

CARE ABOUT  
CUSHING'S



# PPID AND YOUR HORSE

An owner information guide

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Care about Cushings is an online resource to support owners with the lifelong management of PPID.

It allows you and your vet to view your horse's PPID history at a glance and you can save diary entries and upload photographs to monitor their progress. You can also access expert information at the touch of a button.

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# Introduction

This guide has been created to provide horse owners with practical information about PPID in horses. Experts in the field discuss this complex condition and provide management and treatment recommendations that will help you and your horse to manage the symptoms of PPID and enjoy life together.



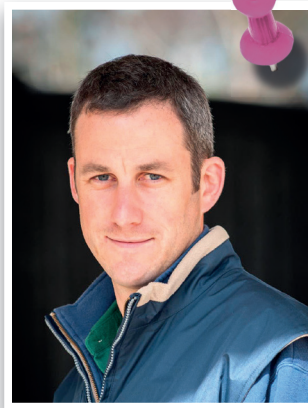
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Professor McGowan became interested in aged horses, endocrine disease and laminitis during her first academic appointment as a lecturer at the Royal Veterinary College in the UK in 1999 where she was involved in clinical research for PPID and Equine Metabolic Syndrome. She continued her interests during appointments at The University of Queensland, Australia and Helsinki, Finland. Cathy returned to The University of Liverpool, UK in 2008, due to her particular interest in native breeds and ponies. She is now Professor of Equine Internal Medicine and Head of the Equine Division.



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David is a specialist in equine medicine at Rainbow Equine Hospital, Malton, North Yorkshire. He spent a number of years working as part of the Laboratory Team at Liphook Equine Hospital and has also worked at Universities of 'School of Veterinary Medicine' in both the United Kingdom and Australia. He is actively involved seeing cases in all fields of equine medicine but has a particular interest in endocrine disease and in the prevention and management of laminitis. He has been actively involved in research and publication in this area for many years and has published a number of papers on the diagnosis and management of pituitary pars intermedia dysfunction.



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Teresa qualified as an Animal Nutritionist, working for several well known feed manufacturers and specialising in Equine nutrition. Over the last 25yrs, Teresa has been responsible for the management and publication of many important equine nutrition research studies in conjunction with Universities and equine colleges. She has written extensively for equine magazines; lectured in the UK, USA, and Europe; taught at all the UK Vet schools and delivered CPD to qualified vets. Teresa also led the team that provided nutritional support for Team GB, and sits on the BHS Welfare Committee. Teresa is now responsible for integrating nutrition as part of the curriculum at the The School of Veterinary Medicine at The University of Surrey where she is Senior Teaching Fellow in Veterinary Nutrition.



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After graduating in Veterinary Medicine and Surgery from The University of Glasgow in 2000, Jo worked in equine first opinion practice, with additional time spent working in a large equine referral hospital in Sweden and as a volunteer veterinary surgeon in The Gambia for the Gambia Horse and Donkey Trust. In 2011, Jo completed her PhD in equine geriatric health and welfare at The University of Liverpool, which was the first major UK study in veteran horses. During this time, she also gained the Royal College of Veterinary Surgeons Certificate in Advanced Veterinary Practice (Equine Internal Medicine). Jo now works at the Animal Health Trust, where she is predominantly involved in Equine Grass Sickness research; however she maintains a keen interest in geriatric medicine.



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Andy graduated from The University of Bristol in 1988 and after an initial spell in mixed practice has worked in equine practice for the last 25 years. His interest in Cushing's disease arose from involvement with an elderly laminitic horse called Churchill who Andy worked with in the early 1990s when this disease appeared of little general interest to most horse owners and vets. Andy is a recognised UK and European Specialist in Equine Internal Medicine and, as well as clinical work, now runs the Liphook Equine Hospital Laboratory which is the main centre for diagnostic testing for PPID and EMS in horses in the UK.



# WHAT IS PPID AND WHAT DOES IT MEAN FOR MY HORSE?

**Prof. Cathy McGowan**

If you haven't heard the term PPID before, then you may know of this condition as "Equine Cushing's Disease." It is a common hormonal disease of horses and ponies and PPID is the more accurate description of the condition because it describes the part of the brain which is dysfunctional in horses – the pars intermedia of the pituitary gland. PPID is the abbreviation of 'pituitary pars intermedia dysfunction.' The term 'Cushing's disease' originated from the American doctor, Harvey Cushing, who described a different disease in people. Although the human disease also originates in the pituitary gland, it is from the pars anterior, and therefore a different disease to what we see in horses.

The 'dysfunction' describes increased hormone output from the pituitary gland and it is the output of these hormones that causes the clinical signs seen in your horse. Output is increased because the levels of dopamine, the normal chemical controller of their release, are low, and can no longer control their release. This allows the pars intermedia of the pituitary gland to become enlarged (hyperplastic) and eventually turn into a benign tumour (adenoma). It is not the changes in the pituitary gland, but the hormones released into the bloodstream that cause the problems.

