

## VETADVICE

# All the better to see you with...

The equine eye is bigger than an elephant's and it's got some nifty features that make it unique – here we discover how life looks to our horses and get to grips with some tricky eye conditions with the help of veterinary ophthalmologist Chris Dixon

### MEET THE EXPERT

#### Chris Dixon



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Illustration: Samantha | Elmhurst BA Hons. [www.livingart.org.uk](http://www.livingart.org.uk)



**How you see**  
Eyes in the front of our head give us a relatively narrow field of vision



**How he sees**  
Eyes on the side of a horse's head give him a wide field of vision

## THROUGH HIS EYES

Most mammals' eyes are very similar and, despite differences in shape, size and colour, all work in the same way. However, it's fair to say the equine eye is special, as it's thought to be the largest of any land mammal - even bigger than that of an elephant!

To get to grips with how your horse sees, first imagine looking at life through a wide-angled lens and you're half way there. Horses live in a panoramic world with a high sensitivity to movement in their peripheral visual field. This evolutionary development is a survival mechanism, designed to enable them to quickly detect predators and means they can see much more than us mere humans.

We see with binocular vision, meaning our brain receives one picture from the information that both of our eyes take in. Horses do also have a small binocular field of vision, but the majority of their sight is monocular with the brain

receiving two images at once, as each eye sends a different picture.

## NOW FOR THE SCIENCE BIT

Your horse's retina uses photoreceptors to capture photons of light and create electrical impulses that can be sent to his brain for processing. The two types of photoreceptors are called 'rods' and 'cones'. Rods work in dark conditions and are activated by small amounts of light (rods provide lower definition than cones) while cones provide colour vision. It's because our horses have a greater proportion of rods than cones that they're thought to have better vision on dull, cloudy days rather than bright, sunny days.

Horses' vision - 'dichromatic vision' - comes as a result of them having two types of cone as do pigs, goats, cows, sheep and deer. We have what's called 'trichromatic vision' which comes as a result of having three types of cone. With it we can see three basic colours -

red, green, blue - as well as a range of transitional tones. Horses, with their dichromatic vision, can't distinguish red. Instead, reds appear yellow - a little like red-green colour blindness in humans - and it's very difficult for horses to discriminate between yellows and greens.

The cones in our horses' eyes are quite widely distributed through the retina in comparison to the cones in our eyes. We have what's called a fovea, a spot on the retina with a very large concentration of cones, providing us with high definition vision. But horses have what's called a longitudinal 'visual streak' and to focus objects of interest onto the visual streak a horse might have to tilt his head.

**DON'T FORGET**  
To make it easier for your horse to see poles and fillers, these obstacles should really be painted a different colour to stand out in the environment in which they're in, not a different shade of the same colour

## NIGHT VISION

We might worry about riding in the dark but it's not a problem for our horses who have superior night vision. Their ability to see in the dark is provided by what's called a 'tapetum' - not because they eat lots of carrots! The tapetum acts like a mirror on the back of the eye. Ever seen a dog or cat's eyes shine when light is shone onto them at night? That's the tapetum reflecting the light back. Unlike our horses, we don't have tapetums and with a lower number of rods, our ability to see at night is poor in comparison.

Along with their ability to see in the dark, horses are also able to reduce the glare of bright sunlight. This is achieved because the centre of an equine lens contains yellow pigments that filter certain wavelengths of light, reducing glare. We can achieve a similar effect but only by wearing yellow tinted sunglasses. Furthermore, the horse's eye contains an inbuilt sun visor called the 'corpora nigra'. This can be seen as a dark horizontal structure that runs close to the pupil margin. And while our horses' eyes are pretty good at functioning in bright and low light they do need time to adjust, especially if moving from a dark stable into bright sunlight or vice-versa.

The tapetum reflects light

The 'corpora nigra' is a dark horizontal structure

## DID YOU KNOW?

If good human vision is 20/20 equine vision has been recorded at 20/33. This means that details a human can see at 33ft are only visible to a horse at 20ft. However horse vision is thought to be better than that of both dogs (20/75) and cats (20/100)



Horses might need to angle their heads to judge the jump better

## BLIND SPOTS

With their eyes on either side of their head it's understandable that horses have a couple of blind spots. The first is directly behind the head extending over the back and tail and the second is below the muzzle extending approximately 1m out in front.

It's because of this second blind spot that your horse's muzzle whiskers are so important - as he can't see below

his muzzle, his sensitive whiskers are used to feel what's out there instead.

Because of where his eyes are positioned, when your horse is jumping, he'll try to change the angle of his head to assess the obstacles he's being asked to jump.

If your horse is ridden on a short rein, it can limit his ability to judge the correct distance and can increase his anxiety.

## Common problems

Unfortunately, having large eyes on the side of a head is the reason we see so many horses with eye trauma. If left untreated, simple scratches from passing bushes or flying debris can easily transform into a condition that threatens survival of the eye. To help reduce the potential problems caused by dirt and debris, the horse's eye has a natural 'windscreen wiper' called the 'third eyelid' or 'nictitating membrane', which is absent in humans. This membrane sweeps across the cornea to keep it clean, but can sometimes protrude with certain diseases or if the eye is sore.

## ULCERS

Damage to the cornea is often referred to as an ulcer by veterinary surgeons. Minor superficial ulcers should heal within a few days,

but if it becomes infected or the ulcer extends into the deeper layers of the cornea, treatment is required to alleviate the pain and prevent any loss of vision.

