Where to go when nerve blocks don't reveal the source of pain

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When systematic nerve blocks fail to eliminate the lameness, this results in diagnostic dilemmas. Palpation is a crucial part of every examination. It is the systematic evaluation of the limb by touch (i.e., feel for structural changes and pain).[1] The examination needs to look at all portions of the limb but should be gauged so the most time is spent in examining the most common areas of injury. Manipulative tests or flexion tests are important adjunct to a lameness exam and can often give an important (lead to establish the cause(s) of lameness.[1-3] In many cases the pain caused by manipulation is so severe that the horse will retract the limb. In more subtle cases, the only satisfactory way of evaluating the effect of manipulation is to trot the horse immediately and note any exacerbation of a problem.

Thermography offers the veterinarian new diagnostic insight for their patients. Interpretation of thermal images must be based on good quality, properly positioned images. Thermal cameras are highly accurate instruments for measuring temperature and can provide invaluable information to determine a site of lameness, pain, or autonomic dysfunction. Scanning over an object will not magically show a "hot spot" at the site of the problem. A standard examination protocol for each body segment evaluated should be used.[5,6] Each point of focus on the body should include dorsal, palmar/plantar, medial, and lateral views when possible. Contralateral and dorsal views should be equidistant and fill the image screen. Whenever possible, it is recommended that the contralateral extremity should be captured in the same image. Imaging is contraindicated if bilaterally symmetrical images cannot be evaluated. Injured or diseased tissues will invariably have altered circulation.[4-6] One of the cardinal signs of inflammation is heat due to increased circulation. Thermographically, the "hot spot" associated with the localized inflammation will generally be seen in the skin directly overlying the injury. However, diseased tissues may, in fact, have a reduced blood supply either due to swelling, thrombosis of vessels, infarction of tissues or change in sympathetic tone. With such lesions the area of decreased heat is usually surrounded by increased thermal emissions, likely due to shunting of blood.

Multiple thermographic images of a suspect area should be made.[5] The area in question should be evaluated from at least two directions approximately 90° apart, to determine if a "hot spot" or "cold spot" is consistently present. The horse's extremities should be examined from 4 directions (circumferentially).[4-6] Significant areas of inflammation will appear over the same spot on each replicate thermogram.

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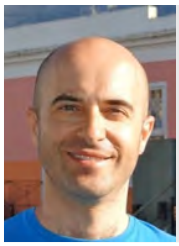
Tracy Turner began his professional career as a farrier and used those skills to help finance his education. He received his DVM degree from Colorado State University in 1978. He completed an internship at the University of Georgia and a surgical residency as well as a Master of Science degree at Purdue University in 1981. His Master's thesis was "Thermography of the Lower Limb of the Horse." He served on the faculty of the Universities of Illinois, Florida and Minnesota. At Minnesota, he was Head of Large Animal Surgery and attained the rank of full Professor before leaving academics to join Anoka Equine Clinic in 2004. In 2016, he started his own practice dedicated to Sports Medicine and Surgery.

Turner's primary research efforts have focused on equine lameness with particular interest in equine podiatry, back issues in horses, rehabilitation and thermography. His podiatry research has evaluated the radiographic and morphologic characteristics of hoof imbalance, as well as the differential diagnosis of palmar foot pain (PFP) and the development of PFP treatment strategies. Turner has researched the use of diagnostic imaging techniques for evaluation of equine back problems (including saddle fit) and developed epidemiological data on overriding spinous processes in horses. He pioneered the use of thermography as a diagnostic aid in lameness evaluation, as well as its use in horse welfare regulation. Turner has extensively published on these topics and been invited to lecture nationally and internationally. In 2004, Turner was inducted into the International Equine Veterinarian's Hall of Fame.

Turner is a Diplomate of the American College of Veterinary Surgeons, a Diplomate of the American College of Sports Medicine and Rehabilitation and is a Fellow of the American Academy of Thermology (AAT). He is an active member of the AVMA, AAEP, AAT and the American Horse Council. Turner has served as chairman of the AAEP's Farrier Liaison Committee, served on the AAEP Foundation Advisory Council, the AAEP Educational Programs Committee and the AAEP Board of Directors. He is currently Vice-President of the AAEP. He is past-president of the American Academy of Thermology. He has consulted for United States Equestrian Federation, The USDA Horse Protection and Federation Equestriene Internationale (FEI). He has served as a Veterinarian Official at 4 Pan America games, 2 World Equestrian Games, at the 2016 Olympic Games in Rio de Janeiro and 2021Tokyo Olympics. He has participated as an instructor at Equitarian Workshops in Mexico, Nicaragua, and Costa Rica and has participated in the Equitarian projects in Honduras, Costa Rica and Peru. He is married to veterinarian Julia Wilson and has two sons. He loves the outdoors and rides whenever possible.