## The clinical signs of PPID

The early clinical signs of PPID can often be overlooked or put down to old age at first. These are the development of a pot belly and loss of topline over the back; both signs associated with reduced muscle mass and strength (Figure 1). Depending on the breed, athleticism and degree of fat covering your horse, this may be more or less obvious. In many horses carrying excess weight, the muscle underneath their fat is lost faster than the fat, and the fat takes on a 'lumpy' appearance and can be more prominent. Fat can also appear in abnormal places, especially in the hollow above the eyes; 'the supraorbital fossa' (Figure 2).

Other signs develop as the disease progresses, including an excessively long hair coat, ('hypertrichosis'), and delayed or even absent hair coat shedding. These signs are often more obvious in native breeds that usually have a very thick winter coat. Conversely, signs can be more subtle in some fine-coated breeds, possibly with excessively long hairs on the limbs, underneath the belly or neck, instead of an obviously long coat all over.



**Figure 1:** Aged horse with loss of topline and pot belly typical of PPID. Note also the long haircoat, more prominent under the throat and neck rather than all over.



**Figure 2:** 12 year old Welsh pony mare, 'Blodwyn' diagnosed with both PPID and Equine Metabolic Syndrome (EMS) being managed with medication and a grazing muzzle. Note the bulging above her eyes.

Other signs include excessive drinking, wetting and sweating, poor performance and lethargy. The lethargy is interesting as it is likely to be due to an increase in the opiate-type hormone, beta endorphin. This hormone works in the same way as morphine and is a powerful painkiller, which means your sleepy looking horse may actually be in a rather happy place!

A more insidious clinical sign is susceptibility to infection (including parasitic infections i.e. worms). You will need to be aware of this and ensure that you keep regular veterinary visits and take regular worm egg counts. Contrary to popular belief, most horses with PPID are completely free of concurrent disease. Although they have a lower resistance to disease, they should not have any additional problems at all if they are well managed and the PPID is treated. Diseases that we have seen commonly in PPID horses before diagnosis and treatment include sinusitis, endometritis (chronic infection in the uterus) and periodontal (gum) disease.

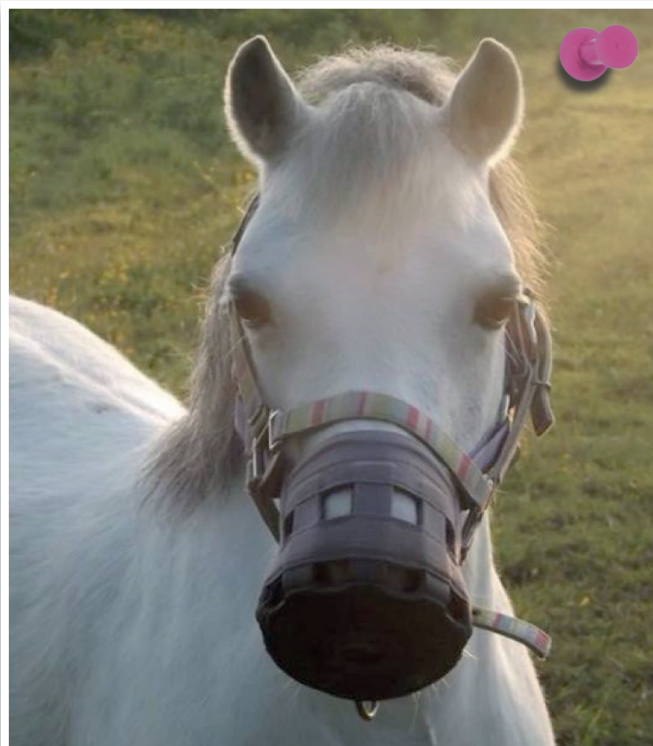
The most worrying clinical sign of PPID is laminitis. Horses with PPID are more susceptible to laminitis because of the abnormal levels of circulating hormones from their pituitary gland. This risk is even greater if your horse already has underlying hormonal abnormalities in the form of Equine Metabolic Syndrome (EMS).

## So what does this mean for my horse?

A diagnosis of PPID is not the end of the world. The majority of affected horses respond well to treatment and many of those will return to their previous use, including athletic uses. PPID is very common, affecting one in five horses over the age of 15 years, and although we think of it as a disease, it can also be considered accelerated ageing, specifically of the pituitary gland. Levels of dopamine, the controller of hormone production from the pituitary pars intermedia, decrease with ageing in all horses. But, horses with PPID have an accelerated loss of dopamine. Fortunately, the available veterinary treatment, pergolide, specifically replaces dopamine levels and restores this function (Figure 3).

Obviously, some horses are not diagnosed until they are quite old. Most horses with PPID will be in their 'teens' or older, with an increasing likelihood of diagnosis every year after 15 years of age. Aged and geriatric horses have an increased susceptibility to a range of conditions and diseases even without PPID, particularly dental disease, lameness, and eye, heart, lung and skin conditions (including tumours such as sarcoids and melanomas). Many of these diseases are readily managed and treated if you pick them up early, so regular health checks by your

veterinary surgeon will keep your horse at its best for the longest period possible. Although your horse will



**Figure 3:** 'Blodwyn' enjoying life with grazing restriction and pergolide treatment, remains laminitis free after almost two years.

have reduced immunity, PPID does not increase the risk of the major diseases of old age in horses.

