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Lameness in horses : Frequent osteo-articular pathologies

1. Generalities about lameness investigation

Lameness is a frequent cause of intolerance to work in horses and causes high costs and early retirement in horses.

Unfortunately, in most cases, no evident sign of swelling and pain on palpation may be present. In numerous cases, no obvious lesion is visible on radiography so that the precise localisation of pain is very important. Therefore, lameness investigation is complex and time-consuming for the veterinary surgeon.

Precise knowledge of anatomical structures is of utmost importance. A swelling of the hock can affect very different structures and be caused by different pathologies (tarso-crural joint, collateral ligaments, tarsal tendinous sheath or sub-tendinous bursae).

In the following, the degree of swelling of a structure will be graded in 3, from slight, moderate to severe. Mostly, slight swelling is not clearly visible, but palpated. A swelling of a structure is called "diffuse" when it is not only the synovial pouches or the structure itself that are swollen but also the subcutaneous tissue. This is often the case, when the condition is chronic or when severe inflammation is present, e.g. in case of septic arthritis of a joint.

The lameness grading system used is the grading of the AAEP, on 5.

Grade 1 lameness: Lameness difficult to observe and inconsistent whatever the condition.

Grade 2 lameness: Lameness difficult to observe but in certain conditions (after flexion test or on circle) the lameness is observable in a constant manner.

Grade 3 lameness: Lameness easy to observe in all conditions at trot.

Grade 4 lameness: Severe lameness already observed at walk.

Grade 5 lameness: Severe pain, no load on the limb.

A complete lameness investigation begins already with the signalement of the horse, because following age and breed as well as the use of the horse, the problems that appear are different (developmental disease in young horses, degenerative disease in older horses) and the prognosis is different, too.

The history is important, concerning the generalities about the patient and usual work as well as the precise questions about the conditions of the onset of lameness. Care should be taken, that some

owners may not tell the truth, they were not aware that their horse is lame for a long time or they do not want to tell you, that it lasts for several months.

General exam and body condition should be evaluated, but most causes of lameness do not cause alteration of the general condition. Only severe lameness (4 and 5/5) may alter the general condition of the horse as well as some cases of severe infection, like severe cellulitis of the limb.

Inspection at rest: Evaluation of symmetry, swelling of joints or tendons/bony surfaces. Always palpate from the hoof to the upper limb, especially in the front limb, 80 % of all lameness cases are localized in the digit. Evaluation of conformation is also important. The horse's abnormal conformation may induce lameness. Recognize abnormal or improper trimming or shoeing of the horse. Palpation should be systematic and compare both limbs. Check the digital pulse. Palpation should be repeated after the examination in movement, to check in greater detail the lame limb. Attention should be given, not to get influenced by an obvious abnormality (e.g. a horse with an old tendonitis that is no more painful and that is lame on the other limb or from another region) or by the history of the owner.

Inspection in movement: On walk on a straight line and a hard and even ground. Abnormal flight of the foot and the landing of the foot should be evaluated. If lameness is already seen at walk, you are in front of a grade 4 lameness and the examination that follows should be adapted because the horse may have a severe lesion that may worsen if you do flexion tests or diagnostic analgesia. In that case, repeat the palpation, including the foot that should be tested with a hoof tester. When the lame limb is determined, a thorough palpation can be repeated. Passive manipulation of joints may reveal ankylosis or pain as well as abnormal laxity.

After these steps, it is advised to do flexion and extension tests as well as "wedge" tests. As we want to localise pain with these tests it is very important to stay specific for a zone. Therefore, e.g. fetlock flexion test on the hindlimb should be done near to the ground to avoid flexion of hock and stifle. Abduction and adduction are interesting for meniscal problems, but no test is "pathognomonic" of one lesion or one joint. Therefore, conclusions were made with a combination of all the results. In most cases diagnostic analgesia is necessary. Especially for front limb lameness in the digit or the fetlock, it is very important to do all the functional tests to be able to choose the adapted shoe as a part of the treatment.

In case of persistent lameness after digital anaesthesia, it can be advised to complete other flexion tests of the high limb if not already realized because of the risk of lesion when you do many tests and trotting after higher limb analgesia. I would also advise to avoid trotting in the deep sand after high limb blocks, especially at the lunge.

