

## **BEVA Trust Travel Scholarship**

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#### **Colorado State Arthroscopy Course**

##### **Introduction**

Modern equine orthopaedic surgery is dominated by diagnostic and surgical arthroscopy. The ability to make minimally invasive interventions in equine joints has transformed the practice of modern equine surgical practice. Arthroscopic techniques have replaced arthrotomy as the benchmark of patient care. Arthrotomy is generally associated with an unacceptable level of morbidity associated with the procedure and a much higher risk of infection. Surgical site infections in equine orthopaedic surgery have dramatically reduced with the introduction of minimally invasive techniques. Falling from around 10% to less than 1% using arthroscopy<sup>1,2</sup>. Since the late '70's, early '80's, diagnostic followed by arthroscopic assisted interventions have become increasingly accepted as the gold standard treatment for many equine joint conditions. The advances in equine arthroscopy have mirrored those of human surgery and now the majority of surgery involving synovial cavities are performed under endoscopic guidance. Arthroscopy is a challenging technique that requires considerable practice to master. Therefore, it is essential that anyone wishing to embark on a career of equine surgery is familiar with both the basic and advanced principles of equine diagnostic and surgical arthroscopy.

As a surgery resident undertaking a three-year programme at Rossdales Equine Hospital it is a strong recommendation of the European College of Veterinary Surgeons that all trainees attend an arthroscopy course. At Rossdales Equine Hospital we perform around 800 general anaesthetic surgeries a year. The many of which are

performed with the use of arthroscopic techniques. There are several arthroscopy courses held around the world. However, the one with the best reputation is undoubtedly the course held at Colorado State. This is the original course which has been held at the large animal veterinary medical teaching hospital at Colorado State University since the mid-80's. I travelled to Fort Collins in Colorado where the annual basic and advanced arthroscopy courses were held on the 4<sup>th</sup> to the 6<sup>th</sup> June 2009.

### **Itinerary**

The basic and advanced arthroscopy courses were held over three days. The first day was taken up with the basic arthroscopy course, this was presented, by Dr Wayne McIlwraith, Chris Kawcak and Laurie Goodrich. The course combined a half day of lectures and a similar amount of time performing arthroscopy on cadaver limbs. The instructors for the basic course were all eminently qualified especially Dr Wayne McIlwraith who, as a pioneer of equine surgical arthroscopy.

Dr McIlwraith is an entertaining and enthralling speaker and was responsible for the majority of the lectures delivered on the first day of the arthroscopy course. Chris Kawcak and Laurie Goodrich are staff surgeons at Colorado State Veterinary Medical Teaching Hospital and are heavily involved in the clinical cases at Colorado State. They also have research interests in the Equine Orthopaedic Research Centre at Colorado State University.

Dr McIlwraith delivered the first five lectures, these included instrumentation, basic arthroscopic techniques and diagnostic arthroscopy followed by arthroscopic surgery of the carpus, fetlock and tarsocrural joint.

Arthroscopic surgery involves first distending the joint with sterile saline or air through a needle. Followed by placement of a small stab incision through the skin and joint capsule. This allows placement of a rigid, 4mm diameter arthroscope coupled to a camera into the joint allowing direct visualisation within the joint. The joint is explored in a routine fashion. Illumination of the inside of the joint is provided by a “light source” much like a fibre-optic endoscope. The camera projects an image onto a screen. The surgeon views the screen and uses the image to direct the arthroscope. After the joint has been evaluated in a routine fashion, a instrument portal is made. This is usually on the contra-axial side of the joint. This allows the introduction of various instruments into the joint, that allow the surgeon to perform intra-articular manipulations. The main instruments of arthroscopic surgery are grasping forceps such as ethmoid forceps and Ferris-Smith ronguers, these long handled instruments allow the removal of osteochondral fragments from the joint. More advanced instruments were also included such as radiofrequency probes that allow cutting and dissection of soft tissues within the joint.

The lecture programme was followed by lunch after which a “wetlab” was undertaken with a live demonstration of arthroscopy of each of the joints covered in the morning session and then individual laboratory exercises on the carpus and fetlock joints with four participants per cadaver limb. The practical portion of the course was excellent. It is extremely difficult to learn arthroscopy without the arthroscope in your hand and therefore this opportunity to practice techniques was immensely useful. The first set of joints covered was the carpus. This demonstration included how to perform a diagnostic arthroscopy of the middle carpal joint, the correct anatomical landmarks for insufflation of joint with sterile saline and positioning of appropriate portals to

ensure access to the carpus is complete. Carpal arthroscopy is dominated by horses used for racing and therefore these horses tend to experience middle carpal joint pathology on the medial aspect of the joint. Therefore much emphasis was placed on the technique for acquiring a lateral arthroscope portal and a medial instrument portal. This should allow the operator full access to the distodorsal aspect of the radiocarpal bone, which is often subjective to fragmentation in the course of race training. The antebrachiocarpal joint exhibits a variety of conditions. However, most commonly, the radius and intermediate carpal bone exhibit traumatic damage or failure to adapt to training and therefore emphasis on this joint was placed on the lateral aspect of the joint, with a medial arthroscopic portal.

