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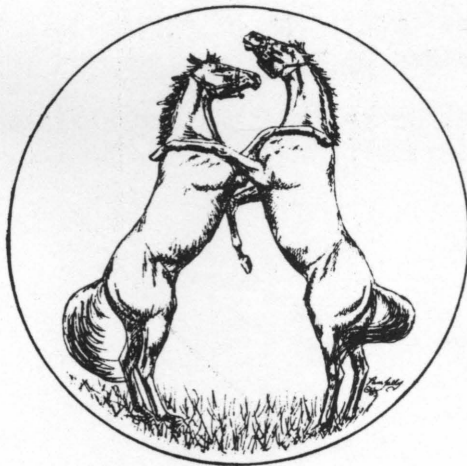
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1985

VIRGINIA HORSE CONVENTION SEMINARS

JANUARY 19-20, 1985
HOLIDAY INN - MIDTOWN
3200 WEST BROAD STREET
RICHMOND, VIRGINIA

ALSO INCLUDED: "THE VIRGINIA HORSE CENTER")



The Virginia Horse Council

organized by Virginia Horsemen for Virginia Horsemen

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Assembled By
Virginia Horse Council
P.O. Box 9532
Richmond, Va. 23228

Seminars Sponsored in Cooperation
With:

- * Virginia Cooperative Extension Service
- * Virginia Tech Animal Science Department
- * Virginia-Maryland Regional College of
Veterinary Medicine
- * Virginia Department of Agriculture and
Consumer Services
- * Virginia Horse Industry Organizations and
Individuals

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THE VIRGINIA HORSE CENTER

The Virginia Horse Center is envisioned as an equine event facility satisfying horse competition, education, marketing, and recreational needs for the Old Dominion while providing an adequate and appealing location for national and international events. In consideration of the strong traditional ties between the horse business and travel and tourism, the Virginia Horse Center would serve as the catalyst for expanded economic development in the state. The horse industry in Virginia currently has a tremendous impact on the state economy through its professional and recreational activities. This impact was estimated by the Virginia Cooperative Extension Service in 1981, at almost 322 million dollars annually. Each year Virginia's horse community either purchases or produces agricultural goods and services totaling almost 55 million dollars. It is ironic that in a state possessing an industry exhibiting such vitality, adequate facilities are not present to allow continued development.

As currently conceived the Virginia Horse Center would include: a large indoor arena (clear span floor, seating for over 4500 people); a sales pavillion (available for demonstrations and seminars, seating 800-1500 people); a covered warm up area (also suitable for small shows); permanent event stabling for 500 horses; grand prix show ring, large traditional outdoor show ring; at least one dressage ring (space available for additional temporary rings when needed for larger competitions); camping facilities; developed trails for recreation and competition use (combined training, coaching, competitive and endurance trail riding); and appropriate office and parking space.

Appreciation for the need and interest in the establishment of a horse center is not a recent phenomenon. In 1969, the Commission of the Industry of Agriculture's Horse Industry Task Force recognized the need and reflected the importance through the recommendation "Establish a large modern indoor arena for shows, sales and other programs". Continually since the appearance of this report fourteen years ago, Virginia's horsemen and other agriculturists have been discussing the establishment of a center. In its 1980 report to the Governor and the General Assembly, the Agricultural Opportunities Commission recommended that the Virginia Department of Agriculture and Consumer Services and our land grant universities "Develop marketing programs for the horse industry, such as a horse center, which, with sufficient private and public support, would enable this industry to increase its contribution to the economy of the Commonwealth".

A preliminary study of the establishment of a Virginia Horse Center was published by the Virginia Dept. of Agriculture and Consumer Services in June of 1979. This study generally reviewed the support voiced by numerous horse related organizations in Virginia, presented an initial list of needed facilities, recommended general acreage and location requirements, and provided suggestions of funding options. A resolution was then introduced and passed by the 1980 General Assembly creating a Joint Legislative Subcommittee to study the feasibility of establishing a

Virginia Horse Center. This joint subcommittee was composed of two Senators, three Delegates, the Commissioner of Agriculture and Consumer, and four citizens of Virginia representing various facets of the horse industry appointed by the Governor. This subcommittee received public testimony and began its initial study in 1980.

A continuing resolution was introduced and passed by the 1981 Assembly. During 1981, evaluation continued with emphasis placed on review of lands owned by the State which could possibly be utilized, continued evaluation of need, and a survey of possible private financial support.

In its report to the 1982 Assembly and the Governor, the subcommittee found that "The establishment of a horse center would greatly enhance the position of the industry and economically benefit the State". The subcommittee did not recommend construction due to the State's then current fiscal situation, but did recommend that "The Department of Agriculture and Consumer Services should continue to explore means of establishing a Virginia Horse Center, including siting, financing and management arrangements".

The 1982 General Assembly passed a resolution requesting the Department of Agriculture and Consumer Services to explore alternative means of establishing a Virginia Horse Center and continuing the Joint Subcommittee. Financial estimates were prepared for construction costs, gross revenue, operating expenses, profit/loss projections, impact on Virginia's economy, travel generated tax revenue, and overall comparative benefit of construction of such a facility.

This economic study estimated cost of construction at \$4,036,488 (exclusive of any cost for land). A projection based on no debt or debt service, minimal income and relatively high operating expenses indicated that on a yearly basis the center should pass the breakeven point after the second year and begin to show a modest profit. Estimated direct input to Virginia's economy (based on exhibitor spending only—not considering spectator dollars) rises from \$2,432,100 during the first year of operation to \$6,994,800 by the fourth year, totaling over \$20,000,000 during the first four years of operation. Estimated total tax revenue generated from travel associated with the proposed center totals \$1,771,714 for the same four year period.

The study by the Joint Legislative Subcommittee and the Virginia Department of Agriculture and Consumer Services illuminates several elements which must be integrated into any discussion of the Virginia Horse Center.

First of all, a Virginia Horse Center would have a dramatic positive impact on Virginia's economy, but would not in itself be a significant revenue generator (to achieve this, user fees would have to be quite high, excluding many Virginians). Secondly, the proposed facility is only feasible as a self supporting entity (after the first 24 to 36 months) if it is free from debt and resulting debt service. Thirdly, to ensure a maximum positive impact on the economy, the Virginia Horse Center would have to aggressively market its facilities and Virginia in general.

Several proposals from areas across the State were received by the Joint Legislative Subcommittee during late 1983 and early 1984. These proposals included ones offering land at no cost to the Commonwealth or established agricultural facilities seeking designation as the Virginia Horse Center and public funds to complete or upgrade their facilities. As interest appeared to be increasing from areas wishing to assist the State in establishing a Center in their localities, the subcommittee recommended that the study be continued so that proposals already received could be evaluated, new proposals could be accepted, and all proposed sites visited before final subcommittee recommendations be made. The subcommittee felt that the creation of the Virginia Horse Center was predicated on land at no cost to the Commonwealth and that a significant amount of non-state dollars be involved in construction. The study was continued by House Joint Legislation No. 64.