Mostly used blocks on the front limb were digital palmar anaesthesia and digital anaesthesia. The low four point and the high four point or the block of the lateral palmar nerve were also frequently used. With low four point, care should be taken to avoid to puncture synovial structures (fetlock joint and digital sheath). Therefore sufficient sterile preparation is necessary even for anaesthesia of the palmar nerves. Remember the precise localisation of the blocks and the volumes of local anaesthetic necessary, otherwise you may have false results. Skin sensitivity should be tested before trotting the horse. False negative results can occur in case of aberrant nerve localisation and distant injection to the nerve. In case of severe inflammation the nerves may be severely stimulated and the local anaesthetic does not work. False positive results are the pain that is not in the region that should

normally be anaesthetised with a specific block. Intermittent lameness or low grade lameness may be challenging to diagnose.

Higher blocks on the limb (median and ulnar nerve block as well as tibial and peroneal nerve blocks) are more difficult to realize, because time is needed between realisation of the block and evaluating the horse (45 minutes up to 1 hour). The foot flight and the locomotion may be changed too, rendering interpretation more difficult.

Intra-articular anaesthesia should be done after strict sterile preparation. Respecting the adequate volume to inject is important, otherwise the product can act outside the joint on palmar nerves or the joint may become painful.

On hindlimbs diagnostic analgesia may be more difficult to realize and as strict digital problems are less frequent we often start DA with 6 point low or even a 6 point high block. As on the dorsal aspect of the limb near to the extensor tendon, the peroneal nerve may course down to the fetlock or even the pastern, it is advised to put local anaesthetic around the extensor tendon. In case of important lameness always check the foot very well for P3 fracture (hoof tester).

With all these steps we hopefully have localized the lameness to a precise region/joint that can be examined by means of diagnostic imaging like radiography and ultrasound.

Degenerative joint disease (DJD), especially distal and proximal inter-phalangeal arthritis

The coffin joint is the most solicited joint in horses and a frequent site of lameness, especially in jumpers and dressage horses. Distension of the joint can be observed as a round bulb under the extensor tendon just above the coronary band. It can be seen and palpated by digital pressure. Proximal inter-phalangeal degenerative joint disease often shows more remodelling and "high ring bone" can be palpated as a firm swelling on the dorsal and lateral aspect of the pastern at the level of the PIPJ. Its motion is less important than of the DIPJ. In most cases lameness may be bilateral and intermittent similar to what is seen in cases of navicular disease. Synovitis or soft tissue damage in the distal IPJ can be of traumatic origin and of sudden onset with strict unilateral lameness. Lameness is increased on the hard surface and on the corresponding limb on the circle. Some horses do not show lameness on the straight line but as soon as they were trotted on a circle they show clear lameness, sometimes persistent for the rest of the day, hindering usage of the horse. Abnormal limb conformation and incorrect latero-medial balance of the foot or high or asymmetric heels can worsen the lameness. The tests mostly positive are elevation of heels, elevation of lateral and/or medial side of the hoof as well as flexion test of the foot. Diagnostic analgesia: distal digital palmar can be 100 % positive, abaxial sesamoïdal block always positive, a shift of the lameness to the other front-limb occur in case of bilateral problem. The intra-articular block of the DIJ also suppresses the lameness. Proximal inter-phalangeal joint disease can also be positive to palmar nerve block and is always positive to abaxial sesamoidal block as well as to intra-articular block of that joint.

In case of simple synovitis no radiological abnormality on the bone can be observed. But beginning osteoarthritis of the DIJ without radiographic abnormalities can be difficult to distinguish. In more severe cases radiography can show peri-articular remodelling the the joint, of the extensor process of the 3rd phalanx. Be aware of different radiological conformation of the normal extensor process.

Suchondral bone lesions are another sign of degenerative joint disease. The proximal inter-phalangeal joint shows more bony remodelling and tends to arthrodesis naturally.

Treatment is based on corrective trimming and orthopaedic shoeing, especially full rolling motion shoes are indicated, if possible a light shoe in aluminium, e.g. Equi + or similar shoe. Intra-articular medication can be given in form of hyaluronic acid and corticosteroid like triamcinolone as well as a cure of polysulphated glucosaminoglycan systemically or locally. Nevertheless, pay attention to severe inflammatory reaction or joint sepsis with PSGAG administration locally. It is contraindicated when there is severe joint inflammation. The third aspect of treatment is adapted training or reduced training especially lunging the horse is not indicated.

