Veterinary Research Trip, November 2007 – February 2008, Morocco

Upon graduation from Liverpool Vet School in July 2007, I promised myself to make a real effort in helping the situation of equine suffering in the developing world. I set to work to earn funds to buy a motorbike and equipment in order to carry out a sponsored motorbike ride to Morocco, by working in rural mixed practice in North Wales for 4 months. During this period I wrote to every licensed veterinary pharmaceutical company in the UK offering them company sponsorship, set up a fundraising website, published posters and fliers for general distribution (kindly donated by Perspectives Photographics Ltd), and attracted articles about the cause in various publications, both veterinary and non-veterinary.

Left: Saying farewell to Professor Derek Knottenbelt, Chairman of the Society for the Protection of Animals Abroad (SPANA), at Leahurst Equine Hospital, on a freezing November morning.

By the time I rode out of Leahurst on Monday 19th November I had company sponsorship from BCF Imaging, Veterinary Endoscopy Services (VES), ProPlan and Bimeda. The combined funds raised in money and equipment for SPANA totaled over £10,000. Notably, BCF Imaging donated an ultrasound scanner, and VES an electric tooth rasp.

The trip also attracted the BVA/TAWS Travel Grant, the UFAW Research Grant and the BEVA Trust Award.

After suffering serious weather conditions for the first four days, a breakdown in France, and black ice in the Pyrenees I began to see why people had thought me naive to attempt this trip in Winter, having only just passed my test! However after much adventure, and against the odds I arrived in Marrakech after eleven days in one piece, and was welcomed heartily into the SPANA refuge. This was the first of three hospitals in which I would work as a volunteer vet, helping under the supervision of the resident Moroccan vets.

I found the day to day work extremely rewarding. Being part of the veterinary team, I was encouraged to take responsibility for cases as they came in and carry out initial work-ups. At the Midelt and Khemmiset refuges I was sometimes the only vet present when a case came in. Although obliged to contact the vet in charge before carrying out any major procedures, being in this situation forced me to have self-confidence and practice decision-making. Sometimes I was confronted with something I'd never even read about before, much less seen in my initial mixed practice months. This forced me to go back to first principles, to take a logical, systematic approach to the clinical investigation. The shortage of diagnostic options at the smaller refuges also reinforced the importance of a thorough clinical work-up.

Whilst working at the clinics I was able to develop a number of skills. My command of the French language improved considerably, and I made an effort to learn basic Arabic and Berber. In the remote regions this was a necessity, as English (and often French) was not spoken.

I took advantage of the highly experienced SPANA technicians to learn the skills of farriery and dentistry, both of which are much needed vocations in the clinics. Due to a combination of poverty and ignorance these basic needs are often overlooked by the owners of working equids in Morocco. A high proportion of mature animals seen at the clinics (for whatever reason) were in need of foot trimming, tooth rasping, or both.

Right: working out in the souq, or market, with the mobile SPANA clinic. Lame animals with chronic horn overgrowth and hoof imbalances were not uncommon presentations. The inevitable 'long toe' of a neglected foot creates a fulcrum point that ultimately leads to chronic flexor tendonitis. These cases tend to respond to corrective trimming as a first line of treatment, but owner compliance is essential for ongoing management.

Left: working in the Marrakech SPANA Hospital. Hospitalisation of cases gave us a chance to keep on top of the inpatients' feet and teeth.

Just as lameness was frequently a result of neglected feet, emaciation and anorexia were often a result of neglected teeth.

Another valuable skill I was able to develop was that of wound management. A combination of over-working and inappropriate harnessing was responsible for a high incidence of chronic wounds in patients seen at the clinics. Animals with acute wounds were also frequently presented, usually due to working in close proximity with motorized traffic.

Right: Standing in front of the Midelt refuge with the SPANA team. Dr Hassan is holding the electric tooth rasp kindly donated by VES. Philipa the mule is loaned by SPANA to owners of hospitalized animals so that they can continue to make a living. I am holding Tajine, an abandoned puppy I took from Marrakech to Midelt on the bike. Tajine is now the Midelt guard-dog, and his story provides a valuable learning topic for the visiting school-children each week.

