

Management of the older horse

The increasing age of horses presented for veterinary care has been recognised over several decades. The increase in the percentage of horses older than 20 years of age has been attributed to improved nutrition, early recognition and management of conditions seen more frequently in the geriatric horse, and the increased willingness of owners to pursue veterinary care to maintain the comfort of their senior horses. Geriatric medicine is devoted to the management of conditions that have increasing age as a risk factor for their development. Conditions that are seen more frequently in older horses include pituitary pars intermedia dysfunction, chronic weight loss, obesity, osteoarthritis, laminitis, neoplasia and cardiovascular dysfunction. In addition, routine wellness care is essential for early recognition of age-related changes and prompt institution of appropriate care to maintain the comfort of the horse.

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Care of the older horse is increasingly a major focus of equine practitioners, as a result of an increasing percentage of horses working and competing into their 20s (McKeever, 2002). Horses may be considered to become geriatric somewhere between 15 and 20 years of age (McGowan, 2011), although there is no universal definition because of the differences in the apparent rate of aging changes. These occur between various breeds of horses, with pony breeds commonly achieving greater than 30 years of age (van der Kolk et al, 1995), and among individual horses within a breed. Improvements in nutrition, improved health care and increased recognition by owners that geriatric horses can continue to be useful during their older years have all contributed to an increasing geriatric horse population (McKeever, 2002; Brosnahan and Paradis, 2003). With increasing age, there is an increasing risk of certain diseases. Early recognition of these diseases and proper management is important for maintaining the older horse's welfare and subsequent quality of life.

Pituitary pars intermedia dysfunction

Pituitary pars intermedia dysfunction is one of the most common diseases seen in older horses, and increasing age is the primary risk factor for this disease. Affected horses have a mean age of 21 years (van der Kolk et al, 1995). Estimates would suggest that pituitary pars intermedia dysfunction is seen in 20% of horses older than 15 years and 30% of horses that are greater than 30 years of age (Ireland and McGowan, 2018). Pituitary pars intermedia dysfunction is caused by a degeneration of dopaminergic-pro-

ducing neurons in the hypothalamus. This degeneration results in the loss of dopamine-mediated suppression of the pars intermedia and in hyperplasia and adenoma formation in this portion of the pituitary gland. As a result of pars intermedia hypertrophy and loss of suppression of adrenocorticotrophic hormone production, levels of adrenocorticotrophic hormone are increased and often accompanied by characteristic clinical signs (McFarlane and Cribb, 2005). Classical signs include hypertrichosis (failure to shed), lethargy, weight loss, pendulous abdomen, increased susceptibility to infections and foot abscesses, increased drinking and urination (polyuria and polydipsia), and concurrent laminitis (*Figure 1*) (McFarlane and Cribb, 2005). Hirsutism can be considered pathognomonic for the diagnosis of pituitary pars intermedia dysfunction. Affected horses may be identified by measurement of basal plasma adrenocorticotrophic hormone and an increase in seasonally-adjusted levels (Copas and Durham, 2012). If results are equivocal but pituitary pars intermedia dysfunction is still suspected, a thyrotropin-releasing hormone stimulation test may be considered (Hart et al, 2021). Lifelong pergolide mesylate is administered initially at 2 µg/kg and adjusted if the control of clinical signs and plasma adrenocorticotrophic hormone are deemed inadequate (Durham et al, 2014). The ability to dissipate heat appears to decline as horses age, and the coat will further impede heat loss (McKeever et al, 2010), so regular clipping during the warmer months of the year is essential in the management of horses with pituitary pars intermedia dysfunction (McFarlane, 2011). Provision of adequate shade is also beneficial. Additionally, horses affected with pituitary pars intermedia dysfunction should receive



Figure 1. A horse with pituitary pars intermedia dysfunction showing characteristic hypertrichosis, loss of muscling along the topline and pendulous abdomen.

regular dental care, hoof care and be monitored for changes in body condition (McFarlane, 2011).

