

Lameness and Poor Performance in the Sports Horse: Dressage, Show Jumping and Horse Trials (Eventing)

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Introduction

Successful identification, management, and prevention of injuries in sports horses requires a thorough understanding of the demands of each sport and the ways in which injury may be manifested. It is essential to be able to communicate with the client (be it the owner, the rider, or the trainer), which means understanding the terminology (or jargon) that goes with the sport. It is important to recognize what is involved in the training of the horse to allow it to compete in whatever discipline in order to plan appropriate rehabilitation programs and in order to be able to give a realistic prognosis. For example, the prognosis for a superficial digital flexor injury in an elite show jumper is very different than that for a three-day event horse.

It is essential to recognize that despite owners' and or trainers' expectations, not all horses have either the athletic ability or the temperament to perform at a high level. However genuine a horse might be, unwillingness to perform does not necessarily equate with a pain-related problem, although of course it may. This is especially the case with amateur-owned and -produced horses. At the other extreme, a professionally produced horse may compete very successfully despite significant musculoskeletal problems, and may superficially appear to be sound. However, recognition and successful management of those problems may enhance the athletic ability of such horses. There are many problems that a horse is able to cope with at lower levels of competition, but which become manifest when greater athletic demands are placed upon the horse, when it starts to train and compete at higher levels.

The causes of lameness in horses competing at low levels of dressage, show jumping, and horse trials are very similar to each other, and generally mirror

those of pleasure horses. However, they may become manifest sooner since the horse is more likely to be making turns and circles, rather than just working in straight lines. In the forelimb foot pain referable to foot imbalance, bruising and navicular disease, and low grade degenerative joint disease (DJD) of the metacarpophalangeal and interphalangeal joints, and in the hindlimb DJD of the distal hock joints are common. Mild intermittent upward fixation of the patella or delayed release of the patella can be a problem in young horses starting training, especially in Warmblood horses, and can result in low-grade discomfort and nappy (unpredictably resistant) behavior. Work patterns of the lower level horse tend to be rather inconsistent and the ground conditions (footing) on which the horse either works or competes may not be ideal. Amateur riders may be slower to recognize some problems through lack of feel, but other problems may be manifest earlier than in a professionally produced horse because the rider does not have the skill to compensate for gait abnormalities. However, as the level of competition becomes higher and the athletic demands placed upon the horse become greater, some different patterns of acute injuries emerge in the different disciplines.

Dressage

The Sport

Dressage combines balance, suppleness, and power. A good horse gives the impression of athletic elegance and expressive animation. The horse must be completely obedient and go wherever the rider wants and carry out movements at his request. In doing so the horse has to rely on his rider, to trust him and to accept him as his superior. The key to the training and development of a dressage horse from the lowest levels to International Grand Prix is

gymnastic exercises that aim to strengthen the muscles and thereby avoid injury to joints and tendons associated with an increased workload.

The Federation Equestre Internationale (FEI) dressage rules state that the object of dressage is the "harmonious development of the physique and ability of the horse." Through the levels of dressage training, the center of gravity of the horse and rider is placed further caudally, obtained by increasing the degree of flexion and loading of the hindlimbs while at the same time freeing the front end of the horse to create a more airborne, uphill set of movements. This can only be obtained by increasing the power of the hindlimbs, by synchrony in movement between the front limbs and the hindlimbs and through the freedom of movement of the back.

In German the following describe the aims of the correctly trained dressage horse:

- [1] Takt (i.e., rhythm)
- [2] Lossgelassenheit (looseness and suppleness)
- [3] Anlehnung (contact with the bit)
- [4] Schwung (energy and swing)
- [5] Geraderichten (straightness)
- [6] Versammlung (collection)

In Europe the competitive sport has been divided into three levels: L, M, and S. L covers novice level (novice and elementary), M covers medium and advanced medium while S covers Prix St. Georges, Intermediare I and II, Grand Prix, and Grand Prix Special. The movements required at each of these levels reflect the horse's degree of collection with the L classes expressing balance and freedom of movement, M classes requiring more collection and lateral movements, while S classes demand ultimate collection to enable movements of maximum collection and suspension, such as piaffe, passage, and canter pirouettes.