The deadline for submitting proposals was May 15, 1984. As of that date eight localities had submitted proposals. Each proposed site was visited by the subcommittee during early June of 1984. After extensive review of each proposal and site, the subcommittee unanimously adopted the following recommendations. These recommendations are included in the final report of that subcommittee to the Governor and General Assembly of Virginia (House Document No. 45).

RECOMMENDATIONS:

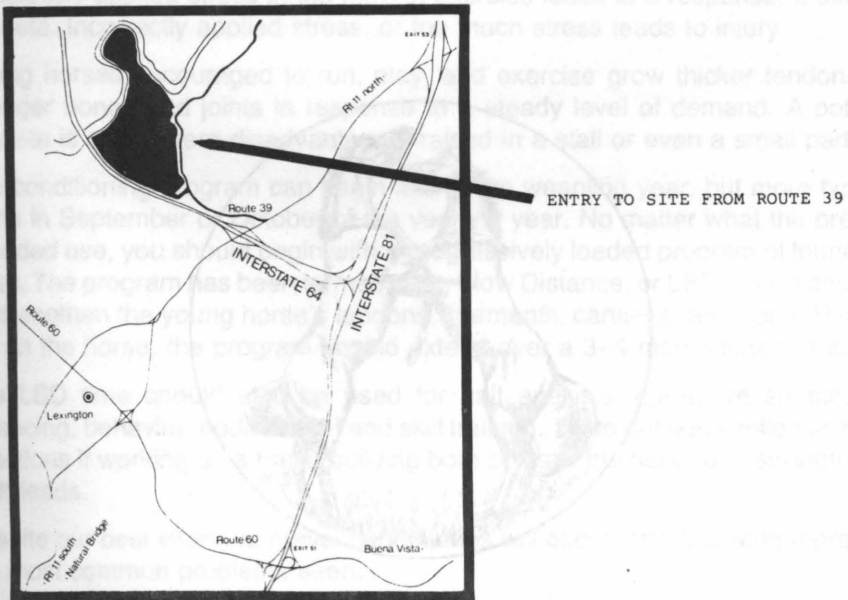
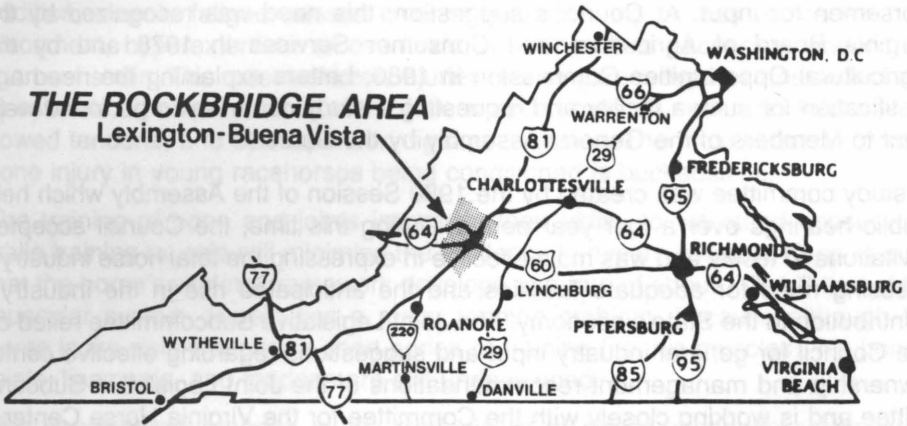
The subcommittee maintains that a Virginia Horse Center should be owned and operated by the Commonwealth under the direction of a board composed of citizens representing the many varied facets of the horse industry.

The site proposed by the Rockbridge Area Committee for a Virginia Equine Center is hereby recommended to the Governor and the General Assembly of Virginia as the location of the Virginia Horse Center.

This site recommendation is contingent on the fee simple conveyance to the Commonwealth of the 361 acre site, and the minimum pledge of \$885,000, to be available on reasonable demand following creation and funding of a Virginia Horse Center by the General Assembly. This site recommendation is also contingent on the continued and expanded statewide efforts by the Rockbridge Area Committee and the state horse industry to raise additional funds.

This subcommittee has determined that the creation and operation of a Virginia Horse Center on this site is feasible and beneficial to Virginia's economic growth, and recommends the establishment of such a facility.

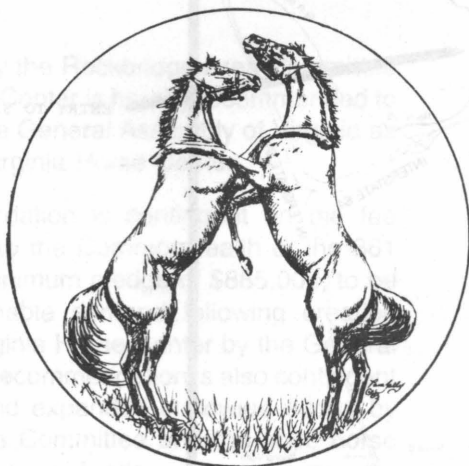
Establishment of the Virginia Horse Center requires enabling legislation be passed by the General Assembly and signed by the Governor, and that sufficient funds be appropriated to complement those pledged by the non-state sector.



VIRGINIA HORSE COUNCIL COMMITMENT TO HORSE CENTER ESTABLISHMENT

The Virginia Horse Council officially incorporated in 1971, two years after the Governor's Task Force recommended establishment of a large modern indoor arena for shows, sales and other programs. Through the mid 1970's the Council held preliminary discussions regarding the need for such a complex and what facilities should be included. Beginning in 1977, the Council began to actively inform the total horse industry of possible modes of establishment and survey horsemen for input. At Council's suggestion, this need was recognized by the Virginia Board of Agriculture and Consumer Services in 1978 and by the Agricultural Opportunities Commission in 1980. Letters explaining the need and justification for such a facility and requesting a study commission be found were sent to Members of the General Assembly by the Council.

A study committee was created by the 1980 Session of the Assembly which held public hearings over a four year period. During this time, the Council accepted invitations to testify and was most effective in expressing the total horse industry's pressing need for adequate facilities and the anticipated rise in the industry's contribution to the State's economy. The Joint Legislative Subcommittee relied on the Council for general industry input and suggestions regarding effective center ownership and management recommendations of the Joint Legislative Subcommittee and is working closely with the Committee for the Virginia Horse Center.



The Virginia Horse Council

Lameness In The Conditioning Process

By Larry Booth, DVM, MS

The majority of training injuries are due to a combination of concussion and hyperextension of the limbs. Hyperextension occurs as a result of muscle fatigue due to exhaustion. Fatigue affects the horse more quickly than the human athlete because the horse runs on its big toe, as opposed to the human who runs on the flat foot. As a result the entire suspensory system tends to droop out of shape allowing hyperextension of the joints as the horse gets tired, setting up for injury. In addition, muscle fatigue causes incoordination leading to loss of precise hoof placement, hyperextension or overflexion of joints, and excessive tendon and ligament strain. The most common injuries resulting from hyperextension include: 1) osselets, 2) chip fractures of the fetlock and carpus, 3) sesamoid fractures, 4) bowed tendons, and 5) suspensory ligament injuries. The most common form of bone injury in young racehorses being conditioned is buckedshins.

