



**STOP; DON'T TURN THE PAGE HAVING JUST READ THE TITLE!! IF YOU'RE  
OF THE OPINION THAT 'THEY'RE JUST SMALL HORSES WITH LONG EARS' READ ON...**

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## **INTRODUCTION**

Donkeys are actually extremely popular in the UK; there are approximately 25-30,000 donkeys in Britain; 5800 are housed at Donkey Sanctuary farms and Donkey Sanctuary foster homes. Given the widely claimed stoic nature of the donkey, it is common to find severe dental abnormalities in patients that are eating, and are of normal/above normal weight or even obese. Often, by the time the donkey displays difficulty eating and or weight loss, the problems may be too severe to correct. It is therefore important to make dental examination and treatment a routine procedure for all donkeys, from an early age. This article is intended to present common dental abnormalities found in the donkey, and provides advice regarding treatment.

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The Donkey Sanctuary was founded by Dr Elisabeth Svendsen MBE in 1969.

The Donkey Sanctuary (registered charity number 264818) and its sole corporate trustee, The Donkey Sanctuary Trustee Limited (Company number 07328588) both have their registered office at Slade House Farm, Sidmouth, EX10 0NU.

Incorporating: The Elisabeth Svendsen Trust for Children and Donkeys (EST); The International Donkey Protection Trust (IDPT).

## BACKGROUND

Research has shown that dental disease is second only to hoof problems as the most common medical condition of the donkey. Indeed, there is a 73% prevalence of dental disorders in donkeys across all ages, and a 93% prevalence in post mortem subjects (Du Toit et al., 2009). As is common with horses, donkey dental disease is correlated with increasing age.

In addition to the common dental conditions encountered in horses; donkeys seem predisposed to some more species specific anomalies, the majority of which appear to be somewhat conformationally associated.

## DONKEY DENTAL IDIOSYNCRACIES

### SHEAR MOUTH

Anatomically, the donkey has a greater degree of anisognathism; the maxilla is approximately 30% wider than the mandible (5-7% wider than in horses) at its widest point, although the disproportion of width appears to stem from a narrower mandible rather than a wider maxilla (Du Toit et al., 2009). The greater disparity of jaw widths may predispose to an increased angulation of the occlusal surface (commonly just maxillary arcades); usually, but not exclusively, unilaterally. In extreme cases, the entire maxillary cheek tooth arcades will wear over time ending up completely lateral to their mandibular counterparts resulting in no occlusal contact and potentially fatal overgrowths. Practitioners are therefore encouraged to make regular check ups, and carry out prophylactic procedures to maintain the correct occlusal table angle, which varies between 12.5° and 30° throughout the length of the arcades and between maxillary and mandibular cheek teeth (Brown et al., 2008). Cases of very severe shear mouth do however seem quite responsive to treatment; even in patients initially deemed hopeless cases. Care must be taken to avoid complete removal of transverse ridging in very geriatric or ailing patients wherever possible (making post procedural mastication more effort) especially on the unaffected side. Furthermore, care must also be taken to avoid the exposure of lateral/medial pulp horns, which may well be closer to the occlusal surface than anticipated.



Fig 1.0 Severe unilateral shear mouth, with a ubiquitous wave on the contra-lateral arcades.

## **ACCENTUATED CURVE OF SPEE (ACOS)**

The curve of spee is quite noticeable in donkey breeds, similar to native ponies. It is therefore common to find multiple combinations of focal overgrowths at the rostral and caudal cheek teeth. When an accentuated curve of spee is identified in conjunction with shear cheek teeth, the medio-dorsal most portion of the 3 and 411 may erupt in close proximity (or beyond) to the soft/hard palate(s), or caudal maxillary sinus. If not corrected appropriately these overgrowths may result in penetration of the palate and/ or caudal maxillary sinus. The prognosis is usually poor if the trauma sustained is more than very superficial. Similar rostral overgrowths may fare marginally better if osteomyelitis is avoided and the wound is attended to rapidly and thoroughly.

Accentuated curve of spee should be treated as a variation of normal conformation; the teeth should not be modified to correct the condition, but should be maintained following the jaw lines.