## UVEITIS

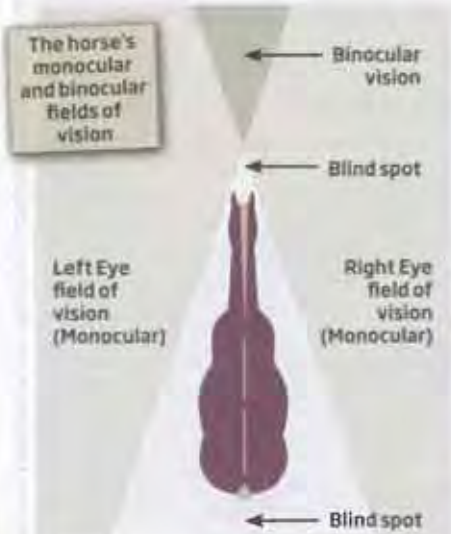
Uveitis, an inflammation of the internal structures of the eye, is an extremely painful condition that creates a spasm or cramp of the internal muscles pulling the horse's pupil into a slit. There are many causes of uveitis and some horses, such as Appaloosas and Warmbloods, are prone to repetitive bouts of inflammation called Equine Recurrent Uveitis (ERU) - this used to be called moon-blindness because it was thought that each bout was caused by the movement of the moon. Over the years many studies



A deep corneal ulcer



ERU is an extremely painful condition



**How you see**  
We can see four basic colours, including red



**How he sees**  
Our horses can't see red - instead it appears yellow

# Care Looking after his eyes

in different countries have tried to find the cause of ERU and we now know that the disease is related to a stimulation of the horse's immune system. However ERU doesn't have a single cause and many factors may contribute to its inception. Studies have demonstrated links to genetic makeup, bacterial and viral infection, trauma and UV light.

Professor Brian Gilger and his associates in the USA have developed a new treatment for ERU. It involves the placement of an implant into the tissues at the back of the eye. The implant is a small disc impregnated with a drug called cyclosporine that's slowly released into the eye. It's been demonstrated that a single implant can last longer than three years and will delay the progression of the disease. The implant doesn't affect the horse's vision and we haven't seen any evidence of discomfort following placement of the implants at our centre.

## CATARACTS

Cataracts are opacities of the lens. They prevent the passage of light through the eye onto the retina and there are many types of cataract, some worse than others. Unfortunately once a cataract has formed there's no medication currently available that can reverse the changes. If the cataract is impairing vision and the eye is otherwise healthy, surgical removal can be considered. A method called 'phacoemulsification' is used to remove the cataract and a plastic lens

can then be inserted into the eye, to give the horse the best possible vision.


## SWELLING

Eyelid swelling is common and can arise from a variety of causes. Examples such as simple trauma and fly-bites resolve quickly, but any lumps that persist should be checked for signs of cancer. Sarcoids can occur close to the eye and there are different treatments available depending on the type of sarcoid seen. Horses with non-pigmented skin are especially prone to sunburn and the use of protective creams or a fly-mask can help to reduce exposure.

## CAREFUL CLEANING

Generally your horse's eyes should be bright, clear and wide open with no swelling or drooping of the eyelid.

It's normal to see a little discharge gathering in the corner of his eyes and you might see watery eyes due to dusty environments from time to time but if discharge or excessive watering persists consult your vet.

To clean or wipe around your horse's eyes don't use a soapy solution or shampoo. There are a number of sterile solutions available, or boiled water that's been allowed to cool is a good alternative. 



A small disc is implanted at the back of the eye

**PRE-PURCHASE**  
If you're thinking about buying a horse, a pre-purchase examination carried out by a vet will incorporate an eye check.

## Eye care

It's always dangerous to leave a sore eye without appropriate treatment as a small problem can rapidly turn into a condition that could lead to blindness. Here are some signs and symptoms to look out for:

- Excess tears or discharge from eyes
- Squinting
- Avoidance of bright light
- Rubbing the eye
- Redness and swelling of the conjunctivae
- A small pupil or a persistently large pupil
- A blue tinge to the surface or inside the eye
- A white or red substance inside the eye
- Surprise when approaching from one side
- Tripping over objects



A little watering might be nothing

**TOP TIP**  
Eyes are fragile and if you see a problem contact your vet for advice



Equine cataract

## Caring for the blind

Horses who are blind in one eye will have limited vision and may struggle to perceive depth, but they can live normal lives. There are many one-eyed horses who continue to compete and even win races.



Boo is blind but still enjoys life pic: Nigel Barker Eastern Light Photography

Redwings Horse Sanctuary in Norwich cares for one horse who is completely blind plus a number of partially sighted horses. Boo, the blind horse, was shot in the eye in

2009 with an air gun from point blank range by local thugs at his home in Sussex. He'd already lost one eye to cancer, which meant he was left completely blind. As a Clydesdale cross at 16.1hh, Boo is a big horse, so being blind presents no end of challenges, including the risk to any handlers dealing with such a large, blind animal.

Boo was due to be put to sleep but his devastated owners approached the staff at Redwings as they'd heard the charity had some blind horses in its care. "We said we would offer him a home providing he could have

a quality of life," says Nicola Markwell of Redwings. "We did an assessment and he turned out to be such a brave chap and so calm and placid that he took to life here really easily. He has a seeing eye horse friend called Gliner, and he has two paddocks which are his for the summer and winter months - as long as he lives in those and we keep his hay and water in the same place all the time he has no problems - he is so confident

in his surroundings now that he will have a little trot and he even lies down to sleep in the sunshine so we know he must be feeling safe and happy!"

**DON'T MISS**  
Go to page 68 for our 'Equines on film' feature and check out Dylan Jones' stallion Diablo who is missing an eye but still stars in films!