The training of bone and joints increases their ability to withstand concussion, while training muscle will minimize the tendency to hyperextension. Keep in mind that the horse's skeletal framework develops at a rate of about 1/2-1/3 that of the muscular system. Herein lies a major training problem, because although the horse looks visibly fit after a short period of training (i.e. his muscles), his bones, joints, ligaments, and tendons are still undeveloped.

The conditioning process is an example of a stress response relationship. Judiciously applied stress in the form of exercise leads to a response, a stronger athlete. Incorrectly applied stress, or too much stress leads to injury.

Young horses encouraged to run, play, and exercise grow thicker tendons and stronger bones and joints in response to a steady level of demand. A potential athlete is at a severe disadvantage if raised in a stall or even a small paddock.

The conditioning program can begin late in the weanling year, but more typically starts in September or October of the yearling year. No matter what the breed or intended use, you should begin with a progressively loaded program of foundation miles. The program has been termed Long Slow Distance, or LSD, and is designed to strengthen the young horse's tendons, ligaments, cartilage, and bone. Depending on the horse, the program should extend over a 3-4 month time frame.

The LSD time should also be used for gait analysis, corrective shoeing and balancing, behavior modification, and skill training. Try to get equal mileage in both directions if working on a track, building both sides of the horse and strengthening both leads.

Despite our best efforts at prevention, injuries will occur. The following represents the most common problems seen.

BUCKED SHIN COMPLEX:

This condition is usually seen in the racing Thoroughbred from about 18-36 months of age. It also occurs in the racing Quarterhorse and occasionally in the Standardbred.

Bucked shins are microfractures in the dorsal cortex of the metacarpal bones (cannon bones) and are the result of repetitive stress or fatigue. During training, the dorsal cortex of the bone remodels and thickens in response to the increased compression that occurs. If an abnormal amount of stress is applied before the bone has a chance to complete its remodeling phase, a fracture may occur.

The most successful approach to treatment combines rest, phenylbutazone and ice therapy in the acute stages followed by controlled exercise and electromagnetic therapy (blue boot). Controlled exercise includes walking for several weeks, followed by ponying and slow gallops for several more weeks until the horse appears clinically healed. At this time work can resume at a slower pace. Continued lower intensity work allows the bone remodelling process to proceed at the same time that the fracture is healing.

Preventative measures include; 1) putting a good foundation of work into the young horse, 2) avoiding hard track surfaces that prevent the hoof from cutting in leading to sliding of the foot on impact and increased compression on the dorsal cortex of the metacarpal bones, 3) avoiding toe grabs and the long-toe, long-heeled hoof shape which delay breakover and predispose to fatigue, and 4) avoiding horses with back at the knee conformation which increases compression on the dorsal aspect of the metacarpal bone. Thermography and bone density measurements using ultrasound may signal a problem and help prevent further injury.

FETLOCK PROBLEMS:

Synovitis (osselets), first-phalanx chip fractures and degenerative joint disease are encountered in all ages and stages of training. The cause is hyperextension of the joint. Abnormal track conditions, the long toe-low heel foot conformation and fatigue combine to produce and exaggerate the hyperextension that occurs.

Specific therapy depends upon the condition but generally includes cold water therapy, phenylbutazone, intra-articular corticosteroids, and/or hyaluronic acid, topical DMSO and electrical stimulation. Intra-articular fractures are best removed using arthroscopic surgery.

CARPAL PROBLEMS:

Carpal synovitis, chip, and slab fractures and degenerative joint disease occur as a result of repetitive hyperextension of the knee. Hyperextension is predisposed by: 1) conformational defects (calf knee), 2) limb fatigue and 3) long-toe, low-heel shoeing.

Arthroscopic surgery is now the treatment of choice for all carpal chip fractures. Synovitis and degenerative joint disease are handled similarly to the fetlock.

SESAMOID AND SUSPENSORY LIGAMENT PROBLEM:

Sesamoiditis, sesamoid fractures, and suspensory desmitis can occur in any equine athlete but occur most frequently in the Standardbred. Injuries involve problems of fatigue, loss of support, and poorly engineered race track turns. Sesamoiditis and sesamoid fractures can spell the end of a racing career depending upon the type and extent of the injury. Inflammation of the suspensory

ligament (desmitis) is a more serious problem in the racing Thoroughbred than in the Standardbred. Principles of therapy include rest, ice therapy, support bandages, and non-steroidal anti-inflammatories such as phenylbutazone. Controlled exercise and therapeutic ultrasound can help in the rehabilitation process. Ligaments heal slowly and actually heal stronger when they are stressed lightly. This means that the horse with a ligament injury should be rested only long enough to resolve the acute inflammation, then he should receive a progressively increasing amount of exercise that can be performed without lameness. The result will be a faster and stronger repair.

TENDON PROBLEMS:

Superficial digital flexor tendinitis (bowed tendon) is one of the most common injuries in Thoroughbred racehorses. This injury involves repetitive overstretching of the tendon leading to microtrauma and degeneration of the tendon fibers and eventually disruption of the tendon. Hyperextension of the limb due to exhaustion and fatigue of the flexor muscles can lead to extreme tendon stretch and gross disruption of the tendon fibers.

The principles of therapy are the same as for ligament injuries. Healing may take up to 9–12 months; and often the tendon never heals strong enough for a successful return to competition. Prevention and early detection of inflammation become critical. Thermography can provide a measure of early detection of inflammation in the tendon so that a major injury can be averted. Diagnostic ultrasound can provide information on the extent of damage to tendons and ligaments and can be used to monitor healing.

A Sound Horse Starts With Sound Basics

By Danny Ward

Hoof care as most know is a vital part of owning a horse. The old saying no foot-no horse will always apply.

The foundation of the horse is often overlooked on a day to day basis. Following simple procedures such as diet, exercise, routine cleaning, inspection and hoof care can prevent many problems down the road. These problems can be costly and lengthy to correct, if at all. Today's horses absorb a lot of shock and concussion as most have a job to do, whether it is in the show ring or just the good old pleasure horse.

A horse can only produce and perform as long as they are comfortable. Good early hoof care is the best time and money spent. This care not only depends on the farrier, but a joint effort with the owner. The shoer may only see each horse every six or eight weeks as the owner can be more aware of changes that may be seen on a day to day basis. Working together on a schedule of training , proper hoof care and evaluation can make a world of difference in later performance and endurance, not to mention comfort of the horse which has a direct affect over all movement encountered.

Let's back up a little and look at the foot in the early stages and changes that can be made under the most normal conditions. The foals hoof at birth is fairly soft and pliable and requires the downward weight and movement received to develop into a strong healthy foot. At the early age usually a lot of running and exercise is normal, so the wearing of one side of the hoof more than the other is normal. On another thought, it is not uncommon for one side to grow faster, which in either case redistributes the weight and pressure on the supporting leg or hoof. This unnatural distribution if not attended to in time could easily promote faulty confirmation, movement or possible lameness in later years. Many defects in shape, balance and flight can be avoided if caught and corrected early enough.

