

# Veterinarian explains Scintigraphy and MRI

In this of Horse International we are going to explain how advanced imaging techniques, like MRI and scintigraphy, work

## Scintigraphy

Equine scintigraphy (bone scan) involves injection of a radioisotope, (technetium-99m) which is linked to a compound called bisphosphonate-MDP. Within a couple of hours this combined compound shows up in areas of the horse's skeleton where there is increased activity of the bone, which may indicate lesions. Because the radioactivity of the compound gradually decreases, radiation is emitted from the horse's body. This radiation (gamma radiation) is captured by a gamma camera. Through computer software, an image is acquired where abnormalities in bone activity can be detected as so called 'hot spots'. Scintigraphy is a very sensitive technique which can detect bony changes much earlier than radiography (sometimes even years before radiographic changes can be seen). Our gamma camera is designed to enable quick and efficient acquisition of scintigraphic images of any area of the axial and appendicular skeleton in the standing horse, meaning no general anaesthesia is required. Dr. Bergman is the founder of equine scintigraphy in the Netherlands (since 2003). Because of this, SMDC offers a lot of expertise and experience in performing scintigraphy and analysing the results. SMDC is currently the only clinic in the Netherlands that has the newest and most up to date scintigraphic equipment.

## Indications

The indications for using equine scintigraphy are; poor performance, multiple limb lameness, lameness that cannot be localised using nerve and joint blocks, horses that cannot be safely examined using nerve and/or joint blocks, horses suspected of having (stress) fractures, or findings in areas in the horse that cannot be imaged adequately with

other techniques (radiographs and/or ultrasonography), like certain areas in the axial skeleton. Besides detecting lesions not identifiable by other imaging techniques, scintigraphy can also help to establish the clinical significance of lesions detected by radiography, ultrasonography or MRI.

## Preparations

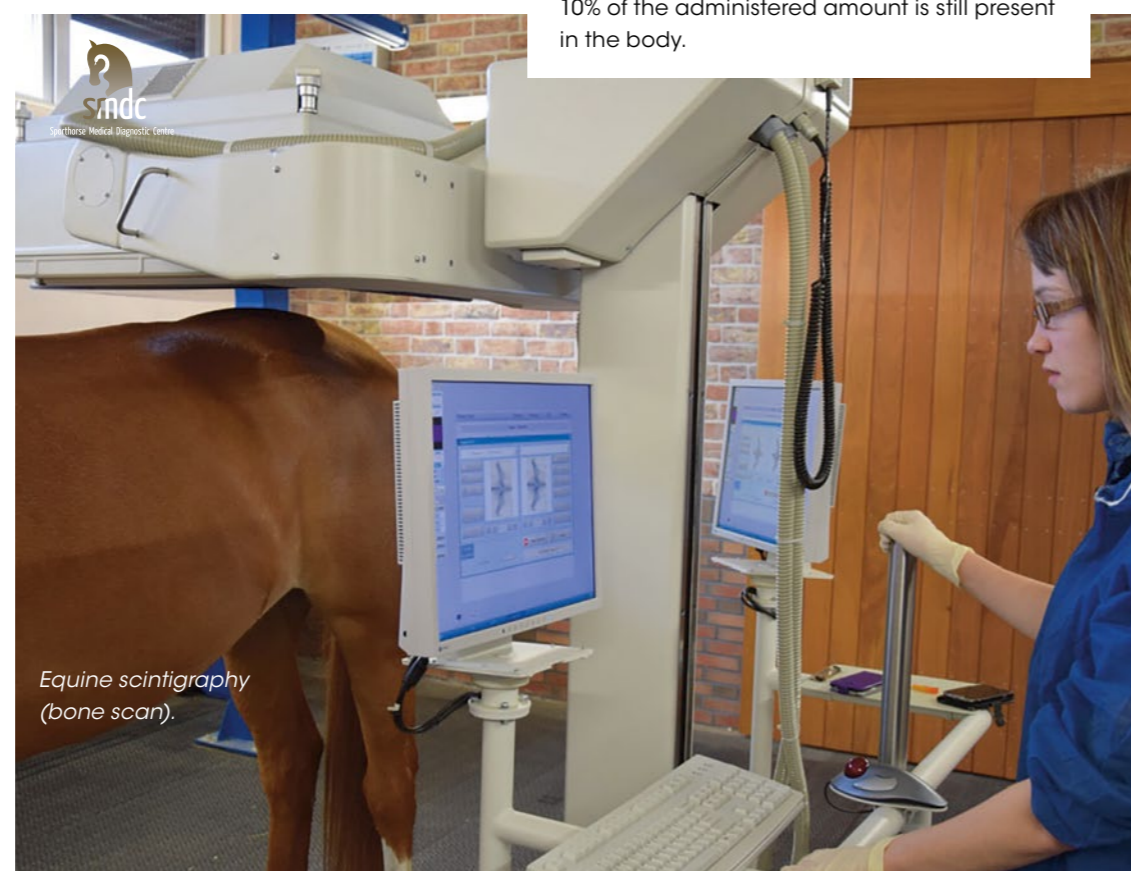
If possible, the horse is lunged beforehand to increase the blood circulation, which helps to maximise the uptake of the technetium- MDP. After injection of the technetium-MDP, due to radiation safety reasons, the horse can only be handled by SMDC staff and will be in quarantine in the dedicated scintigraphy stalls. To prevent the horse from potentially coming in contact with his/her radioactive urine, the legs get bandaged and the feet are placed in special hoof bags. Two hours after the injection the horse is ready to be scanned. During the scan the horse has to stand still for a significant period, and therefore is lightly sedated.

