysfunction and its interactions and influences on the neuromusculoskeletal system and the other body systems.^{7,8} Joint degeneration usually progresses through three phases of pathology: dysfunction, instability, and degeneration.¹⁰ Spinal segmental dysfunction is not usually visible on plain films, but it can be seen with flexion-extension (i.e., stressed views) or videofluoroscopy. Joint dysfunction is characterized by altered joint motion (i.e., hypomobility or hypermobility), localized pain and inflammation, and abnormal paraspinal muscle hypertonicity. The instability phase is characterized by cartilaginous, meniscal, capsular, and ligamentous deformation and degeneration. Potential radiographic findings may include osteophyte formation (i.e., traction spurs), vertebral insta-

bility (i.e., listhesis) or evidence of intervertebral disk protrusion. The spinal degenerative phase is characterized by attempted stabilization of the degenerative tissues. Radiographic signs of advanced osteoarthritis and osteophyte formation, spinal ligament ossification, and spinal ankylosis can be visualized at this stage.

The basic elements of spinal dysfunction include altered articular neurophysiology, biochemical alterations, joint capsule pathology, and articular degeneration.^{7,8} Alterations in articular neurophysiology from mechanical or chemical injuries can affect both mechanoreceptor and nociceptor function by means of increased joint capsule tension and nerve-ending hypersensitivity. Mechanoreceptor stimulation induces reflex paraspinal musculature hypertonicity and altered local and systemic neurologic reflexes. Nociceptor stimulation results in a lowered pain threshold, sustained afferent stimulation (i.e., facilitation), reflex paraspinal musculature hypertonicity, and abnormal neurologic reflexes.

Mechanical or chemical irritations also induce local biochemical alterations and the release of inflammatory products. The inflammatory process can alter the intra-articular environment and contribute to joint capsule pathology and periarticular fibrosis. Concurrent paraspinal musculature hypertonicity further restricts joint motion and may also contribute to intra-articular and extra-articular adhesion formation. Progressive joint immobilization can lead to continued articular degeneration, fibrocartilaginous replacement of the joint cavity, degenerative joint disease, and eventual ankylosis. Joint degeneration continues as the dysfunctional joint is unable to distribute normal biomechanical stresses. Abnormal joint and paraspinal tissue biomechanics induce additional articular degeneration, subchondral bone changes, and joint derangement.

7. Why Do Horses Need Chiropractic Care?

Chiropractic conditions in performance horses usually have a history of a traumatic event or injury related to overexertion.¹¹ The trauma may have occurred in a single event such as a trailer accident or fall (i.e., macrotrauma). The injury may also occur over a long period as a result of cumulative, repetitive injuries (i.e., microtrauma) associated with poor saddle fit, improper riding techniques, or faulty conformation. Long periods of confinement, inconsistent training programs, overuse syndromes, or stresses and strains related to athletic activities may also predispose horses to musculoskeletal injuries and reduced performance. Older horses, just like elderly humans, are susceptible to loss of spinal flexibility, joint degeneration, and loss of muscle strength. Aged horses also have increased healing times and increased chances of having chronic conditions or abnormal musculoskeletal compensations from prior injuries.

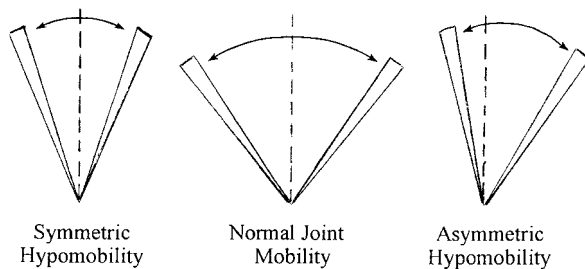


Fig. 3. Diagram of symmetrical and asymmetrical loss of normal joint motion.

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8. What Types of Conditions Respond to Chiropractic Care?