Lateral movements apply specific unique strains to different structures within the skeleton. In shoulder-in, half pass, renvers, and travers the horse is evenly bent in his neck and body, but moves on more than two tracks. In shoulder-in the horse moves on three tracks (1: outside hindleg, 2: inside hindleg and outside foreleg, 3: inside foreleg), with the body at an ideal angle of 30° to the direction of movement. In travers (quarters in) and renvers (head to the wall) the horse moves on four tracks. These movements create an unusual strain on the horse's back and an additional twisting movement on the appendicular joints. The increased engagement of the hindlimbs developed through collected work allows for greater storage of elastic strain energy in the hock joints and pelvis which, via the increased lifting of the forehand, allows for high energy movements such as medium and extended trot. The term "cadence" is closely associated with "working through the back" and "self-carriage." Self-carriage reflects a level of training where the

horse has learned to balance itself and its rider and has additionally developed its musculature to allow movement with greater range of freedom.

Anlehnung (contact with the bit) is an important concept to understand, requiring the horse to move freely forward with impulsion, to take the bit, and to accept it and react to it without resistance. The FEI rules require the horse to work 'on the bit,' that is with the front of the head positioned in the vertical plane. 'Contact with the bit' and 'on the bit' are frequently misunderstood terms. The horse must move with energy and impulsion, working through the back for correct contact with the bit. Misinterpretation leads to restriction of the horse by the hands, sometimes resulting in loss of action and gait irregularities.

In recent years there has been a tendency towards training dressage horses in an "over bent" fashion, with the horse's forehead behind the vertical plane. This is said to be a requirement for development of the trapezius, rhomboidius, and other muscles of the shoulder/withers region, thus enabling a greater lift of the forehand via the shoulder girdle. Although this method of training contradicts the FEI requirement for the horse's forehead to be in a vertical plane, top riders are able to place the horse's head in virtually any position according to what is required.

The Dressage Horse

The majority of dressage horses competing internationally are Warmbloods with a high proportion of Thoroughbred. Today's dressage horse combines the elegance and athleticism of the Thoroughbred with the power and trainable mind of the Warmbloods. Very few pure Thoroughbreds reach international standard: most Thoroughbreds lack the strength in all three paces, particularly in the walk and the trot compared with the Warmblood horses. The dressage horse must be able to show the difference between working, medium, and extended paces, which also requires proper collection.

The dressage horse must be naturally well balanced. The head and neck must be set on sufficiently high to facilitate working 'up hill' and making easy contact with the bit. The shape of the withers region is important so that the saddle sits easily in the correct position. The dressage rider spends a lot of time sitting in the saddle, in sitting trot; therefore correct weight distribution is critical.

Most dressage horses are broken at three or four years of age and begin competing in young horse classes as five-year-olds. Medium classes are reached by the age of seven and many future Grand Prix dressage horses do their "Small Tour" at the age of eight and nine. Once the dressage horse has reached Grand Prix level, the training predominantly involves repetition of movements, maintaining suppleness, and increasing physical power. It thus becomes obvious that they will rarely succumb to acute stress-induced traumatic injuries, but more likely to repetitive, accumulative subclinical

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injuries which may surface at irregular intervals. This means that, with the correct training and management, dressage horses can continue to compete at the highest level at an advanced age, often as old as 15 to 20 years.

Wear and tear lesions frequently occur due to a less than ideal joint and limb angulation, but many other factors influence the durability of the horse, including genetic predisposition and less than ideal management conditions prior to skeletal maturity. The main requirement must be the ability of the horse to balance itself at all paces, since imbalance and asynchrony in movement apply unusual strains on many structures.

Training Surfaces

Dressage horses are predominantly trained on artificial surfaces with a high degree of cushion, providing a consistency in the training surface not paralleled in other equestrian sports. All dressage competitions in mainland Europe take place on artificial surfaces and only in England does dressage at the lower levels (L) still take place on grass. This standardization of working and competition surfaces unquestionably plays a huge role in the low occurrence of many acute orthopedic problems in the dressage horse. Some trainers, however, consider consistent working on ideal surfaces likely to "soften" the limb structures and recommend that the horses are occasionally either jumped or hacked out on less ideal surfaces to institute a subclinical stimulus for bone, joint, tendon, and ligament adaptation.