One of the differences between Thoroughbred race practice in the United Kingdom and North America is the removal of dorsoproximal first phalangeal fragments. Our North American colleagues strongly believe that almost all fragments should be removed arthroscopically. However, the emphasis in the United Kingdom is much more on removal if there is lameness localised to the fetlock joint. The second practical focused on dorsal pouch arthroscopic surgery of the fetlock and removal of medial dorsoproximal first phalangeal fragments. This joint was not as technically challenging to examine as the carpus. Although the participants were examining normal joints for the practical, the instructors were able to “manufacture” chips for the participants to remove. The instructors were ever present circulating around the practical room and with approximately 40 participants they did a very good job of spreading themselves evenly around the practical hall. The wetlabs were performed in rooms which lay-off the main surgery rooms and theatre of the Colorado State Teaching Hospital. As we were performing the practical on cadaver limbs several

horses were being winched into position ready for their respective surgical procedures. This gave the busy hospital a real atmosphere of being in the cutting edge of equine surgery.

The second day of the arthroscopy course covered advanced arthroscopy and at this time two guest speakers were added to the faculty. Dr Alan Nixon from Cornell University and Dr Dean Richardson from the University of Pennsylvania. Dr Alan Nixon is an eminent equine surgeon and is involved in many novel research projects and the development of new techniques in surgical arthroscopy. He is perhaps best known for his textbook on Equine Fracture Repair. This is the standard text of repair of broken bones in horses. Dr Richardson is also best known for his research on and expertise in equine fracture repair. However, this is closely linked with minimally invasive surgery and diagnostic and surgical arthroscopy is of paramount importance in this field.

The second day of the course as a full day of lectures moving onto some of the more advanced arthroscopic techniques. This included arthroscopic guided repair of third carpal slab fractures, arthroscopy of the palmar aspect of the carpus, carpal sheath tenoscopy including treatment for radial osteochondroma and desmotomy of the accessory ligament of the superficial digital flexor tendon. Dr McIlwraith also provided an update of his most current research on cartilage healing and new methods of cartilage repair. Following the lunch break, the course moved back into the lecture theatre for arthroscopic surgery of the fetlock joint including removal of apical, some abaxial and basal sesamoid fractures. Dr Richardson introduced the use of arthroscopy in the repair of fractures of the condyle of the third metacarpus and tarsus,

and this was followed by Dr. MacIlwraith lecturing on the treatment of osteochondral lesions of the tarsocrural joint. Dr Nixon finished the day's lectures with a talk on diagnostic tenoscopy of the digital flexor tendon sheath.

The second day of the advanced course and the third day of the course overall, covered arthroscopic surgery of the stifle, the shoulder and the proximal and distal interphalangeal joints; arthroscopic approaches to the elbow and finished with arthroscopic surgery of the coxofemoral joint by Dr Nixon. After lunch there were more demonstrations and practical exercises.

The first practical demonstration featured a live anaesthetised horse. This horse was a research animal and subject to humane destruction after the demonstration. The horse was first positioned in dorsal recumbency and used for demonstration of tarsocrural joint, carpal flexor sheath and palmar fetlock arthroscopy. The horse was then placed into lateral recumbency where arthroscopic surgery of the elbow, shoulder and hip was demonstrated. Arthroscopic techniques of the elbow, shoulder and hip are extremely difficult to perform on cadaver limbs and for this reason the techniques were demonstrated on a live horse. The use of a research horse in this way was not questioned by many of the North American participants. However, obviously the use of a horse in this way would not be condoned in the United Kingdom. Many of the European participants, including myself, did have some misgivings about this part of the course. However, it certainly added to the quality of the teaching and made demonstration of the techniques much easier.

Following this demonstration, a practical was performed on cadaver limbs of stifle, and palmar or plantar fetlock arthroscopy, distal interphalangeal arthroscopy and tarsocrural arthroscopy. This practical concluded the course and was extremely useful in the practice of the technique.

Arthroscopic equipment was provided by two North American companies based in Colorado; Sontec and Arthrex and the equipment available for use in the practical demonstrations was of an extremely high quality. It included three chip digital arthroscopic cameras and pressure regulated arthroscopy pumps.

### **Purpose of Visit**

I attended this course in order to reinforce my knowledge of arthroscopy that we currently use daily at Rosssdales Equine Hospital. It is always important to seek expert opinions in the field of study and the faculty of the course were all eminent speakers and world leaders in equine arthroscopy. The trip also gave me the opportunity to meet other residents from all over the world including France, the United Kingdom and North America. In the future I am sure that these contacts will prove increasingly useful as I establish a career for myself in equine surgery.

### **Conclusions**

The course was extremely well run and the practical demonstrations gave me a real insight into how to take the course material and apply it to my own cases. It was

extremely important for my development as a surgeon to attend this course and I have learnt many valuable things from it.

I would like to express my sincere gratitude to the BEVA Trust who funded my travel to the Colorado State in order for me to participate in this course. As my residency is not funded by an external organisation, it would not have been possible for me to attend this course without the assistance of the BEVA Trust.