In case of severe osteoarthritis of the PIPJ (high ringbone), the horse may benefit from surgical arthrodesis, mostly realised with 2 5.5 screws that pass transarticular in lag fashion through the joint. A more stable construct is based on the screws laterally and medially and an axial small LCP plate of 3 holes. Return to sport is possible with a good prognosis as the PIPJ is a joint of low motion.

Navicular disease/palmar foot pain

Navicular disease is a chronic forelimb lameness associated with pain in the region of the distal sesamoid bone or navicular bone. It is a very complex syndrome that is known for a long time but still not completely understood. The new techniques of diagnostic imaging, especially MRI, but also digital radiography, have elucidated lesions that could not be shown before, like lesions of the deep digital flexor tendon in the hoof capsule, ligament lesions in the foot and fragments at the distal border of the navicular bone. Again precise knowledge of anatomical structures and the biomechanics of the foot are important to understand the different types of “navicular disease”.

Clinical presentation is mostly an insidious onset of loss of performance and finally lameness. As navicular disease is often bilateral, no clear lameness may be seen and poor performance may not be diagnosed as a lameness problem.

At rest horses can point one foot forward to diminish strain on the affected region, primary lesions of the deep digital flexor tendon may show the same symptom. Horses with all hoof conformations can have navicular disease, but poor latero-medial and dorso-palmar hoof balance predispose horses to develop the disease.

In most cases horses are lamer on the circle, mostly the corresponding limb and on a hard surface. DIPJ distension and positive response on testing the frog with a hoof tester may be present. In some cases lameness is only observed when ridden. Distal limb flexion may increase lameness. In most cases heel or toe elevation is painful as well as elevation of the lateral or medial hoof wall with a wedge.

Diagnostic analgesia localises the pain in the palmar foot region, but palmar nerve block is not always completely positive but always abaxial sesamoidal block. Anaesthesia of the distal IPJ can diminish lameness as well as anaesthesia of the navicular bursa, depending on the lesion that causes pain.

The lesions observed on radiography are distal border fragments, synovial fossae increased in number and size or balloon shaped. Cysts can be observed and the proximal margin of the bone can be

irregular. The facies flexoria of the bone can be irregular, the cortex of the bone can be thickened. On the suspensory ligaments laterally and medially enthesiophytes can be seen.

In a lot of cases no abnormality can be seen on radiography or only slight changes even if severe lameness is present, due to lesions of soft tissues. The deep digital flexor tendon can show lesions near to the distal sesamoid but also higher in the pastern. This can be one reason for unresponsiveness to digital palmar anaesthesia and to digital palmar neurectomy.

No curative treatment is possible and treatment should always be based on several aspects like corrective trimming and orthopaedic shoeing, management and medical therapy. In case of sole medical treatment by infiltration of corticosteroids, the action of therapy may be short and recurrence of lameness and enhanced degenerative process are observed.

In our clinic, we use “full rolling motion shoe” concept in case of navicular disease of “articular” form (lameness increased on the circle, heel elevation positive, intra-articular anaesthesia of DIPJ positive), like a Equi + shoe. When the toe elevation is also painful we put another shoe with that also offers full rolling effect with heel extension. In case of severe lesion of the DDFT, we also use an egg bar shoe, but it should always have a good roller effect, to favour break over and lateral movements. This should be preceded by corrective trimming and accompanied by specific medication like HA in the joint or the bursae or with autologous platelet rich plasma (PRP) locally infiltrated into the tendon lesion by ultrasound guidance.

Bone spavin (distal inter-tarsal and tarso-metatarsal arthritis)

This form of osteoarthritis of the tarso-metatarsal and the distal inter-tarsal joint is a frequent cause of hindlimb lameness in horses of all disciplines. The disorder mostly appears in middle aged horses but a developmental form, juvenile spavin, is also described in horses younger than 2 years and may be related to incomplete ossification of the 3rd tarsal and the central tarsal bone in the newborn foal.

Clinical presentation: Swelling may be present at the medial or cranio-medial aspect of the distal tarsal joints. Normally no swelling of the tarso-crural joint is seen, unless the proximal inter-tarsal joint is involved. The degree of lameness varies from moderate to severe lameness to only reluctance to work in case of bilateral lameness. Soreness of the lumbar region is often reported and horses may be misdiagnosed as a back problem. Most horses show positive hock flexion test and also a positive Churchill test (pressure on the distal tarsal bones and then trotting). You should start the flexion test on the less lame hindlimb, sometimes the increased load on the lame limb may increase lameness on the limb that is not flexed.