## **FOCAL OVERGROWTHS (FO)**

Overgrowths should always be corrected as soon as possible, but care must be taken to correctly distinguish ACOS from caudal overgrowth of the 3 and 411 and or rostral focal overgrowths of the 3/406. The differential diagnosis requires careful palpation and excellent visualisation of the whole oral cavity. Should the height of 3/411 vary from the gingival margin at the rostral and caudal aspects, then it is likely that the tooth has some degree of overgrowth. Feeling over the top of the lower 11's, the ramus should be able to be palpated fairly easily.

Commonly, it is the rostral aspect of the mandibular 11's that is overgrown, coupled with an overgrown maxillary 10. Owing to its location, reduction of just the rostral aspect of the lower 11 can be awkward. The use of 'pony' style floats with sharp solid carbide blades, and or the use of the HDE power instruments (particularly in this instance making use of the maxillary 'cone' burr or the curved flexi disc set to follow the curve of spee) with the shorter extension are the instruments of choice for working on donkey dentition. A normal horse sized full mouth speculum (esp. the world wide 4000 series) will fit even the smallest of donkeys.

## **BRACHYGNATHIA AND PROGNATHIA**

Impaction or displacement of the lower 9's and or 10's coupled with or caused by an accentuated curve of spee commonly produces dominant maxillary counterparts. Many donkeys will also present with varying levels of mandibular brachygnathia, which may self correct following remedial treatments to the cheek teeth (and incisors only if genuinely necessary). There will however be instances where the animal is genuinely brachygnathic and will require regular treatment to manage the condition. Conversely, in miniature donkey breeds and some types of Asiatic mules (i.e. Nepali Mule), mandibular prognathia is a common observation and very regular prophylactic treatment is required to avoid unnecessary overgrowths in these cases. Prognathia has also been reported as a common problem for donkeys in some parts of Portugal.



Fig 2.0 Facial deformity of the Nepali mule and consequent dental malocclusions.

## WAVE MOUTH

It is easy to foresee that a series of focal overgrowths may present when a combination of oral disease and certain conformations coincide. Wave mouth is another relatively common abnormality, and the treatment aims are similar to that in the horse; to provide a uniform height of clinical crown without complete removal of transverse ridging where possible. Conservative procedures scheduled at regular intervals is preferable to one curative treatment, especially in cases of acute/chronic anorexia, dysprehension/dysmastication, colic and hyperlipaemia where treatment stress, and post procedural discomfort may well adversely affect recovery. Indeed some malocclusions will never be corrected and consideration must always be given to the amount of reserve crown available. As donkeys typically live longer than horses, it is possible to perform minor reductions and regain occlusion in animals in their late teens/early twenties. It is however; occasionally best to allow minor focal overgrowths to remain in order to allow as much occlusion as possible in an elderly patient. When worn teeth exfoliate or wear beyond functionality; the dominant teeth may then be reduced to prevent contact with the opposing jaw, and to increase jaw motility. Dental reductions should follow current protocols whereby occlusal tissue is removed in stages resulting in an incomplete loss of the dark staining of the secondary dentine and preferably with incomplete loss of the transverse ridging. If reductions are continued much past this point; there is considerable and unnecessary risk of irritation to the odontoblast processes and or direct pulp exposure. It is entirely preferable to perform several reductions over time rather than one corrective procedure in all but the most minor overgrowths.

It is usual for cases suffering multiple oligodontia/exodontia to require considerable dietary modification to provide adequate nutrition whilst minimising risk of choke, colic and hyperlipaemia.

## VENTRAL CURVATURE OF INCISORS

Ventral curvature of incisors has 97% prevalence in donkey's; it is thus recognised as normal anatomy (Du Toit et al., 2009). If incisors are of normal length, and cheek teeth occlusion is good, attempts to rectify the ventral curvature will usually result in a loss of incisor occlusion and is undesirable. In certain cases the donkey may completely wear out either incisor arcade (although more commonly the maxillary incisor arcade is affected).