Basic training and handling of the legs should start early almost immediatly or no later than two to three weeks old. At this time the handler has the advantage and with good routine training can set habits that can pay off in years to come. All horses need periodic hoof care to be properly aligned and balanced to each individual's conformation. To the untrained eye most often there will look like nothing unusual is happening, but most often one side will be lower on the foot. After long periods, this can put uneven stress and pulling of the ligaments and suspensory system as well as misalignment of the bone structure that can cause many of the problems that occur with horse that have conformation and flight defects. Early training, patience and care will also reflect on the care by the farrier. This I can speak from experience from the quality of workmanship that goes into the unruly horse that is trying its best to put you out of business is usually much less than the horse that has been well mannered and accustomed to hoof care. To properly trim or shoe a horse, expecially if using or performance is expected, some cooperation is needed. The ones that stand are easier to handle and will surely get the better effort from the farrier which in turn will improve on not only stance, comfort but performance. Later in life when full grown and heavier, more shock will be received by the foot and leg, expecially when under use, good alignment will lessen the chance of strain and injury by allowing each part of the system to work with the other, evenly distributing weight and concussion received.

The foot when landing undergoes several changes that are necessary in maintaining a sound foundation. They are in this order:

1. Heels hits ground first.
2. Pastern and fetlock descend.
3. The coronary band is pulled toward heels.
4. Frog is compressed.
5. Heels expand, the sole slightly drops.

When the foot is raised everything is reversed and returns to normal. The hoof that is functioning as it should, is very flexible and can withstand quite a bit, but if one section is not as healthy, others have to double up. Most often when this happens, noticeable differences in the hoof and movement are not far behind. Corrective shoeing and trimming is now very popular and granted many things can be helped by various methods when approached with the individual horse, age and conformation in mind. Correction by trimming, I feel, should be started as soon as any defect is detected. After a year or so old, the leg and future conformation is basically set for life. This however does not mean that something in most cases can not be done to help most stance or flight problems. In the past, I have found that it is better to do as much correction with the shoe or trying to camouflage rather than twisting and creating pressure on areas not used to it. The fast results and instant miracles may do more harm than good. The slower methods allow the weight distribution and changes to be done gradually, especially on the young. Balance on the aged horse that is working is equally important. This basically means keeping the legs and feet in some proportion to the weight received for not only comfort but for endurance. What appeals to the eye may not reflect comfort or performance.

Most lameness can simply be put in one of four categories; owner neglect, poor conditions, over-worked, conformation, and of course improper shoeing.

Neglect is most often just neglect on routine hoof care; letting the feet grow out to abnormal lengths that affect not only use but put extra pull on the back of the leg and tendons. The longer a foot is allowed to grow, the weaker it becomes and subject to cracking and splitting. The breeds that require the longer toe lengths are surely to be well taken care of and require the uppermost in care by the farrier and handler.

Poor conditioning or over worked fall into the same area. Many horses suffer from fatigue if not worked and muscled up to long hard work. Most shoers find this early in the spring when the weather breaks and riding conditions become more favorable and the first shoeing of the season. For the most, horses that are over ridden will create heat, soreness and puffy legs until properly conditioned for what ever job that is expected. Conformation naturally is a variable as the straighter horse with few exceptions has more stability than the horse with the hoof and leg problems, although as mentioned early, many corrections can be made if attended to. Last but not least, improper shoeing or trimming. This factor is quickly becoming the least with the aid of the American Farriers and local state associations organizing to form standards of mechanics and knowledge needed to recognize and deal with problems in a more professional manner. At this time, the American Farriers Association offers two levels of expertise, Basic and Journeyman certification. Either are mandatory and left up to each individual, but those interested in improving their work and trade have welcomed such testing. Both levels require a written exam and practical aspects that reflect the skills and study that are needed in becoming a qualified and competent farrier.

With the trend and knowledge that is available for not just the farrier, but also the veterinarian and owner, the horse has steadily improved by up-dating and researching information that can only up-grade standards helping us all help the horse.

Laminitis And Navicular Disease

By Polly Modransky, D.V.M.

Virginia-Maryland Regional College of Veterinary Medicine

Blacksburg, Virginia

Probably two of the most common yet perplexing and frustrating causes of lameness in the horse are laminitis and navicular disease. Both are multifaceted processes which tend to make diagnosis difficult and treatment often unrewarding.

Laminitis:

Equine laminitis is a systemic syndrome characterized by a lameness which appears later in the course of the disease. Causative factors are numerous and include carbohydrate overload, stress (i.e. sudden changes in diet or exercise), prolonged placental retention, unrestricted cold water intake after vigorous exercise, unrestricted grazing of lush grasses, prolonged corticosteroid therapy, and endotoxemia. The physiopathology is under intensive investigation and the lameness has been attributed to a peripheral vascular lesion (a coagulopathy and a vasoactive process) which leads to ischemic necrosis of the soft lamina and possible separation of the hoof wall and the coffin bone at the interface.

In order to better understand why certain therapies or drugs are more effective than others in treating the syndrome, laminitis can be divided into developmental, acute, and chronic phases. The developmental phase begins with the initial insult (i.e. grain overload) and ends with the first episode of lameness. If the laminitis is a result of carbohydrate overload, this phase lasts approximately 24-72 hours. Significant systemic changes take place during this time which are believed responsible for the acute lameness.

The use of heparin, an anticoagulant, and phenoxybenzamine, an alpha-adrenergic noncompetitive blocking agent, have been studied as preventive agents in animals thought to be susceptible to developing laminitis. Both drugs have shown promise but further investigation is necessary.

The acute phase of laminitis begins with the first sign of lameness. Classically, these animals will have a bounding digital pulse, warm feet, an abnormal stance, and a stilted gait. Duration of this phase varies and is dependent on when, or if, rotation of the coffin bone occurs.

One author has characterized the severity of the lameness and described irreversible morphologic changes that occur in acute laminitis.

- The horse lifts his feet incessantly when standing. No lameness is evident at at walk. At the trot, the gait is short and stilted.
- The horse moves willingly at the walk. The gate is stilted. A forefoot may be lifted without difficulty.
- The horse moves reluctantly and vigorously resists any attempt to lift a forefoot.
- The horse does not move without being forced.

It is during the acute phase that treatment is most efficacious in preventing rotation. For treatment to be successful, however, it should be implemented no later than 12 hours prior to the onset of Obel grade 3 lameness; even then, irreversible laminar changes may be unavoidable.

Treatment is aimed at preventing further damage to the lamina, enlargement of the area of ischemia, and coffin bone rotation. Mineral oil can be used to remove or decrease the uptake of endotoxins from the intestinal contents in cases of grain overload. Blood flow to the digits can be restored by moderate exercise. It may be necessary to perform digital nerve blocks and administer phenylbutazone in order to accomplish this in extremely painful animals. Oral methionine can be administered to the animal daily to encourage maintenance and repair of the hoof-coffin bone bond. Systemic antibiotics are recommended in all cases in which serious laminar deterioration has taken place. Redistribution of weight to the heel and frog portions of the foot will lessen the tendency for coffin bone rotation and subsequent sole penetration. This can be accomplished by trimming, padding, shoeing, casting, or a combination of these. Also, allowing the animal to stand in a soft sand stall has been shown to be beneficial.

