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Review Article

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A review on assessment of cause and management of wound in donkey

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Abstract

Donkeys are subjected to different welfare problems in rural and urban areas, even though they have a crucial role in day to day activity. Among the welfare issues of donkeys overloading and inadequate access to feed or health care facilities are the most common problems. Moreover, they are exposed to long working hours with little rest, poor husbandry, lameness, poorly designed harnesses, severely tethered or hobbled, cruel training methods, lack of shade, lack of water, inhumane handling, heat stress, inhumane disposal when old or worn out. Donkeys provide invaluable support for the livelihoods of communities. However, there is limited information regarding donkey welfare issues in Ethiopia. Wounds in working donkeys are seen on the leg, girth, tail, saddle and wither regions. These wounds are often caused by a combination of poorly fitting and designed tack or harnesses, beating with sticks and improper management practices. One approach to decrease the prevalence of wounds is through educations of donkey users. Ethiopian farmers have themselves identified a need for greater knowledge through training. There is almost no published work available on causes of wounds and their management practice by local communities in several areas in Ethiopia. The objective of this paper was, therefore, to assess the causes of wound injuries and their management practices and the scope of use of traditional treatment of injured donkeys and mules.

Keywords: Ethiopia, Donkey, Wound

Introduction

The world donkey population estimated is about 44 million; half is found in Asia, just over one quarter in Africa and the rest mainly in Latin America (The Brooke, 2007). Ethiopia has about 6.75 million donkeys or 32% of all the donkeys in Africa and 10% of the world population. Although donkeys are found in all the ecological zones of the country (arid to alpine) the majority are found in the highlands (CSA, 2010/11; Strakey and Fielding, 1997). Specific to Amhara National Regional State there are 2 million donkeys, 124 thousand mules and 300 thousand horses. There are about 11 donkeys per square km of land or one donkey for every two households in

the community. This ratio is much higher in the rural community, with three donkeys per every five household (CSA, 2012/13).

In Ethiopia, the majority of donkeys are found in highland areas, even though they are widely distributed in all agro-ecological zones of the country widely distributed in the dry and mountainous areas. In all zones of Ethiopia, donkeys are primarily used as pack animals. The low level of development of the road transport network and the rough terrain of the country makes the donkey the most valuable pack animal under the smallholder farming systems of Ethiopia (Strakey and Fielding, 1997). It is known that donkeys often are involved in multipurpose activities and help in transporting goods to and from markets, farms, and shops, traveling long distances. They also pull carts carrying heavy loads 3 to 4 times their body weight. They work from 4 to 12 hours/day, depending on the season and type of work. The increasing human population, demands for transport of goods to and from far, remote areas, and construction activities around towns are making equines highly demanded animals (Biffa and Woldemeskel, 2006).

Despite their use, the husbandry practices of working equines especially of donkeys are poor (Mekuria *et al.*, 2013). Unlike horses, donkeys are not provided with feed supplements. Feed shortage and disease are the major constraints to productivity and work performance of equines. They are brutally treated, made to work overtime without adequate feed or health care indicating their poor welfare status (Biffa and Woldemeskel, 2006).

The animal welfare is being compromised internationally due to several constraints such as poverty and lack of knowledge. Research conducted in Ethiopia demonstrated that improvements in the welfare of donkeys had significantly improved their work output which in turn improved livelihood situations of the poorest communities in the rural and peri-urban areas. The welfare of working donkeys in developing countries is therefore crucially important, not only for the health and survival of those animals, but also for the livelihoods of those people dependent on them. Though donkeys provide several advantages, health and welfare is a visible problem, and most of the animal owners are not even aware of animal welfare and management practices; as a result animals have to undergo significant suffering due to improper husbandry practices. Studies to elucidate the magnitude of this problem are lacking. Such information would be useful for designing strategies that would help improve donkey health and welfare (Mekuria *et al.*, 2013; Biffa and Woldemeskel, 2006).