Alterations in body condition

Geriatric horses often fall at either extreme of body condition, being either obese or too thin (Ralston et al, 1989). A multitude of factors can contribute to weight loss in the older horse, including decreased appetite, reduced digestive efficiency, impaired ability to compete with herd mates because of a loss of status or infirmity, dental abnormalities, declining or failing organ systems and neoplasia (Ralston et al, 1989). Surveys of geriatric horses identified that 2% and 4.5% horses were underweight in Australia and the UK, respectively (McGowan et al, 2010; Ireland et al, 2012a). A reduction in fibre digestion is seen in geriatric horses compared to younger horses, so it is important to provide high quality forage and feeds with higher quantities of crude protein (Ralston et al, 1989). Ensuring adequate time to consume feed without competition from herd mates is necessary in many geriatric horses (McFarlane, 2011). Older horses with weight loss require thorough clinical examination, including:

- A complete blood count
- Serum biochemistry
- Dental examination
- Evaluation of endocrine function.

Processed pelleted feeds designed for senior horses are frequently recommended (Ralston et al, 1989; McFarlane, 2011), especially when dental abnormalities are present. Senior feeds have improved digestibility, are easier to chew, are balanced for essential vitamins and minerals and are more energy dense for older horses that have difficulty maintaining body weight (Ralston et al, 1989).

In contrast, obesity is seen in 30% of Australian horses (McGowan et al, 2010) and 26% of geriatric horses in the UK (Ireland et al, 2012a). The most common causes of obesity included over supplementation (especially with concentrates), decreased activity, and endocrine disorders such as equine metabolic syndrome (McGowan et al, 2010; Ireland et al, 2012a). Geriatric horses

that are obese may have issues with endurance, increased strain on joints and tendons and be more prone to laminitis (McGowan et al, 2010; Ireland et al, 2012a).

Careful evaluation of the diet should be performed, along with nutritional counselling and evaluation for insulin dysregulation through an oral sugar test (Table 1). Measurement of basal insulin levels followed by an oral sugar test can be used to monitor the appropriateness of current management programmes, in addition to providing information on insulin dysregulation. If insulin dysregulation is identified, weight loss, increased exercise and monitoring of insulin is recommended (Frank et al, 2022). The diet should be restricted to grass hay with vitamin and mineral supplements. Initially, hay feeding is restricted to 1.5% of the horse's body weight in dry matter each 24 hours. Hay with greater than 10% non-structural carbohydrates (starch and sugar) may be soaked in cold water for 60 minutes to reduce the soluble carbohydrate concentration before feeding (Frank et al, 2022). Horses that are resistant to weight loss may benefit from temporary levothyroxine supplementation (0.1 mg/kg bodyweight daily). The dose should be gradually reduced and then discontinued once weight loss has been achieved or after 6 months (Frank et al, 2022). Sodium-glucose co-transporters type 2 such as erguglflozin (0.05 mg/kg by mouth per 24 hours) have shown promise in managing horses and ponies with severe insulin resistance, and have also shown promise when used in ponies with severe signs of laminitis (Meier et al, 2018; Frank et al, 2022).

Neoplasia

With increasing age, there is an increase in the risk of neoplasia; however, the relative risk of neoplastic disease in the aging horse appears to be lower than seen in other species (Valentine, 2006). The skin of grey horses should be examined for increasing size and number of previously identified melanoma. In some studies, the incidence of squamous cell carcinoma (most frequently seen in non-pigmented skin in the ocular region, external genitalia, oral cavity and stomach) increases with age (Figure 2) (Junge et al, 1984). Kerr and Alden (1974) found that squamous cell carcinoma is present in 12% of horses over 9 years of age.

