

One-of-a-Kind Limb-Sparing Surgery Provides New Hope for Pediatric Osteosarcoma Patients

Dr. James C. Wittig and Team Pioneer Breakthrough Surgical Approach Using 3D-Printed Prosthesis and Free Vascularized Fibula Transplant

MORRISTOWN, NJ, UNITED STATES, August 20, 2025 /EINPresswire.com/ -- Dr. James C. Wittig,

“

I emphasize to all the residents and students training with me that it is the biggest compliment in the world for a parent to trust me to perform such a complex limb saving surgery on their baby”

James C. Wittig, MD

one of the world's top orthopedic oncologists, led a team of residents and innovators in 2024 to successfully implement a surgical solution for an exceedingly rare orthopedic oncology patient.

"My surgical team and I were blessed to perform a [one-of-a-kind limb-sparing surgery on a very special young patient](#) who presented to us with a diaphyseal osteosarcoma, a rare type of bone cancer that accounts for only 10% of osteosarcomas," Wittig said. "The younger the patient, the bigger the challenges."

Dr. Wittig is now the founder and CEO of Mandala Medical Group, which is developing a range of social impact-based organizations, including a new nonprofit, Pediatric Cancer Foundation New Jersey, launching in September 2025.

A Rare Case

The patient was just six years old with cancer in their humerus—an exceedingly rare case, since diaphyseal osteosarcomas typically develop between ages 12 and 20, most often in the femur or tibia.

Dr. Wittig explained: "In patients older than 10 or 12 years, growth of the arm is not as much of a concern, and perhaps even the growth plates could be removed and solely a prosthesis used for reconstruction. However, in this age group, the growth of the arm is a significant concern. There are no prostheses that can accommodate for the growth of the arm, and the arm would end up exceedingly short. To permit growth in the future, the growth plates would need to be preserved, which means cutting the bone very close to the tumor without getting into the tumor, and then reconstructing with a stable construct that also permits growth. Our challenge in this case was to

create a reliable reconstruction that restores bone, permits growth, and preserves the potential for full future use of the arm. So in this case, we combined a free vascularized fibula, which can biologically heal and get thicker over the course of time, with a special customized 3-D printed prosthesis that will fit the defect perfectly and allow for immediate stabilization of the arm until the fibula graft heals."

Innovative Surgical Approach

Dr. Wittig and his team performed a radical resection of the humeral tumor, followed by a free vascularized fibula transplant combined with a custom 3D-printed prosthesis.

The surgical plan involved:

- Resection of the cancerous portion of the humerus.
- Harvesting a fibula segment with blood vessels for grafting.
- Creating a biological bridge to restore the bony architecture.
- Stabilizing the transplant using a custom, two-piece 3D-printed "clamshell" prosthesis.

This prosthesis stabilized the bone during healing, allowing the transplanted fibula to hypertrophy and function as a normal humerus.

Collaboration and Precision

Dr. Wittig collaborated with Dr. Eric Chang, Plastic & Reconstructive Surgeon, who connected the fibula's blood vessels to those in the humerus to restore circulation.

"Preoperative chemotherapy effectively killed the tumor, enabling me to cut within just 5mm of the tumor using custom cutting guides on the prosthesis," Wittig explained. "This was much closer than the 2cm margin we typically achieve, but it allowed us to preserve enough bone above and below the growth plates for the fibula reconstruction."

Outcomes

The innovative solution avoided both donor bone (due to infection risk) and full upper-body casting (impractical for a child undergoing chemotherapy). Instead, the custom implant absorbed stress until the fibula healed, after which the fibula took over as a fully functional humerus.

Today, the patient's reconstructed arm shows excellent functionality and long-term promise.

About Dr. James C. Wittig

Dr. James C. Wittig is a world-renowned orthopedic oncologist and healthcare leader specializing in the treatment of bone and soft tissue sarcomas. He has performed thousands of limb-saving surgeries with a special emphasis on children. He is also the co-author of *Techniques in Orthopedic Surgical Oncology*, the only textbook dedicated to surgical techniques in this field.

About Mandala Medical Group

[Mandala Medical Group represents a range of businesses and a nonprofit](#) foundation, all centered on improving patient health, wellness, and longevity. Founded by Dr. James C. Wittig,

MD, Mandala is committed to medical innovation, compassionate care, and giving back through initiatives like the Pediatric Cancer Foundation New Jersey.

Learn more at <https://www.mandalamedicalgroup.com> or follow Mandala on LinkedIn: <https://www.linkedin.com/company/mandala-medical-group>

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