

The first clinical case of tibia implantation

Before the operation, the team of doctors asked Yimai IEMAI 3D for help, and Yimai printed out the prosthesis that needed to be replaced according to the actual situation. Combining the short-term load-bearing and actual needs of bone regeneration in the future, the two parties finally chose PEEK material and the MAGIC HT PRO model to complete the tibial prosthesis printing after many negotiations and trials.

According to the preoperative diagnosis results and the data simulation of CT reconstruction, two sets of surgical plans and tibial prostheses were printed out. The 3D printing technology greatly ensured the smooth progress of the operation.

1. Patient information:

A 34-year-old male, due to an accidental fracture of the tibia, requires a prosthesis to replace a section of the tibia.



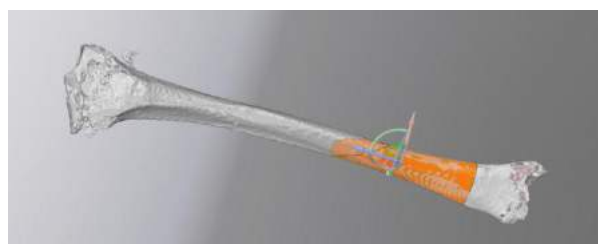
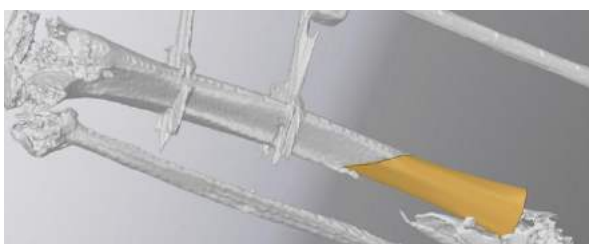
Preoperative data (positive position)



Preoperative data (lateral position)

2. Preoperative planning:

Based on the patient's preoperative data, the patient undergoes a three-dimensional reconstruction of the medical image of the tibial prosthesis replacement surgery, and the doctor performs a comprehensive comprehensive evaluation of the patient before the operation, as shown in the figure.

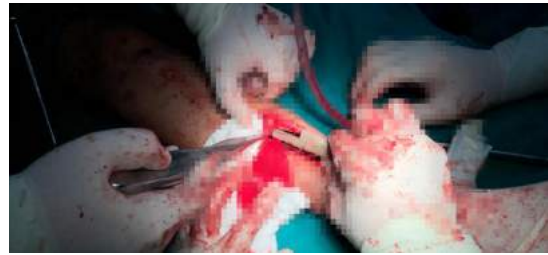


3. Surgery implementation:

Based on the patient's preoperative data, the patient undergoes a three-dimensional reconstruction of the medical image of the tibial prosthesis replacement surgery, and the doctor performs a comprehensive evaluation of the patient before the operation, as shown in the figure.



Distal plastic design



Installation (1)



Installation (2)



Installation finished

4. Postoperative results:

The operation was successfully completed, and the patient recovered well after the operation, waiting for the stitches to be removed and waiting to be discharged from the hospital.



Postoperative data (positive position)



Postoperative data (lateral position)

Advantages of 3D printing technology in medical applications

For patients with bone defects or bone deformities, traditional standardized medical implants often fail to meet the requirements due to large individual differences and varying degrees of disease. Therefore, using 3D printing technology to quickly customize personalized, high-performance orthopedic implants can truly meet the immediate needs of patients.

Ideal material for 3D printed implants: PEEK

Compared with traditional metal implant materials, PEEK, as a semi-crystalline polymer material, has the advantages of light weight, elastic modulus close to the original bone, friction reduction and wear resistance, excellent biocompatibility, and good physical and chemical stability. , It has become one of the ideal materials for bioprosthesis implants.



IEMAI3D printed PEEK wire

Excellent biocompatibility:

PEEK has good biocompatibility, no cytotoxicity, mutagenicity, carcinogenicity, and does not cause allergies. These are the most basic requirements for whether a material is suitable for implants.

X-ray penetration:

Compared with metal, PEEK can be penetrated by X-rays and has good visibility: 1. Avoid causing artifacts on X-ray films; 2. It can be performed with the assistance of CT scan or MRI, helping doctors in surgery. The position of the implant is adjusted during the process, and the healing

3D Printing Solutions For High Performance Materials process can be easily tracked after the operation, so as to achieve good monitoring of bone growth and healing.

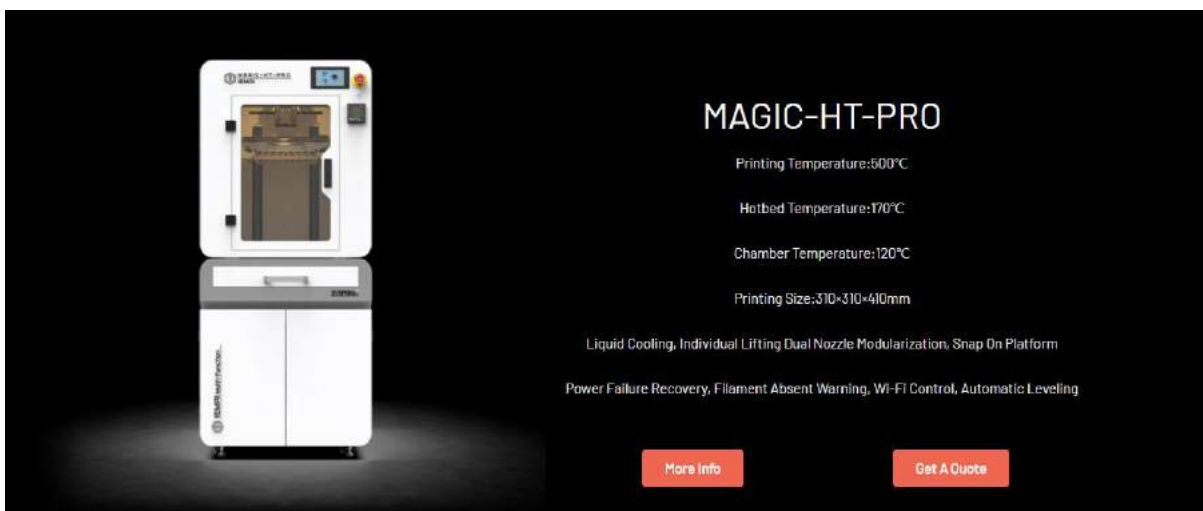
The modulus of elasticity is closer to that of cortical bone:

PEEK is rigid and flexible, and its elastic modulus is closer to that of bones, which can effectively alleviate the stress shielding effect. The stress on the bones is not completely borne by the implant, making the bones healthier and longer. Since its inception, PEEK has been active in intervertebral fusion cages in various medical device fields.

IEMAI PEEK 3D printer



All series of PEEK 3D printers



MAGIC HT PRO



3D Printing Solutions For High Performance Materials

↓ ↓ IEMAI 3D brand introduction ↓ ↓

Imai Intelligent Technology Co., Ltd. is a high-tech enterprise in China focusing on 3D printing R&D and production. Its brand IEMAI 3D is a global industrial-grade 3D printer brand, committed to providing users with multi-material compatible "All in one "The 3D printing solution supports most of the thermoplastic materials in the printing market and helps users solve the problems encountered in manufacturing. We implement high-quality standards for product development and production, and all 3D printers and materials have obtained CE and ROHS certification. We attach importance to brand building and have obtained trademark certificates from China, the 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. Now, our 3D printing solutions have been applied to: aerospace, automotive, petrochemical, medical, dental and electronics manufacturing.