Arena maintenance is extremely important; drainage is an essential key to a good surface. Dead corners of deep sand predispose to momentary loss of balance and may predispose to the development of lameness. Any sudden change of surface integrity will predispose to lameness. Young horses in particular work more easily and confidently on firmer artificial surfaces, where they can obtain a more confident grip and are less likely to fatigue.

Tack

The horse must be comfortable in its tack if it is going to work optimally. Dressage saddles are designed to position the rider with a deep seat and with an extended leg position. The surface area over which the weight is distributed must be as large as possible, to avoid focal pressure points. The use of gel pads and layers of saddlepads is not a substitute for good saddle fitting. The saddle must fit both the horse and the rider, and must position the rider appropriately in balance. The fit must be assessed with and without a rider. The shape of the horse's back musculature may change as the horse develops muscular strength and power, therefore a previously well fitting saddle may become constricting.

Acceptance of the bit is crucial in the dressage horse. Horses vary considerably in the shape of the mouth and the sensitivity of the corners of the lips, the bars, and the tongue. There is also a huge variation in the thickness of the tongue between individuals. A slight crack in the corner of the mouth caused by an inappropriate bit can cause major problems with proper acceptance of the bit and the horse's willingness to work straight. The horse may be very apprehensive of taking the bit, may take irregular steps, or be reluctant to bend properly. The presence of wolf teeth is frequently blamed for reluctance to accept the bit properly or irregularities in gait. Provided that a wolf tooth is immediately in front of the first upper cheek tooth, and not mobile, it is rarely associated with pain. At S level, horses have to compete wearing a double bridle, i.e., the mouth has to accommodate both bradoon (snaffle) and curb bits. These vary hugely in size, shape, and design and selection of the most appropriate can be critical.

Potential manifestations of a musculoskeletal disorder include:

- Reluctance to accept or go to the bit, shortening the neck, stiffness
- Not taking the contact evenly on the left and right sides
- Irregular rhythm in specific lateral movements, e.g., left shoulder-in and right half-pass
- Irregular rhythm in medium or extended trot
- Short steps behind in walk
- Uneven height of steps or lack of rhythm in piaffe and passage
- Inability to collect, stiffening the back, and not 'sitting down' behind
- Loss of freedom and elasticity of movement
- Late behind in flying changes or difficulties in changing from left to right compared to tight to left, or vice versa

Lameness Examination

Examining the lame dressage horse does not differ in any great detail from examination of any other equine athlete. However, it frequently requires more time being spent observing the horse ridden, since many dressage horses only reproduce the perceived problem, often no more than a resistance, when ridden through certain movements or at medium or extended paces. This, however, does not mean that the horse should not be examined in hand, including walking and trotting on a straight line and lunging on both hard, non-slippery surfaces (such as gravel), and on artificial surfaces. Lunging on tarmac or concrete not only carries the risk of the horse slipping with potentially disastrous consequences, but also in most cases alters the gaits of the horse so much that it has little value in a lameness examination. Leading the horse on a circle at a trot also tends to alter the horse's stride. The horse

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does not have the freedom to move his neck and instead will “set” his head on the leader’s hand.

In many cases the usual rider has to be available in order to reproduce the described problem if this is not an overt lameness. If the rider is not in balance or sits crookedly this can itself induce gait irregularities or lameness. However, it should be remembered that as well as bad riders creating lameness, good riders may hide lameness. The latter may take place completely unintentionally and involve no more than a corrective change of point of balance of the rider through a corner, but enough that for a long time the problem may not be observable from the ground. The majority of veterinary surgeons who are not competent riders are not fully experienced to appreciate the subtle differences in high quality dressage horses and by attempting to ride the horse to better appreciate the problem may create an embarrassing situation. They are better advised to spend more time observing the horse from the ground.

The veterinary surgeon should not just focus on the limbs when seeing the horse ridden. It is important to observe such changes as an increased lathering of the mouth, audible change in the rhythm of the stride or even absence of teeth grinding or grunting following a particular diagnostic test.

