**Harry Steele-Bodger Memorial Scholarship**

Veterinary surgeons are no longer the persons in charge of the care of cattle's feet in the U.K. The farmer, farm personnel and in some herds a lay trimmer has taken over this role.

We have largely been superseded due to economics, but also because farm workers and para-professionals, have increased in knowledge, skill and possess up to date equipment. However the national incidence rate remains alarmingly high:
38% (4-69%); (Kossaibati & Esselmont, 1999)
55% (11-170%); Clarkson et al, 1996)
69%(32-112%); (Hedges et al, 2001).

I applied for the travel award to try and look at new thoughts and ideas on the pathogenesis of claw diseases and how veterinary intervention could help to reduce the problem. I travelled to Zurich in Switzerland, where I spent time with Drs Pete Ossent and Karl Nuss and Skara, Sweden where I learnt from Drs T. Manskse and C. Bergsten.

**Zurich**

Pete Ossent developed a simple but very useful procedure for post mortem examination of hooves. Most techniques relied on sagittal plane examination of hooves, but by heating feet in a water bath for 40-60 minutes the horn shoe can easily be removed, enabling better access to gross and histo-pathological examination.

This enabled Ossent and his colleague Christoph Lischer to further study the pathogenesis of bovine laminitis, (Ossent and Lischer 1998).

By practising the technique, reading the literature and with the help of Pete I gained a deeper understanding of lesions I commonly encounter.

Solar ulcers remain by far the most common non-infectious cause of lameness in the U.K. Recently they have published work, which may help identify the reason why they occur, (Lischer et al 2002).

In solar ulcers the sinkage of the third phalanx is associated with abnormal load, whether it be to poor conformation, overgrowth etc. Pete originally speculated the sinkage of the phalanx could be due to circulatory disturbances in the corium. It was also found that the connective tissue holding the third phalanx weakens around calving (Tarlton and Webster 2000). The Zurich group then looked at the elastic properties of the collagen that hold the third phalanx. They postulated that the excessive elasticity of the suspensory apparatus around calving could enable contusion of the corium via the third phalanx and thus lead to an ulcer. Uneven load due to overgrowth, gait abnormality etc would further exacerbate this.

Between the third phalanx and the corium there is a digital adipose cushions. Although it had been described anatomically, Ossent and Lischer highlighted its role in the pathogenesis of ulcers. The heel cushions are arranged in three parallel fat cylinders: axial, abaxial and central. Akin to the triple cushioning that is found in a running shoe. The cushions in those with ulcers were found to have less adipose tissue. Once the adipose tissue is lost/damaged it is replaced with connective tissue. Heifers have less well-developed fat cushions than older cows. This would further support observations that solar ulcers commonly reccur and heifers that become lame are more at risk from lameness in subsequent lactations.

I think there is a lot of potential work, which could be done to look at the role of the fat pad in bovine lameness. Particularly with diet, floor surfaces and body condition.

A lot of studies were also done at Zurich showing the strong relationship between metabolic parameters and vitamin status with healing of solar ulcers. The work further supports the attention to detail that is required for the diet of the high yielding cow.

I was very impressed with the novel ideas and approaches the group has taken into looking at claw diseases. Especially as the Brown Swiss, (the primary breed) is well known for being "good on their feet".

Their treatment of the individual cow was much more emphasised at the university, compared to the U.K. or other countries with larger dairy herds. The smaller herd size, and better economics, within the Swiss dairy industry could explain this.

I got the chance to attend and help in numerous operations in the hospital, e.g. a rumenotomy, digit amputation, treatment of fractures, wounds etc. The sepsis and care would be of the standard used in equine hospitals here.

Interestingly many of their cases consisted of cows brought in which had effectively fell down a mountain, it was not uncommon to have cows rescued by helicopters after they had rolled down one of the Alps. Therefore mandibular and lower limb fracture fixations were commonplace.

Dr Karl Nuss was the main Food Animal surgeon at Zurich and he also had a strong interest in bovine lameness and has published widely on the subject, particularly regarding digit amputation. Karl had only recently joined the faculty, after coming from Berlin, where they had made an interesting finding which had caused much discussion within the foot trimming world, (Paulus and Nuss 2002).