Fig 3.0 Normal ventral curvature of the incisors

## DISPLACEMENTS AND EXTRACTIONS

Displacements are another important focus of interest when treating donkeys; they are more commonly found in the molar cheek teeth, especially lower 9's and 10's and upper 10's and 11's. The displacements may be quite severe and if periodontal disease has not advanced sufficiently, these teeth may have very solid attachment.

## EXODONTIA

Veterinary extraction of very displaced cheek teeth is one course of action, yielding very good results in terms of resolution of tissue trauma and localised periodontal disease. It does however reduce the functionality of the mouth – probably not significantly in the animal in which only one cheek tooth is extracted, but possibly adversely in those suffering multiple oligodontia. Extreme caution must be used when extracting cheek teeth that are very steeply angled (some are virtually horizontal) as incorrect use of molar forceps will readily cause fracture to one or more apices. Radiographs of displacements identified very early on may provide clues as to the causes and or likely directions of the impending displacement.



Fig 4.0 Typical molar displacement

Multiple extractions in a singular session should be avoided wherever possible as the sudden reduced function in addition to stress, and possible pain and potential infection will cause acute inappetence. Consequently there is a likelihood of rapid onset hyperlipaemia which carries an extremely high fatality rate. Extractions should always be staged if the affected teeth are on contra-lateral arcades, as it is beneficial to leave the donkey with one pain free side on which to eat. On occasion the practitioner may observe digitally loose cheek teeth that are only held in occlusion via the mesial compression of the arcade. The general advice regarding extractions is to extract those teeth deleterious to health, to do so in stages and with appropriate veterinary intervention. For veterinarians performing extractions; the use of regional analgesia is strongly advised should periodontal attachment be more than negligible.

It is typical in elderly donkeys, particularly on the maxillary arcades that once one tooth is extracted, two or three others lose their stability and also require extraction. Consideration should be made beforehand and a veterinary surgeon consulted so that radiographs can be taken if necessary in advance to forewarn of the likelihood of multiple extractions so that adequate time and drug therapy may be employed. Post procedural care and management changes need to be considered and discussed at length with the owners.

## **ANALGESIA**

It is imperative that suitable drug therapy in terms of analgesia (in addition to sedation for all but extremely loose digital extractions), and antibiotic cover (if necessary) be employed, so these cases should be treated by a veterinary surgeon. Donkeys do not show pain in the same way as horses; it is much, much harder to identify but that does not mean the animal does not experience the same degrees of pain as any other species. Usually extractions which require the use of forceps, and or any degree of physical periodontal separation will mean that the animal requires analgesia (prior to, during and post procedural), sedation, adequate antibiotic cover and post procedural assessment; these cases therefore require veterinary intervention.

## **POST EXTRACTION MANAGEMENT**

Significant post procedural alveolar infections are common in donkeys who have not received antibiotics or who have not had a patch applied to deep sockets. Again this is enough to cause acute inappetence/anorexia.

Immediately post extraction, it is beneficial to flush the socket using saline or diluted chlorhexidine (1 in 2000). The socket should be assessed for fragments and debris. Once clean, deeper sockets are usually well managed by partially filling with manuka honey and placing a patch over the opening to prevent the ingress of ingesta. We have achieved great success using polyvinyl impression material for such purposes, but dental wax would be a suitable substitute.

The oral patch is left in place for up to 2 weeks before changing for a smaller replacement. Patches may be replaced sooner in cases of younger donkeys with full cheek tooth extractions, or cases with retained fragments/heavily infected sockets etc. Patching should continue until healing results in a socket of insufficient depth to hold a patch.

## **ODONTOPLASTY**

Donkeys that appear to have stable minor displacements, i.e. those which deviate from the normal alignment of the arcade but do not appear to increase in severity over time, are readily treated by regular modification of the clinical crown or 'odontoplasty'. By profiling and contouring the displaced portion of the affected crown in addition to the immediately adjoining teeth, the alignment of the arcade is improved and opportunity for food impaction is reduced. Great care must be taken to avoid direct and indirect iatrogenic insult to the pulp tissues. Superficial to moderate levels of periodontal disease may be treated by irrigation, debridement and application of an interproximal bridge always in conjunction with odontoplasty and dental equilibration. More advanced periodontal disease may require a course of antibiotics possibly even direct antibiotic gel preparations with or without temporary/semi permanent bridging. Some donkeys may be effectively managed using odontoplasty to prevent food accumulation and consequent infections; but dietary modifications may be required.

