

In: **Veterinary Care of Donkeys**, Matthews N.S. and Taylor T.S. (Eds.). International Veterinary Information Service, Ithaca NY (www.ivis.org), Last updated: 7-Jun-2005; A2918.0605

Skin Disorders of Donkeys

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Acknowledgements

I am very much indebted to my friends and colleagues at the Donkey Sanctuary, SPANA and at The Brook Animal Hospital for their help with this paper and to others who have regularly consulted and shared cases with me over the years. Several individuals have helped provide both information and images for this paper.

I am aware that the veterinary profession has largely ignored the donkey and that this is unjustified given the significant contribution that the donkey has made to us all and continues to make to simple communities across the world. For example there is no definitive book on the diseases of donkeys at any level - it is largely viewed as a small (and possibly cantankerous horse!). I am glad to be offered an opportunity to contribute to this Internet journal and to try to improve the profile of this amazing and lovely creature.

Introduction

The donkey has for centuries been regarded as a robust and willing servant of man and most veterinarians accept that as a species it suffers rather fewer skin diseases than most other domestic animals. However, this may be more in the perception than the actuality because the donkey tends to show few signs of cutaneous discomfort. The skin of the donkey is well adapted to the rigors of direct sunlight and extremes of heat. The donkey has a specific adaptive ability to cope with desert and other high temperature conditions. They preserve water by sweating against the skin and limit the loss of water by allowing the body core temperature to rise significantly. The latter adaptation allows the donkey to restrict the need for heat loss by evaporation and the cooling under the hair coat maximizes the cooling efficiency of sweating. These properties may give the impression that the donkey's skin is hardy and able to take almost any insult but quite the reverse is true. Nevertheless, the skin of the donkey may possibly be subject to fewer of the infectious diseases that afflict other equidae.

Many of the diseases of the donkey (and the horse for that matter) have not been well characterized and so they are often given the names of the "similar" disorders in humans and other animals.

There is a dearth of pathological information about the skin of the donkey that reflects the shameful lack of interest in the species over countless years. The donkeys long-suffering and tolerant nature simply makes the diseases less "important" in the eyes of the owners or carers. It is certainly true, however, that working donkeys in poorer parts of the world often have a short life span because of the rigors of their lives and their skin afflictions may be a major cause of debility and failure to maintain a healthy and effective working life. Some of the skin disorders that afflict donkeys in tropical climates are very serious both to the donkey itself and to its owners. Zoonotic implications should be considered where *Cryptococcus* and *Histoplasma* organisms are endemic.

The major syndromes of donkey dermatology that might be encountered in practice include

1. Pruritus
2. Nodular Skin Disease
3. Alopecia
4. Moist / Exudative Dermatoses
5. Dry Dermatitis (Flaking and Scaling)

A. Genetic & Developmental Skin Disorders

There are few genetic diseases of the donkey although there are a few anecdotal reports of epitheliogenesis imperfecta with large areas of skin missing from birth. The author has encountered one case of a skin fragility condition that resembled the cutaneous asthenia (Ehrloss-Danloss Syndrome) that is encountered in other species (including the horse). In this case the skin was easily traumatized and healed very slowly with large scar formation. The healed skin remained even more fragile

and the repeated damage that resulted simply from normal handling was not considered to be acceptable and the donkey was destroyed at 7-months of age. The donkey is likable also to dermoid cyst formation and these typically or found in low numbers along the dorsal midline. They contain hair and adnexal structures in a chaotic arrangement. Surgical excision is curative and they do not appear to recur.

B. Immunological Skin Disease

The donkey is remarkably free of immune mediated skin disease but Pemphigus-like diseases have been recorded; a condition that is clinically and pathologically indistinguishable from pemphigus foliaceus is encountered from time to time with skin-keratin and mucocutaneous junctions being affected most obviously. The condition can become generalized and hair loss with circular exudative patches may be encountered. The condition is usually non-pruritic and can be diagnosed from biopsy.