Lameness after synovial sepsis

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Text

Synovial sepsis is a relatively common condition affecting horses and causes acute lameness and pain. It is a serious condition and prompt, aggressive and early treatment is associated with better outcome. Bacterial synovial infection causes a severe inflammatory reaction in the synovial environment, and this process can trigger degenerative changes. Even with acute aggressive treatment, eradication of the infection may be challenging in some cases. Some cases may develop protracted synovial infection with chronic lameness. In other cases, involvement of tendinous or osteochondral components may cause persistent lameness.

Unfortunately, the clinician may face the scenario when a horse shows lameness after treatment of a synovial infection and the question to answer is: Is the infection eradicated? Or is the infection persistent?

As clinicians, we strongly rely on synovial fluid analysis. Bacterial culture is considered the gold standard for diagnosis of synovial sepsis; however, it is considered that only about 35-45% of those cases with suspected synovial infections may yield a positive bacterial culture. Cytology of the synovial fluid is also used to guide our decisions; however, any intrasynovial intervention, being synoviocentesis, needle flush, surgery or intraarticular medications can each and all have important inflammatory effects, which lead to increased inflammatory markers. As a consequence, synovial fluid analysis in these cases quite commonly yields results that fall within what is considered the grey area as to the diagnosis of persistent synovial sepsis, and this makes interpretation and decision-making difficult. The absence of a gold standard for the diagnosis of synovial sepsis is limiting.

Clinical scenarios will be reviewed where the dilemma of what is happening, what the cause of persistent lameness is and a discussion on how to approach and manage these cases will be presented and discussed with the audience.

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Luis regularly speaks at national and international congresses, has over 50 publications in peer-reviewed journals and has contributed to textbook chapters. He is also the co-editor of the recently published textbook Complications in Equine Surgery.

During his free time Luis enjoys attempting skiing, running, swimming and spending time with his wife and 2 kids.

Managing Proximal Suspensory Desmitis: fore & hind limbs

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Summary
My current treatment regime involves a combination of the techniques described below. Extracorporeal shockwave therapy is used in persistent lameness due to proximal suspensory desmitis in the forelimb and low-grade cases of hindlimb proximal suspensory desmitis. In hindlimb proximal suspensory desmitis a plantar metatarsal neurectomy and fasciotomy is employed if the block pattern is appropriate. In cases with marked hypoechogenicity this is combined with a PRP injection. With aggressive surgical management I would consider that the prognosis is dramatically improved in a large number of cases. Follow-up of these cases during the rehabilitation period is important in optimising the outcome.

Conservative and medical management
Management of acute injuries should involve rest, anti-inflammatory therapy and controlled exercise under serial ultrasound monitoring. One-off regional infiltration with corticosteroids (e.g. 10mg triamcinolone in 3mls of local anaesthetic) can be beneficial in decreasing the inflammation in acute cases. It can also be useful in managing low-grade chronic/active cases in the short term. This is often the most appropriate form of treating flat racing Thoroughbreds, as there is not time in their short careers for the lay-off associated with surgery.

Platelet rich plasma (PRP) is the currently favoured biological product for the treatment of PSD. It contains a number of anabolic growth factors, and there are a number of commercially available systems that allow the product to be easily used in practice. It can be used on its own in cases of acute desmitis, especially in forelimbs, but in hindlimbs it is most commonly employed along with other forms of treatment – for the reasons outlined above that lead to the chronic pain state. I prefer to use autologous conditioned serum (Irap) in marginal lesions in the mid-body and branches, as it is less fibrinogenic and should be less likely to cause adhesions. Intravenous infusion of bisphosphonates has been useful in some cases of enthesis-related pain.