Many owners will worry that having PPID is painful or debilitating for their horse, reducing its quality of life. As discussed above, unless your horse suffers from laminitis, PPID is definitely not a painful condition and in fact the endorphin levels will be potent painkillers. Although untreated horses with PPID may be debilitated, especially from muscle loss and poor performance, again these are readily reversible with treatment. So, by working with your veterinary surgeon for appropriate treatment and management, your horse or pony can still have a useful and good quality of life.

This guide aims to help guide you as to the right care for your horse or pony, including how and when to monitor your animal, how to feed and provide general care for your horse or pony with PPID and lastly, how to manage laminitis in the horse or pony with PPID.



# MONITORING THE PPID PATIENT

Dr David Rendle

## Why should I monitor my PPID-affected horse or pony?

In simple terms, if you don't monitor your horse carefully it is more likely that it will suffer from clinical problems as a result of its PPID. If monitored carefully and treated effectively, most horses with PPID can lead a very happy and normal life. By being proactive you will not only improve your horse's quality of life, but will also be less likely to have to face the expense and distress of coping with laminitis and the other clinical signs of PPID.

As our understanding of PPID grows it becomes more apparent that the dysfunction of the pituitary gland, clinical signs (Figure 4) and rate of disease progression vary widely between affected horses. It is therefore important that individual horses are monitored closely and that treatment is tailored to each patient.

Laminitis is potentially the most damaging of all of the clinical signs that may develop as a result of PPID. Bouts of laminitis occur intermittently and without warning, and being potentially devastating when they do occur, it is important that PPID and other risk factors for laminitis are controlled. Laminitis may be the first and can be the only clinical sign of PPID, so just monitoring the horse's appearance, demeanour and other clinical signs is insufficient to give complete peace of mind that laminitis will not develop. Monitoring using blood samples is therefore important in minimising the risk of laminitis developing even in horses that outwardly appear fit and healthy. If horses have already had an episode of laminitis, then they are at higher risk of another episode developing, so careful monitoring of these cases is especially important.

## How should I monitor my horse or pony?

There are two aspects to monitoring a horse with PPID:

1. Monitor the horse itself both in terms of its attitude, energy levels and any signs of disease.
2. Measure the activity of the pituitary gland by checking hormone levels in blood. Measuring hormone levels is important as a means of identifying horses that are at risk of developing clinical signs before they occur – prevention is obviously far better, and less expensive, than cure.

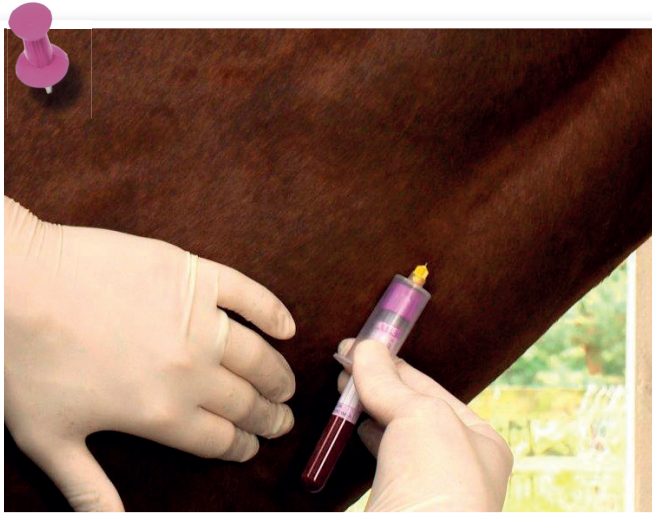


**Figure 4.** This pony has developed fat pads above his eyes in the supra-orbital fossae. It is important to continually monitor your horse or pony for development of new clinical signs of PPID, which may indicate that the disease is progressing.

Clinical signs of PPID may vary and as they can be hard to assess, it is often helpful to take photos of your horse and record your observations in a diary. Body condition should be assessed regularly by determining condition scores and assessing weight using a weigh-tape, or a weigh-bridge if one is available. If your horse has a history of laminitis, then you should check regularly and carefully for evidence of laminitis. Signs such as widening of the white line, solar bruising and irregular growth rings may all be indications of sub-clinical laminitis which may be due, at least in part, to uncontrolled PPID. Laminitis is not always obvious and painful. Foot damage can be occurring without obvious external signs, or the affected horse being lame. This sub-clinical laminitis will weaken the feet and further increase the risk of full-blown laminitis episodes.

The difficulties of detecting and monitoring subtle clinical signs, and the intermittent nature of some of them, highlight the importance of measuring the activity of the pituitary gland itself. Fortunately, monitoring is straightforward and only requires a single blood sample in the majority of cases (Figure 5); the procedure is the same as for the initial diagnosis of PPID. The concentration of adrenocorticotrophic hormone (ACTH) is measured to determine whether the pituitary gland is still functioning abnormally and releasing excessive quantities of hormones into the blood despite treatment.





**Figure 5.** Measuring ACTH by blood sampling is as important as monitoring clinical signs when monitoring the progress of horses and ponies with PPID.

## How often should I monitor my horse or pony?

The frequency of required testing varies between patients, but typically endocrine testing is performed every 4–6 weeks until the pituitary is under control, and at least twice a year thereafter. If there is a recurrence or worsening of clinical signs, then it is also worth considering re-testing to evaluate the effectiveness of treatment.