Many injuries start as mild or seemingly harmless conditions that after time develop into more serious problems. Poor saddle fit, inadequate shoeing, or poor conformation are factors that contribute to these types of slowly developing injuries. Other injuries are severe or life threatening and gradually improve but may never totally resolve; or they improve for a short time but later develop into debilitating arthritis or soft-tissue fibrosis. Trailer accidents, falling over backward, or dramatic falls over jumps are examples of some of these types of injuries. Chiropractic care can help manage the muscular, articular, and osseous components of some of these injuries in performance horses.

Chiropractic treatment addresses mechanically related disorders of the nervous or musculoskeletal systems. Chiropractic care can provide a conservative means of treatment for horses with back problems and may also help in the prevention of some mechanically related disorders. Research suggests that spinal manipulation may also affect certain neurologic and visceral disorders (e.g., cardiovascular, respiratory, gastrointestinal, etc.) by means of somatovisceral reflexes in both animals and humans.^{7,8} Trained animal chiropractors should be able to evaluate spinal disorders and determine if the neck or back problem will be potentially responsive to chiropractic care or if a medical or surgical condition exists that can be better managed with traditional veterinary care. Unfortunately, chiropractors are often asked to treat animals as a last resort, when all else has failed or when the disease has progressed to an irreversible condition. Chiropractic care has helped some of these chronic conditions when other types of treatment have failed. However, chiropractic care is usually much more effective when utilized earlier in the course of a disease (Fig. 1).

9. Spinal Pathology in Horses

Injuries or disorders anywhere along the spinal column can have serious effects on the horse's ability to perform. Diagnosis of the underlying spinal pathology in horses with back pain is very important in the appropriate treatment and chiropractic management of spinal disorders. Primary spinal injuries usually affect the paraspinal musculature or spinal articulations. Back or neck injuries may occur as a result of trauma, poor conformation, improper tack, or use and fitness level of the horse. Spinal problems can be classified into three basic types of injuries involving either the muscles, tendons, and ligaments (soft-tissue injuries), bones and joints (osseous injuries), or nervous system (neurologic disorders). However, multiple concurrent injuries have been reported in 17% of horses with back pain.¹²

Soft-tissue injuries have been noted in 39% of

horses with back pain.¹² The most commonly reported injuries included longissimus muscle strain and supraspinous and sacroiliac ligament sprains. Jeffcott reported a complete recovery rate of 73% and recurrence of 25% in horses with soft-tissue spinal injuries.² Chiropractic care is usually contraindicated in the acute stages of soft-tissue injury. However, as the soft-tissue injury heals, chiropractic has the potential to help restore normal joint motion, thus limiting the risk for future reinjury. Specialized soft-tissue techniques can also help to treat myofascial trigger points and muscle hypertonicity characterized as noninflammatory muscular disorders that may produce ischemic, tender points or hypertonic bands within muscles. Myofascial trigger points are usually associated with sites of muscle belly innervation. Various physiotherapy techniques can also be used with traditional veterinary care to optimize ligamentous healing.

Osseous pathology is usually localized to the mid-section of the back that lies under the saddle. Jeffcott reported a 39% prevalence of osseous vertebral lesions in horses with back pain.² A thorough knowledge of the osseous anatomy and potential developmental or congenital anomalies of the axial skeleton is required for the proper evaluation and treatment of spinal disorders. Abnormal spinal curvatures are due to either structural or functional defects. Structural defects include articular facet hypoplasia, hemivertebrae, or other osseous malformations. Chiropractic is usually not indicated in these types of defects because they are usually quite severe if noted clinically, and affected horses are often euthanized. However, functional defects, such as unilateral paraspinal muscle contraction, may be amenable to chiropractic care. Severe osseous changes such as joint subluxation, luxation, or fractures are often contraindications for chiropractic. Impinged spinous processes are thought to be due to conformational defects in the spinous processes.¹² Abdominal strengthening or spinal flexibility that promotes a reduction in spinous process impingement may be helpful in the healing process. Chiropractic care may provide symptomatic relief in early degenerative joint disease if related to joint hypomobility and subsequent joint degeneration.