Table 1. Oral sugar test

Karo light corn syrup test
• Test in the morning after an overnight fast
• Administer 0.45 ml/kg bodyweight of Karo Light corn syrup orally
• Collect blood into lavender top (EDTA) tubes at 60 and/or 90 minutes
• Positive test is >63 iu/ml
Oral sugar challenge (1g/kg)
• Fast horse for 6 hours
• Feed 1g/kg bodyweight powdered dextrose mixed with 1g/kg bodyweight water and 1g/kg bodyweight lower sugar chaff
• Collect blood for insulin testing 2 hours later (lavender top)
• Positive test is >85 iu/ml

Other common tumours in geriatric horses include abdominal lipomas that cause strangulating lesions of the gastrointestinal tract, requiring exploratory laparotomy and intestinal resection with anastomosis for correction (Valentine, 2006). Many owners are reluctant to perform intestinal surgery in aged horses because of uncertain future longevity or inability to justify the expense associated with surgery. However, a survey found no difference in the occurrence of short-term complications and short-term outcomes in horses over 20 years of age compared to horses aged 4–15 years (Gazzerro et al, 2015). Benign thyroid adenomas are frequently found in older horses (Valentine, 2006). The adenomas can achieve significant size but are rarely associated with altered thyroid function (Figure 3) (Ueki et al, 2004). Non-specific signs of lethargy, weight loss, enlarged lymph nodes (Figure 4), skin masses that wax and wane, colic and respiratory distress can all accompany equine lymphoma (Valentine, 2006). Non-specific clinical signs, with alterations in body weight should prompt a complete evaluation including complete blood count, serum chemistry, acute markers of inflammation, along with thoracic and abdominal ultrasound, and evaluation of any pleural or abdominal fluid effusions for signs of neoplasia.

Cardiovascular disease

Cardiac disorders, including murmurs and declining function, are more likely to occur as a horse ages. Cardiovascular abnormalities were found in 50% of horses over 16 years of age in one hospital survey, with aortic valve insufficiency accounting for 80% of the identified lesions (Else and Holmes, 1972). Aortic valve regurgitation results in a characteristic, decrescendo diastolic murmur. Aortic regurgitation may initially be well tolerated, and often affected horses can still be ridden. However, the sudden onset of a loud murmur, changes in murmur intensity, exercise intolerance, ventral oedema or obvious jugular pulses are all reasons to stop exercise until the cause of the murmur has been more fully investigated by echocardiography and stress testing (Stevens et al, 2009; Marr, 2010).

Musculoskeletal disease

Musculoskeletal abnormalities are common in horses over 15 years of age, with up to 50% demonstrating signs of lameness (Ireland et al, 2011) and 80% showing foot abnormalities (Ireland et al, 2011). Lameness was seen in 77% of ponies older than 30 years of age (Ireland et al, 2011). Laminitis is seen more frequently as horses increase in age and is largely correlated with obesity and the increased incidence of pituitary pars intermedia dysfunction. Clinical signs of laminitis can be insidious, so periodic monitoring for signs of alteration in hoof growth such as lines that are divergent relative to the coronary band, dropped sole, dished dorsal hoof wall, and widened white line at the toe should prompt further evaluation with hoof testers and foot radiographs. If abnormalities are detected, the horse should be further evaluated for the presence of pituitary pars intermedia dysfunction and insulin dysregulation.

Osteoarthritis is characterised by alterations in gait, reduced range of limb flexion, abnormal hoof wear, joint enlargement and synovial effusion, and is a consequence of aging and trauma that



Figure 2. Typical appearance of a squamous cell carcinoma of the third eyelid of a horse.

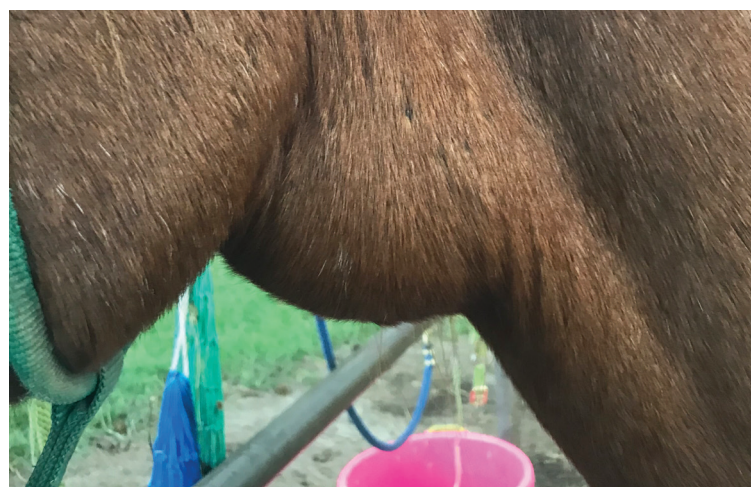


Figure 3. Benign thyroid adenomas are typically found in the throat latch area and are often freely movable under the skin.



