

Healing Oasis Wellness Center
2020 Conference – Nov 13th – 15th, 2020
Biomechanics and Performance – The Perfect Marriage
Location: National University of Health Sciences, Lombard, IL

SPEAKERS:

Clayton

1. **When the hoof meets the ground:** The hoof interacts with the ground throughout the stance phase of the stride. The component parts of stance are primary impact, secondary impact, support, and break over, each of which plays a role in developing the necessary ground reaction forces. The goal is to develop the forces necessary to perform a specific activity while preserving the integrity and soundness of the limb tissues. The physical properties of the footing, such as hardness, elasticity, and shear resistance, affect how it interacts with the hoof and loads the limbs. This talk explains stance phase mechanics and explores how different properties of the footing affect limb loading, performance and soundness.
2. **Ground reaction forces: the sine qua non of legged locomotion:** Locomotion results from the generation of ground reaction forces (GRF) when the hoof presses against the ground during the stance phase of the stride. The same forces that propel the horse upward, forward and sideways are also responsible for the majority of equine lameness. This talk describes generation of GRFs between the hoof and ground, the transmission of these forces through the limb, and the potentially deleterious effects on the bones, joints and soft tissues. The GRFs from all grounded limbs combine to produce a net GRF that is responsible for movements of, and rotations around, the horse's center of mass. Each gait has a distinct and different limb support sequence and GRF pattern that determine the body motion characteristics of the gait.

Cramer

1. **Current Research Related to Spinal Manipulative Therapy (SMT).** This session will summarize key research findings related to spinal manipulative therapy (SMT). Findings related to mechanisms of action of SMT, particularly findings related to biomechanics, will be emphasized. Recent research findings related to SMT treatment of mechanical neck and back pain and intervertebral disc disorders, as well as risk vs. benefit of SMT will be included. Recently adopted professional guidelines for care involving SMT will also be summarized.
2. **Biomechanics of Spinal Manipulative Therapy (SMT).** This session will include a discussion of current biomechanical principles related to back pain and SMT. Biomechanics of the facet (zygapophyseal) joints and intervertebral discs and how SMT affects these structures will be emphasized. Unique biomechanical features of SMT of the cervical, thoracic, lumbar, and sacroiliac regions will be discussed. In addition, mechanical strategies used to modify SMT based on the unique characteristics and pathologies of patients (i.e., control strategies) will be presented. Special biomechanical characteristics of unique procedures (e.g., traction, very high velocity – low amplitude manipulation) will be included in the discussions.

Haussler

1. **Upper and lower cervical biomechanics, pathology, and related performance in the veterinary field.** This presentation will focus on the functional anatomy and sports medicine aspects of the cervical region. Soft tissue, osseous and neurologic pathology will be discussed as it relates to the equine and canine chiropractic patient. Horse will be used as the foundational model with comparative or contrasting examples provided in dogs, where applicable.
2. **Thoracolumbar biomechanics, pathology, and related performance in the veterinary field.** This presentation will focus on the functional anatomy and sports medicine aspects of the thoracolumbar region. Soft tissue, osseous and neurologic pathology will be discussed as it relates to the equine and canine chiropractic patient. Horse will be used as the foundational model with comparative or contrasting examples provided in dogs, where applicable.
3. **Lumbosacral biomechanics, pathology, and related performance in the veterinary field.** This presentation will focus on the functional anatomy and sports medicine aspects of the lumbosacral and sacroiliac joint regions. Soft tissue, osseous and neurologic pathology will be discussed as it relates to the equine and canine chiropractic patient. Horse will be used as the foundational model with comparative or contrasting examples provided in dogs, where applicable.