Extracorporeal Shockwave Therapy (ESWT)
ESWT has now been employed for a number of years in the treatment of proximal suspensory desmitis. In my experience it has been extremely helpful in the management of chronic active cases of proximal suspensory desmitis in the forelimb. Crowe et al (2004) reported on a series of cases of hindlimb PSD treated with radial ESWT, and improved the prognosis to around 41%. This is significantly better than with conservative treatment, but still poorer than the surgical treatments that will be described. Lischer et al (2006) reported on 22 cases of hindlimb PSD treated with focused ESWT, which also had a 41% success rate at six months. This supports my clinical impression that there does not seem to be any difference between radial and focused machines in the outcome following treatment. In the hindlimb I tend to use it in either mild, acute cases or for the management of low-grade, chronic cases, and continued treatments may be necessary. Clinically there does not seem to be any difference between radial and focused machines in the outcome following treatment. I now use higher settings for the hindlimb than the forelimb: with the EMS Swiss DolorClast Vet 2500 pulses at 3.5 bar with a 10mm applicator versus 2000 pulses at 3 bar. I would normally combine this with medical management.

Plantar metatarsal neurectomy and fasciotomy
This treatment was developed as the surgical option for the management of proximal suspensory ligament desmitis in the hindlimb. This procedure combines decompressive fasciotomy of the deep laminar plantar metatarsal fascia with neurectomy of the deep branch of the lateral plantar nerve. This nerve branch is the common origin of the medial and lateral plantar metatarsal nerves, which apply sensory innervation to the origin of the suspensory ligament. Surgery should be restricted to those cases that have had a very good response to a block of the deep branch of the lateral plantar nerve. Long term follow-up has yielded a long term success rate of 75% returning to normal function. The surgical technique will be described, and approximately 4-5cm of nerve is removed through a 3.5cm incision.

The same procedure has also been used successfully in forelimb cases, but there is generally less need for this.

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Andy qualified from Cambridge University Veterinary School and subsequently trained in surgery at the University of Bristol and then at Rossdales in Newmarket. After working as University Equine Surgeon at the Queen's Veterinary School Hospital, University of Cambridge he returned to Rossdales, where he became a partner and, in 2021, a clinical director. Andy's main areas of speciality lie in orthopaedic surgery and lameness, especially related to competition horses. He has always been interested in the application of novel diagnostic and therapeutic techniques to lameness problems and poor performance. He is a Diplomate of the European College of Veterinary Surgeons and holds the Royal College of Veterinary Surgeons (RCVS) Diploma in Equine Orthopaedics. He is recognised by the RCVS as a Specialist in Equine Surgery. He is team vet to the Japanese Three Day Event Team. He has previously been team vet to the British Three Day Event and British Pony Showjumping Teams; the Japanese Showjumping and Dressage Teams; the Hong Kong Dressage Team; as well as working for numerous private competitors at competitions and championships. He was an official treating vet for the 2012 Olympics in London. In 2015, Andy was awarded Diplomate status by the American College of Veterinary Sports Medicine and Rehabilitation (ACVSMR), which means that he now holds diplomas in three separate areas of expertise (surgery, orthopaedics and equine sports medicine). He is a Board Director of British Showjumping. He enjoys skiing, ski mountaineering and racing cycling in his spare time.

Managing osteoarthritis in the tarsus

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Text

Osteoarthritis of the distal tarsal (distal intertarsal and tarsometatarsal) joints is a common cause of lameness in horses. Different treatment options have been investigated and used in equine practice over the years.
Adequate hoof trimming and balance aiming to help to unload the medial aspect of the tarsus, with the use of wider, thicker outside branch or lateral extension to help unload the medial aspect of the tarsus have been recommended, especially for those horses with bowleg conformation.

Extracorporeal shockwave therapy has recognised analgesic effects and is often used over painful tarsal joints.

Administration of NSAIDs is also common adjunct therapy in horses suffering from tarsal joint pain, but potential side effects of these drugs need to be considered.

Intraarticular injection with corticosteroids remains a main cornerstone when treating distal tarsal pain. As the joints involved are low motion joints, type of corticosteroid and their associated potential detrimental chondral effects are not of such a concern as when treating high motion joints.