Testing is required at least twice a year to account for the seasonal changes that occur in the pituitary gland. The activity of the pituitary gland increases in the late summer and early autumn, but activity can increase dramatically in horses with PPID, placing them at increased risk of developing clinical symptoms. It is therefore recommended that testing is performed in August or September to enable treatment modification during this period if necessary. A second routine test is then performed in the Spring. If high ACTH levels are identified, then the dose of pergolide is typically increased, and further testing is performed every 4–6 weeks until ACTH levels are brought back under control.

Following treatment with pergolide, the ACTH concentration should return to normal or at least reduce considerably.

In addition to measuring the hormones that come directly from the pituitary gland, it is also worthwhile measuring insulin concentration, either following an overnight fast or a sugar test. Although insulin comes from the pancreas rather than the pituitary gland, it often increases in horses with PPID and gives an indication of the risk of laminitis. Therefore, to ensure optimal control of PPID and to minimise laminitis risk, both ACTH and insulin are measured on a regular basis.

# FEEDING THE PPID HORSE OR PONY

Dr Teresa Hollands

## Nutritional balance to support disease management

It is important to appreciate that the diet that you have been feeding your horse or pony will not have caused PPID; equally diet will not cure it either. However, as Hippocrates was reported to have said,

*"If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the safest way to health."*

In other words, the correct nutritional support can help your horse or pony cope better with the consequences of PPID. Remember though, that over the age of 15, the risk of getting PPID increases by 18% per year, independent of their diet.

Understanding which aspects of the disease can be supported nutritionally, and how to manage the diet so that it doesn't make the problem worse will help you put together a suitable nutrition plan for your horse or pony. Also, do remember that if your horse does not have laminitis, exercise can help minimise many of the clinical signs that are associated with PPID.

For most horses and ponies with PPID, the nutritional requirements are very similar to older animals in general. However, some horses with PPID have clinical signs including weight loss, obesity and/or a predisposition to laminitis. Therefore, the keys to nutritional management in these horses are feeding them the most appropriate forage, and attention to the dietary components to ensure nutrient balance.

## General nutrition tips for the PPID horse or pony

### 1. Check the fat cover of your horse fortnightly

Although the majority of horses with PPID lose weight, some are overweight. In both cases, it is very important to monitor your horse's fat cover. PPID shares some similarities with human Parkinson's disease, and the accumulation of oxidative stress within the body's cells over a long period of time is responsible for some of the disease signs. Being fat increases the oxidative stress in your horse's body, just as it does in people. Try and keep your horse's fat cover to less than 3.5 (out of 5) across all the areas you score in order to minimise additional oxidative damage. Being fat also appears to be a risk factor for insulin resistance (IR) and your horse's PPID can make IR worse. Every 2 weeks, use the technique described in the video link below and write down the scores, so that you can track changes and discuss them with your vet (see below for management of overweight or underweight horses with PPID).



How to fat score your horse:  
[https://youtu.be/Zih1jT\\_pUgQ](https://youtu.be/Zih1jT_pUgQ)

## 2. Forage and fibre

Horses are trickle feeders, so from a welfare perspective, it is important that their diet satisfies their natural eating behaviour by ensuring they have enough bulk to eat. This will minimise their risk of developing gastric ulcers, stereotypies and colic. The major part of any horse's diet is forage, which includes grass/pasture, hay, haylage and chaffs (chopped forage) (Table 1).

**Table 1.** Forage types for the PPID animal.

Forage	Overweight	Underweight	Caution
Grass	Restrict grazing as high calorie (see below)	Can be ideal forage source	If laminitis prone needs to be restricted (see below)
Straw	Oat or barley, mixed 50:50 with soaked hay or as sole forage source  Monitor fibre length in droppings; if more than 2.5cm, then teeth not processing; could increase colic risk	Not enough calories for weight gain	NOT wheat straw-high in lignin.  Not suitable if problems with teeth.  Low protein (requires supplementation)
Soaked hay	Can lose 1kg of sugar (calories) from hay into water after 12hr soak therefore good option for overweight animals	Soaking hay for 30mins is enough to reduce dust for horses with respiratory problems, but nutrient loss may be of concern for underweight animals	Soaking hay leaches out calories and important minerals (salts); always use a good quality balancer when feeding hay soaked for > 30mins
Haylage	Horses can obtain more calories from 1kg haylage compared to 1kg hay, so likely to put on more weight. Therefore, to be avoided in animals needing to lose weight	Can be useful for the horse that needs to gain weight as long as it is not laminitis prone.  No dust so good for horses with respiratory problems	Haylage is higher in water compared to hay (lower DM content), so it is important that enough is fed. Normally 1.5-2x more weight than hay  Should not be fed to laminitis prone horses or horses with a history of EMS
Pelleted fibre	Too high in calories and eaten quickly therefore not suitable for overweight animals	Useful if horse has trouble chewing or gum disease as doesn't get stuck between the teeth	Can be eaten very quickly, so put a large brick in manger to slow eating and feed very small amounts several times per day
Chaff/ chaff based feeds	Only feed low calorie, unmolassed chaff	Alfalfa chaff is a good source of protein and calories for underweight horses	Chaff based feeds will be higher in calories compared to hay and straw

The bulk content of each forage type can vary, depending on its water content. For example, grass has high water content and hay has a lower water content. This is often described as the 'dry matter' content of the forage. All horses should be allowed to eat around 2–2.5% of their bodyweight as dry matter, so horses will require a greater total weight in feed if fed forages with a higher water content (Table 2). If your horse is underweight, the forage should generally be higher in calories. If the horse is overweight, then the forage should be lower in calories.