## **PERIODONTAL DISEASE AND DIASTEMATA**

Diastema and associated periodontal disease have an incredibly high prevalence in donkeys compared to horses; some 85% of donkeys at post mortem demonstrated diastema of the cheek teeth (Du Toit et al., 2008). The diastema may or may not be associated with displacements. The most common areas for diastema are the maxillary 6/7's and 7/8's, but most often the diastemas are found on the mandibular 9/10's. The occurrence of lower 9/10 diastema seems to coincide with the most common area for mandibular displacements. Following the creation of diastemata, a self-perpetuating cycle of food infiltration, degradation and infection occurs until eventual tooth loss. Despite the suggested stoicism of the donkey, it is likely that the animal would experience considerable pain and it is imperative that a thorough visual and digital oral examination be a part of any investigations

associated with excessive salivation, oral malodour, inappetence/anorexia, colic (especially impaction), hyperlipaemia, and weight/condition loss. Treatment and assessment of periodontal pockets should be performed under sedation by a veterinary surgeon.

A particularly successful approach in category 1-3 periodontal disease is to thoroughly clean the diastema and associated pocket using a pressure water pick (modified garden sprayer) with a 1 in 2000 dilution of chlorhexidine or saline and tepid water. Once clean, the diastema can be bridged using a temporary impression material (polyvinyl). This technique can be used in conjunction with direct antibiotic application if required. The bridge may be exfoliated in young equines fairly rapidly (3-4 weeks), owing to eruption, but may become semi-permanent (replaced every 6 months) in older donkeys where eruption has slowed considerably. Category 1 periodontal disease may be controlled solely with appropriate odontoplasty. Category 4 (greater than 4mm rotational movement) have suffered serious insult to the periodontal ligament and associated fibres, and should be extracted.

## **INCISOR AND CANINE PATHOLOGIES**

Incisor defects are relatively common in donkeys. From minor displacements and infrequent fractures to complete tooth rotation, polyodontia, severe displacements including brachy and prognathia and advanced periodontal disease; it is also (consequently) not uncommon to find varying degrees of missing teeth. Singular dominant incisors will become loose through mechanical separation; giving rise to opportunities for infection. In addition, the canine teeth may erupt in very close proximity to the incisors frequently allowing for mass accumulation of calculus covering canines and typically corner incisors (occasionally the lower 04's will delay the eruption of permanent 3 and 403 by some considerable time [6-8 months or so]). There appears to be less sexual dimorphism (regarding the canines) than demonstrated in horses and so both male and female donkeys may be affected. An incisor examination should always be performed prior to fitting the full mouth speculum. Any pathological deviations from the normal bite pattern can be improved prior to undertaking cheek teeth procedures. Incisors with severely compromised attachment require extraction. The use of regional analgesia alongside sedation and post procedural pain relief is fundamental to effective and humane extractions so should be carried out by a veterinary surgeon. In donkeys with a few stable incisors, or even no incisor's at all; it is better to use ground out incisor plates than to make use of the traditional 'gum' bars, which will inflict severe trauma to the interdental space – even when padded. Very loose incisors are best extracted prior to cheek teeth assessment/treatment if the speculum is likely to impinge on them.