Henry

1. **Five components of the oral examination: What you have been missing!** Our veterinary training as students was largely aimed at providing an examination of the body with great emphasis on the core systems. The oral cavity was often left for those that may have had an interest. In the past decade many advances have been made through scientific backed publications on the necessity of a thorough oral examination. This presentation will attack the oral examination by bringing to light the major disease processes and their clinical findings. It will give the practitioner a check list to complete so that a complete oral examination will be performed. Gone are the days of examining a horse for sharp teeth as well as examining a dog or cat for calculus accumulation of the teeth. We will also discuss the need for recognition of age related dental changes in the species.
2. **Why you are lost without dental radiographs.** Along with a thorough oral examination comes the need for dental imaging. In many circumstances there are disease processes that are progressing bellowing the gum line and are not manifesting visually in the oral cavity. This presentation will demonstrate the necessity for dental imaging as it relates to each disease process and give a check list of the process for reviewing the radiographs. We will also discuss proper labeling and positioning to obtain diagnostic images. This will be an eye opening presentation for anyone performing routine dentistry in horses, dogs and cats.

Henderson

1. **Strengthening specific muscle groups to improve on biomechanics to reduce strain on passive tensile tissues.** This lecture will involve a discussion of biomechanics for the tissues across joints that are highly active in certain functional movements of dogs. Emphasis will be placed on specific exercises to address the active, contractile muscle tissue and its role in protecting passive tensile tissues from excessive forces. Proper form and execution of the exercises to achieve desired goals will be included.
2. **Core strengthening for lumbosacral stenosis.** This lecture will cover the biomechanics of movement across the lumbosacral joint, anatomical variation across dog breeds and physical demands in performance and working dogs that influence this joint. The risk factors for lumbosacral stenosis and therapeutic measures will be discussed, based heavily on the human literature in the management of chronic low back pain. The material will also include core strengthening for possible prevention of recurrence of the associated clinical signs in dogs with lumbosacral disease.
3. **Most common conditions encountered in working dogs (military and police).** Military and police working dogs have specific physical demands placed upon them by their duties. Common musculoskeletal injuries and disorders of working dogs will be discussed in this lecture, along with surgical and non-surgical treatment and prognosis for return to duty. We will also cover some of the unique challenges of management of injuries and post-operative cases and physical rehabilitation for high-drive working dogs.
4. **Functional rehabilitation for performance dogs.** Working and sporting dogs have activities of daily living that go well beyond those of most house pets. For these athletes, a complete rehabilitation program after injury or illness must include a re-conditioning phase for return to those activities. This lecture will focus on implementation and progression of specific exercise techniques to support safe and effective return to performance for common sporting and working dog tasks.

Gudehus, Timm

1. **Podiatry: “Proven concepts in a diverse field of vague recommendation, research, and current biomechanical understanding.** Podiatry and hands-on clinical training around the equine foot used to be an important part of the large animal clinician’s curriculum throughout the clinical years in veterinary school. Seemingly, this has been slowly removed and knowledge from the past is being lost. Also, the biomechanical aspect has been dropped out of according textbook chapters. Given the ungular stance and locomotion, peak forces concentrate across a small area for a large body weight. Depending on speed and impact, the peak forces are exponential the body mass of the patient. It appears logic that all ground breaking forces are exacerbated or improved based on podiatry adaptations, for the better or the worse. This talk will recap historical knowledge and experiences from older text books reaching back to the early 1900’s. In addition, modern biomechanical analysis, lab-work and force plate research will be incorporated to weed through the plethora of knowledge and differentiate this as scientific as possible from

false claims circulating the layman's knowledge available through journals, brochures and the internet.