Cervical myelopathy is due to both structural and functional disorders in the cervical vertebrae. Static compression caused by malformation and dynamic lesions caused by segmental hypermobility are both contraindications for cervical adjustments. However, regional hypomobile vertebrae may require chiropractic adjustments to help restore adjacent joint motion and potentially reduce joint hypermobility in the affected vertebrae. All infectious or toxic neurologic disorders are not primary chiropractic conditions because they are not mechanically related spinal disorders. However, chiropractic care or certain physiotherapy modalities may be indicated af-

ter initial medical treatment to help limit residual spinal pathology.

10. How Does Chiropractic Work in Horses?

Most of what we know about animal chiropractic has been borrowed from human chiropractic techniques, theories, and research and adapted to our animal patients. Therapeutic trials of chiropractic adjustments are often used since we currently have limited knowledge about the effects of chiropractic care in animals. Chiropractic adjustments are applied to areas of spinal segmental dysfunction and the horse's condition is closely monitored as the neuromusculoskeletal system responds to the applied treatment. In general, conditions with an acute onset respond rapidly to adjustments, whereas chronic conditions usually take long-term treatment or rehabilitation. Chiropractic is a conservative modality that may be applied repetitively over a set time period as the patient's own recuperative abilities are used in the healing process to restore normal joint motion and neurologic function. This is often a confusing concept for most traditional practitioners accustomed to a one-time fix by utilizing potent medications or surgical procedures.

Question: How can a 1200 lb (~544 kg) horse be adjusted? Answer: one spinal segment at a time. The following equation helps us to understand what is happening when a force is applied to a horse's back during adjusting:

$$\text{force} = \text{mass} \times \text{acceleration.}$$

Because the mass (i.e., spinal segment) is constant, a rapidly applied adjustive thrust will produce a proportionately larger force within the spinal column than a slowly applied adjustive thrust can produce. Small, rapidly applied adjustments are also easier to control and have less risk of soft-tissue injury than more forceful types of manipulation. Additionally, if the horse does not relax the paraspinal musculature, then the mass that is affected increases dramatically from the weight of one spinal segment to the weight of the entire spinal region or potentially the entire horse. An effective adjustment cannot be applied to a nervous, tense horse without risk of injury to the horse or the practitioners themselves.

Chiropractic adjustments are usually done without any sedation or other medications, but they may occasionally be done under anesthesia if this is indicated. Chiropractic is *not* done with sledge hammers and two-by-fours, ropes and pulleys, pickup trucks, or tractors. These types of techniques are often applied without a thorough understanding of joint physiology, spinal anatomy or biomechanics, or chiropractic principles. A good rule of thumb is, if it does not look like something that you would be willing to have done to yourself, then maybe you should not have it done to a horse.

11. Equine Chiropractic Techniques

Horses are usually held by a trained handler on a loose lead during the chiropractic adjustments. The cervical spine, sacrum, and extremities are evaluated and adjusted as needed from ground level. However, the thoracolumbar spine and pelvis often require an elevated surface for the horse to stand on for effective adjustments and proper doctor positioning to limit potential injury to the doctor. Equine chiropractic is physically demanding and requires significant mental concentration. The horse must be relaxed and focused on what the practitioner is doing. The practitioners must also be relaxed and focused on the horse to adjust a specific vertebra without causing injury to the surrounding tissues or to the doctors themselves. Environmental distractions are counterproductive to effective chiropractic care. Muscle relaxation allows the specified joints to be brought to tension before adjusting and to evaluate the elastic barrier of the joint. Motion palpation is utilized to evaluate joint motion restrictions so that the adjustive thrust can be applied correctly. Stabilization of adjacent joints or spinal segments is required for the application of a proper adjustive thrust. Chiropractic adjustments involve rapid, small amplitude forces applied to specific musculoskeletal structures with the intent of evoking a therapeutic response.