Figure 1. Pemphigus foliaceus-like Syndrome. - To view this image in full size go to the IVIS website at www.ivis.org . -



Figure 2. Pemphigus foliaceus-like Syndrome. - To view this image in full size go to the IVIS website at www.ivis.org . -

Treatment is largely unrewarding but high dose steroids can be attempted; probably the best of these is prednisolone at 2 - 3 mg/kg for the first 7 days and then tapering the dose progressively down to a minimum effective alternate daily dose. The risks of laminitis following steroid usage in donkeys has not been defined to the author's knowledge and certainly there does not appear to be a higher risk than in horses (in which I believe the risk is heavily overstated).

C. Nutritional Disorders of the Skin

In spite of severe nutritional deprivation the skin of donkeys remains remarkably healthy unless there is concurrent trauma. The combination of trauma (especially recurrent injury) and malnutrition is probably one of the most significant combinations with respect to the health of the skin. A nutritionally deprived donkey becomes liable to parasitic (*Habronema* spp.) and bacterial infections. Dermatophilosis is a common isolate in damaged or inflamed skin but it difficult to know if this is primary or secondary and certainly in the face of nutritional deprivation the severity of the infection can be far more severe.

D. Allergic Skin Diseases

Insect hypersensitivity occurs in donkeys but is not often the typical Sweet Itch Syndrome seen in horses. In the author's experience many of the cases suffer from sensitivity to biting flies other than *Culicoides* spp. Nevertheless many do show a typical distribution and seasonal onset that is indistinguishable from equine sweet itch. Typically the affected donkey shows an intense pruritus that becomes worse when they are exposed to the causative insects and show a progressive severity with succeeding years. Self-trauma causes extensive hair loss, dermatitis and variable lichenification and thickening of the skin on the neck and withers regions in particular. The rump and tail head are also affected in many cases. With increasingly traumatized skin secondary infection, further fly irritation and exposure to ultraviolet light the condition can rapidly become very serious in individual animals. Whilst treatment is required in any case that shows signs it is far better to prevent exposure to the allergen. This may be easier said than done! Most insects do not "like" windy cold or rainy conditions and so this can be a useful way of helping. However, the downside of this is that these conditions are not ideal for donkeys in other respects. Housing during maximal risk periods and "turn-out" at minimal risk periods (e.g., overnight and in the heat of the day) can help. Insect repellents and other synthetic pyrethroids as well as various natural and other insect repellents will help but in severe cases the only effective way is to separate the donkey from the allergen. All-in-one suits may be practical but in most cases are not! Severely excoriated skin can be treated with antibiotic/steroid creams and parenteral medication with corticosteroids such as prednisolone may be the only way of reducing the severity of the inflammation. In my experience the use of depot steroids such as methylprednisolone acetate is not very useful.



Figure 3. An interesting method of protecting the legs from fly and parasite attack! - To view this image in full size go to the IVIS website at www.ivis.org . -



Figure 4. The legs of a donkey showing a severe pruritic allergic dermatitis to the presence of chorioptes mites. Self-trauma leads to progressive irritation and more self-trauma. - To view this image in full size go to the IVIS website at www.ivis.org . -

E. Neurological Diseases of the Skin (Cutaneous Hyperesthesia)

A hyperesthetic (apparently pruritic) skin disorder that resulted in severe self-trauma has been encountered. The donkey sustained a fracture of a cervical vertebra and the associated dermal segment showed persistent sweating and remained a constant irritation to the donkey. The area was hyper esthetic persistently but topical local anesthetics had no material effect.

Rabies is a critical disorder in all species both for the open case and for its clear zoonotic potential. Donkeys are liable to rabies like all other major mammals and affected animals may show severe (central/paradoxical) pruritus. The patient will bite, lick and rub at the site of the original inoculation. Usually there is a history of a bite at the site and so clinicians MUST always ask before they examine a donkey in an endemic area that shows a focal severe progressive pruritus. Usually the course of the condition is rapid and so a diagnosis may be assumed or confirmed from the clinical and supportive tests.

F. Traumatic Skin Disease

Probably the most prevalent and dramatic and disturbing skin disease is trauma. Donkeys maintained in poor conditions are required to work very hard with poor nutrition and with an ill-fitting harness (if any is fitted at all!). Traumatic skin diseases are a recurrent and a major concern in working donkeys worldwide. Like many of the other skin disorders this is best regarded as a direct consequence of domestication. Feral populations of donkeys are remarkably free of skin disease of any sort and traumatic injuries usually heal remarkably well.

