

UP vets' partial knee replacement surgery on Theophylline the cat another first for South Africa

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Radiographs of Theophylline's right pelvic limb after the surgery with the new patella groove implant in place and the kneecap back in normal position.

Specialist veterinary surgeons at the **Onderstepoort Veterinary Academic Hospital (OVAH)** in the University of Pretoria's **Faculty of Veterinary Science** conducted South Africa's first partial knee replacement on a cat. They used a custom-made artificial groove for the kneecap to glide in, saving the cat from having her right leg amputated.

Performed by Dr Elge Bester and Dr Adriaan Kitshoff from the Faculty's **Department of Companion Animal Clinical Studies**, this procedure is not only a first for the 100-year-old-faculty and the hospital, but for the country as well.

Their patient, Theophylline, a domestic shorthair cat, was rescued from a parking lot drain as a young kitten and quickly warmed the hearts of her rescuers. She was given the name "Theophylline", which is the name of a drug (bronchodilator) that is used to relieve symptoms including wheezing, tightness of the chest and shortness of breath related to diseases such as asthma, for instance.



Theophylline at home and back on her operated leg three days after surgery.

However, when Theophylline was six months old, during the COVID-19 lockdown, she fell from the window of a second-storey building. “This resulted in a very severe and complicated fracture of her right femur involving the knee joint. This fracture carried a poor prognosis for return to full function and likely meant Theophylline would need to rely on only three legs going forward,” said Dr Kitshoff. This would have affected the quality of life for the cat as they use their hindlegs to propel themselves when jumping.

According to Dr Bester, “Theophylline’s amazing owners were willing to try everything and were extremely committed to getting her back on all four feet. They wanted, most of all, to allow her to be a normal active kitten and to be able to continue going on ‘missions’ and play with her big brother, Felix.”

This started a three-month journey for Theophylline to get back on all four of her limbs with confidence and without pain and discomfort. She underwent multiple surgeries to try and reconstruct her femur and knee joint. The first of these surgeries included the insertion of numerous pins at various angles. This ensured that the alignment and length of the femur were salvaged.

“After the healing of the femur bone from the first surgery, Theophylline unfortunately developed a lateral patella luxation (when the kneecap/patella moves out of the groove of the knee joint),” said Dr Bester. A subsequent surgery to correct this was unsuccessful and did not help

Theophylline to be more comfortable and without pain when walking, running and playing. The quest to help her regain normal, pain-free mobility of her leg continued.



Dr Elge Bester and Dr Adriaan Kitshoff performing surgery on Theophylline's leg.

The two surgeons matched the determination of her family in finding a solution for her leg and spent a great deal of energy and time investigating various options for little Theophylline. They concluded that a complex procedure called patellar groove replacement could potentially be used. SaSpine Pty Ltd (which manufactures mostly implants and instrumentation for neurosurgery) and StratCure Pty Ltd (the distributor), under the guidance of Tjaart Henning, Gert Bekker and Lara Guldenpfennig, immediately agreed on custom making an artificial groove for the kneecap to glide in, which would be the first of its kind to be implanted in a cat in South Africa. They used polyethylene, a medical-grade plastic which is used for the manufacturing of joint replacement components for humans.

The artificial groove went through about three prototypes as the small size of the implant made the manufacturing process and ways to secure it to the bone challenging. A few days ago, Dr Kitshoff and Dr Bester placed the new implant into Theophylline's right femur. This allowed her to finally flex and extend her knee without pain and without abnormal movement of the kneecap.

Following surgery, Theophylline has recovered well and is fully weight bearing on the right hindleg and showing full range of bending motion of her right knee again; she is also back at home with her family. Dr Kitshoff and Dr Bester said: "Hopefully, we'll be able to help patients with similar conditions to have a better quality and pain-free life."

Director of the OVAH Dr Paul van Dam, said: “This outcome has been one that has delighted all those involved and demonstrated that sometimes the odds can be beaten – especially if you have a compliant patient, extremely dedicated owners and the expertise of a skilled veterinary team.”

Two weeks ago, Dr Kitshoff and Dr Ross Elliott made news when they performed **ground-breaking heart surgery on two dogs**. Their approach entailed dilating the opening of a heart valve with a balloon.

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