Left: A typical example of chronic harness wounds. This animal presented with exhaustion and emaciation after chronic blood loss from the deep 'Mal de Garrot' (withers) lesion.

Right: After just 10 days of appropriate wound management a visible improvement was appreciated. The tissue deficit has been filled with granulation tissue.

Whilst working at the clinics I was also able to develop my surgical skills, thanks to the encouragement and expertise of the resident Moroccan vets. Operations of note included carrying out my first castration on a mule, removing a 4kg testicular tumour from a donkey, and repairing an umbilical hernia in a mule foal. The photos below show a typical case of 'taxi trauma', requiring general anaesthesia for repair. I was lucky enough to get plenty of experience in dealing with these acute trauma cases.

Programmes I took part in outside my normal veterinary responsibilities included the Imlil Mule Initiative (incentive-based monitoring and treatment of animals) in the mountains above Marrakech, and the Worming Programme around Khemisett.

Left: dosing a donkey with fenbendazole near Khemisett. In three days we wormed nearly 1400 equids, with the help of dosing guns designed for use in livestock.

Based in Midelt, in the Northern High Atlas, and in partnership with the SPANA vet Dr Hassan, I carried out a research project on pack wounds. The survey was a longitudinal study analysing a population of mules and donkeys used in the wood trade in the region. The main objective variables investigated included:

- signalment of animal (species, age, sex, girth, body length)
- weight of load
- dimensions and features of the pack (berdaa)
- location of associated lesion
- severity of lesion

Data on many other subjective variables were collected using a questionnaire. This involved a translator (SPANA technician) interrogating the owner in Arabic or Berber, asking the distance travelled each day, frequency of work, details of feeding and watering, problems encountered when working, and so on.

By including control populations in the survey it was possible to control for the effect of the study region, and of course, for the effect of the wood trade. Control population 1 consisted of animals in the study area not involved in the wood trade. Control population 2 consisted of pack-carrying animals in the central lowlands of Morocco (Khemisett region), not involved in the wood trade. In total, 147 animals were involved in the study.

Right: Weighing wood loads in the headlights of the SPANA van. The project had to be conducted either at night or at dawn, as the wood trade is illegal. The wood collectors face serious reparations if they are caught by the Forest Guardians. Tracking down these men with their caravans of animals proved to be a serious task in itself.

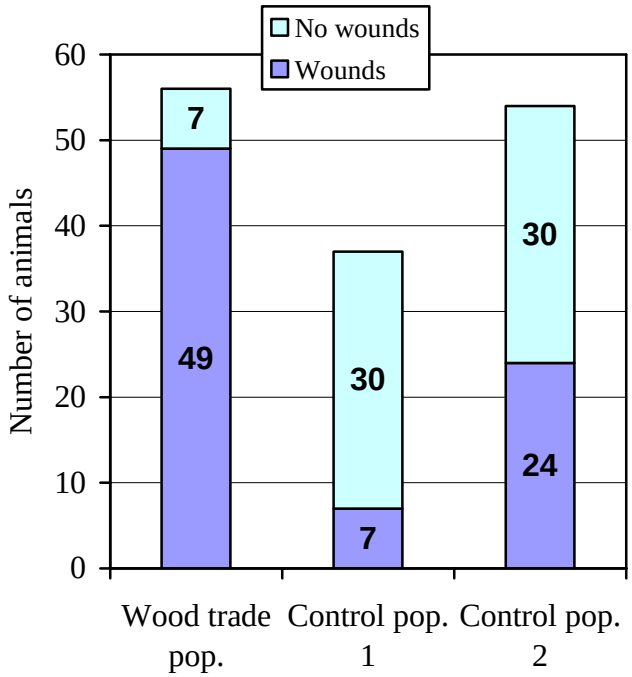


Fig. 1: A graph showing the total number of animals with and without pack wounds in each group.