Most of the serious skin damage is caused by recurrent injury - repeated trauma is a known and strong inhibitor of wound healing and the geographical locations where donkeys work usually mean that both their nutritional status and the risks of parasitic and bacterial infection of wounds is high.



Figure 5. Traumatic injuries to donkeys is common in working animals. The needs of the owners and some degree of ignorance result in repeated trauma to the skin that inhibits healing and causes considerable skin hyperplasia and thickening. - To view this image in full size go to the IVIS website at www.ivis.org . -

Whilst donkeys have a largely resilient skin they can react to inappropriate contacts through dirty tack or through chemical injury. Usually the clinical features of these dermatoses relate to specific defined areas of application/contact with the irritant material. Saddle/harness oils may be irritant and then for example the pattern of contact will be evident from the clinical examination - lesions that are restricted to contact areas.



Figure 6. This donkey suffered from a well-defined focal dermatosis that was restricted to its tack contact areas. The condition related to very contaminated and badly cleaned tack and resolved quickly following replacement of the head collar with the one shown here. - To view this image in full size go to the IVIS website at www.ivis.org . -

G. Neoplastic Skin Disorders

The donkey is liable to several cutaneous tumors including (in order of prevalence) sarcoid, squamous cell carcinoma, fibroma/fibrosarcoma and rarely melanoma.

By far the commonest problem is the sarcoid. This has been the subject of a considerable research effort at Glasgow University in particular in co-operation with the Donkey Sanctuary. There is no doubt that donkeys are severely affected but the type and distribution of the sarcoid is somewhat different from that seen in horses. Donkeys are more liable to severe invasive and fibroblastic lesions and the occult and verrucose forms are less common in this species.

A virus etiology has been suggested but the epidemiology in both horses and donkeys is not fully explained by this possibility. There are clearly aspects of oncogenetic mechanisms that are involved in the condition. There are families that appear to be particularly susceptible and there is much anecdotal evidence of "contagion" but whether this is simply a matter of virus contact is another debate all together.

Predilection sites for sarcoid in donkeys include the face (especially around the mouth and eyes) and in particular the groin region. Occult sarcoids are not common in donkeys: they seem to have a much higher proportion of fibroblastic lesions.

Notwithstanding the benefit that can be derived from biopsy, it is probably unwise to biopsy a sarcoid lesion without a plan for its immediate treatment. The treatments available are very limited and all have problems of one sort or another. The reality is that early treatment of any sarcoid may serve at least to limit the long term severity but ill-advised attempts that lack proper thought may simply exacerbate the problem. Thus surgical excision may be an effective option where the limits of the sarcoid can be defined but simply debriding the bulk of the lesion or failure to include a wide enough margin may result in a dramatic deterioration. It is now well established that recurrence at the site of a sarcoid excision surgery is a common feature and that this can arise either from partial excision or from seeding of the operative site with cells from the lesion itself. In the author's experience the latter results in a more extensive exacerbation than the former. Cryosurgery is also possible but suffers from the same limitations. The hitherto recognized "remote" effects on sarcoids at other sites (suggested to be due to hematogenous cryo-antigens released into the blood) does not occur in donkeys in the author's experience. Cryosurgery is limited in its efficacy to small lesions in convenient sites and to limited numbers. The simple application of liquid nitrogen to the skin of any animal without proper control or the use of thermocouples and controlled freezing equipment is totally unacceptable as a veterinary procedure. "Burning" the lesions with red-hot irons and electrically heated wires are totally unacceptable - they are illogical, cruel and do nothing to help the disease. Laser surgery and diathermy are logical provided that they are carried out under controlled conditions by experienced surgeons.