The acute phase ends and the chronic phase begins with rotation of the coffin bone which can occur as early as 3 hours following onset of lameness. The acute phase lasts approximately 48 hours after the last episode of lameness if there is no rotation. It is important to remember that acute laminitis is an EMERGENCY.

The chronic phase of laminitis starts either 48 hours after the onset of lameness or when rotation of the third phalanx is evident radiographically. It is thought that necrosis of the soft lamina results in loss of their suspensory function. This allows the weight of the horse, the leverage placed on the toe, and the pulling force of the deep digital flexor tendon to mechanically force the coffin bone from the hoof wall. Systemic alterations also occur during this phase. These include hypertension, renal disease (membranous glomerulonephritis and medullary necrosis), and a myriad of endocrine abnormalities.

Therefore, treatment of the chronic phase should include evaluation and treatment of the systemic abnormalities as well as the digital lesion. Corrective shoeing and trimming may have to be repeated every 3–4 weeks in these animals. The hooves should be trimmed so that the coffin bone is parallel to the bearing surface and parallel to the hoof wall at the toe. A wide web shoe with a bar placed from the apex of the frog and extending caudally about 1–1/2" has been recommended. More

recently, the use of the "heart-bar" shoe has shown considerable success in many affected animals. An inferior check ligament desmotomy may be beneficial in some of the more chronic cases that fail to respond or respond poorly to the above therapy.

Pedal bone rotation has been used as a prognostic indicator in cases of laminitis. There has been shown an inverse relationship between the degree of rotation of the coffin bone and the ability of the horse to return to athletic function. Horses with less than 5.5 degrees rotation should return to their former athletic ability; 6.8-11.5 degrees rotation lend itself to a guarded prognosis; and those animals with greater than 11.5 degrees rotation have an unfavorable prognosis.

Laminitis is more easily prevented than treated. If it can't be avoided, then early detection of the problem and rapid therapy will yield the best prognosis overall.

Navicular Disease:

"The pathogenesis of navicular disease has been long, assiduously, and fruitlessly debated. Probably only in diagnosis is there more difference of opinion than there is in pathogenesis." (Rooney)

Horses affected with navicular disease have a history of intermittent lameness which usually will respond to rest. Owners will often complain that the horse refuses or hesitates in changing leads and does not seem to extend its forelimbs properly. A shoulder lameness is often suspected. Turning the horse in a circle toward the affected side will also exaggerate the lameness. The lameness may be aggravated with heavy work and work on hard or uneven surfaces will usually accentuate the lameness.

Historically, the lameness may be present in one limb and then the other. Usually both front limbs are affected even though one is more severely affected than the other. The animal will typically land on his toe rather than flat on the hoof to avoid concussion in the heel region. Many times the toes will become bruised and the horse will again be forced to land flat. Pain over the navicular area may be elicited when the foot is examined with hoof testers.

Local infiltration of the palmar digital nerves with anesthetic will generally lead to improvement and many times the horse will become lame in the opposite front limb. The degree of improvement with this nerve block should be noted since it will become important when considering methods of treating the problem. Injection of anesthetic directly into the coffin joint and/or navicular bursa can also be performed.

Diagnosis of the disease is usually based on clinical signs, history, and results of diagnostic nerve blocks. Radiographically, only 50–60% of the cases will have changes in the navicular bone compatible with the diagnosis of navicular disease. Radiographs are, however, helpful in ruling out other possible causes for a heel lameness.

Normally, there will be conical lucencies visible on the distal border of the navicular bone. Changes in these lucencies, i.e. cones to "lollipops", are indicative of the syndrome. Other radiographic changes suggestive of navicular disease include

osteophyte production along the lateral wings, proximal and distal margins of the navicular bone, medullary sclerosis, erosions on the flexor surface of the bone, radiolucent areas within the bone, and dystrophic calcification of the flexor tendon. In order to best evaluate the navicular bones radiographically, at least three views of each navicular bone should be taken.

The methods of treating this lameness are numerous. Often times only a poor response is achieved with therapy. This is probably due to failure to resolve many of the factors involved in the etiology and pathogenesis of the disease.

Juxtabursal injection of orgotein is designed to eliminate the inflammation in the area. It may need to be repeated in 2 weeks and not all animals affected will respond. The success rate having been reported is 50%.

Administration of drugs that have effects on the vascular or hemodynamics system have been tried. The use of warfarin was designed to prevent further thrombosis in the navicular bone. However, hemorrhage is a common complication. Stabilizing the dose of the drug, its interaction with other drugs (i.e. phenylbutazone), and the necessity for continual monitoring of the OSPT are also disadvantages to this method of therapy. The success rate has been reported to be 80%. Isoxuprine hydrochloride is a beta-adrenergic stimulant which increases peripheral vascular and cerebrovascular blood flow by directly relaxing the vascular musculature. Use of this drug in combination with corrective shoeing have been fairly successful in my experience. Usually a 6 week course of therapy with the drug is required.

Corrective shoeing alone generally has a poor success rate. When combined with phenylbutazone or isoxsuprine hydrochloride administration, the success rate increases. Many cases of navicular disease can be directly related to poor foot conformation or poor foot care. Corrective shoeing should first be directed at correcting these problems.

Classically, the recommended shoeing has been a full bar shoe, rolled toe, raised heels, slipper heels, and a pad. The hoof should be allowed to expand normally and slipper heels are very useful for this purpose. Pads will allow the bars and the hoof wall to bear weight which will in turn diminish concussion on the foot. Rolling the toe will decrease the work of moving the foot. Raising the heels will help to alleviate pain originating in the navicular area. Exercise should be continued if the shoeing is to be effective.

Neurectomy should be considered only as a last resort. This does not cure the problem by rather masks the signs. It is important when considering this alternative to remember that the horse will respond to the surgery only as much as he responded to the posterior digital nerve block. If there was only 60% improvement in his lameness, then he will only be 60% better after the neurectomy. One must also keep in mind that there are potential postoperative problems. These include painful neuromas, regrowth of the nerve, rupture of the flexor tendons, sloughing of the hoof wall, and incomplete desensitization of the heel.