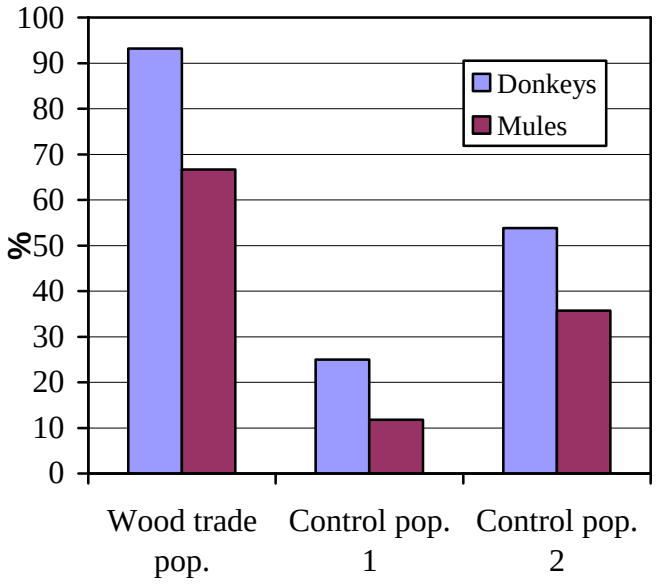
The chi square test showed that the difference between the wood trade population and each control population was statistically significant (both $P<0.0001$). In both analyses, confidence intervals did not overlap, supporting the significance of these results.

The difference between the control populations was not found to be statistically significant, ($P>0.05$, overlap of confidence intervals).

Calculation of Relative Risk showed that animals working in the wood trade in the Northern High Atlas region are 4.6 times more likely to suffer pack wounds than animals working in the same region outside the wood trade, and 2.0 times more likely than pack-bearing animals working in the agricultural lowlands.

Fig. 2: A graph showing the percentage of donkeys and mules in each group with pack wounds.

This graph illustrates how in the study, the prevalence of pack wounds appears consistently higher in donkeys than in mules, however statistical analysis showed that these differences were not significant ($P>0.05$, overlap of confidence intervals).



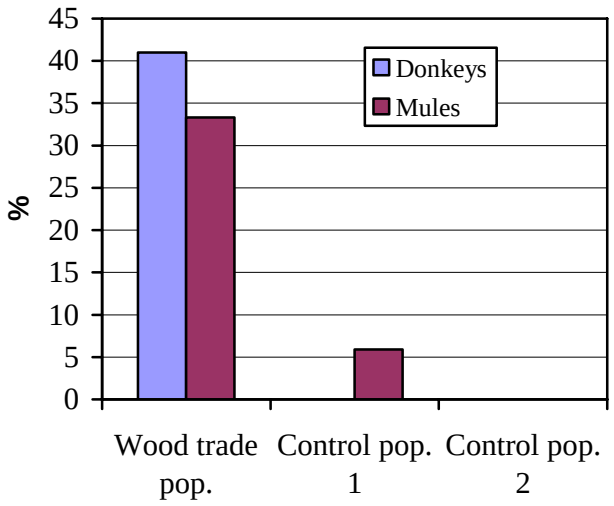


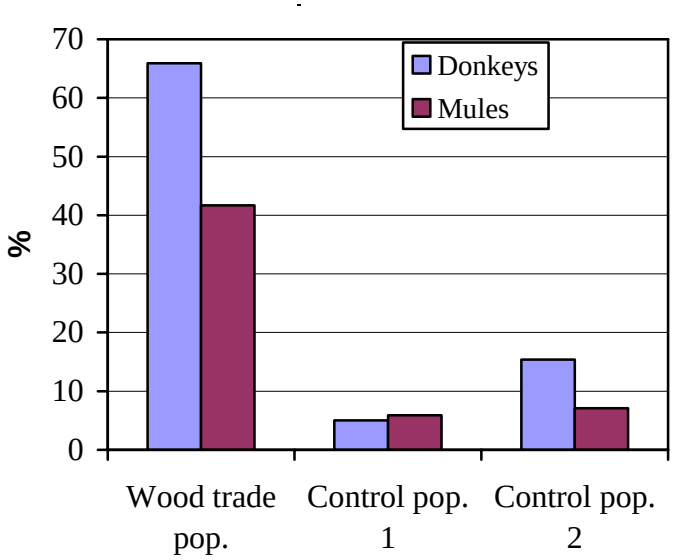
Fig. 3: A graph showing the percentage of animals with wounds penetrating to the subcutis (Grade 2).

