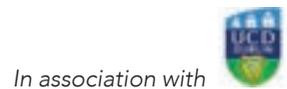


An overview of ongoing small-animal research



Dr Marie-Pauline Maurin, assistant professor of small-animal surgery, University College Dublin, gives an overview of some of the interesting ongoing research that is taking place in the college's Small Animal Surgery Department

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PROJECT 1: Computed tomographic evaluation and comparison of femoral, tibial and patellar conformation in cats diagnosed with medial patellar luxation and cats exempt from any orthopaedic condition.



Figure 1: Computed tomographic 3D reconstruction image of a cat diagnosed with bilateral medial patellar luxation.

Canine patellar luxation is most commonly reported medial, bilateral and considered as a hereditary problem in the majority of dogs. Patellar luxation is rarely reported in cats with only isolated traumatic reports. However, a higher prevalence of medial patellar luxation

is described in specific breeds (eg. Abyssinian and Devon Rex) and most of the cases are developmental, which would suggest a genetic predisposition. Although grade 1 (on a scale of 1 to 4) medial patellar luxation (defined as patellar laxity) can be considered normal in some cats, stifle ligaments laxity has been suspected to be correlated with feline patellar instability and luxation. Apart from stifle laxity, anatomic changes including shallow trochlear groove and medial displacement of the tibial tuberosity, no other bone deformity are reported. Computed tomographic (CT) studies have demonstrated a higher specificity and sensitivity in dogs with hind limb skeletal conformational abnormalities such as distal femoral torsion/varus in comparison to standard radiography. These conformational changes are suspected to be contributory to medial patellar luxation. One computed tomography study investigated anatomical and mechanical femoral and tibial angles in cats without any orthopaedic condition. However, there are no CT studies investigating skeletal conformation in cats diagnosed with patellar luxation. The objective of this retrospective and comparative study led by Dr Maurin in collaboration with Dr Hoey, Dr Santos (UCD) and two orthopaedic surgeons in the UK, is to evaluate and compare femoral, tibial and patellar conformation in cats with and without a diagnosis of medial patellar luxation. A second study led by Dr Maurin and in collaboration with the same investigators, involves measurement of patellar laxity after different surgical treatments in a biomechanical setting as well as CT evaluation. These studies aim to achieve a better understanding

of the pelvic limb conformation in cats diagnosed with medial patellar luxation, improving our current surgical treatment approach and clinical outcomes. **References available on request.**

PROJECT 2: Comparison of accuracy of placement of pedicle pins in the canine thoracolumbar spine using a novel technique versus 3D-printed patient-specific drill guides: a randomised ex-vivo study.

Spinal fractures are infrequently encountered in small-animal referral practice. The prognosis for neurologic recovery is dependent on whether there is presence of nociception on neurologic examination, with those having lost deep pain having an extremely guarded prognosis. A variety of surgical techniques have been described for stabilisation of spinal fractures in dogs including use of pins and polymethylmethacrylate, spinal plating, external skeletal fixation, among others. Pedicular pins can be placed freehand using calculated angles obtained from preoperative computed tomography of the spine, under fluoroscopic guidance, and using 3D-printed drill guides. In people, robotic-assisted pedicle screw placement is now commonplace but is not available for veterinary patients. Use of patient-specific 3D-printed drill guides has become increasingly popular in the veterinary literature for a variety of purposes including spinal deformity correction and stabilisation of the atlantoaxial and lumbosacral junctions. A high degree of accuracy of pedicle screw placement in the canine is reported in the literature, however, the 3D-printing technology is not readily available at the present time.

The objectives of the current study led by Dr Mullins and in collaboration with Drs Espinel Ruperez and Vagias (UCD) and surgeons in Universities of Bern, Wisconsin and Iowa is to compare the rate and grade of spinal canal violation of pedicular pins in the canine thoracolumbar spine using a novel technique versus use of 3D-printed patient-specific drill guides. **References available on request.**

PROJECT 3: Clinical presentation, complications and outcomes of dogs undergoing percutaneous drainage, sclerotherapy or surgical management of intrarenal cystic lesions in dogs.

Intrarenal cysts epithelial-lined benign fluid-filled structures located within the substance of the kidney. They are uncommon in dogs and are usually incidental. They can be solitary or multiple and are distinct from perinephric pseudocysts observed in cats, which are not true cysts. Occasionally, renal cysts can grow to a large size causing progressive loss of renal function, abdominal pain, systemic hypertension, or peritoneal effusion associated with rupture. A number of treatment options exist for symptomatic intrarenal cysts in dogs including percutaneous drainage, injection of sclerosing agents (eg. 95% ethanol) targeting fluid-producing cells lining the cyst, partial nephrectomy/deroofing and omentalisation, and total ureteronephrectomy. There is a lack of published studies in the veterinary literature reporting treatment, complications, and outcomes of dogs with intrarenal cysts. There are anecdotal reports of apparent benign renal cystic lesions being

diagnosed as malignancy on histopathology, which raises concern over treatment of such cystic lesions with sclerotherapy or surgical deroofing and omentalisation. On the other hand, performing total ureteronephrectomy for management of a solitary large renal cyst in the presence of smaller contralateral renal cystic lesions raises concern over the possibility of progression in contralateral cyst size and development of renal insufficiency. The objectives of this multi-institutional retrospective study, led by Dr Mullins and in collaboration with Dr Vagias (UCD) and universities in UK, Europe, US and Canada, are to report perioperative characteristics, histologic diagnosis, complications and outcomes of dogs undergoing percutaneous drainage, sclerotherapy or surgical management of renal cysts.

PROJECT 4: Arthroscopic hip toggle stabilisation in the cat: description of technique, feasibility and safety, and deviations from the surgical technique.

Coxofemoral luxation is commonly encountered in feline orthopaedic practice. Treatment options for coxofemoral luxation in cats include conservative management, closed and open reduction, and salvage options such as femoral head and neck excision and total hip arthroplasty. Hip toggle stabilisation is commonly used to treat coxofemoral luxation in cats and dogs. The goal of this technique is to maintain coxofemoral reduction by replacing the ligament of the head of the femur with synthetic material until joint capsular healing and periarticular fibrosis occurs. The long-term success rate with

this technique in cats is reported as high as 86%. Arthroscopy offers a minimally invasive method to assess damage to joint capsule and the articular cartilage of the acetabulum and femoral head, to debride remnants of ligament of the femoral head, and is associated with reduced patient morbidity, decreased postoperative pain, faster recovery, improved visualisation, and increased precision. The objectives of this study, led by Dr Mullins and in collaboration with Dr Espinel Ruperez (UCD), are to: (1) describe the technique of arthroscopic hip toggle stabilisation in the cat; (2) evaluate the feasibility and safety of the technique; and (3) evaluate any deviations from the surgical technique.

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