Figure 7. A large fibroblastic sarcoid on the medial stifle region that recurred each time following ill-advised attempts to remove it surgically. - To view this image in full size go to the IVIS website at www.ivis.org . -

Immunological mechanisms may be of value. There are anecdotal reports from Mexico of the benefits of autogenous blood injections but it is very hard to see any immunological benefit from this approach. The reality is that a few cases do seem to spontaneously resolve (although this seems to be less common in donkeys than in horses). The use of intralesional BCG has been advocated and this appears to be a useful but by no means certain treatment for localized nodular and fibroblastic lesions around the eyes of the donkey. The critical factors appear to be the true intralesional injection: perilesional injection has no material benefit and risks the development of anaphylaxis. The mechanism for the effects of BCG are probably due to its intense chemotactic nature - macrophages and neutrophils and some mononuclear cells are actively drawn into the site and remove cells to which the BCG has adhered. Repeated injections are required and as the tumor becomes necrotic and decays true intralesional injections become more difficult.

Topical cytotoxic compounds based on heavy metals and cytotoxic and antimetabolic chemicals such as cisplatin and 5-fluorouracil are valuable because they are convenient and relatively cheap. Often these are the only material options available. They do, however, cause much tissue necrosis and some pain is inevitable. The results suggest that some fluidounce lesions and those that have a superficial nature are more susceptible to the methods but again there are wide variations in response and not all lesions will respond at all. There are many questionable materials that purport to be effective treatments but most of these (if not all) have no proven efficacy and have not been studied properly. For the most part unproven and non-veterinary treatments should be avoided as far as possible.

The gold standard for treatment of the equine/asinine sarcoid is radiation but the availability of teletherapy and interstitial brachytherapy is very limited. The expense and practicality are severely limiting factors.

Other skin tumors do occur from time to time but they are all rare and occur sporadically; there is correspondingly little

established about the treatment options and their relative prognosis.

Melanomas are rare in donkeys but do occur from time to time around the eye region in particular. There is little correlation with hair coat and skin colors. As with any other nodular skin disease a biopsy is usually helpful.



Figure 8. Orbital/scleral melanoma. - To view this image in full size go to the IVIS website at www.ivis.org . -

Squamous cell carcinoma occurs in donkeys in much the same way and character as in horses. Cutaneous and ocular forms are more common than penile/vulval forms. Ulcerative and proliferative (and mixed destructive-proliferative) forms occur. Treatment options are effectively limited to surgical excision or cryosurgery. There are no scientific comparative studies on the use of cisplatin, 5-fluorouracil or radiation in donkeys and given the paucity of literature reports it is difficult to predict which treatments are best in any particular circumstances.



Figure 9. Squamous cell carcinoma-like lesion. This resolved with potassium iodide therapy suggesting that it was in fact a pyogranuloma. - To view this image in full size go to the IVIS website at www.ivis.org . -

H. Iatrogenic/Idiopathic Skin Disease

It is an unfortunate fact that many donkeys are subjected to all manner of mistreatment for trivial skin disease or are inclined to be ignored until the skin is appallingly bad and then subjected to an inappropriate treatment. Old engine oil, hot liquid paraffin etc., have, regrettably, been used for years to treat lice! Of course they do kill the lice but the disadvantages are plain!

I. Chemical/Toxic Skin Diseases

Donkeys are liable to the full range of toxic skin disease and perhaps the most alarming is photosensitization arising as a result of chronic/terminal liver failure. Ragwort (*Senecio jacobaeae*) is highly toxic to donkeys (as for horses) but they will eat it in the green state when food is otherwise in short supply. Advanced liver failure signs may be present to guide the clinician but sometimes photosensitization is the first sign. Extensive exudative inflammatory dermatitis over exposed areas of the skin arises. Interestingly in the donkey, in the author's experience that the eruptions are not necessarily always confined to the white skinned areas although the white areas are invariably much worse.

Direct (primary) photosensitization does not seem to occur as commonly in donkeys as in horses.



Figure 10. True photosensitization due to advanced liver failure. Note the distribution pattern in non-pigmented skin. - To view this image in full size go to the IVIS website at www.ivis.org . -

Chemical skin damage is common as result of over strength chemicals used to treat skin disease. There is a general belief that the skin of the donkey can "tolerate" every known insult but in reality donkey skin is probably one of the most sensitive to chemical insult.

