

Hornbill gets new lease of life with prosthesis

Bird had an aggressive form of cancer on its casque, the helmet-like structure on its beak

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A great pied hornbill with an aggressive form of cancer on its casque at the Jurong Bird Park has been given a 3D-printed prosthesis fitted on top of its bill.

The casque refers to the helmet-like structure on the beak of a hornbill.

The hornbill was fitted with the 46g prosthetic casque on Sept 13 af-

ter an operation to remove the cancerous growth on its natural casque, park operator Wildlife Reserves Singapore (WRS) said in a statement yesterday.

In the operation, veterinarians cut and removed part of the bird's natural casque to scrape off the cancerous tissue within it, before the prosthetic casque was put in place.

The prosthesis protects the surgical wound from being exposed and gives the hornbill's natural casque



Dr Hsu Li Chieh from The Animal Clinic using a drill guide to fix the 3D-printed 46g prosthesis on the beak of the hornbill. The 22-year-old bird, named Jary, is recuperating at Jurong Bird Park's Avian Hospital's outdoor ward and will remain there until the end of this month. PHOTO: WILDLIFE RESERVES SINGAPORE

time to regrow, a process that can take up to a year.

The 22-year-old bird's new appearance has earned him the name Jary, which means "a warrior with a helmet" in ancient Norse.

He is recuperating under close observation at Jurong Bird Park's Avian Hospital's outdoor ward and will remain there until the end of this month.

Great pied hornbills are classified as near threatened in the International Union for Conservation of Nature's Red List of Threatened Species, and can live up to 40 years on average.

Jary was diagnosed with cancer in July after keepers noticed that he had an estimated 8cm-wide gash on his casque that exposed the underlying tissue.

Two hornbills in the park suffered a similar condition in the past and both died. One succumbed to the cancer despite chemotherapy, while the other's disease progressed too rapidly for treatment.

Jary's unlikely shot at survival came as a result of a collaboration between the park's veterinary team, the Keio-National University of Singapore (NUS) Connective Ubiquitous Technology for Embodiments Centre, the NUS Smart Systems Institute, the NUS Centre for Additive Manufacturing and The Animal Clinic.

The three NUS-linked organisations contributed their 3D-printing capabilities while honorary consultant Hsu Li Chieh from The Animal Clinic was roped in to assess 3D prosthetic models for the bird.

It took almost two months of designing and discussions before a model was deemed a perfect fit for the hornbill.

Dr Xie Shangzhe, assistant director of conservation, research and veterinary services at WRS, said: "This case is a great example of how veterinarians and engineers can work together to utilise science and technology for the treatment of diseases such as cancer in all species, including birds.

"Together, we achieved the best possible outcome."

WRS said the plan had required some specialist veterinary intervention as well as some high-tech engineering gadgetry to perform surgical resection of the casque and to replace it with a 3D prosthesis.

Jary started eating normally the day after the surgery, and recently began colouring his prosthetic casque yellow. This happens when the bird rubs the casque on his preening glands, which secrete a yellow pigment. "These natural behaviours are good indications that he has accepted the prosthesis as part of himself," said Dr Xie.

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WORKING TOGETHER

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DR XIE SHANGZHE, assistant director of conservation, research and veterinary services at Wildlife Reserves Singapore.