Soaking hay for 12 hours removes a lot of the sugar (the main source of calories) from the ration which makes it ideal for overweight or laminitis-prone horses. It is important to feed a good quality balancer alongside, as important minerals can also be lost during this process.





**Table 2.** Forage calorie content comparison

Forage (7.5kg dry matter)	Fresh weight (kg)	Calories provided by forage per day, shown as MJ (Mega Joules)
Winter pasture – 17hrs grazing	30	47
Late cut meadow hay	8.9	52.5
High fibre haylage	12.5	75
Straw (oat or barley)	8.9	37.5
Summer grazing – 8hrs plenty grass	38	76
Good quality meadow hay	8.9	75
Spring grazing – average grass/all night	50	90

Each forage type provides the same amount of bulk, which is equivalent to a 375kg pony eating 2% of its bodyweight as dry matter. The daily requirement for that pony, if it is not exercised, is approximately 52.5 MJ/day. Forages providing more calories than the pony’s daily requirement are shown in pink.

### 3. Balance forage deficiencies

All forages will need balancing for protein, vitamins and minerals, and some may need supplementation with additional energy/calories. If your horse is currently at their optimal weight, then a balancer fed at 100g/100kg body weight provides the nutrients but does not add extra calories; divide into two feeds with a handful of alfalfa chaff if required. Ensure that the balancer has sufficient protein, some low-calorie balancers have more protein restriction relative to caloric restriction and should be avoided.

### 4. Extra antioxidants

Grass contains high levels of vitamin E and other natural antioxidants, which help to prevent cellular damage from oxidative stress, but many horses with PPID need to be turned out on restricted grazing, because the sugar (calorie) content of grass is unpredictable. Hay and other forages are low in antioxidants and even though many veteran horse diets contain extra antioxidants, your horse may benefit from additional supplementation.

### 5. Extra amino acids

Muscle wastage is common in horses with PPID and many forages do not provide sufficient amino acids (protein). Research has shown that older horses that are fed additional amino acids maintain muscle mass as well as younger horses do. Specific amino acid supplements are available from your vet and should be fed in conjunction with his balancer or feed and regular exercise to stimulate muscle development.

### 6. Daily exercise

Many horses with PPID continue athletic careers and exercise is always helpful for their metabolism. If your horse is sound, then keep up regular exercise. For the less athletic, try and ride, long rein or lead out at a brisk walk for 30 minutes per day, 6 days a week. In Parkinson’s disease in people, exercise is protective and slows deterioration of the condition. It is possible that the same may apply to horses.

## Managing the overweight PPID horse or PPID horse prone to laminitis

In both overweight and laminitis-prone horses with PPID, there is a risk of abnormal responses of the hormone insulin in response to sugar and starches in the diet. This abnormal insulin response can put your horse at risk of further bouts of laminitis. To keep the insulin response low (and reduce the risk of triggering laminitis), it is very important that the amount of sugar and starch that they eat per meal is low. In general, that means overweight and laminitis-prone horses with PPID are fed a low calorie, high fibre diet, which means mostly forage. It is important to remember that the forage can be deficient in protein and micronutrients, so you will need to feed a high quality balancer.

### Forage feeding strategies for overweight/laminitis-prone PPID horses

As shown in Table 2, even forages can provide too many calories. However, it can be dangerous to restrict your horse’s bulk forage. Therefore, feed them low calorie forage such as:

- Hay that is low in nutritional value i.e. contains less than 10% water soluble carbohydrate (WSC) (you can have your hay analysed to find this information)
- Hay soaked for 8–16 hours, or mix hay and straw together in a 50:50 mixture (as in Table 2)

Straw is too low quality to be fed on its own. Higher calorie forages can still be fed, but they must be fed in smaller quantities at a time (trickle fed) ensuring that your horse doesn't exceed their calorie requirements. For example, grass/pasture as outlined below.

### Controlling grass intake but ensuring daily exercise

If your horse is overweight or because he is laminitis-prone, grazing should be restricted. Using a muzzle is the best way of restricting intake (see Figure 2). Always ensure that the muzzle is well fitted and your horse can still drink through the muzzle.

Giving a horse a restricted time on pasture is only effective if there is very limited grass available. If there is excess grass, then they can still consume excess calories and this can actually be counter-productive by increasing the risk of laminitis. A horse turned out on grass without a muzzle for a short time period (3 hours) eats more per hour compared to a horse turned out all day. If they are insulin resistant and laminitis-prone, then this will mean that they will be consuming a lot of sugars in one go putting them at risk of an abnormal insulin response, potentially triggering laminitis. Horses turned out for longer lengths of time eat less per hour but overall will eat the same total amount. If there is only a limited amount of grass, for example a bare or mown field, then being out all day and all night might be preferable, as the horse will not consume as much sugar per hour. Adding a muzzle will reduce this further but still allow the horse to get some exercise and therefore burn off some calories. However, the calorie content and the total amount of forage eaten must be taken into account, and it can be difficult to assess how many calories a horse is eating when at grass. If a horse must lose a substantial amount of weight initially, your vet may suggest a period off pasture so that his food and calorie intake can be measured carefully.