Figure 4. An enlarged prefemoral lymph node. Arrow points to the swelling that can be palpated in the fold of the flank.

may occur over time secondary to occupation. It is common in geriatric horses, and was the presenting complaint for 24% of geriatric horses presented to a referral hospital (Brosnahan and Paradis, 2003). The incidence of lameness and reduced range of motion in joints increases with age and can ultimately be the cause for geriatric horse retirement (Ireland et al, 2012a). Initially, lameness may be intermittent and mild.

The Obel grading scale can be used by veterinarians and horse owners to establish a baseline and monitor progression of mild lameness over time. Obel grade 1 is characterised by subtle shifting of weight between the forelimbs, normal gait at a walk and a short-strided gait at a trot. Obel grade 2 is identified when the horse is short-strided at a walk and turns with obvious difficulty. Progression of lameness to Obel grade 3 is recognised when the affected horse is reluctant to move forward and vigorously resists lifting of a foot off the ground by the examiner. When a horse refuses to move forward except with force, it is considered to have progressed to Obel grade 4 (Obel, 1948). In many instances, decreased range of motion is the first indicator of osteoarthritis, followed by the presence of synovial effusion (Ireland et al, 2012b; van Weeren and Back, 2016). Radiographic surveys are indicated when such signs are seen.

Regular hoof care, intra-articular therapies and non-steroidal anti-inflammatory drugs are all used to manage osteoarthritis. In many geriatric horses with orthopaedic problems, long-term non-steroidal anti-inflammatory therapy may be used. If long-term non-selective cyclo-oxygenase inhibitors are used, annual monitoring of creatinine, blood urea nitrogen levels and/or urinalysis with specific gravity, albumin and total proteins should be performed to detect possible renal and gastrointestinal compromise. Detection of kidney injury or protein-losing enteropathy should prompt discontinuation of non-steroidal anti-inflammatory drugs and further evaluation of the geriatric patient. Nutraceuticals are used extensively by owners but often lack specific evidence of efficacy (McIlwraith, 2016; Much et al, 2020). While they do not appear to cause harm, benefit appears limited and more specific joint therapy may be of greater benefit.

Ocular disease

During routine veterinary examination reported in two different surveys, ocular disease was identified in between 80.7% (Ireland et al, 2012a) and 87.8% (Malalana et al, 2019) of horses older than 15 years. Corneal lesions were found in 14% of the horses examined and included scarring, corneal oedema and other opacities (Malalana et al, 2019). The abundance of corneal injuries may be related to an age-related decline in corneal sensitivity resulting in increased frequency of trauma (Malalana et al, 2019). Older horses also have age-related changes in corneal epithelisation (Malalana et al, 2019), which may result in ulcers that are slower to heal compared to younger horses. As horses age, the risk of equine recurrent uveitis increases, as does the risk of cataract formation. In one survey, up to one third of geriatric horses had a cataract in one or both eyes (Malalana et al, 2019). Additionally, abnormalities of the retina or optic nerve were identified in 84.4% of this population of geriatric horses, but alterations in vision were only seen in 5.5% of the horses (Malalana et al, 2019). Excessive

tearing, corneal opacities or noticeable changes in the lens clarity should prompt a detailed ocular examination. Horses with visual compromise should be kept in familiar surroundings free from obstacles. A trusted companion can be an asset when dealing with a horse with limited vision.

Wellness care

Wellness care is important to maintain the comfort and athletic potential of the older horse. Regular check-ups are necessary to monitor previously diagnosed problems, identify new conditions, and recognise changes in body condition that may negatively affect health. Geriatric medicine should focus on early recognition and timely intervention to maintain the health and comfort of the older horse.