In many cases, the veterinary surgeon relies heavily on the observations of the rider during the lameness examination; this may involve the appreciation of subtle change of gait or even just an impression of a stronger rhythm or less heavy contact on the bit following a peripheral nerve block. Many riders feel through their own body that the horse is working “crooked,” i.e., not straight and in complete balance, and will be able to tell the veterinary surgeon if this feeling has been altered by any of the diagnostic tests.

In many cases, it is useful to alternate between lunging and ridden work, often going back to lunging with full tack after the horse has been ridden to see a possible difference in the gait from being ridden.

A useful test is to ask the rider to deliberately ride “on the wrong diagonal,” i.e., rising trot with the rider in the saddle when the inside forelimb is bearing weight. Both forelimb and hindlimb lamenesses, and horses suffering from back pain in particular, will alter when the weight-bearing diagonal (of the horse) is changed. The difference between the horse’s outline and attitude when changing between sitting and rising trot may also add valuable information.

In some cases, the rider creates lameness. This most commonly occurs with amateur riders who misunderstand the principles of creating an outline and working the horse forward to the bit. Over-restriction by the hands, with inadequate impulsion (“the hand brake on and no leg”), can create gait irregularities. Lower level trainers are sometimes

unable to appreciate these problems and may themselves be unable to work the horse better. It is therefore preferable to use a good professional rider who is not the trainer to work the horse. It may require several days to determine definitively whether the problem is one of riding and or training, or reflects a genuine lameness. If the rider sits consistently crookedly they can create back pain and loss of hindlimb rhythm and symmetry. Some dressage horses are exuberant and expressive movers and also strong-willed characters who may refuse to go forward properly if ridden by an enthusiastic, but less competent amateur rider, especially if the rider is somewhat apprehensive, and inclined to be overrestrictive. Nappy behavior and unwillingness to work can reflect a pain-related problem, but not necessarily so.

It should be remembered that not all horses are athletes. Many owners tend to think that all horses can learn to do dressage. Veterinary surgeons must in certain situations be prepared to offer the opinion that the particular horse has too many shortcomings physically (or psychologically) to be able to perform advanced dressage. A veterinary surgeon may be able to overcome a specific problem, but cannot provide missing athleticism.

Do not forget to check the obvious. Dressage horses do physically alter during a training lesson. As the muscles over the withers and shoulders expand a particular saddle may therefore appear to fit correctly prior to working the horse, but be restrictive an hour later when the horse begins piaffe and passage movements. Horses with a short poll and a relatively large mandible often find it difficult to acquire the correct degree of neck flexion.

If a diagnosis cannot be made because clinical signs are too subtle, or it is difficult to determine whether or not the presenting clinical problem is pain-related, it may be useful to work the horse while treating it with anti-inflammatory analgesic medication (at least 4 g phenylbutazone/day po) for two to three weeks. This may or may not “provide” a lame horse when medication is withdrawn and can help to determine if a performance problem can be attributed to pain.

Some skeletally normal horses evade the rider, will not work on the bit, may resist, and not bend properly. Amateur riders in particular may be indoctrinated that the use of training aids such as draw reins is detrimental to classical training. However, careful use of draw reins may actually make the horse submit and work well.

Diagnostic Analgesia

Technically there are no differences in the application of diagnostic analgesia between dressage horses and other equine athletes. However, the response should be assessed both ridden and non-ridden. With subtle problems it is particularly important that the conditions, including the surface, must remain consistent throughout the lameness investiga-

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tion. It is not possible to start the investigation on one surface only to find that halfway through the nerve blocks the horse has to be assessed on a different surface.

Common Causes of Lameness or Reduced Performance

The most common causes of reduced performance or lameness in the dressage horse include:

- Proximal suspensory desmitis
- Suspensory branch injuries
- Degenerative joint disease of the centrodistal and tarsometatarsal joints
- Synovitis or degenerative joint disease of the forelimb distal interphalangeal joints
- Synovitis of the middle carpal joint
- Synovitis or degenerative joint disease of the metacarpophalangeal or metatarsophalangeal joints
- Tenosynovitis of the digital flexor tendon sheath, primary or secondary
- Palmar cortical fatigue fractures of the third metacarpal bone
- Thoracolumbar and sacroiliac pain

The Show Jumper

The athletic demands placed upon the elite show jumper are huge. It must be able to jump large fences with precision, accuracy, and care, sometimes at speed. It must be supple and able to make sharp turns and jump from a virtual standstill, while also being able to jump almost from a gallop. It must have tremendous strength in the back and hindlimbs to be able to adjust stride length and jump from 'deep' and bascule, with the capacity to jump large spread fences.