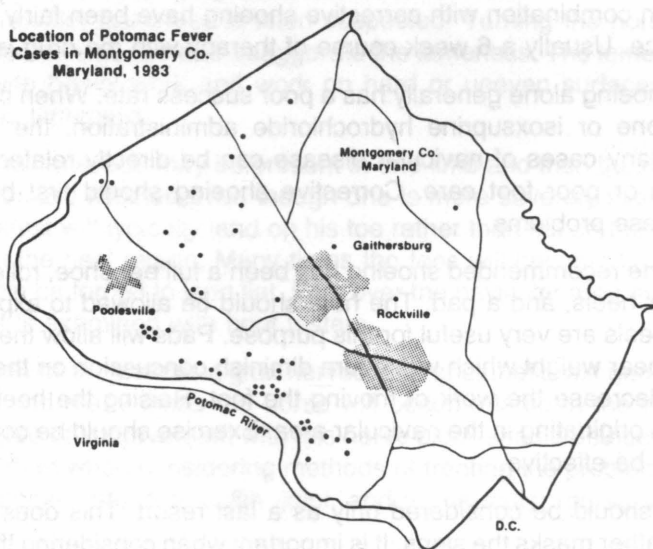
Prognosis is guarded and is dependent on the duration of the lameness and the extent of the damage to the navicular bone. At present, we cannot cure the disease process; we can only offer palliative treatment.

RECENT DEVELOPMENTS IN RESEARCH INTO POTOMAC HORSE FEVER

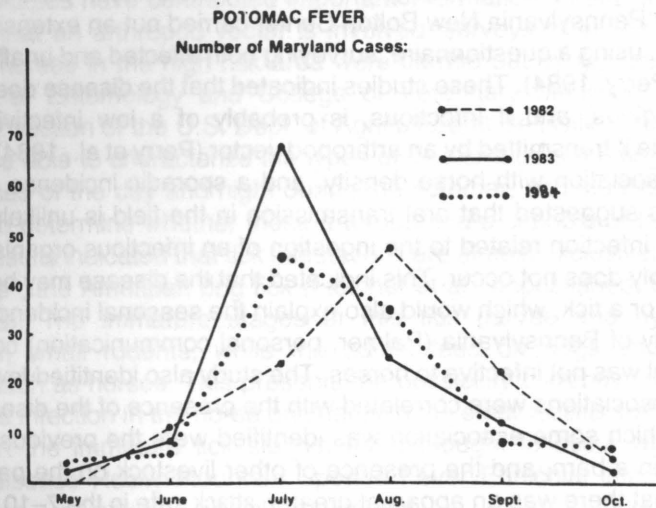
Brian D. Perry, BVM&S, DTVM, MSc, MRCVS

INTRODUCTION: Potomac Horse Fever (PHF) had become somewhat of an enigma over the past few years. Indeed, it has only relatively recently been recognized as a discrete disease entity by astute veterinary practitioners in Montgomery County, Maryland, who brought it to the attention of the Departments of Agriculture and regional University research groups in 1982. However, during the last few months, considerable progress has been made in elucidating the cause and mechanism of this disease. Below I will describe to you the results of recent research, and what they mean to the future treatment and control of this disease.

DISTRIBUTION AND OCCURRENCE: The disease was first recognized as a distinct disease entity in Montgomery County, Maryland, with few cases recorded from surrounding counties. Many of the cases appeared to occur in the area adjacent to the Potomac river.



In Virginia, PHF has been reported only from the northern counties of Loudoun, Fairfax, and Frederick. The disease has also been reported from Pennsylvania. Following its recognition in the mid-Atlantic region, reports of a similar disease have been received from other regions of the United States including Ohio, Michigan, Wisconsin, Oklahoma and Colorado (Whitlock et al., 1984). Potomac Horse fever is seasonal, with the highest incidence occurring between the months of June to September.



In 1983, the number of cases reported in Maryland was 116. During 1984, 101 cases occurred in Maryland and 7 cases were reported in Virginia.

CLINICAL SIGNS: The disease is characterized by a fever of 102–107 degrees F., and the horse goes off its feed and becomes depressed. There is a marked drop in the circulating white blood cell count. Distinct abdominal tinkling sounds are heard on auscultation prior to the onset of diarrhea, and these represent a progressive accumulation of fluid in the cecum and colon. Diarrhea usually follows within 1–5 days, and varies in its character, from a mild cow-flop consistency to severe pipe-stream diarrhea. The horse rapidly dehydrates. In a small proportion of cases, colic may occur and laminitis is a sequel in about 20–30% of cases seen. Of those horses which become clinically sick, about 25% die or are put down. This proportion has varied from year to year (17%–36%).

RECENT RESEARCH PROGRESS: It is just two years ago when the first plans for a concerted research effort were made, in preparation for the summer of 1983. During that summer, an intensive series of field studies were carried out in order to characterize the disease, and large scale screening of a variety of samples from clinical cases for known pathogens was carried out at various laboratories. From this work, several results emerged. Huang and colleagues (1983) in Maryland and Dutta (unpublished) found a corona virus like agent in the feces of affected horses, but this agent did not produce disease when reinoculated into ponies (Knowles et al., 1984). Ehrich and colleagues (1984) in Virginia examined feces from affected and unaffected horses for the presence of toxin produced by Clostridia, a group of bacteria. They found that "C. perfringens" type A enterotoxin was found in a small proportion of both affected and unaffected horses, and concluded therefore that they did not play a primary role in the disease. Jenny (1984) reported that affected horses did not develop antibodies to a wide variety of previously recognized equine pathogens.

In the field, meanwhile, the College of Veterinary Medicine in Blacksburg and the University of Pennsylvania New Bolton Center carried out an extensive epidemiological study, using a questionnaire, surveying both affected and unaffected horses and farms (Perry, 1984). These studies indicated that the disease does not appear to be contagious, and if infectious, is probably of a low infectivity, or a low challenge rate if transmitted by an arthropod vector (Perry et al., 1984). Because of a lack of association with horse density, and a sporadic incidence on individual farms, it was suggested that oral transmission in the field is unlikely, and that a point source infection related to the ingestion of an infectious organism in feed or water probably does not occur. This indicated that the disease may be transmitted by an insect or a tick, which would also explain the seasonal incidence. Studies at the University of Pennsylvania (Palmer, personal communication) confirmed that fecal material was not infective to horses. The study also identified few variables in which risk associations were correlated with the presence of the disease. The risk factors for which some association was identified were the previous presence of the disease in a barn, and the presence of other livestock on the pasture. It was also found that there was an apparent greater attack rate in the 7–10 year old age group of horses, and that there were more cattle and dogs on affected farms than on farms which had not had the disease. The significance of these findings has yet to be determined (Perry et al., 1984).

The next major landmark in research was when it was shown by two research groups that the disease could be transmitted to susceptible horses by the inoculation of whole blood from early untreated clinical cases (Jenny, unpublished; Whitlock et al., 1984), following an incubation period of 10–15 days. This allowed a detailed characterization of the clinical disease to be performed in subsequent transmissions, (Whitlock, et al., 1984).

In his screening of horse serum from recovered horses to a variety of disease agents, Jenny (1984) had included tests for rickettsial agent Ehrlichia, which were carried out at the University of Illinois. These showed that recovered horses developed antibodies to an agent called "Ehrlichia sennetsu", a rickettsial organism not found in the United States. This indicated that a rickettsia may be responsible for the disease. Transmission studies were initiated at the Virginia-Maryland Regional College of Veterinary Medicine in College Park and Blacksburg, and at the University of Illinois. Rikihisa, Perry and Cordes (1984) subsequently reported the identification of an ehrlichial organism in the wall of the large colon of affected horses, apparently multiplying in that site. This supplied the link between this apparently blood-borne organism, and the clinical disease of the alimentary tract.