J. Infectious Skin Disease

Skin infections are common in donkeys and they are liable to the full range of microorganisms and ectoparasites.

a) Viral Skin Disease

For the purposes of this paper viral skin disease will not include the asinine sarcoid, which is considered in neoplastic conditions. The donkey is susceptible to EHV 3 infection (Equine Herpes Virus 3, coital exanthema) and this is usually regarded as a transient venereal infection. It can affect the penis of the stallion and the perineal skin and vulva of the jenny. An acute, florid inflammatory response with transient vesicles and secondary infection some days after coitus, is the classical symptom. Treatment is simply with soothing antibacterial creams and if the area is significantly painful, human

hemorrhoid creams are useful because they contain antibiotic and local anesthetics. Sexual rest is important because it can spread rapidly and a rest for up to three weeks will usually allow the stallion to recover and become non-infectious. There does seem to be a carrier status in the males in which immunity is solid for some years. Carrier females are thought to be responsible for the spread and recurrence in a breeding herd but there may be other mechanisms for it. Many Herpes virus infections have a latent capacity and so recrudescence is likely.



Figure 11. Typical appearance of coital exanthema in a donkey that developed after mating. - To view this image in full size go to the IVIS website at www.ivis.org . -

b) Bacterial Skin Disease

The common bacterial skin diseases focus on:

1. Dermatophilosis
2. Staphylococcal/Streptococcal farunculosis/folliculitis
3. Fusobacterial dermatitis and coronitis (*F. necrophorum*)

Mixed infections are common in donkeys and the limbs are probably more often affected than the body but ectoderm dermatophilosis does occur and can be very difficult to treat.

The immune status of a donkey with extensive skin infections should be established.

Clinically it is sometimes possible to make an informed guess as to the bacteria involved. A very painful lesion will usually involve Staphylococci while a moderately painful lesion with closely adherent scabs will be Streptococcal. Staphylococcal skin infection usually has less exudate while *Dermatophilus* may have more exudate. *Dermatophilosis* produces focal lesions with a loose scab that leaves a florid red base after removal. The lesion is more irritational than painful.

A specific diagnosis is important and this should be obtained by culture and if necessary biopsy (with or without deep biopsy culture). Once the full spectrum of bacterial involvement is known and the sensitivity profiles established then rational treatment can be given. For the most part, however, bacterial infections will clear spontaneously with good hygiene. It is an important principle of treatment to render the skin inhospitable to bacterial growth. A close clip out and a single antibacterial wash is helpful. Blankets, rugs and bandages should be removed - these simply increase the local exudation and macerate the skin still further. Furthermore it is very easy to restrict capillary blood flow and so create a marginal superficial (and occasionally deeper) necrosis of the skin. Ensuring that the skin remains dry and the donkey is given a healthy diet are important aspects.

c) Fungal Skin Disease

Donkeys are liable to ringworm infestation and the clinical features are often less obvious in them than in horses.

Ringworm due to *Trichophyton* and *Microsporum* dermatophytoses is not common but present in the usual manner with centrifugally expanding circular patches of alopecia, scaling and mild exudation. There is seldom any significant pruritus but the donkey may respond to gentle rubbing of the lesion. More extensive less well-defined areas may develop in cases affected with certain of the *Trichophyton* spp.



Figure 12. A dermatophyte infection of the neck of a donkey. Note the lack of circular lesions commonly thought to be a characteristic feature of "ringworm". - To view this image in full size go to the IVIS website at www.ivis.org . -

Diagnosis is typically by hair pluckings from the active outer margin of the lesion, or appropriately stained biopsies.

Treatment involves topical antifungal washes such as enilconazole or natamycin. Oral griseofulvin is commonly prescribed but there is no real indication that it is effective. The large majority of dermatophytosis cases resolve spontaneously (as in horses) but there may be a delay if the donkey is either immunocompromized or is malnourished. Immunity is reasonably effective and repeat infection with the same organism should not occur for over 2 years. Vaccine technology has not yet reached the donkey! Spread to other donkeys must be prevented by good hygiene and isolation of affected cases.

d) Protozoal Skin Disease

1. *Besnoitiosis*

In the relevant geographical areas a diffuse scaling dermatitis may be caused by *Besnoitia* spp., protozoa. The changes are typically non-specific but the histopathology is distinctive.