It has been known for over a century that the lateral hind claw is affected by ulcers and “laminitis related” lesions more frequently than other claws. Many different theories have been proposed mainly related to mechanical overload and leg abduction due to pregnancy and udder size. Nuss and his colleague found that after corrective trimming the lateral claw reaches further distal than the medial. It had been previously reported that the digital bones were the same size (Ranft 1936).

This led the group to hypothesise that the difference may lie in the metatarsal condyles. The opposite occurs in the foreleg where the medial metacarpal condyle is longer They have just published work (Nacambo at al 2004) where they looked at and found significant differences in the length of the metatarsal condyles in calves (up to approximately 2mm), claw sizes were also larger. As calves are smaller the differences are obviously less pronounced, it will be interesting when they extrapolate this work to adult cows.

Another postgraduate student looked at the gait of heifers on a treadmill. It was found that the lateral hind claw always hit the ground first, in comparison with the medial hind claw, (Meyer at al 2004).

This is a major finding in explaining the occurrence of lesions on lateral hind claws. It has also implications in the school of thought of claw trimmers.

In functional or Dutch foot trimming the lateral claw is adjusted to the medial after the medial claw is pared for sole length, sole width, bulb length, bulb height, bulb width and sole surface area. Taking the findings into account questions arise as to the difference in that style of trimming as the animal ages.

Paulus and Nuss (2004) presented a paper highlighting these differences. They showed that the bulb height of the medial claw decreases with age and questioned whether we should take the bulb height of the lateral claw down to its level. They postulated the decrease of the medial bulb’s height is most likely due to the under-use, as the lateral claw would be taking most of the load. Trimming the bulb height of the lateral claw too low will result in it being more susceptible to heel horn erosion and digital dermatitis.

It indicates the need for regular trimming to stop the disparity becoming too large.

Pete Ossent also arranged for me to go out with one of the Faculty Veterinarians to investigate a Neospora problem. Although there was a language barrier, it was good to watch the way the veterinarian let the client vent his obvious frustration, instead of doing the talking first. The vet was partly funded by the state and specialised in infectious diseases, particularly Neospora. He mentioned that the areas near public areas, e.g. tourist areas, hunting lodges, etc had more of a problem with the disease. It was interesting that the client had moved his cattle to an area where a group met regularly to hunt with dogs.

He also introduced me to the unique way the Alps get used as communal tack grazing for the lowland herds in the summer months. This means it is one big open herd and creates a very different scenario for monitoring infectious diseases compared to our herds.

Towards the end of the week, Pete arranged for me to travel east to Chur. I stayed with a former colleague who used to work at Zurich, called Guolf Regi who had returned to Chur to run a mixed practice. I was very lucky to spend a few days with him; we went on a few calls, a couple of lame cows, a few fertility cases and some artificial insemination. Guolf told me that veterinarians do most of the A.I. work in Switzerland.

Guolf was a keen conservationist and fortunately my visit coincided with a meeting he had on Alp Flix, with a group set up interested in preserving the natural flora and fauna of the Alps.

They had just finished a study where they found many new species of plant and animal. We met with some of the researchers and visited a cheese making plant at the top of the Alp.

When we returned to Chur, Guolf toured me around a meat- processing factory, where he regularly carried out meat and facility inspection. The factory specialised in a local delicacy, a preserved beef, which cost over £35 per kilo! Interestingly the meat was imported from Brazil before processed.

Farmers in Switzerland are also worried about the future. In Chur I met three neighbours who were going into a partnership, moving all the milking to one farm and were going to have two out of three weekends off! A neighbouring, aged bachelor had also set up a deal with them, whereby his cows get milked in return for his land when he is too old to farm it. There was also a lot of concern over whether the government would uphold its support for the dairy farmer in the Alp regions. I had heard of one farmer who had a grant to build a shed for one cow!

**Sweden**

Thomas Manske had just finished his thesis on hoof lesions and lameness in Swedish dairy cattle. This was based on data gathered over two years with nearly 5000 cattle trimmed. The study found that most Swedish dairy cows had hoof lesions, however the majority did not always cause lameness. He looked at animal and herd factors. He found most hoof lesions increased with age (except white line and sole haemorrhages). High yielding cows were more at risk of solar ulcers; lameness increased in correlation with parity, and was highest in those calved 61-150 days.

He highlighted the importance solar ulcers had on fertility, cows which suffered from this lesion had a longer calving interval, lower first service to conception, lower over-all conception rate, increased services per pregnancy and higher cell counts.