Regular booster vaccinations as normally recommended for adult horses in the same geographical region should not be neglected as horses age. Changes in both innate and adaptive immunity have been observed in geriatric horses. Additionally, older horses are more likely to have concomitant pituitary pars intermedia dysfunction, and affected horses have been shown to have decreased neutrophil function (McFarlane et al, 2015; McFarlane, 2016). Cytokine profiles in aged horses are pro-inflammatory, but responses to vaccinations and neutrophil function appear to be diminished (McFarlane et al, 2010). Population studies have demonstrated an increase in disease severity for equine herpes virus 1 and West Nile virus infections in older horses, so it is important to be vigilant with vaccination programmes (Salazer et al, 2004; Schuler et al, 2004).

Normal older horses appear to maintain immunity against parasites, but there is some limited evidence that faecal egg counts are increased in horses with pituitary pars intermedia dysfunction (McFarlane et al, 2010). A minimum of twice yearly faecal egg counts and appropriate anthelmintic therapy are recommended for all geriatric horses (McFarlane et al, 2010).

Routine dental care is essential in the geriatric horse, and a complete oral examination should be performed to identify malocclusion, loose or missing teeth and sharp enamel points, resulting in diastema formation with feed retention. In geriatric horses, the grinding surface may lose its sharp enamel ridges and the smooth surface may result in an insufficient ability to grind feed properly. This can result in increased occurrences of choke, impaction colic, weight loss and increased faecal water. Signs of 'expired' grinding surface can include passage of intact grain kernels and increased fibre length in the faeces. A published referral hospital survey reported that 8% of geriatric horses had dental abnormalities that were detected during a routine physical examination and had not been previously recognised by the owner (Copas and Durham, 2012). As horses age, the grinding surface of the molars may wear away, and the horse will not be able to grind roughage effectively. Poor mastication can increase the frequency of oesophageal obstruction (choke). Increased salivation, coughing, anxiety and food material seen at the nares should prompt an immediate veterinary examination and passage of a nasogastric tube.

Adjustment of the diet to processed, pelleted feed will allow horses access to appropriate nutrition when mastication is ineffective and may be useful to prevent future episodes of oesopha-

geal obstruction. Processed feeds may have been heated, which improves small intestinal digestibility and decreases starch delivery to the colon, resulting in potential decreases in both colic and laminitis (Siciliano, 2002).

Regardless of whether the aged horse is still being ridden or is retired, regular trimming and foot care is required to keep them moving comfortably. Previous episodes of laminitis or lower limb osteoarthritis may be managed in conjunction with a farrier and prophylactic shoeing. In horses with altered hoof growth secondary to previous episodes of laminitis, regular radiographs should be obtained to aid the farrier to trim the horse appropriately.

Conclusions

Care of the older horse is reliant upon regular examinations, early recognition of geriatric disease, owners providing appropriate resources and care, ensuring good air hygiene, competition-free access to food and clean water, appropriate footing for those with impaired mobility, and routine assessment of the comfort of the horse. Detection of acute discomfort, unresponsive loss of more than 20% of normal body weight, worsening of known medical conditions, increased recumbency with inability to stand without assistance or identification of incurable disease should prompt a discussion with the owner regarding quality of life and discussions of options, including euthanasia. **EQ**

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Figure 2 is reproduced courtesy of Dr Sandra Yucupicio.

Conflicts of interest

The author declares that there are no conflicts of interest.

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KEY POINTS

- The percentage of horses that are greater than 15 years of age is increasing.
- The primary risk factor for pituitary pars intermedia dysfunction is advancing age, and hirsutism (when present) is considered a pathognomonic sign of this condition.
- Alterations in body condition are common in older horses, and both obese and overly thin horses should be further evaluated for comorbidities.
- Annual examinations with periodic laboratory support are recommended for early detection of organ dysfunction, neoplasia and alterations in locomotion.
- Reduced range of motion and increasing synovial effusion may occur before overt signs of lameness in geriatric horses that are no longer being ridden.
- Routine vaccinations, semi-annual oral examinations, faecal egg counts and appropriate anthelmintic treatment and body condition scoring are still essential to maintain the health and comfort of geriatric horses.

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