Options for facilitated or accelerated ankylosis using chemical drugs have been used over the years. Chemical fusion agents include sodium monoiodoacetate (MIA) and, more recently, ethyl alcohol. MIA affect chondrocyte metabolism leading to chondrocyte death. MIA was associated with marked inflammatory response and pain and its use has therefore become less common. Ethyl alcohol has detrimental effects on the cartilage, which are expected to accelerate the process of ankylosis. Ethanol has also been associated with neurolytic effects, which leads to sensory innervation blockage at the intraarticular level. It is important to highlight that for any chemical fusion treatment approach, a pre-surgical contrast radiological study to assess the communication with proximal interatarsal/tarsocrural joints must be performed as diffusion of the chemical agent into these joints would cause severely detrimental effects. Laser can also be applied intra-articularly to produce ankylosis. These options of chemical fusion all have effects toward joint ankylosis, but the process to achieve to a sufficient ankylosis and pain-free sate may be prolonged and require repeated treatments.

Surgical approaches to distal tarsal joint pain from osteoarthritis include articular drilling and plate fixation. Articular drilling has been used for many years and the reported outcome is good. The produced causes destruction of the articular cartilage and subchondral bone with exposure of the subchondral bone allowing bone fusion to occur. The amount of cartilage damage is limited to the drilled tracts. A good amount of drilling is preferred to expedite he ankylosis process; however, excessive drilling or entering the plantar tarsal canal may cause instability and pain.

Most recently, arthrodesis with use of a trans-articular plate has been reported. A T plate is used and both affected joints are bridged. This procedure is more involved but produces a more stable, solid construct, which may decrease risk of pain and convalescence.

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Understanding Biomechanics Of The Stifle

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Text And Bibliography:

The femorotibiopatelar region is directly related to the pelvis. All of the gluteal and femoral muscles, 14 ligaments, 2 meniscus, 3 joints and its innervation (Direct innervation: Femoral/gluteal nerve and caudal/ obturator nerve; Indirect Innervation: sciatic nerve) makes this a complex area in terms of biomechanics but also very exciting to study.

The biomechanical mechanisms of this region have been well described and can easily help understanding the different pathologies of this part of the body.

The hind limb reciprocal apparatus is part of the biomechanical mechanism of this region where the femorotibiopatelar joint maximizes its efficiency spending less energy. The flexion of the femorotibiopatelar and coxofemoral joints induce simultaneously the flexion of the tarsal and fetlock joints. The opposite movement of extension of the limb is also a combined and balanced action of both peroneus tertius and superficial digital flexor muscles.

The capacity to extend the femorotibiopatelar joint by the stay apparatus, the dorsal locking and unlocking of the patella by the proximal traction of the quadriceps femoris muscle, the medial rotation caused by the sartorius muscle, the lateral rotation action of the gluteus femoris muscle over the patella, the caudal movement of the meniscus during femorotibial joint flexion, the understanding of the coxofemoral luxation as a consequence of an untreated upward fixation of the patella, the cranial meniscotibial ligament desmopathy and many others can only be fully understood by knowing well the biomechanics of the femorotibiopatelar region.

MV. MSc.PhD. Iselp/Alapile Certified. Jairo Jaramillo Cárdenas

se formó hace 24 años por la Universidad de La Salle-ULS en Bogotá, Colombia; Allí realizó su residencia en clínica y cirugía de grandes animales. Es maestro en cirugía equina por la FCAV / UNESP Jaboticabal, y doctor en cirugía equina por la FMVZ / UNESP Botucatu. Se enfocó su especialización profesional en el aparato locomotor de los equinos, terminando el programa, y siendo titulado por ALAPILE (Asociación Latinoamericana de Patología e Imagenología del Sistema Locomotor del Equino); en la secuencia, también terminó y se certificó por el ISELP (International Society of Equine Locomotor Pathology). Durante la titulación y certificación de estos programas, realizó un internado en el departamento de "Equine Field Service" en la Universidad de Davis (UCDAVIS) en el estado de California en Estados Unidos. Actualmente es el socio-gerente de la empresa "EQUARTER" (actuando en educación continuada) en Brasil, América Latina y algunos países de Europa y Ásia.

Stifle lameness: Update on subchondral bone cyst management

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Subchondral bone cysts (SBCs), and more specifically medial femoral condyle (MFC) cysts, are associated with lameness and poor performance in sport and racehorses and research has focused on them for years. Unfortunately, their etiology remains unclear although most studies suggest a traumatic origin. In fact, SBCs have been experimentally created after performing a small cartilage lesion with or without an additional subchondral lesion in the MFC of horses and ponies.

SBC scan cause lameness due to the inflammatory and morphological changes produced in the subchondral bone plate. With time, SBCs have been suggested to be also associated with mechanical abrasion of the meniscus and tibial plateau and with changes in the biomechanical environment of the joint. Ex-vivo and finite element studies performed have found that the medial meniscus and the tibial plateau uncovered by meniscus are subject to additional stresses and prone to damage when a defect in the MFC was present.