The stresses placed on the hindlimb suspensory apparatus on take off and the forelimb suspensory apparatus at landing are enormous. There is immense torque placed on joints when making quick turns. Thus there is the potential for subclinical lamenesses, causing low-grade intermittent or continuous pain, to compromise performance without resulting in overt lameness. Nonetheless some horses are able to perform very successfully despite low-grade overt lameness. Some problems that a horse can cope with adequately when performing at lower levels may become a problem when the horse is subjected to extreme demands on its athleticism.

Chronic lameness must be identified and controlled to:

- Enable a horse to pass mandatory veterinary inspections at international competitions
- Reduce the risk of the development of secondary acute problems
- Optimize its performance

Acute onset lamenesses must be identified and treated rapidly to minimize the risk of the development of a chronic problem.

The elite show jumper generally has a heavy competition schedule with minimal time for recovery from injury before it is next expected to compete. It also has to withstand travelling long distances between competitions and often confinement in relatively small stables, with little opportunity for turnout. Therefore exercise is restricted to ridden work and hand walking. The horse must be able to jump on a variety of surfaces, and when jumping outside will inevitably wear studs in all four shoes to improve traction and to avoid slipping. This will alter forces generated through the foot and distal limb. Since elite show jumpers travel so much, use of the same farrier becomes difficult, so the horse may be subjected to variable trimming and shoeing. Due to the intensity of competition early identification of any potential problem is crucial; therefore regular, comprehensive monitoring of the musculoskeletal system is beneficial.

The majority of successful, modern elite show jumpers are naturally well-balanced, loose-moving athletes. They are relatively large horses, the majority being between 550 and 700 kg body weight. Unlike many other disciplines there is a reasonable balance of males (geldings and stallions) and mares, although there does not appear to be any difference in susceptibility to injury. The majority of elite show jumpers are Warmbloods that vary in their conformation, but are generally well proportioned. The feet are a notable exception. The feet of Warmblood horses are often not well conformed, nor well proportioned in size and shape relative to the horse's body weight. Thus this can be regarded as a conformational fault, sometimes compounded by poor foot trimming. Greater attention to correct foot balance may help to prevent some lameness. Horses usually reach Grand Prix level by 8 to 9 years of age and may continue to compete up to 15 to 20 years of age.

Clinical Examination

Successful management of the elite show jumper requires knowledge of the individual, how it normally moves both in straight lines and in circles on both soft and hard surfaces, and how it responds to a variety of manipulative tests. It is essential to have a good working relationship with not only the rider, but also the groom, who may have greatest knowledge of any subtle changes in the horse's action or behavior.

Low-grade problems may first be manifest as a change in performance rather than overt lameness. Manifestations of a musculoskeletal disorder may include:

- Not pushing evenly off both hind limbs, with the hindlimbs drifting to one side therefore not jumping squarely across a fence
- Reluctance to turn
- Refusing to land with one forelimb leading

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- Difficulty in making the distances in a combination fence
- Difficulties in alteration of stride length
- Reluctance to get deep into a fence, or a tendency to have rails down in such circumstances
- Rushing fences
- Stopping (refusing)
- Changing legs behind in canter

Comprehensive clinical examination should include careful palpation of the limbs and back for detection of areas of heat, pain or swelling, and muscle tension. The development of synovial effusion not seen before, even in the absence of overt lameness, should be regarded with suspicion. Flexion and twisting of joints should be performed to assess both mobility and the presence of pain.

A significant number of elite show jumpers exhibit some degree of shivering type behavior in one or both hindlimbs. Frequently this does not appear to be associated with any compromise in performance, but it does complicate the evaluation of the response to flexion of the hindlimbs.

The horse should be evaluated moving freely in hand on a hard surface and on the lunge on both the left and the right reins, on both soft and hard surfaces. The response to distal and proximal limb flexion of each limb should be assessed. In some instances it is necessary to evaluate the horse ridden, and if necessary, jumped, in order to detect a problem. It may be necessary to rely on the feeling of the rider that the horse is 'not right.'