The ehrlichiae were found multiplying in different types of host cells, and damage associated in their presence could be seen, suggesting a possible mechanism for the disease process. The culture of this Ehrlichia in laboratory cell cultures was announced by Holland and Ristic (unpublished) at the University of Illinois and Rikihisa and Perry (1984) at Virginia Tech. Both these research groups were able to reproduce the disease by the inoculation of this organism into susceptible ponies, and both have developed a diagnostic test to detect the presence of antibodies to this organism in the serum of convalescent and recovered horses.

Two other studies have contributed important information. Firstly, inspired by the indications that an arthropod vector is involved, surveys of all insects and ticks feeding on horses in the high risk area were carried out by groups from Virginia Tech, Dept. of Entomology and College of Veterinary Medicine, and by the Entomology section of the U.S. Dept. of Agriculture at Beltsville, Maryland. These studies were able to characterize the types of flies and ticks feeding on horses at different times of the day and night during the summer, and studies are currently underway to determine whether these arthropods are capable of transmitting the disease. Results indicated that tick infestations are almost exclusively "Dermacentor variabilis", the American dog tick (Fletcher et al., unpublished; Schmidtman, unpublished). The immature stages of this tick (larvae and nymphae) feed primarily on small rodents, while the adults feed on dogs and other larger mammals such as horses. This presents the possibility currently under investigation, that the infection in the horse originates in the small rodents and other animals that support the immature tick stages, as is thought to occur with the related rickettsial disease Rocky Mountain Spotted Fever Ehrlichial infections of some other species are known to be tick transmitted.

The second important study as yet unmentioned was inspired by the fact that other ehrlichial infections can be treated with the tetracycline group of antibiotics. Researchers at the New Bolton Center, investigating the efficacy of these compounds, found that although administration of tetracycline suppressed the onset of clinical disease, it did not prevent PHF from developing, but appeared instead to extend the incubation period (Palmer, personal communication). Furthermore, tetracyclines can themselves cause an enteric condition in horses not unlike PHF, and so they concluded that this treatment can not at present be recommended.

CONCLUSIONS: So what do these developments mean? They mean that although much research remains to be done, the areas of study have been clearly identified. Firstly, the development of a serological test will allow surveys to determine the distribution of PHF in the United States, and elsewhere. Secondly, the growing of the causal organism in cell culture opens the door to the possibility of developing a vaccine. Thirdly, the discovery of the possible mechanism of the disease in the large intestine, lays the groundwork for the study of specific therapy, and fourthly, the indication of possible tick involvement in the transmission of the disease offers another avenue for disease control studies.

REFERENCES: References for this article can be obtained from the author.

Sportsmedicine & Athletic Conditioning

By Dr. C.R. Harden

Battlefield Veterinary Clinic—Richmond, Virginia

Probably the fastest growing field of interest for both human and horse athletes is the new and complex technology of sportsmedicine, undoubtedly a result of the worldwide trend toward fitness and health. Scientific methods are beginning to replace ancient remedies, folklore and cowboy cures. These latest therapeutic devices commonly in use now range from acupuncture to ultrasonics.

Acupuncture is the ancient Chinese art or science of inserting needles (or sometimes just finger pressure) at specific sites to alter the flow of positive and negative energies throughout the body. This science is not well understood by us in the Western World but in skilled hands Acupuncture and Acupressure have definite proven benefits.

Ultrasonics are receiving new attention in our technological renaissance; the principal involved is the penetration of body tissues by sound waves produced by an electronic generator massaged over the skin. The waves stimulate blood supply, reduce swelling, relieve pain and in certain cases reduce mineralization and bone deposition. Care must be taken because overexposure can be very harmful.

Other forms of deep tissue stimulation include: lasers, radiation (by implants or by external generation), several types of faradism, such as electromagnetic field generators (called the "blue boot" at race tracks), electrical muscle stimulator electrodes to enhance muscle strength and tone without stress to adjacent joints, and devices that change galvanic potential in various tissues which can alter ion transfer, bone deposition and the rate of healing. All of these methods have respective indications and differing degrees of success and all require experienced professional supervision.

Cryotherapy and cryosurgery are forms of treatment using extreme cold, usually liquid nitrogen, to alter skin and deeper tissues. The insult to the tissues stimulates a strong healing response that in many cases will resolve the injury when healing is complete. This is similar in theory to the old remedy of "firing" but is without the severe tissue destruction and pain associated with the firing procedure.

Many of you sports fans will remember our two 1984 Olympic stars Mary Lou Retton and Joan Benoit. Both underwent major knee surgery just prior to brilliant performances! Mary Lou had surgery here in Richmond just 10 days before the start of the Olympic gymnastic competition; Joan underwent surgery only 19 days before placing in the U.S. Olympic marathon trials, and then impressively winning at the Olympics barely two months later. This surgery is called "arthroscopic" surgery and requires only very small incisions less than 1/4 inch to insert a flexible

scope into the joint, have a look around then repair the damage with precision miniature machines. Often training is resumed after only two or three days recuperation. Arthroscopic techniques are readily available for horses but unfortunately are not a cure for all joint problems. Care must be taken in evaluating which cases will be successful, so to avoid a very costly procedure and still have a horse unable to perform athletically. The athletes old standby, hydrotherapy or the "whirlpool" is the most effective remedy available to the average horseman. It consists of gentle massage action in hot, cold or lukewarm water. The general rule (with some exceptions) is that acute (recent) injuries respond well to cold for the first 48 hours. Fifteen minutes of soaking in whirlpool at 50 degrees Farenheit repeated up to every two hours will constrict blood vessels, reduce or prevent inflammation and swelling that causes pain, reduced mobility, disruption of muscle and tendon fibers, stretching of joint capsules, and all the other factors that retard healing. The other part of that general rule is that chronic (old) injuries are prompted to heal faster by hot whirlpool therapy 20 or 30 minutes not exceeding 120 degrees Farenheit. Effectiveness may be enhanced in some cases if the hot whirlpool is preceeded and followed by cold.

Another very simple and effective way to treat acute injuries is to use "ice massage". Freeze water in small styrofoam cups, when needed peel away the top portion of the cup and hold the ice by the insulated "handle". Massage the ice over the inflammed area for about 15 minutes.

Diagnosing injuries, evaluating gaits and athletic ability have come a long way also. Some of the high tech diagnostic tools include ultrasonics, arthroscopy, scientigraphy, dynamography, infrared thermography, electrogoniometry, cinematography, synovial fluid enzymatology and synovial fluid ultra molecular analysis. In experienced hands these are very efficient methods for diagnosing subtle ailments but can become quite expensive, so lets come back down to earth.Diagnosing athletic injuries is after the fact!!! The smart and successful trainers do not rely on diagnosis and treatment but rather on PREVENTION. Athletic injuries can be prevented or at least the likelihood can be very greatly reduced. Let's look at how injuries occur.