Several techniques are used to treat MFC SBCs, from conservative treatment to intracystic injection of steroids to surgical procedures. While conservative treatments were used in the past, they are currently not recommended unless the cyst is only a subtle concavity. Intracystic injection of triamcinolone (10-18 mg in several spots within the cyst) is used to minimize the inflammatory environment and bone resorption that has been histologically identified in naturally occurring cysts. This technique can be used ultrasonographically or radiographically-guided but best results are obtained when performed arthroscopically-guided. Additionally, higher success rates are obtained when attempted in younger animals, non-arthritic joints or smaller cysts.

Cyst debridement with or without cyst filling and resurfacing is another surgical possibility. However, only performing cyst debridement (traditional surgical technique) have been suggested to potentially cause meniscal and tibial damage and rarely promotes radiographic healing. Thus, it could be considered out of favor by many. Different materials can be used for cyst filling +/- resurfacing such as cancellous bone, bone marrow concentrate , tricalcium phosphate granules or chondrocytes. Debridement in conjunction with cyst filling led to a successful outcome in up to 74% of cases.

In the last decade, a novel surgical technique consisting of placing a transcondylar cortical screw through the cyst via an extra-articular approach has obtained encouraging results with success rates of 75% and higher. The benefits of this technique are thought to be associated with the preservation of the cartilage overlying the SBC and with the high rate of radiographic cyst healing (up to 75%). Additionally, debridement of the inflammatory cyst lining is achieved during drilling for screw placement. Some special drills can be used to maximize this debridement. Transcondylar screw placement is currently the gold standard for many surgeons as it achieves radiographic healing and lameness resolution in most cases. However, prognosis still depends on the health of the joint compartment (i.e: lack of additional damage to the medial meniscus, tibial plateau or femoral condyle surface), especially when older horses or chronic cases are considered.

Thus, pre-operative radiographic and ultrasonographic screening in addition to arthroscopic assessment of the joint during screw placement are key for patient selection and the success of the surgical technique. In recent years, the use of a reabsorbable interference screw has been tested for SBC in the stifle and other locations. The use of these screws rather than cortical screws was introduced due to concerns regarding horse selling value when stainless steel implants were radiographically visualized later in life, especially in young Thoroughbreds going to auctions. Despite the fact that these implants produce radiographic healing and lameness resolutions in short term rates similar to the cortical screw, their long term effects are still to be proven. Bone healing seems to be produced due to the osteoinductive and osteoconductive properties of the screw materials rather than to biomechanics as is the case for the cortical screw. Different healing patterns can be seen at the subchondral bone plate level with both techniques.

Newer techniques such as subchondroplasty are being extrapolated from human medicine and results will be available soon. Similar to screw placement, the cyst is accessed extra-articularly with a cannulated drill and then a biomaterial +/- PRP or BMAC are injected to achieve cyst filling. This material is replaced overtime by bone.

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Alvaro Garcia Bonilla obtained his Veterinary Degree in 2005 from University of Cordoba (Spain), followed by two internships in Spain. One at a private practice and the second one at University of Barcelona (2006-08). Then, he moved to Canada where he completed a surgical internship at Milton Equine Hospital, followed by an orthopedic research fellowship at University of Pennsylvania (USA) (2009-11). After all this training, he went to The Ohio State University where he obtained a Master of Science focus on the stifle and subchondral cystic lesions at the same time that he completed an equine surgical residency (2011-14). In February 2015, he became a Diplomate of the American College of Veterinary Surgeons. After finishing his residency, he stayed at The Ohio State University as an Emergency and Surgery Clinical Instructor for one year followed by locums at University of Montreal (Canada), Charles Sturt University (Australia) and Langford Equine Centre (University of Bristol, UK) before joining the surgery team at University of Montreal as an Assistant professor in equine surgery in October 2016. He is now an Associate professor and director of the research lab in clinically applicable and minimally invasive surgery at the University of Montreal. He has published numerous articles in peer-reviewed journals and has participated in several national and international conferences.

Field of interest: Sinoscopy and sinus surgery, subchondral cystic lesions in the stifle, orthopedic and arthroscopic surgery, standing arthroscopy and minimally invasive procedures.