By regular claw trimming he found the prevalence of solar ulcers and lameness can be decreased.

Sweden has reported one of the lowest incidence rates (4%) of lameness. Most herds in Sweden are trimmed twice a year and 76% employ a professional hoof trimmer, whereas in the U.K. it has been reported at 16%, although I would think this differs a lot from area to area.

I timed my visit to Skara with a course for hoof trimmers, veterinary and agricultural students. This initially involved a series of lectures about anatomy, lameness, and cow comfort. I did overlook the fact that I knew no Swedish whatsoever, but I gathered most of what was being talked about. I than spent a few days out on farm with the foot trimmers. About two-thirds of the trimming in Sweden is done with a mallet and blade, the rest with an electric grinder. Christer Bergsten, a well-known name in bovine lameness was also running the course with Thomas. I went out with each of them on the practical days and was learned a lot about their method of foot trimming. It was different to find that half of the hoof trimmers on the course were females; I do not think I have ever met a female trimmer in the U.K.

Around 70% of the farms are still tie-stall, with a similar story to the rest of Europe, where the cubicles or “losdrift” are increasing in popularity. Many of the tie-stall herds have rubber slats; it has been found that rubber helped a great deal with lameness in the national herd. Christer Bergsten has done a lot of work with flooring surfaces, cow comfort and lameness. He divides his working time between teaching and research at Skara and work for

the Swedish Dairy Association. The latter is a farmer -funded group looking into problems that affect the national herd. This has helped the Swedish dairy farmer become very aware of lameness prevention and control.

The recent transition from modern tie-stall to cubicle has put an interesting difference to our system. A lot of them are on slats, (although it exists digital dermatitis is not a problem in Scandinavia), and they have a feeding stall with rubber flooring. The cows step up onto a divided rubber floored feeding stall, this enables them to stand on a soft flooring, whilst keeping their feet cleaner, as the stall is short enough for the faeces to fall onto the slatted area.

I did not realise the advantages that rubber flooring had to offer. Concrete flooring wears down the walls and the overgrowth occurs at the sole rather than the toe. This is not as visually obvious, but it means the cow is taking more load on an area not designed for a high degree of load bearing. If a cow/heifer has minimal fat bodies for shock absorption, this must be magnified on concrete.

Rubber prevents the flattening of the soles and would potentially help in reducing lesions like solar ulcer. I have heard anecdotally, that people who lay down rubber strips for cows to walk on, find they congregate there when they are in oestrus. I would speculate that the firmer footing and less concussive forces when bulling, would give the animal more confidence to show natural oestrus behaviour.

Bergsten has recently done work on locomotion patterns, with a postgraduate (Telezhenko 2000); here they used a simple method of analysing the cow's gait on five different floor surfaces, with whitewash or imprints. The cows walked most naturally on sand and least on slatted concrete. Lame cows walked with shortened stride and step lengths although this would improve on better floor surfaces.

Thomas also arranged for me to spend a few days with a district veterinarian. The veterinary service had previously all been supplied by the State, but about a decade ago the veterinarians were given a choice of remaining with the State or being private.

The district veterinarians provided exactly the same service as private vets but were paid a set wage by the State. The fee fro call outs seemed to be astronomically expensive, although they were getting very little income from drug sales and there is no T.B.

In Scandinavia the antibiotic situation is totally different, no drugs are dispensed without seeing the animal first, even mastitis tubes. Every mastitis case was seen and cultured, *Staph aureus* positive cows were encouraged to be culled or milked in a different group. With this low usage they did not appear to have a sensitivity problem.

I was also impressed with the health status of the national herd. They had eradicated most of the infectious diseases, and had a lot of state support to eradicate the remaining ones, e.g. Salmonella, BVD etc. The national average was over 10000kg per year and they had a wealth of excellent epidemiological data relating to metabolic diseases and fertility.

**Summary**

As well as getting an in depth understanding of the pathogenesis of many of the common lameness associated lesions, I seen different systems, protocols and mind sets which help in it's prevention. More preventative trimming and softer floor surfaces will no doubt reduce our national herd's problem. The differences between farming, veterinary services and State support was striking, although each farmer I spoke with had the same fears and ideas of the future.

I have forged many new friendships and interests due to the scholarship, and I am very grateful to the Committee for agreeing to part-fund my travel.

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