## **CALCULUS**

Calculus deposition appears to correlate with age; elderly donkeys may present with considerable malodorous deposits at the canines and incisors, but also around the maxillary premolars. It has been noted however, that donkeys as young as 7 may experience considerable plaque calcification. It is likely that as incisor eruption decelerates and canine eruption is static in mature animals, the opportunity for calculus exfoliation is minimised hence build up becomes significant in aged animals. When calculus accumulates on the lateral edges of the cheek teeth it may well hinder ingesta enroute to deglutition and cause food stagnation at the interproximal spaces and along the free margin of the gingiva. Furthermore, calculus may become very sharp and ulcerate adjacent soft tissues occasionally to a severe extent. Calculus is easily removed by manual floats, or forceps on more rostral teeth, but its rapid re-deposition warrants regular attention. Calculus re-growth at the premolars may be as rapid as >1cm thickness in under six months, consequently affected patients warrant very regular attention. Calculus deposits should not be underestimated with regard to pathogenesis and traumatic risk to soft tissue.



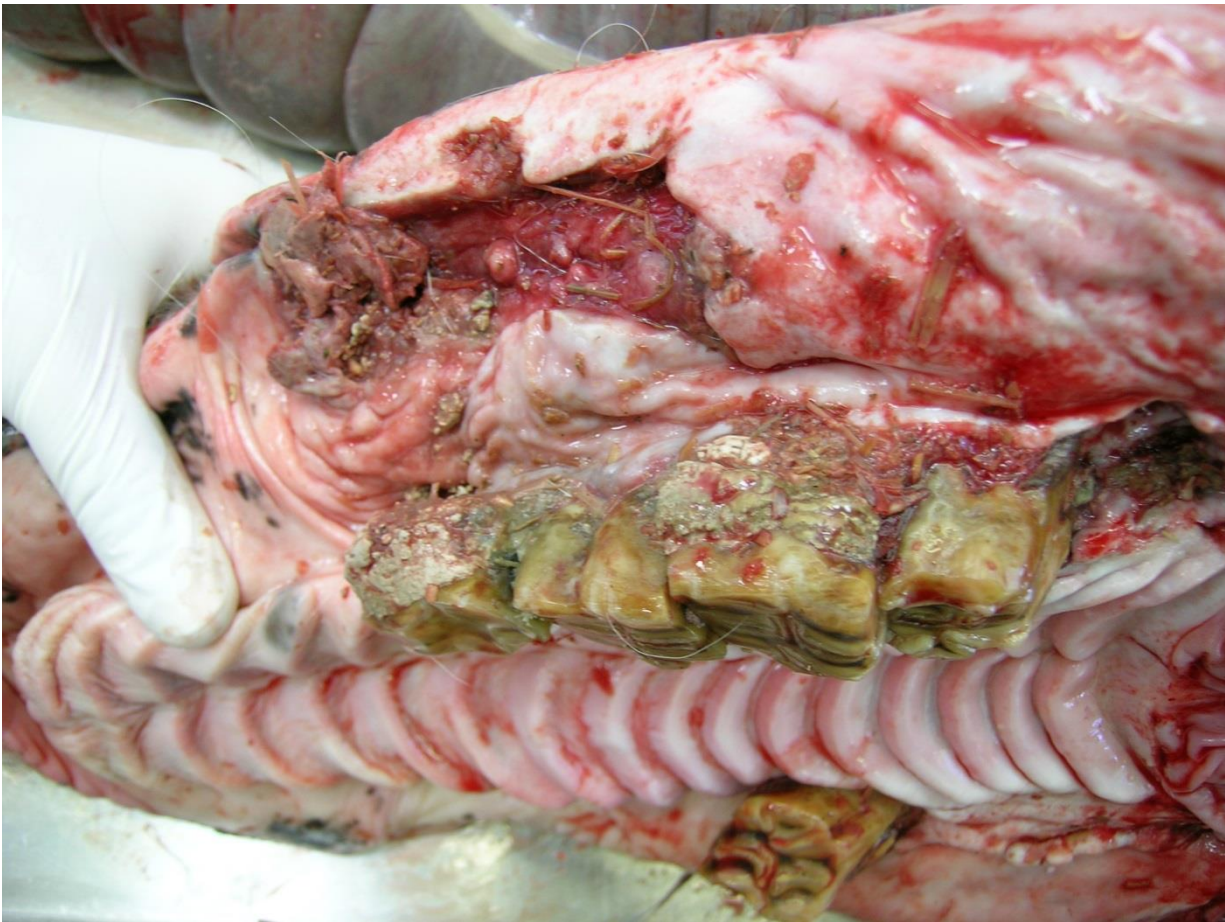


Figure 5.0 Severe cheek injury from partially exfoliated calculus deposition

## **CORRELATION WITH CLINICAL SIGNS, OR LACK THEREOF**

Of particular note when considering dental conditions of the donkey, there is little to no correlation between dental abnormalities and clinical signs. Frequently very severe anomalies are visualised, yet the donkey is in average/above average condition with no apparent or reported signs of dysprehension, dysmastication, anorexia/inappetence etc. This apparent 'stoicism' necessitates oral assessments to be carried out very regularly in the donkey to identify problems at an early stage. Often, by the time signs of dental disease are apparent, there is very little that can be done to rectify the problem. When presented with an aged donkey with poor body condition, or perhaps recent weight loss or other illness concurrent with chronic dental disease, do not automatically assume that this is the primary or even sole source; in these cases it is important that a veterinarian carries out a full clinical examination, which may conclude dental pathology as the least of the animal's concerns.

Practitioners should also be aware of the systemic 'quirks' of the donkey; hyperlipaemia is a significant risk and carries a high mortality rate. It is no longer acceptable for any dental service provider to advise owners to 'not worry if the animal became inappetent for a day or so following remedial work'; this is extremely dangerous in donkey patients and is highly likely to render the animal hyperlipaemic (60-95% of these cases result in death/euthanasia (Grove, 2008)). Consideration must be made prior to treatment regarding the general health of the donkey.