Diagnostic anaesthesia: In most cases intra-articular analgesia of tarso-metatarsal or distal inter-tarsal joints will be positive. Pay attention, in case of high plantar nerve block, pain in the distal tarsal region may be alleviated. Localisation of pain is important, as diagnosis cannot always rely on radiography, as there is an occult form of spavin without radiographic changes.

Radiography: Always take images of both hocks as the problem is often bilateral, even if at one time lameness is only present on one hindlimb. Narrowing of the joint space, remodelling of the dorsal aspect, sclerosis of the 3rd tarsal and central tarsal bones, new bone production.

Treatment: Again treatment is based on corrective trimming and shoeing with a roller effect to favour the break over of the toe, in order to reduce the flexion of hock and stifle during the stride. Intra-articular treatment is based on corticosteroid (methylprednisolone or triamcinolone) with or without HA. In order to favour the fusion of the joint, ethyl alcohol injections were applied. Treatment with bisphosphonate is also possible (Tiludronate). In case of severe and chronic lameness unresponsive to medical treatment and shoeing, an arthrodesis by trans-articular drilling can be realised. After fusion of the joints, the lameness resolves and the mobility is not too much reduced as the distal tarsal joints are low-motion joints.

Meniscal injury and stifle osteoarthritis (OA)

The stifle is a very complex joint, with 3 synovial pouches and several ligaments and the menisci. In most cases the meniscal injury concerns the medial meniscus and also the medial femoro-tibial joint. Subchondral cystic lesions of the medial femoral condyle can also favour stifle OA and meniscal lesions.

Clinical presentation: moderate to severe hindlimb lameness. The swelling of the femorotibial joint is not easy to palpate and less visible than femoro-patellar distension. Flexion test of the hock and stifle but also the abduction and adduction of the thigh are painful. Intra-articular anaesthesia is not always completely positive and in case of improvement of 50 % the localisation should be supposed to be in the stifle.

Radiography: Only in case of severe lesions tibial plateau osteophytes or bony remodelling can be observed. In some cases no radiological abnormality. Ultrasonography is necessary for diagnosis. Distension of the joints with increased villous synovial pad formation and hyperechoic spots in the synovial fluid can be seen as well as lesions of the menisci themselves (tears) or the cranial meniscal ligament (hypoechoic).

Treatment should be based on stall rest and intra-articular treatment, like HA or autologous PRP. In case of severe meniscal lesion of traumatic origin, an arthroscopic evaluation with debridement of the meniscal lesion is also a good treatment option. When movement is resumed, a good roller shoe can help to reduce flexion of the stifle during the stride.

Developmental orthopaedic disease (DOD), like osteochondrosis (OC) and subchondral bone cysts.

OC is a very huge subject that is extensively documented by fundamental and clinical research and complete discussion of the pathogenesis will go beyond the frame of this presentation. As it is a very frequent disease present in about 30 % of warmblood horses, I have to speak about the subject. As it is a developmental disease, it can be seen in very young horses and even foals of less than 1 year. OC is a focal failure of endochondral ossification. A lesion process and a repair process take place together. The process is stable at less than 12 months. Therefore the screening radiographies of young horses were mostly done between 12 and 18 months.

Most frequent lesion site in horses are the stifle or femoro-patellar joint with lateral and (medial) trochlear ridge, tarso-crural joint with intermediate ridge of the tibia, medial malleolus, lateral (and medial) ridge of the talus, MC- MT- phalangeal joints (midsagittal ridge) and scapulohumeral joint (glenoid cavity and humeral head). Other sites are also possible but less frequent and typical.

Clinical presentation: In most cases horses do not show symptoms in the young age before starting to work. Lameness is not consistently observed, only in case of severe lesions of the trochlear ridge of the femur or the scapula-humeral joint (lameness 4/5). Severe swelling of the joint may be present, especially in femoro-patellar and tarso-crural joints.

Radiography can show the typical lesions with an irregular bone contour or a detached fragment. Arthroscopy is most commonly performed even before clinical signs may appear in order to avoid secondary degenerative disease. Prognosis for future performance is mostly excellent, except the lesion of the femoro-patellar joint that have a less good prognosis.

For breeders it is interesting to control the absence of lesions in the mares and the stallions and to control feeding of mares during gestation and of the young foals to reduce the incidence of the lesions.