

UP vet science alumni reunite in US to perform tusk extraction on six-ton elephant

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The three South African veterinarians, friends and UP alumni with Bulwagi in the background from left to right, Prof Adrian Tordiffe, Dr Mark Penning and Prof Gerhard Steenkamp.

Three University of Pretoria (UP) veterinary science alumni recently reunited in the US to relieve a hefty African elephant of “toothache” by combining their skills in animal care to extract one of its tusks.

[Faculty of Veterinary Science](#) alumnus Dr Mark Penning, who is based at Walt Disney World Resort in Florida, reached out to fellow UP alumni Professors Gerhard Steenkamp and Adrian Tordiffe of UP’s Onderstepoort campus to assist with the physically demanding, specialised procedure that needed to be performed on Bulwagi, a resident of Birmingham Zoo in Alabama.

Bulwagi, a bull who was born in 1981 at a safari park in Florida in the US, had been experiencing intermittent dental issues associated with a tusk that he had fractured, possibly as a result of a fall. In December 2010, Bulwagi joined the elephant herd at Disney’s Animal Kingdom Theme Park and, other than occasional tusk issues, appeared to be in excellent health. The nearly six-ton bull was later moved to Birmingham Zoo, where he is a mentor, protector and teacher to two younger bulls.

The long-term health and well-being of Bulwagi falls under Dr Mark Penning, Vice-President of Animals, Science and Environment with Disney Parks, Experiences & Products. Dr Penning oversees thousands of Disney’s animals, including the horses that draw carriages and carry characters through the theme parks, and more than 350 species of wildlife at Disney theme parks. He also oversees the use of animals in Disney film and TV productions, and ensures that the company meets its ambitious 2030 environmental targets.

“After developing an infection in the cracked tusk, a variety of veterinary dentists came to Bulwagi’s assistance, even going so far as to fit him with a carbon fibre cast to stabilise the crack,” Dr Penning explains. “However, over time it was agreed that extraction of the tusk was the only way to remove the cause of the recurring infection and prevent further bouts of illness.”

Recognising that removing a tusk from a bull elephant is a big ask, Dr Penning got in touch with his fellow alumni to help resolve the elephant’s giant toothache once and for all.

Professors Tordiffe and Steenkamp have had a unique partnership since 2009: Prof Tordiffe is able to anaesthetise a bull elephant and keep it on a level plane of anaesthesia over several hours while Prof Steenkamp uses elephant dental equipment to saw, file, chisel and drill down to the apex of the tusk and safely perform an extraction.



Professor Gerhard Steenkamp evaluates the fractured tusk and surrounding bone before the operation starts.

Prof Steenkamp has worked on elephants on five continents, and during the COVID-19 pandemic, spent 14 days in quarantine in Australia in order to help an elephant with a tusk fracture.

“Doing surgery on such a big bull elephant is no simple matter,” Prof Steenkamp says. “Items that a veterinarian takes for granted in a small animal practice are not available for elephants. Simple things like endotracheal tubes have to be specially made at sizes that are effective in an elephant’s tracheae. The weight of a bull makes respiration during recumbency challenging, and assistance is

provided by positive pressure ventilation. Fortunately, Dr Jeff Zuba, a world authority on elephant anaesthesia, provided endotracheal tubes and a ventilator."

"Dr Stephanie McCain and her team of animal care professionals at Birmingham Zoo were excellent hosts, and spent many days preparing for the big procedure," Prof Tordiffe says. "Consultant Alan Roocroft ensured that Bulwagi was safely and ideally positioned to allow us to do our work. Bulwagi weighs 13 000 pounds, and moving him around was extremely difficult, which is why the positioning for surgery was so important. The barn where Bulwagi is housed was filled with veterinarians, technicians and a range of animal care professionals from nine elephant-holding institutions, all eager to learn and there to ensure that Bulwagi was well cared for."



Professor Adrian Tordiffe busy ventilating Bulwagi after the endotracheal tube was placed, before the surgery started. It is clear that a large team of professionals is needed to successfully anaesthetise and operate on such a large patient.

Once Bulwagi was anaesthetised, Prof Steenkamp began the physically demanding task of splitting the tusk into segments and separating the ligament holding the tusk in place. After three hours, the entire tusk had been safely removed, and the cavity was flushed out thoroughly. Once a painkiller was administered during the procedure, powerful enough to continue working as the procedure ended, Bulwagi was given the antidote drugs to wake him up.

"Within a couple of minutes, he was on his feet and slowly walking around. Soon he was eating as if he didn't have a care in the world!" Prof Steenkamp says.

As soon as the animal care team sent Bulwagi out, the two younger elephant bulls came over to welcome him back, and gently explored his face and tusk area with their trunks, Prof Tordiffe recalls. "It was a very happy and rather relieved team that watched him walk away," he adds.

"As animal care professionals, we want to provide the very best care we can," Dr Penning says. "Sometimes the size, shape or complexity of the animal makes it difficult, and we rely on the knowledge, experience, ingenuity and courage of our colleagues. Everyone involved in the care of Bulwagi are very grateful to Proffs Steenkamp and Tordiffe for their contribution. There was

something for everyone involved to take away from this procedure. That is what makes the profession so special – working together to provide better care to animals everywhere. It was a special time for the three alumni too, getting together on the other side of the world to help an elephant.”

The veterinary scientists are happy to report that Bulwagi is doing very well – the tusk cavity is healing as expected and there is no sign of infection.



Bulwagi, the 41 year-old African elephant bull 24 hours after the operation. He was doing really well and white anti-fly ointment was put on the skin surrounding the area where the tusk was extracted.

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