Perineural regional analgesia and intrasynovial analgesia are invaluable techniques for isolation of the site(s) of pain, either to alleviate overt lameness or to improve performance. It is sometimes necessary to medicate a suspicious joint on a diagnostic basis, since a better effect may be achieved. Nuclear scintigraphic examination can be invaluable in identifying areas with suspicious pathology in cases of low-grade poor performance, but due to the large variation in scintigraphic appearance between clinically normal horses, it is usually necessary to desensitize a suspicious region to confirm that it is indeed a source of pain. Radiography and ultrasonography are essential components of the diagnostic armamentarium.

Management for Optimal Performance

The development of synovial effusion within a joint, pain on passive manipulation of a joint, or induction of lameness after flexion are all indicators of possible significant pathology which merits treatment by judicious intra-articular medication. In the forelimb those most commonly affected are the distal interphalangeal (DIP), metacarpophalangeal, middle carpal, and antebrachio-carpal joints. In the hindlimb the centrodistal and tarsometatarsal joints of the hock and the femoropatellar and femorotibial joints are most frequently affected.

The joint should be evaluated radiographically in order to determine the presence of pre-existing articular pathology, or, if a recurrent problem, progression of any previously identified pathological change. However not all radiographic abnormalities are necessarily of current clinical significance. For example small osteophytes on the dorsoproximal aspect of the third metatarsal bone are frequently present unassociated with any compromise in performance. Particularly in Warmblood breeds modelling of the proximal articular margin of the middle phalanx in both forelimbs and hindlimbs is a common incidental finding.

The thoracolumbar region should be assessed carefully since the back is very prone to low-grade muscular injury and bony abnormalities such as impingement of the summits of the dorsal spinous processes which can cause recurrent low grade discomfort in elite athletes. However, mild impingement can be present without associated clinical signs, therefore its significance should be assessed by clinical examination, response to local infusion of local anaesthetic solution and, if necessary, nuclear scintigraphy.

Acute Onset Lameness

There are many potential causes of acute onset lameness, which are not unique to the show jumper, elite or otherwise. There are however a number of conditions which seem to occur with higher frequency in elite level show jumpers, compared to horses performing at lower levels. These include:

- Desmitis of the accessory ligament of the deep digital flexor tendon (ALDDFT) in the forelimb
- Superficial digital flexor (SDF) tendonitis in the forelimb
- Deep digital flexor (DDF) tendonitis within the forelimb hoof capsule
- Proximal suspensory desmitis in the forelimb and less commonly the hindlimb
- Desmitis of the medial or lateral branch of the suspensory ligament (SL) in either the forelimb or hindlimb
- Tenosynovitis of the digital flexor tendon sheath (DFTS), either primary or secondary.

The Event Horse

The Sport and the Event Horse

Eventing (horse trials) combines dressage, show jumping, and cross-country, together with steeplechase and roads and tracks phases in a three-day event. The event horse must primarily be a brave, clever, bold jumper cross-country, with scope and speed. However, in modern day competition this is not sufficient to excel, and the horse must also have reasonably athletic paces and a temperament that can be trained for dressage, combined ideally with an ability to show jump with care. Horses with a predominance of Thoroughbred breeding excel.

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The majority of pure Warmblood horses struggle to achieve the speeds required at top levels, and, if always working in top gear, are more prone to injury. Many outstanding horses are quite difficult, naughty individuals and require very careful individual production.

Horse trials are divided into a variety of grades at national level from very basic (Pretraining and Training in the United States, Pre-Novice in Europe), Preliminary (Novice in Europe), Intermediate, and Advanced. Three-day events are run under FEI rules and graded at one, two, and three star and four stars (major international championships).

Three-day eventing places extreme demands on the musculoskeletal system, through the demands of both the training program and the competition itself. The horses compete on extremely variable terrain and must be able to cope with both hard and soft footing, often up hill, down hill, and across hills, and must be prepared accordingly. Galloping and jumping on various gradients place huge strains on the limbs and back, and horses with poor conformation are particularly at risk to injury.