## The scan

The gamma camera measures the amount of radiation that is emitted from the horse's body. This is the highest in areas where active bone processes are occurring (these are also known as 'hot spots'). Piece by piece, the entire body is imaged via multiple scans. During each 90 second scan, the horse has to stand still. If the horse moves slightly, the up-to-date computer software is able to analyse and correct the received image. If there is too much movement, then the area has to be re-scanned. Depending on the horse's cooperation and/or movement, a scan usually takes about 2-2.5 hours.

## Safety

It is important to understand that scintigraphy is a very safe method of examination and the radiation dose is very small. The injection is virtually painless and there are no associated allergies or other consequences described. The technetium is excreted via the urine and is broken down naturally. After 24 hours only 10% of the administered amount is still present in the body.



Equine scintigraphy (bone scan).



MRI, Magnetic resonance imaging.

## Discharge

The horse can go home as soon as the concentration of technetium in the body is low enough. You will be informed ahead of time when your horse is allowed to leave. The scintigraphic images will be analysed and a report will be made. The report will be discussed with the client (and referring veterinarian) and you will receive a detailed report with your horse's scans. Frequently, additional examinations are performed to be able to make the most optimal rehabilitation plan for your horse.

## MRI

MRI stands for Magnetic Resonance Imaging. SMDC Advanced Imaging has a high quality standing MRI for horses. MRI produces highly detailed quality images that can show any abnormalities in tendons, ligaments, bone and other structures. In the front legs we are able to image from the foot to the carpus and in the hind limb from the foot to the hock. Every part of the body contains lots of hydrogen atoms (protons). These are the atoms that are responsible for giving us the MRI image with the help of a very strong magnet and radiowaves. These radiowaves are captured by a coil and are translated into a detailed image via computer software. Different structures can be imaged via different radiowaves and different sequences. MRI is very versatile in the ability to provide images sliced in many planes, and is capable of producing three-dimensional images in a variety of orientations. These highly detailed

images are interpreted by collaborating board certified radiologists.

## Indications

Magnetic resonance imaging (MRI) is indicated when the results of radiography and ultrasonography do not explain the lameness. Problem areas (such as ligaments, tendons and bony lesions) in the foot, pastern, fetlock, metacarpus, carpal, metatarsus and hock, from which more detailed information is needed; detecting bone fluid (edema and bone necrosis), or when further detailed information after scintigraphy. During an MRI examination only a small area can be evaluated and therefore it is important that the lameness is localised as much as possible beforehand.

## Preparations

Metal cannot go into the MRI room. This is why shoes will interfere with the image and will be removed ahead of time. The MRI room is a closed environment sealed from outside radiowaves. Only SMDC trained staff is able to be present in the room during the examination. We will gladly give you a tour ahead or after your horse's MRI.

## The scan

During the scan, the area of interest needs to be placed in the magnet. A coil will be placed around this area. This coil both sends and receives the radiowaves. These radiowaves are not felt by the horse physically. Because the horse has to stand still for a prolonged period

of time, he/she will be lightly sedated. Depending on the horse's cooperation and/or movement as well as the region that is to be imaged, the MRI procedure can take anywhere from 45-120 minutes. The quieter the horse stands, the shorter the length of the procedure.

## Discharge

During the MRI, hundreds of images/scans are acquired which are all interpreted by our collaborating board certified radiologists. The results will be explained and discussed with the owner and if applicable, the referring veterinarian. You will receive a detailed report including images as well as recommendations on what to do next. Usually the horse can go home the same day. In some cases it may be advisable to leave your horse at the clinic overnight in case applicable treatments have to be performed. ■

## THE VETERINARIANS



Dr. Brenda Hoogelander



Dr. Elisabeth van Veggel

## ABOUT SMDC

Sporhorse Medical Diagnostic Centre (SMDC), based in the Netherlands, is a multidisciplinary centre of excellence where all orthopedic diagnostic and treatment modalities can be utilized in combination with experience, extensive knowledge and individual attention. Dr. Bergman, Dr. van Toor, Dr. Cokelaere, Dr. Hoogelander and Dr. van Veggel dedicate their time to optimize sporthorse performance while considering all factors which might influence it. Their caseload contains horses showing lameness but also includes horses with spine related problems, pre-purchases examinations as well as preventative sporthorse care. [www.sporhorsemdc.com](http://www.sporhorsemdc.com)