Wounds are one of the primary welfare concerns of working equids (Sells *et al.*, 2010).Wound is an open mechanical injury of the skin (epidermis), underlying tissues and organs. It is characterized by pain, gaping, bleeding and functional disturbance (Drug Administration and Control Authority of Ethiopia, 2006). The type of wound in working donkeys includes tissue damage with or without blood/exudates/ pus, abscess formation, or any secondary bacterial complication. Bites (lacerated wounds) will be identified by irregular edges with underlying tissues removed as well as hemorrhage (Svendsen, 1997). The most common cause of these wounds in working equine are over loading, improper position of load predisposing to falling, beating of donkeys, hyena bites, donkey bites, injuries inflicted by horned Zebu (DACA, 2006). Some hobbling methods, inappropriate harnesses or yokes that may be heavy and ragged, long working hours may cause discomfort and inflict wounds (Mekuria *et al.*, 2013). However, studies on equine wound in general and donkeys in particular were not found enough to put the exact picture to its prevalence and damaging effect in Ethiopia. Therefore, the aim of this review is to assess the cause and management of wound in donkey.

Literature review

Definition of Wound

Wound can be described as damage or harm caused to the structure of the body by an external

or internal force which may be physical or chemical in nature (Owen *et al.*, 2012).Wounds can be accidental, due to violence, or iatrogenetically caused by surgeons. All wounds differ in degree, but nature of the wound is the same. A wound may be open, i.e. a break in the skin, or closed (Slatter, 2002). The donkey is liable to skin injury through its relatively exposed limbs and circumstances of its management (Svendsen, 2008).Wounds is one of the commonest health concerns to afflict working donkeys in many countries (Stringer *et al*., 2011).

Classification of Wound

There is no inclusive classification for wound. But, wounds have been classified according to various criteria: anatomical localization (distal limb, carpus or tarsus, proximal limb, rump, head or neck) where Tesfaye and Curran (2005) have indicated back sore as commonly observed incident in donkeys of Ethiopia; time elapsed before presentation (<12 h, 12–24 h, >24 h, unknown); degree of contamination (subjective score on macroscopic appearance); depth (deepest point of the wound, i.e. skin, subcutis, muscle, periosteum, bone) and complications (open synovial cavities, lacerated or ruptured tendons). Limb wounds were defined as wounds located on the carpus, tarsus or distal limbs (Wilmink *et al.*, 2002). Although closed wound may not have disruption of the skin, underling tissue may be severely damaged by disruption of blood supply. Open wound may be further classified by duration and degree of contamination and by the cause and depth of the tissue (Waldron and Pope, 2002).

Causes of Wound

The majority of wounds on Equines in developing countries are as a result of manmade causes, which is in contrast to the majority of wounds on equines in developed countries that are predominantly due to accidental injury. Wounds in working donkeys are seen on the legs, girth, tail, saddle and wither regions (Pritchard *et al*., 2005; Sells *et al*., 2009). These wounds are often caused by a combination of poorly fitting and designed tack or harnesses (badly fitted saddles, collars, hobbles and girths), beating with sticks, donkey bites and improper management practices which include over loading, improper position of load predisposing to falling, hyena bites and injuries inflicted by horned Zebu due to improper housing (DACA, 2006; Curran *et al*., 2005; Pearson *et al*., 2003).

A properly designed, well-fitted and comfortable harness allows the working animal to pull the equipment to the best of its ability without risk of injuries. A poorly designed or ill-fitted harness can cause inefficient transfer of power from the animal to the implement, and fatigue, discomfort or injury to the animal (Pearson *et al*., 2003). A badly fitted saddle will result in saddle sores and an ill fitted girth results in development girth galls. The hair will be rubbed off and a wound develops, which will become infected.