### The underweight PPID horse

If your horse has lost weight (fat and muscle, Figure 5), then it needs nutritional support to provide more calories. As well as the general feeding tips, supplementary feeding an old horse/veteran mix/cube is ideal. For example, a 250kg pony can have 1.5kg–2kg of a veteran horse diet per day (600g–800g/100kg BW – depending on the brand). The total amount should be divided into 4 meals per day, because although your pony loses weight, they can still be prone to laminitis. It is important to remember that even high oil/high fat feeds (cool feeds) and protein can stimulate insulin, so whichever form of supplementary feed you add, meal size must be small. This 'little and often' regime will only provide limited WSC (sugars and starches) per meal and therefore limits any insulin response and reduces the risk of triggering laminitis.



**Figure 5.** Muscle wastage in the PPID horse

Muscle wastage is common in horses with PPID. The diet should provide enough calories and amino acids to support the rebuilding of muscle.

In summary, most horses with PPID should be fed the same as any other older horse. However, those with marked weight loss or weight gain may need extra attention to their diet. Always make any changes to your horse's diet slowly, as sudden changes in diet can be dangerous in horses or predispose to colic. If your horse or pony with PPID needs to lose or gain a significant amount of weight or is laminitic, they may require a more prescriptive diet. Please contact your vet for further advice.

# GENERAL CARE OF THE PPID PATIENT

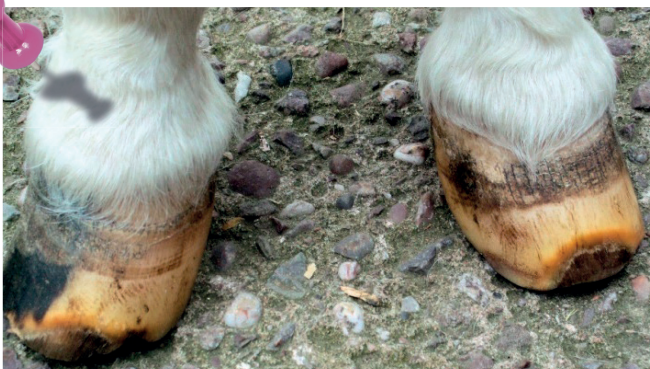
Dr Jo Ireland

In addition to PPID, there are a wide range of common diseases associated with ageing that horses and ponies are at risk of developing as they get older, including dental, musculoskeletal, respiratory, cardiac and skin disorders. While PPID does increase the risk of suffering from laminitis, having the disease does not appear to make affected horses and ponies more susceptible to other common diseases of veterans.

Medical treatment with pergolide is highly successful in the vast majority of PPID cases; however, there are several management and preventive healthcare measures that are important aspects of keeping PPID patients in the best possible health, whether or not they are receiving any medication. Maintaining the PPID patient requires careful attention to preventive healthcare, in particular hoof care, dental care, vaccination, wormer administration and nutrition.

## Foot care

Hoof problems are highly prevalent in older horses and ponies, yet with increasing age they are less likely to be shod, and the frequency with which they receive farrier attention is reduced. Laminitis is the most important hoof condition, and much of the increased risk of laminitis in veterans is likely to be associated with PPID. If you recognise any signs of laminitis in your horse or pony, it is vital to seek veterinary attention immediately. Farriers can play an essential role in the early detection of hoof problems, including laminitis (Figure 6). Shoeing problems may speed the progression of osteoarthritis and correct trimming and shoeing can actually help in the management of arthritis and other musculoskeletal disorders. Even in unshod animals, a check from a registered farrier every two months is recommended.



**Figure 6.** Laminitis is the most important hoof condition to check for

## Dental care

Dental disease is the main oral disorder in horses, and is very prevalent in veteran animals. Common dental conditions include tooth loss, gaps between the teeth (diastemata), periodontal (gum) disease and abnormalities of wear such as focal overgrowths (hooks), wave mouth, shear mouth and smooth mouth. While many horses will suffer dental disease without showing any obvious clinical signs, conditions such as diastemata and periodontal disease are likely to be very painful and can result in weight loss and compromise welfare considerably. Although PPID does not increase the likelihood of dental disease; gingivitis (inflammation of the gums) and periodontal disease are often diagnosed in PPID patients, where increased susceptibility to infection may lead to more severe bacterial infections associated with these conditions.



As dental problems are so common, regular and thorough dental examinations (every six months) by your veterinary surgeon or a qualified Equine Dental Technician (BAEDT) are recommended. It may not be possible to correct all dental abnormalities; however the aim is to prevent pain by removing any loose teeth, sharp edges and overgrowths. Horses with severe dental problems may struggle to eat, particularly long forage such as hay or haylage, which needs to be considered when formulating their diet.



