

## 3D Printed Crested Ibis Fake Beak

There was a book written by the American Nathanni Laxu Mayer, and the Australian Robert Impantu called "The Broken Beak". It told about a young sparrow with a graceful flying posture and agile preying movements. On a day morning, it found that its beak was broken, unable to peck. His body is getting thinner and thinner, his companions are also moving away from him because of fear, and the guests do not understand his difficulties, so he falls into the abyss of despair. It is not uncommon for animals to lose their beaks, bones, limbs, etc. due to fights, accidents, and natural causes. These cute animals not only cause inconvenience in life, but also threaten their lives and fall into desperate situation.

In 2020, a Crested Ibis has its beak broke during the fight for mate. After losing the lower beak, this crested ibis could not eat on its own, unable to comb its feather and lost the heroic posture of the past. The only choice given by the doctor was to make a fake beak. In the past, a red-crowned crane in Nanjing Hong Shan Forest Park had also broken its beak due to a fight, and it was implanted with a titanium alloy made artificial beak. However, but compared to the red-crowned crane, the crested ibis was smaller in size.



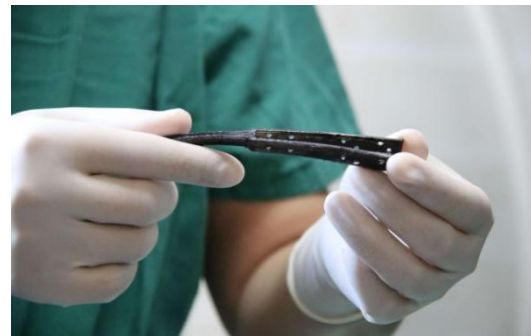
After few rounds of discussion among the medical team, the doctors decide to use PEEK materials to replace the titanium. The weight of the same volume of PEEK materials is only one-fourth of the titanium alloy, and the texture is closer to bird's beak, which has a better stress resistance and hydrolytic stability, non-toxic, corrosion resistance and high temperature resistance.

In 3D Printing Technology, PEEK is one of the most suitable materials for medical implants. Biocompatibility is the most basic element to measure whether a material is suitable for implantation in the human body. This material must be free of cytotoxicity, mutagenicity, carcinogenicity, and not cause allergies. Implantable PEEK has undergone a complete biocompatibility test in strict accordance with the requirements of ISO10993 in foreign independent testing institutions. The results show that implant-grade PEEK has excellent biocompatibility without any side effects.

The elastic modulus of PEEK is very close to bone, and the stress on the bone is not completely borne by the implant, thereby making the bone healthier.



At the first minute after receiving the message from Sichan Academy of Natural Resources Sciences. With the help from Sichan Academy of Natural Resources Sciences, IEMAI 3D established close contact with the Muchuan Crested Ibis Breeding Center and conducted severable conversation; after 6 times of sample installation tests, on March 18, 3D printed PEEK artificial beak finally arrived in Muchuan. On March 19, Wan Fenglin, deputy director of the Orthopedics Department of Muchuan County People's Hospital, performed an artificial beak installation operation on this crested ibis with the assistance of several medical staff.



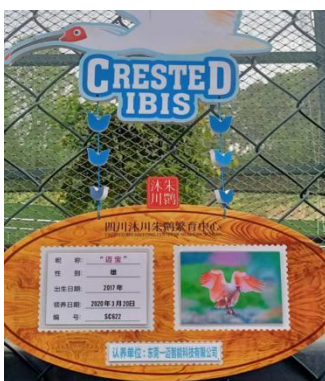


Infiltrating anesthetics, cleaning the wound, bonding the cross-section, drilling, and threading, polishing and adjustment... After 50 minutes of stressful surgery, this crested ibis slowly regained consciousness, and now it has a new “lower beak”.

After the operation, IEMAI 3D adopted this crested ibis. Its name is “Maibao”, which means IEMAI’s Baby.

Even Maibao had its beak implanted, however it required a process for rehabilitation and habituation process after the operation. Thus, manual feeding is still required during these few days.

Until April 11 ,2020, we checked the surveillance video and found that Maibao had preyed on a loach in the pool just as if the original lower beak were still there. The predation process is quick. It is excited to hear this news.



The reason we give “MaiBao” as the name of crested ibis, is because it means responsibilities, which is the best driving force. This not only drives us to continue to pay attention to and care about the status of Maibao, but also drives us to continue to develop core technology, pay attention to application of science and technology, and contribute to the development of science and technology in society, the country, and the world.



IEMAI 3D supports most of the thermoplastic materials in the 3D printing markets and assist the user to resolve the issue encounter during manufacturing, and all 3D printers and materials have achieved CE and ROHS certification. We attach great importance to brand building and have obtained trademarks certificates from China, United States, and the European Union. We pursue core technology research and development, and have obtained software copyrights, invention patents, utility model patents, appearance design patents, and the title of national high-tech enterprise. At present, our 3D printing solutions have been applied to aerospace, automotive, petrochemical, medical, dental and electronics manufacturing.