Biffa and Woldemeskel (2006) and Yilma *et al.*, (1991) suggested wounds in working equines of Ethiopia are mainly predisposed and caused by inappropriate harnessing. Over working and over loading in the donkeys have been reported to be the next leading causes of injury (Mekuria *et al.*, 2013).The high prevalence of infection-related injuries in donkeys suggests the microbial pathogens as either primary or secondary causes, A higher number of donkeys with lacerated wounds due to bite, and damages caused by barbed wire and other sharp objects were also reported to be common causes of lesions in donkeys in central Ethiopia (Biffa and Woldemeskel, 2006; Svendsen, 1997 and Bojia, 1996).

Wound Management

Management and care for donkeys seems to many people to be unnecessary as donkeys are one of the few domesticated animals that appear to do rather well with minimal management (Pearson et al., 1997). Wounds are one of the primary welfare concerns of working equids. Wound is most common health problems of working donkeys in developing countries (Atawalna et al., 2015). Anatomical knowledge is possibly the most important single aspect of wound management in

donkeys. Many problematic wounds have recognizable anatomical complication that could have perhaps been fore seen at the outset (Svendsen, 2008).

The primary objective of wound management should be to encourage rapid progression from acute inflammation to repair without intervention of chronic inflammation which is a significant factor in the pathophysiology of wound healing failure. Wounds fail to heal because there is disruption of the normal delicate balance of growth factors and inflammatory mediators. Wounds should be managed in such a way as to restore the balance of healing processes without damaging any of the cells involved in healing (Knottenbelt, 2003)

Restraining

Restraining makes initial assessment and subsequent procedures far easier (Svendsen, 2008). Any wound in difficult equines and difficult wounds in any equines are best examined with the aid of analgesia of the wound and/or sedation of the equines. In some cases, general anaesthesia is warranted (Caron, 1992).

Preparation of wound for detailed examination

Once the patient is adequately restrained, steps should be taken to minimize the risk of introducing or spreading contamination during detailed examination (Harrison, 1994).

Clipping and shaving the surrounding skin and hair is a source of contamination and adherent debris can obscure wound edges (Caron, 1992). Chemical disinfectants Some surgical scrub solutions have been shown to be cytotoxic and their use in exposed wounds is technically contra-indicated, However, the handling of a wounded area should be considered and disinfection of the skin is necessary (Stashak, 1991).

Cleansing of wound

All wounds should be de-bulked of contaminants and devitalized tissue as thoroughly as possible, regardless of subsequent management. Soil, a common contaminant of equine wounds, has been shown to contain 'infection potentiating factors as well as micro-organisms (Stashak, 1991).Initially irrigation should be performed using a directed jet of fluid under pressure. Washing with wet sponges or low pressure delivery systems do not remove adherent particles or bacteria (Phillips, 1995).

Irrigation will not be fully effective at removing ingrained contaminants nor devitalized tissue. The continued presence of either impairs leucocyte function and promotes an anaerobic environment so impeding wound healing. Additional debridement is therefore mandatory and may be achieved by enzymatic or surgical means. The recently rejuvenated practice of applying maggots to a wound is based on the efficacy of their enzymatic secretions at digesting devitalized tissues (Stashak, 1991; Knottenbelt, 2003).

Dressing and bandaging of the wound

Coverings are wholly advantageous to wound healing; the only disadvantages concern cost and difficult application to proximal limb wounds. Benefits Include: Protection from trauma and contamination, Counter pressure to minimize swelling and fluid accumulation, immobilization, Pain relief and increased temperature and local CO_2, which decreases pH thereby enhancing oxygen dissociation from haemoglobin (Phillips, 1995).

Medication of the wound

It is generally best not to disturb the natural repair process by treating wounds with chemicals which may have as many deleterious effects as beneficial ones (Harrison,1994). In the early stages of wound management counter irritants, corticosteroids, antiseptics and all oil-based ointments should be avoided. Water soluble antimicrobial preparations may be an appropriate adjunct for dressing heavily contaminated or infected wounds. Systemically a broad spectrum regimen is then appropriate and bactericidal drugs are preferable. The contribution of anaerobic

infection in complicated wounds may also need to be considered (Phillips, 1995).Tetanus vaccination/antitoxin should be ensured in all cases of wounding (Svendsen, 2008).