2. Trypanosomiasis

Again this is a geographically restricted condition and persistent non-healing circular ulcers may be present. A direct smear of the squeezed exudate from the lesion usually reveals large numbers of the parasites (usually *T. brucei*).

3. Histoplasmosis

Cutaneous and nasolacrimal histoplasmosis usually/invariably due to *Histoplasma farciminosum* occurs in donkeys. In both cases there is ulceration and granulation tissue proliferation. The infection is spread directly from animal to animal and by vector contact. For the most part the condition is highly (if slowly) progressive with involvement in particular of crinoid skin (such as the region of the hocks and hind legs). The resulting response causes local exudation and thickening with secondary changes such as the obstruction (or even destruction) of the nasolacrimal duct. Secondary bacterial infection and even *Habronema* infestation can occur. Probably the commonest sites for this condition in the donkey are within the conjunctiva and nasolacrimal duct.

e) Parasitic Skin Disease

1. Chorioptic Mange/other Mite Infestations

Chorioptes spp. commonly infest donkeys over winter months in particular and although pruritus is a prominent sign it can be almost insignificant. In heavy infestations there may be severe self-trauma and in some cases a hypersensitivity response develops in which the extent of cutaneous inflammation is far worse than the condition warrants. This is a true hypersensitivity but it is unclear to what the skin is reacting.



Figure 13. Typical moth eaten appearance of a donkey with a severe mite infestation - To view this image in full size go to the IVIS website at www.ivis.org . -



Figure 14a. Forage Mite - To view this image in full size go to the IVIS website at www.ivis.org . -



Figure 14b. *Dermanyssus galinae* - To view this image in full size go to the IVIS website at www.ivis.org . -



Figure 14c. *Chorioptes equi* - To view this image in full size go to the IVIS website at www.ivis.org . -



Figure 15. Self inflicted skin trauma as a result of *Chorioptes* infestation. A similar self trauma could be caused by several conditions and biopsy of such a site is not usually diagnostically helpful. It is far better to obtain groomings and brushings from the wider region and examine for the presence of ectoparasites. In this way it is possible to harvest a few mites from a large area. If *Sarcoptes scabiei* or *Demodex* spp. are suspected then deep skin scrapings or biopsy may help. - To view this image in full size go to the IVIS website at www.ivis.org . -

2. Pediculosis

Lice are common in donkeys in the UK but are actually rare in more extensive management systems. Both biting (*Damalinia* spp.) and sucking (*Haematopinus* spp.) lice occur in donkeys.

Lice tend to be moderately species specific and it is not clear if these are the same species that affect horses. In both infestations, pruritus may be seen and although it may be mild, the donkey may develop a moth eaten appearance without marked pruritus. Where pruritus is present it is usually worse in warm weather and because lice infestations are most prevalent in late winter and early spring the coat alterations are usually obvious. Secondary infections are common in the Hematocrits skin but will usually involve opportunistic pathogens rather than severe skin pathogens.



Figure 16. *Haematopinus asini*. - To view this image in full size go to the IVIS website at www.ivis.org . -



Figure 17. *Damalinia equi*. - To view this image in full size go to the IVIS website at www.ivis.org . -

3. Habronemiasis

Habronema musca infestation of wounds is a possible complication of healing in some parts of the world. It is rare in the UK and no cases have been recorded here yet in the author's knowledge.

4. Ticks

Ticks are a serious problem in some parts of the world and can carry significant infections such as *Babesia*.

Summary

Skin disease in donkeys is a poorly described speciality. Donkeys are liable to the full range of infectious and non-infectious diseases but under most natural conditions they remain remarkably free of skin disease. Traumatic injuries are a serious complication in many places and secondary infection of these injuries and other inflammatory disorders is common. The robust and uncomplaining character of most donkeys means that many skin diseases are presented late in the course and the number of therapeutic agents that can be used is small and so there are major problems. For the most part the philosophy should be to limit medication to the directly effective medications and try to restore the skin to a more natural condition by appropriate management.

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