Statistical analysis showed that the differences in prevalence of Grade 2 wounds between the wood trade population and each control populations were statistically highly significant ($P<0.0001$, no overlap of confidence intervals).

No significant difference was found between donkeys and mules within populations.

Fig. 4: A graph showing the percentage of animals with wounds showing signs of infection (inflammation and/or exudation).

Again statistical analysis showed that the differences in prevalence of infected wounds between the wood trade population and each control populations were statistically highly significant ($P<0.0001$, no overlap of confidence intervals), whilst no significant difference was found between donkeys and mules within populations.



The data gathered also included detailed maps of the location and severity of pack wounds. The dataset has been shared with the Leahurst Epidemiology Department (University of Liverpool) in order to calculate risk factors for the various locations of pack wounds. The likely output from this exercise therefore, having identified that there is indeed a serious problem in this population, will comprise an advisory report highlighting risk factors for pack wounds, and possibly for specific locations of pack wounds. This information may then be used to formulate an intervention strategy. Good

scientific method would then dictate that this intervention strategy be monitored and appraised in an ongoing fashion.

Finally, my impressions on one particular welfare problem that became apparent during my time in Morocco, specifically at the Marrakech hospital: perhaps the most shocking injuries seen at the refuge, (even to desensitised veterinary eyes) are the chronic 'Mal de Garrot' wounds - open sores on the withers, caused by the ‘top-pad’ of the traditional draught harness. These wounds often penetrate to underlying muscle layers due to their chronicity. These cases are frequently so debilitating as to require hospitalisation. Out of all the categories of inpatients, it was apparent that these 'Mal de Garrot' cases were hospitalised for longer periods of time, and were a significant drain on over-stretched resources. This is because epithelialisation can take months to occur in severe, chronic wounds, especially in older animals. Discussions with the staff at the refuge informed me that this specific type of wound is one of the most frustrating to deal with - the patient must be kept in even in the later healing stages (at great cost) because owners often return the animal to work immediately (despite contrary advice), thus perpetuating a vicious cycle.

Before I left for Morocco I took the opportunity to attend a workshop at Holme Lacey Agricultural College, organised by TAWS, on Harnessing Methods in the Developing World. Encouraged by the work of various groups I then spent half a day with Master Harness Maker Terry Davis, to learn more about the principles of harnessing methods. After two hours with Terry I was equipped with a basic understanding of the mechanics of draught harness.

After cleaning up one 'Mal de Garrot' outpatient at the refuge (the owner was not in a financial position to allow the animal to be hospitalised), I decided to use this basic knowledge to try to resolve the animal's predicament. With a technician acting as translator we went outside to where the owner's cart was parked, the standard 4-wheel design of around a tonne of welded steel (left). The owner was keen and receptive to my suggestions, which were based on the principles of draught that I had learned.

- Weight distribution – we used a squashed up wound do-nut on either side of the withers to lift the top-pad off the chronic wound. The owner immediately set about stitching these into the pad.

- Transmission of draught – we tightened the traces from the breast collar to the cart, and moved their point of attachment down to the level of the axle. This meant that the line of draught passed closer to the animal's centre of gravity, thus making the harness much more efficient (easier for the mule!).

I think this case exemplifies how easy it can be to improve harness design armed with the basics of knowledge of draught mechanics. The 'wound do-nuts' are an innovative and often effective intervention, but by no means address the cause of the problem. In my opinion a large percentage of these cases are preventable by education and basic training. Even when vets or technicians attempt to rectify an obvious perpetuation, they are not equipped with the simple knowledge required to tackle the mechanics of draught harness.

An obvious intervention strategy, in my opinion, would be to employ a harness expert willing and experienced in this field, to deliver a similar basic training as I received, to the SPANA staff. Staff could then be encouraged to take an active role in harness assessment and improvement when patients visit the refuge, or are seen in the souq.

Future research projects investigating the risk factors for 'Mal de Garrot' would be extremely useful in addressing the problem scientifically, and an obvious advancement in the welfare of working equids in Marrakech.

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