The major constraints in the management of wounds in donkeys are the need to examine and treat wounds within the first few hours after wounding occurs. The second limiting factor is that, under many practical circumstances, the working donkeys cannot be rested or hospitalized (Knottenbelt, 2003). A combination of necessity, poverty and ignorance means that many wounds presented long after the acute stages. Once complicating factors are presented, then the wound may pass into a continuing cycle of chronic inflammation and failure to heal as a result. Management becomes problematic and need for intensive treatment increases (Svendsen, 2008).

Wound Healing

It has been demonstrated in several mammalian species that the successful healing of full thickness skin deficits relies on two mechanisms, epithelialization and wound contraction (Wilmink *et al.*, 1999).

Epithelialization comprises the multiplication of epidermal cells situated around the wound periphery followed by their subsequent migration inwards across the wound bed (Knottenbelt, 2003). Epithelialization in full thickness wounds is invariably accompanied by the laying down of scar tissue. The latter is composed of inelastic, non refractile bundles of collagen tissue and is devoid of nervous tissue, sweat glands, sebaceous glands and hair follicles. It becomes relatively avascular as it matures (Wilmink *et al.*, 2001).A feature that contributes to the production of an extremely fragile overlying epidermis. Furthermore, the strength of newly formed scar tissue has been found to be extremely low when compared with normal skin making it very susceptible to subsequent trauma (Wilmink *et al.*, 2002).

The second factor involved in wound healing, wound contraction, has been defined as the process whereby the skin, both dermis and epidermis, bordering a full thickness skin deficit is drawn from all sides centripetally over the exposed wound bed during the early stages of repair (Hendrickson and Virgin, 2005). Wound contraction constitutes an extremely valuable factor in successful wound closure, as it effectively reduces the overall area of skin deficit, and thus the final volume of scar tissue, by using cutaneous tissue possessing a normal complement of nervous, glandular, follicular and vascular components (Wilmink *et al.*, 2002).

The rate and outcome of wound healing are determined by many factors, some of which are already in effect when the equine is first presented to the veterinarian. A thorough understanding of wound healing principles, coupled with clear client communication, should enable the practitioner to minimize the number of additional factors that may exacerbate the initial situation (Hendrickson and Virgin, 2005).

According to Svendsen (2008) some significant local factors that inhibit healing include: Excessive tension in margins of wound (often due to incorrect suturing techniques), Accumulated exudates (dead space) pocketing, pH variation (usually alkaline). Ideally the pH of a wound should be around normal physiological pH or very slightly acidic (between pH 6.5 and 7.0). Alteration of the pH of a wound site is often a consequence of infection or wound dressing or solution, Poor surface oxygenation (often due to abnormal biofilms over the wound site that reduce surface gas exchange), Low or high temperature and Low humidity(desiccation) or over hydration (maceration).

Conclusion and Recommendation

Care of equine wounds in the field can be a challenging endeavor. Many times, wound care is complicated by chronicity or by prior inappropriate care in addition to the great degree of tissue trauma that occurred when the horse was

wounded. Recognizing involvement of synovial structures, loss of skin and damage to bone are critical in the initial examination of wounds and will guide future care. Education of clients is also important in that preparing them for possible outcomes during healing may help improve compliance and proper treatment of wound. Owners and trainers often perform much of the daily care and monitoring of equine wounds and thus can greatly assist or impede the progress. The practitioner that improves and utilizes his or her understanding of the wound-healing process in concert with his or her knowledge of local anatomy will be the one who is best equipped to care for wounds in ambulatory practice. In line with the above conclusion the following recommendations were forwarded:

- ✓ Continuous awareness creations to donkey owners on proper management and handling of donkeys should be in place.
- ✓ A comprehensive approach targeting the improvement of welfare of working equids should be given priority by stakeholders
- ✓ Further and detailed investigations on equines are required to be done to having a wider scope able to mitigate the problems on time.

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