- 2. Implants leading to fatigue when improperly used.** Equine osteosynthesis remains a high-failure enterprise at high to extreme cost. The reason is multifold and partially explained by bodyweight, flight mode and immediate need for weight-bearing and stress-shearing capacity through recovery and healing. Previous mismatch of implant size and patient size and weight has been overcome at least in part in the past decade through equine-specific implants. This has made some osteosynthesis results more practical and predictable short of the complication of infection. This presentation will revisit the most common attempted and performed equine fracture repairs. It will also explain how recent improvements in imaging technologies has made certain fractures visible and therefore more treatable. The main focus will be on presenting recent advancement in equine-specific implants and how that shifts the perception from a surgeon's perspective. The relationship of cycling, cyclic-fatigue (at a rate of 200-400 ambulatory cycles per day) and implant stability or failure will be explained in regards to biomechanical testing and clinically relevant results. Altogether, the clinician will leave with a better and recent-most perception of what can and can't be done and how to translate this knowledge into a client-owned clinical patient in the field.
- 3. The Equestride-device is a very functional tool that remains unparalleled.** Complete rupture of equine tendons and suspensory apparatus are often considered untreatable. When attempted, convalescence is long and often a path accompanied by cast and splint sores. Different devices have been described over the years including but not limited to the fetlock and pastern support braces, casts, splints and half-splints, self-made or custom fitted. Aside of the fetlock support brace that utilizes the elasticity of an inner tubing strapped over a metal frame in a 3-point contact and the "elasticity" of the bending of the half-splint or cast shell, these contraptions may be successful. However, they lack a dynamic aspect to load the soft tissue structures at increasing rates by reducing support. Also, they are often accompanied by limiting sores that limits their use. In the early 2000's, Roger Smith and colleagues described the use of a novel device called Equestride. Made of a carbon, this light-weight boot system is made of a rigid outer shell with an elastic spring-like inner membrane. The outer shell is comprised of three components (under the fetlock and the back of the cannon bone), a dorsal pastern brace and a dorsal cannon bone plate. Thereby, it exerts a three-point biomechanical support to the fetlock area. Around the world, the device has been used successfully on thousands of cases successfully but has not been published on since. This presentation will familiarize the practitioner in general with standard methods to immobilize acute and sub-acute soft tissue injuries. In addition, this presentation will cover the transition into a dynamic device, it's fitting and application in clinical cases.

Tomlinson

- 1. Cross-training or sports specific training; controversies and recommendations for the Canine & Equine Patients.** This talk will cover the relative merits of sports-specific training including relevant literature from all species. How that training results in tissue and metabolic response, along with recommendations for training vs rest periods. Cross-training will also be discussed, the specific targets of muscles and joints regarding strength and flexibility. The effect of training on the nervous system is known in other species and can be loosely applied to dogs and horses.

2. **Biomechanics of canine agility - what do we know?** Agility is a sport that requires accuracy, speed, and communication between two species. We only know a small amount about the biomechanics when dogs navigate agility obstacles but that knowledge is steadily growing. Dr Tomlinson will present an overview of current literature and outline what is still unknown and what are likely myths. Finally, future directions recommended in research will be discussed.
3. **Improving gait efficiency after injury in the sporting dog.** Injury results in tissue damage. Different tissues heal at varying rates and the end result of healing changes elasticity, tensile and concussive strength. Our job as rehabilitation therapists is to maximize tissue function after injury. An overview of the biomechanics of canine gait will be given, followed by recommendations to return functional length, elastic storage of energy in tissues and limb movement to maximal efficiency.

MacQueen

1. **Them Vs. You: Implications of Veterinary Malpractice. Veterinary Medicine and its legal ramifications.** This will be an interactive discussion involving real world equine and small animal legal cases. The discussion will include an analysis of each element in a typical veterinary malpractice lawsuit, including: duty of care; failing to meet professional standards of care; causation; and damages. We will also discuss several other common causes of action that typically accompany a veterinary malpractice lawsuit, as well as recent trends in a pet owner's ability to recover emotional damages when their animal has been harmed.

LoGiudice

1. **Anatomy, Gaits, Form, and Function – Oh my!** We will dynamically and interactively review how to evaluate a dog's anatomy, conformation, and biomechanics and how these items directly affect gaits and quality of movement. A review will be included of how the conformation of some working breeds have changed over recent decades.
2. **Can we improve on form and function with VSMT and other therapies?** We will discuss and demonstrate how VSMT and other therapies can directly improve a dog's form and function, using discussion and case presentations.

Lowrey

1. **Evaluation of the fetlock, pastern, and coffin – What ultrasound can provide. I and II:** Evaluation of the fetlock, pastern and coffin region in the horse and how the use of ultrasound in the field can assist with your diagnosis. The utilization of ultrasound and radiology combined can be very effective. Cases will be presented to illustrate the effectiveness of ultrasound and how it may change your approach on how to work up a lameness.