The obvious injury is from a single blow, kick or fall, the aparent accident. Many factors are responsible for the series of events that create an accident and most can be controlled. Mental mistakes can be minimized. Strong mind/strong body, there is a definite correlation. Physical conditioning in various disciplines will increase a horse's overall alertness and mental quickness (assuming that you are somewhat quicker than your horse). Likewise coordination and balance are improved; the horse will be less likely to make mental mistakes and if he should, will be quicker, better balanced and more coordinated therefore more likely to extricate himself with lesser injuries. Also with the physical conditioning comes stronger muscles, bones, tendons, ligaments, etc. so that if trauma occurs the body is more resiliant and able to cope; the injury is significantly less serious.

The injuries that are technically "athletic" injuries are those caused by repetitive actions, the strain of working out every day. These injuries develop by overstretching the muscles, tendons, joints, et al when muscles become too fatigued. The legs lose their natural muscular spring that cushions the entire body, now the joints,

bones, ligaments and cartilage must absorb that concussion. The oversimplified bottom line is: the single greatest cause of athletic injury (lameness) is working a horse after the muscular structures have become fatigued. The obvious prevention: a physical conditioning program for your horse designed to prevent fatigue during the activities that you have ambitioned for the horse. This must be carefully planned so that you don't progress too rapidly causing lameness or progress too slowly wasting time and not achieving the proper end result.

Muscle contractions are caused by groups of chemical reactions inside the individual muscle cells. Some react without oxygen and are called anaerobic while others utilize oxygen from the blood called aerobic. Each type of muscle has specific abilities and impossibilities. Aerobic muscles contract more slowly and with less strength relatively than do anaerobic muscles, however aerobic muscles are capable when conditioned to perform for hours on end whereas anaerobic muscles become exhausted after only 2 or 3 minutes of concentrated work. This is the important concept to remember; jumping, racing, bulldogging, etc. all utilize the stronger and faster anaerobic muscles! Therefore to prevent injury when old Dobbin is tired, you must condition the AEROBIC muscles to support the joints and give the legs that spring that is so important in absorbing shock and concussion. Muscles become stronger and more fit as the individual cells are "trained" to store more chemicals, they also become bigger. Strength is developed not while the muscle is worked but while it is resting after a workout that has depleted its chemicals; rest is a very important factor in muscular conditioning. During rest the blood removes wastes, restores the chemical supply and allows the muscle cell to produce more enzymes. Cells can increase their capacity no more than ten percent per week, therefore exercise levels cannot be safely increased more than ten percent each week. The streamlined formula for physical conditioning is: 1. workout to fatigue by not beyond that point, 2. rest one or more days, and 3. workout again at an increased level not exceeding 110% of the previous week's exercise level. This is the "bones" of a program. There are many subtle variants that must be included if optimum training effect is to be enjoyed.

Quality of exercise is important and two patterns emerge relative to quality, intensity and duration. Intense exercise tends to selectively develop anaerobic strength while exercise of longer duration promotes aerobic muscle growth. The two variables, intensity and duration, may each be increased by a factor of no more than 10% per week.

It must be emphasized that rest is an important aspect of training. It allows the cells to replenish and strengthen and also allows time for the many "micro" injuries to heal before they become a nuisance. The very intense workout (breezing, high jumping, etc.) should not be repeated more frequently than once each week or ten days. Lesser effort workouts must be done the other days. Likewise the longest duration workout should not be repeated in less than seven to ten days. If we allow one day of rest between works, then a typical week would look like this: day 1 intense workout; day 2 rest; day 3 routine workout; day 4 rest; day 5 long duration workout; day 6 rest; day 7 rest. The rest days need not be total abstinence from activity; turning out in a paddock is ideal and maybe using this time to school in not physically demanding activities.

Two other concepts to master in a successful conditioning program are specificity and cross training. Specificity means specific training for a particular activity: running fast trains a horse to be a fast runner; jumping high trains a high jumper. To be great at a specialty demands specific training in that specialty. The significant catch is that this specificity very often leaves certain groups of muscles totally unconditioned while overtraining others. To become the best athletically you must train the total body not just isolated parts. This requires a divergent series of exercises to stress every muscle group in the body. This is called CROSS TRAINING. Examples of different training exercises or cross training for horses are: galloping (right and left leads), trotting, extended walking, bending the trunk to each side, forced collection up into the bridle and engaging the rear end, working up-hill, down-hill, working on a deep surface (grass, sand, plowed field), swimming, working in artificial aids (rollers, chains, weights, hobbles, rubber bands, etc.) sliding stops, rollbacks, backing, spinning, high jumping, long jumping, on the trail, in the ring, with cattle, over distance, intervals, fartleks, et al which can be either under saddle, in harness, lounged or at liberty. The point I am redundantly making is give your horse much and varied types of exercise, don't get in a rut and ride the same pattern every day. Alternate hard days with easy days.

Another principal to learn before your horse becomes injured is to build a base of aerobic conditioning before you begin intensive specificity training. In a young unconditioned horse it may take a minimum of 30 to 60 days of aerobic conditioning before any further training should be attempted. Start with a jogging program, trail riding long workouts of low intensity, worked slowly up to ten miles in 60 to 90 minutes. When the horse is conditioned to recover its pulse to less than 60/minute after a ten minute rest then the most basic level of aerobic conditioning has been reached. Duration and intensity may now be safely increased at the 10% weekly rate discussed earlier.

The importance of taking your horse's pulse cannot be overstated. During work the pulse measures the relative intensity of the workout. A horse in top condition can push the working pulse over 200/minute and recover to less than 60/minute after a ten minute rest. The recovery pulse taken ten minutes after working indicates a horse's general level of fitness. Recovery pulse over 72/minute means the horse is fatigued or becoming ill, time to quit for the day. . . Another time to check your horse's pulse is before any workout, the resting pulse. Well conditioned horses may have resting pulses of 32 or 36/minute. An increase of 10 or 15% indicates malaise, possibly overtraining or pain or incipient illness. A significant increase in the resting pulse is usually very good reason to not workout that day. Don't risk injury or exacerbating illness.

Formulate a clear and concise idea of what your horse is to do (your ambitions for the horse) then plan a conditioning program including as many elements of cross training as can be included in your situation. You will be pleasantly surprised by a more fit horse, a more sound horse and a more willing horse. Formulate a progressive series of goals, each one realistic and within your potential so that your horse achieves a series of victories along his long road of training. This makes training more fun for the both of you; if it is fun you will stick to it better. It is important to enjoy the training as much as you enjoy the competition, because you must train so much more than you compete. Condition your horse for health and soundness, his and yours.

Additional speeches to be included in the Seminar but not available for publication at the printing of this proceedings.

- * Marketing, Financial Arrangements and Promotion
(Panel Discussion - Mr. C. Fred Kohler, President
Va. Thoroughbred Assoc. of Virginia and Mr.
Michael A. Hughes, Hughes Bloodstock Agency)
- * Conditioning and Training the Race Horse
(Mr. Will O'Keefe, Warrenton, Va.)
- * Thoroughbred Size Growth Study
(Dr. Laura Goater, Southern Seminary College)

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