## **TREATMENT CONSIDERATIONS**

On a practical note, consideration should be made to the donkeys' natural state. They are not typically herd animals like horses. Donkeys will tend to bond with one other; usually and preferably another donkey, but they may bond strongly with other species. When attempting dental treatment and the animal becomes fractious, nervous, or difficult to handle, it is often of use to have its bonded friend

close by (ideally within touching distance). Most donkeys will readily accept regular dental therapy, but it is wholly undesirable to battle on with those who are less accepting; stress increases the risk of a donkey becoming hyperlipaemic. Furthermore, the quality of treatment in such animals is significantly compromised. By far the most successful method of treating donkeys is to allow them to be tied to a firmly attached tie ring, on a moderate length of rope. Often an additional holder is not required, but someone standing close by in case of emergency is a must (often young, elderly and infirm patients welcome a friendly holder who is prepared to offer attention during the procedure). The donkey should be allowed to hold his head wherever is comfortable, as although handlers may try and assist the procedure by holding the head in an uncomfortably elevated position, this often agitates the donkey and thus risks health and safety of two personnel. The most successful hold is usually with the assistant standing adjacent to the donkeys head with one hand on each side of the upper arms of the speculum. Very often, an unsedated donkey will make good use of a headstand, but practitioners must remain vigilant throughout treatment.

Many young or nervous donkeys are easier to work with if time is spent prior to treatment, performing an external head examination; this gives the donkey time to settle and realise that your attention is unlikely to be harmful. Allowing the animal to see and smell equipment prior to its placement is another useful pre-emptive action. Some donkeys however, will require sedation from a veterinarian, who should be aware that mules in particular require higher doses to produce effective sedation.

Very thorough external palpation and assessment is required when approaching dental treatment in donkeys. This gives them a chance to become accustomed to the practitioner, but more importantly; as donkeys have such a tremendously thick coat certain conditions are easily missed i.e. mandibular swellings (e.g. apical infections), abscesses, exostoses, salivary duct sialoliths and / or traumatic injuries.

## **FURTHER ASSISTANCE**

The Donkey Sanctuary Veterinary Department are pleased to work in conjunction with veterinary and equine dental service providers on complex cases. We offer a referral service and can offer referring personnel the opportunity to observe/assist treatment of their patients. Additionally, we are able to offer advice concerning health and welfare of donkeys and mules.

For further advice please contact the Donkey Sanctuary Veterinary Department on 01395 579 162 or email [vets@thedonkeysanctuary.org.uk](mailto:vets@thedonkeysanctuary.org.uk)

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