## Preventive healthcare for the PPID patient

### Vaccination

**Horses with PPID can demonstrate reduced immunity to infections, which makes vaccination even more important.**

Although the majority of veteran horses are regularly vaccinated for both tetanus and equine influenza, a higher percentage of aged horses are unvaccinated compared to young horses, and the frequency of vaccination tends to reduce with increasing age. Just like older humans, older horses have a less efficient immune system, therefore regular vaccination is very important to protect them against disease, even if they are not regularly travelling or mixing with other horses. Additionally, unvaccinated horses play an important role in disease transmission during equine influenza outbreaks, and unvaccinated veteran horses may have implications for herd immunity.

### Deworming

As they get older, horses are more likely to have higher worm burdens, especially if they have PPID. Following wormer administration, worm burdens increase again more rapidly in PPID patients compared with other older horses. This is thought to reflect the reduction in immune function that can accompany PPID. Use of a targeted worming programme, incorporating both faecal worm egg counts and a blood test for tapeworm is recommended when devising a worming strategy for older animals and it is advisable for you to discuss your choice of worming programme with your veterinary surgeon, who will be able to devise a tailor-made plan for your horse.

### Nutrition

Feeding the PPID patient is covered in detail in the previous chapter, but selecting the best diet for your horse is an essential part of their healthcare. Advice from an equine nutritionist or your veterinary surgeon will help you to provide an appropriate diet to maintain a good body condition and prevent obesity.

## Other management measures for the PPID patient

The “classic” image of a long, thick, curly hair coat in PPID cases is in fact relatively uncommon and tends to be associated with more advanced cases. It is far more likely that hair coat abnormalities will be less dramatic, and may include delayed shedding of the winter coat, or abnormally long hair only in certain areas. Where horses or ponies are affected by a particularly thick hair coat, they often benefit from being clipped, particularly during the summer months, and regular clipping of excessive hair coat may be required throughout the year. In addition to making them feel more comfortable during warmer weather, clipping can also aid in maintaining good skin health and in the early identification and treatment of skin problems.

### Management of increased sweating that is independent of a long or thick hair coat.

Animals with PPID may sweat excessively, either all over or in patches (Figure 7). Although affected animals may sweat because of a long or thick hair coat, others may continue to sweat excessively even after clipping or in a cool environment. With increasing age, horses and ponies appear to become less able to regulate their body temperature, feeling the cold more than they used to but also appearing less able to cope with hot weather. Clipping as required to maintain a healthy coat, together with rugging as necessary, can help your horse cope with changeable weather conditions and temperatures. It is also important to ensure that your horse has access to adequate shelter when turned out.



**Figure 7.** Increased sweating in PPID horses may be widespread or patchy



### Regular grooming for a healthy hair coat and skin

Regular grooming can help to improve your PPID patient's hair coat and to keep skin healthy, but it also provides a useful opportunity to identify any skin disorders or superficial wounds. Horses and ponies with PPID are often considered to be more susceptible to infections, thought to be due to a degree of immunosuppression. Skin infections are among the most frequently reported secondary infections seen in PPID patients, of which rain rash/scald (dermatophilosis), and mud fever/rash are most common.

### Infection control

In addition to gum disease and skin infections, other infections reported in PPID patients include hoof abscesses, sinusitis and conjunctivitis. Good fly control during the summer months may help to reduce the risk of conjunctivitis; however veterinary attention should be sought if your horse develops nasal or ocular discharge (Figure 8). Early identification of any secondary infections improves the chance of successful treatment, as even minor infections can become difficult to manage in PPID patients.



**Figure 8.** Nasal discharge may be a sign of reduced immunity

### Stress management

As horses and ponies get older, owners often report that they appear to become more susceptible to stress, and the PPID patient may not cope as well as they used to with stressful situations, such as moving to a new yard or a change in their usual grazing companions. Wherever possible, changes to their management or routine should be minimised and, where it is not possible to avoid making changes, they should be phased in gradually to help reduce stress.

### General care summary

Evidence suggests that regular health checks can improve quality of life in elderly human patients, and it is likely that horses with PPID will gain similar benefits. As well as helping you to monitor and manage your horse's PPID, regular veterinary visits ensure that your horse receives appropriate routine preventive healthcare and provide an opportunity for a thorough clinical examination, aiding early detection of any other health problems. One research study found that 83% of owners rated the quality of life of their PPID patient as good or excellent, and careful attention to management and healthcare can help to keep them happy and healthy for years after their diagnosis.

# LAMINITIS AND PPID

## Prof. Andy Durham

Horses and ponies affected by PPID are at increased risk of developing laminitis. However, not all do so and many live a long life entirely free from laminitis. Exactly why some horses do and some don't develop laminitis is not yet fully understood and it is likely to depend on several factors. These are discussed further below and include:

- direct consequences of PPID itself
- whether or not the horse receives effective medical treatment for the PPID
- the possible existence of further laminitis risks in addition to the PPID

## Direct links between PPID and laminitis?

PPID is clearly a very complex hormonal disorder and although diagnosis of the disease is usually based on a single hormone known as ACTH, there are clearly many further hormones that are directly and indirectly involved in this condition. Although PPID is generally diagnosed on the basis of a high ACTH concentration in a blood sample, whether the ACTH level is "a bit high" or "extremely high" does not always appear to relate to how likely the individual is to suffer from laminitis specifically.