Eventing is less forgiving than dressage or show jumping in this respect. Dressage in horse trials is almost always performed on grass and subtle gait abnormalities may be highlighted, especially when the ground is hard. Horses with poor foot conformation or upright hoof pastern axes, which are back at the knee or have straight hocks, do not stand up well to top-level competition. The event horse is also much more at risk to lameness due to direct trauma than horses in either show jumping or dressage, particularly in the cross-country phase.

Horses usually reach advanced level by approximately 8 years of age and the majority of horses competing internationally are older. The majority of injuries in these horses are repetitive strain injuries to soft tissues or joints, or the result of direct trauma, whereas in younger horses there is a broader range of spectrum of lameness common to horses used in a variety of disciplines.

In a one-day event in Europe all three sections—dressage, show jumping, and cross country—are usually performed on one day, whereas in the United States competitions often take place over several days due to the greater distances that competitors have to travel. At a three-day event dressage is performed on the first day, followed by the speed and endurance phase on the second (or third) day. This consists of two roads and tracks phases lasting approximately 20 min and 45 min, performed at a strong trot or canter, interspersed by the steeplechase of approximately 4 min at a fast gallop. There is a compulsory 10-min halt after the second roads and tracks phase, followed by the cross-country of about 4 miles. Show jumping takes place on the final day. Exertional rhabdomyolysis (tying up) occurs quite commonly and is most often recognized in the 10-min break. The speed at which horses must perform, combined with jumping, re-

sults in a high incidence of strain of the superficial digital flexor tendons. This is probably also a cumulative injury reflecting frequency of competition and the speed at which the horse competes.

Loss of Performance and Lameness

Low-grade musculoskeletal problems may present as unlevelness in the dressage phase, especially when working in medium or extended trot, or performing small 10 meter diameter circles or lateral work. In show jumping the horse may show any of the problems described for the elite show jumper. In cross-country, the horse may be reluctant to jump drop fences or to gallop down hill.

It must also always be remembered that refusing may reflect lack of confidence on behalf of the horse or the rider. A horse may compete very successfully at Intermediate level but not have the confidence or the scope to compete at Advanced level. Horses that are too careful and try to avoid hitting fences may paradoxically not be brave enough for Advanced level competition.

Clinical Examination

A comprehensive clinical examination at rest is essential. The horse should always be assessed as a whole, not a limb in isolation. Particular attention should be paid to:

- Foot conformation, trimming and shoeing, and shoe wear
- Joint flexibility, resistance to distal limb flexion and rotation, and pain
- Synovial effusion, especially in the distal interphalangeal or metacarpophalangeal joints
- Neck and back flexibility and tension in the epaxial muscles
- Size, demarcation of the margins, and reaction to palpation of the superficial digital flexor tendons and the suspensory ligaments

The horse should be examined standing squarely on a hard surface to detect muscle wastage, which may reflect a chronic low-grade lameness. It should be assessed moving in hand, before and after flexion tests of the distal and proximal limb joints, on the lunge on both soft and hard surfaces, and ideally ridden, since frequently horses have several low-grade problems when presenting with reduced performance, which will only become apparent if the horse is examined under a variety of circumstances.

Local analgesic techniques, both regional and intrasynovial (intra-articular or intra-theal) are essential to unravel the entire picture.

Significant superficial digital flexor tendonitis may be present without lameness and with minimal detectable clinical signs. Many riders apply a proprietary clay and bandage the limbs after fast work or competitions and this can suppress soft tissue swelling and mask localized heat. Whenever there is the slightest suspicion of injury the tendons

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should be examined ultrasonographically, taking note not only of the echogenicity and demarcation of the margins of each tendon, but also of the size.

Common Causes of Acute Onset Lameness

Common causes of acute onset lameness in the event horse include:

- Proximal suspensory desmitis
- Suspensory branch injury
- Superficial digital flexor tendonitis
- Exertional rhabdomyolysis (tying up)
- Stifle trauma, including bruising, fracture of the patella, and fracture of the tibial crest
- Foot soreness, trimming and shoeing problems, nail bind
- Over-reach
- Traumatic arthritis of the metacarpophalangeal and distal interphalangeal joints
- Degenerative joint disease of the centrodistal and tarsometatarsal joints
- Tenosynovitis of the digital flexor tendon sheath, primary or secondary
- Thoracolumbar and sacroiliac pain