Postadjustive recommendations for actively training horses usually include stall rest or pasture turnout for one day. This provides an opportunity for the horse's body to respond to the applied treatment without being exposed to potential inciting factors of the spinal segmental dysfunction. The horse is asked to return to normal work the next day unless other musculoskeletal injuries are present; then appropriate supportive care is recommended. If stiffness or soreness is noted after adjusting, then an additional day of rest is suggested. If severe or continued discomfort is noted for 2 days then re-examination and appropriate referral, medications, or physiotherapy should be prescribed.

12. Adjunctive Recommendations or Treatment

Chiropractic care is often supplemented with massage, physiotherapy modalities, and stretching or strengthening exercises to assist soft-tissue rehabilitation. These concurrent therapies also help to encourage owner participation in the healing process and provide close monitoring of the patient's progress. Other recommendations may include changes in training schedules or activities, corrective shoeing, or tack changes. Many practitioners have also reported synergistic therapeutic effects with the combined use of chiropractic, acupuncture, and other holistic modalities in equine patients.

13. What Conditions Are Not Treated by Chiropractic?

Chiropractic is not a cure-all for all neck or back problems and is not suggested for the treatment of

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fractures, infections, neoplasia, metabolic disorders, or nonmechanically related joint disorders. Serious diseases requiring immediate medical or surgical care have to be ruled out and treated by conventional veterinary medicine before routine chiropractic treatment is instituted. However, chiropractic care may contribute to the rehabilitation of most postsurgical cases or severe medical conditions by assisting in the restoration of normal musculoskeletal function. Chiropractic care cannot reverse severe degenerative processes or the overt pathologic manifestations of most medical disorders. Chiropractic works optimally in the early clinical stages of disease versus end-stage disease where reparative processes have been exhausted (Fig. 1). This is why chiropractic care and other holistic modalities often fail to produce their fully desired therapeutic effects if used as a last resort.

14. Complications or Adverse Effects of Chiropractic Adjustments

Potential unwanted side effects from *properly* applied chiropractic treatments include a transient increased stiffness or worsening of the condition after adjusting (i.e., aggravated complaint, worsening of the pre-existing state, regional soreness, lameness, etc.).⁷ Adverse reactions from spinal adjustments may occur immediately postadjustment or insidiously within the next 6–12 h. The undesired effects usually last less than 1–2 days. If more serious reactions are noted that last longer than 1–2 days, a thorough re-examination and appropriate treatment should be prescribed. If the condition does not improve with conservative care, then referral for more aggressive diagnostic or therapeutic modalities is recommended.

Potential harmful side effects from *improperly* applied manipulation from untrained individuals may include permanent tissue damage and loss of function (i.e., torn ligaments, injured muscles, luxated joints, fractures, or paralysis if severe underlying pathology is present).

15. Summary

A thorough knowledge of equine spinal anatomy, biomechanics, and potential pathology is required to understand the principles and theories behind chiropractic and to apply its techniques properly. Chiropractic provides additional diagnostic and therapeutic means that may assist the equine practitioner to identify and treat the primary cause of equine lameness or poor performance. Specialized training in the evaluation and treatment of spinal joint

dysfunction and neuromusculoskeletal disorders places chiropractic in the forefront of conservative treatment of spinal-related disorders. However, limited research is currently available on equine chiropractic and other nontraditional modalities in veterinary medicine. In 1996, the AVMA's Committee on Alternative and Complementary Therapies suggested that the research community should be encouraged to prioritize avenues of research and to allocate research funds to projects that will provide further scientific evaluation of these modalities.¹³ The future of equine chiropractic in veterinary medicine is dependent on future research into the clinical effects of chiropractic techniques and the basic pathophysiology of spinal-related disorders in horses.

For more information, contact the American Veterinary Chiropractic Association (AVCA), 623 Main St., Hillside, IL 61257. Office: 309-658-2920; fax: 309-658-2622; e-mail: AmVetChiro@aol.com. This article was reprinted in part from K. Haussler, Equine chiropractic and spinal examination, in *Proceedings*. Annu Conf Am Holistic Vet Med Assoc 1996;115–137.

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