In recent years, theories about causes of laminitis in horses and ponies have changed towards a hormonal focus following solid evidence that high circulating levels of the hormone insulin are an important trigger factor for laminitis. We know that obese native ponies (Figure 9) tend to maintain higher insulin levels in their blood and release more insulin when they eat than leaner horse breeds do, and this is one of the defining features of the condition known as equine metabolic syndrome (EMS). It is interesting that insulin concentrations are also generally higher in PPID cases than in horses and ponies without PPID, especially when measured after eating high sugar feeds or after receiving injections of glucose, leading to the theory that many PPID cases are metabolically similar to obese horses and ponies with EMS even when they are not overweight.

In addition to establishing a diagnosis of PPID based on high blood levels of ACTH, it is also important to know if a horse or pony with PPID has a high or low insulin response to eating sugary feeds or after receiving a glucose injection (known as dynamic insulin testing). There are a few different ways of performing these dynamic tests. The simplest involve fasting the horse for a few hours and then offering a feed of chaff containing glucose or dextrose powder, or alternatively dosing the horse with corn syrup from an oral dosing syringe.

Depending on the exact test, a blood sample is then collected to test insulin between 1 and 2 hours after receiving the test dose. Additionally, a slightly more complex test can be run following glucose and/or insulin injection, although this is usually only done on horses while staying in an equine hospital or clinic. Those PPID individuals with the highest insulin levels during these tests are likely to be those at greatest risk of laminitis and may require special preventative measures to be taken especially with regard to the diet (see feeding the PPID patient).



**Figure 9.** Overweight native ponies are at greater risk of high insulin levels which is a trigger factor for laminitis

## Treatment for PPID?

When PPID is diagnosed then it is usually treated with pergolide. This drug suppresses the overactive pituitary gland and helps to normalise the abnormal hormone production. Standard doses of the drug (typically a single 1 mg tablet each day for a horse and half a tablet for a pony or donkey) are effective fairly promptly in the majority of cases, although some may need higher doses or a longer duration of treatment before control of pituitary function is gained. A small minority may prove to be unresponsive to treatment at practical doses. Although reduced risk of laminitis has been demonstrated after starting medical treatment for PPID, it is logical to assume that those cases that are not fully controlled at a standard dose may continue to experience laminitis.

Thus, it should not be assumed that the starting dose will be effective and further monitoring of your horse following pergolide treatment is important as dose modifications may be required (see section on monitoring the PPID patient).



Standard recommendations are that horses on pergolide treatment should be checked at least twice each year with one of the checks scheduled for between August and late October. These checks should, ideally, comprise an assessment of overall health and wellbeing, hoof and farriery appraisal, measurement of blood ACTH levels as an indicator of pituitary activity and, importantly, a dynamic insulin test to see if insulin response has improved implying a decreased risk of laminitis.

## Other risk factors for laminitis

There are many known factors other than PPID that are known to increase the risk of laminitis in a horse or pony. The most important ones are breed (native types), time of year, lack of exercise, body condition (overweight individuals) and overfeeding. Thus, it stands to reason that if PPID is seen in a native pony that is overweight, not exercised much and is fed too much then laminitis is more likely to happen due to summation of the individual risks. The breed of your horse or pony "is what it is!" You cannot do anything about that other than recognise that certain types might be at increased risk of laminitis and manage them more carefully and strictly as discussed elsewhere in this guide.

Similarly you cannot control the time of year, but you can recognise that additional care should be taken at certain times of year. Late spring and early summer usually represents the peak of the laminitis season, probably associated with access to the sugars in rich grass which cause a peak in blood insulin. Additionally, there is some suggestion that the autumn might represent a time of increased risk of laminitis in PPID cases owing to a general seasonal surge in pituitary activity which peaks in late September.

That leaves laminitis risk factors that are largely under your control, namely lack of exercise, body condition and overfeeding. Although it is often the case that PPID goes along with older age and less activity, efforts should be made wherever possible to maintain some form of organised exercise programme. In addition to maintaining tone of muscle and ligaments, hoof and laminar strength may be improved along with the psychological uplift of your horse enjoying a daily exercise routine rather than vegetating in a field. Smaller breeds such as Shetland ponies might not be so amenable to ridden activities, but training to pulling a small carriage or cart, or even just going for a walk like a large dog is worth consideration!



**Figure 10.** Laminitic rings evident on the hoofs of a horse with PPID shod with a 'steward clog'. Ongoing medication, blood tests and regular farriery care were important in maintaining soundness in this mare.

Unfortunately, recurrent laminitis might make it difficult to implement exercise programmes, but the opportunity should always be taken where lameness allows and even swimming might be a useful form of non-weight bearing exercise if an equine pool is close by. Maintaining the correct body condition can be challenging in some PPID cases. Some PPID cases may struggle to maintain their weight, some may be overweight, and some may change from good condition to losing weight. Therefore, a careful "balancing act" might be needed with close attention to body condition and appropriate response in terms of the amount and nature of their daily feed allowance.

# NOTES



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[www.careaboutcushings.co.uk](http://www.careaboutcushings.co.uk)

Care about Cushings is an online resource to support owners with the lifelong management of PPID.

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