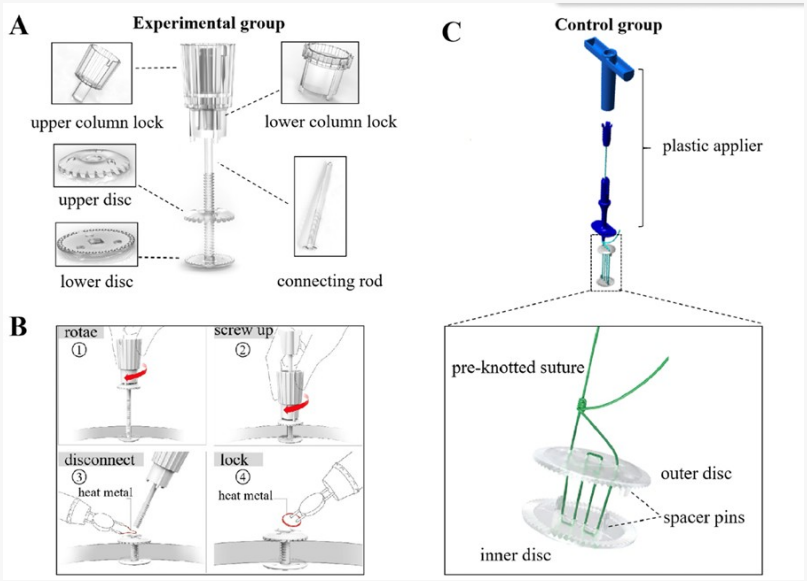
Chinese Neurosurgical Journal Study unveils absorbable skull device that speeds healing

Scientists unveil fully degradable cranial clamp that outperforms leading product in safety and healing



Researchers at Central South University and MedArt developed a biodegradable cranial fixation device that strengthens bone healing, reduces complications, and offers a safer alternative to traditional metal implants after brain surgery.

CHINA, November 4, 2025 /EINPresswire.com/ -- Scientists from China have developed a fully absorbable cranial fixation device that improves skull bone healing and stability after brain surgery. The new implant outperformed the widely used Aesculap® CranioFix clamp. The device provides stronger fixation, safer degradation, and faster postoperative skull recovery, offering a promising alternative to current metal or polymer fixation systems. These findings provide prominent significance for promoting the innovation and development of absorbable cranial flap fixation devices.

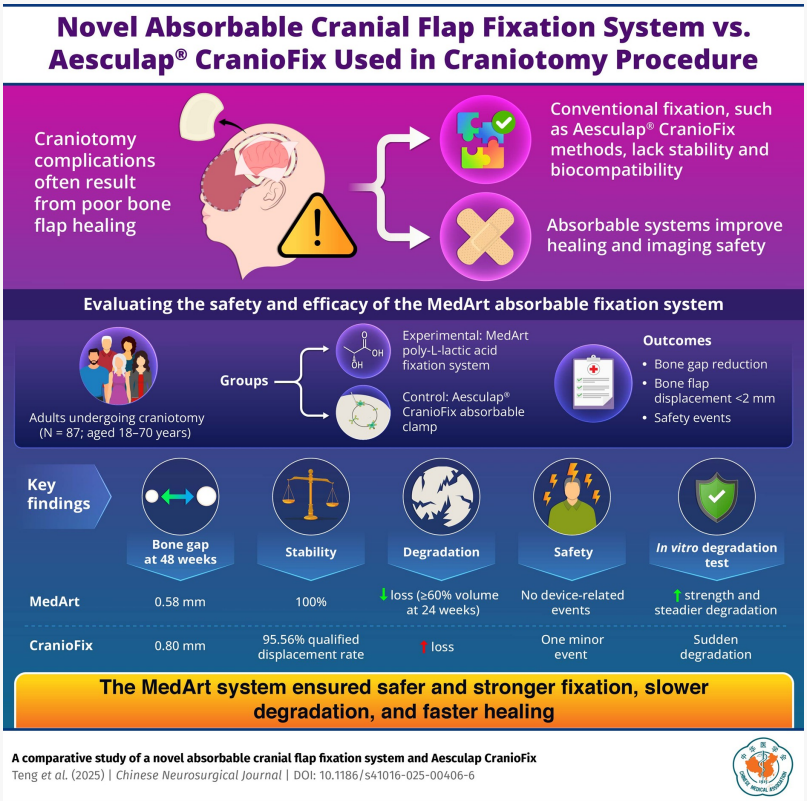
Closing the skull safely and securely after surgery remains one of neurosurgery's biggest challenges. Traditional fixation systems made from titanium or semi-absorbable polymers can interfere with brain imaging, degrade unevenly, or remain in the body long after healing. These drawbacks can slow down recovery, cause discomfort, and increase the risk of complications.

To address these issues, a team led by Dr. Siyi Wanggou and Professor Xuejun Li from the Department of Neurosurgery, Xiangya Hospital, Central South University, China, collaborated with MedArt Technology Co., Ltd., China, to develop a fully degradable cranial flap fixation system made from high-purity poly-L-lactic acid (PLLA). The material is strong, biocompatible, and completely absorbed as the skull heals naturally. The study, published online in Volume 11 of Chinese Neurosurgical Journal, on September 13, 2025, compared the MedArt device with the established Aesculap® CranioFix system through both laboratory tests and a multicenter clinical

trial involving 90 patients at four major hospitals in China.

“Our goal was to create a device that’s strong, safe, and leaves nothing behind,” says Dr. Wanggou. In laboratory tests, the MedArt system maintained fixation strength for twice as long as the CranioFix and degraded gradually, avoiding sudden bursts of lactic acid that can irritate the surrounding tissue. The device reached the test endpoint in 14 days, compared to 7 days for the control system.

According to Professor Li, “The slow, steady degradation supports bone healing and long-term stability.”



Study compares the efficiency of absorbable skull device that speeds healing with biodegradability and higher stability.

The clinical trial confirmed these advantages in patients. Using 3D CT reconstruction, researchers found that the average bone gap in those with the MedArt device was 0.58 mm, narrower than the 0.80 mm seen with CranioFix. The new system achieved a 100% success rate in maintaining bone flap position and showed no device-related complications. Bone healing typically completed within a year, aligning with the device’s full resorption period.

Only one possible device-related issue (minor incision healing) occurred in the CranioFix group. No similar cases appeared in the MedArt group. Blood and imaging results confirmed that both systems were safe, but the MedArt implant showed superior biocompatibility and fewer postoperative concerns.

The researchers also emphasized the device’s ease of use. Its threaded connecting rod and adjustable locking discs allow surgeons to reposition or retighten it during surgery, ensuring precise placement. The flexible design adapts to skull curvature, evenly distributes pressure, and minimizes stress on the tissue.

“Being able to adjust the clamp during surgery improves accuracy and saves time,” says Dr. Hong Liang of MeiyiBoya Biomedical Technology Co., Ltd.

The team believes this new technology could set a future standard for skull fixation, particularly in children or patients with physical trauma who benefit from fully absorbable materials.

Although this trial included only adults aged 18 to 70, further research is planned to explore pediatric applications.

“This is an important step toward safer, more patient-friendly neurosurgery,” Dr. Wanggou adds. “We’ve shown that strength and biodegradability can go hand in hand.”

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Reference
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About Xiangya Hospital, Central South University
Xiangya Hospital, affiliated with Central South University in Changsha, China, is a premier medical institution renowned for excellence in patient care, medical education, and research. Established in 1906, the hospital offers comprehensive clinical services across multiple specialties, including cardiology, oncology, neurology, and organ transplantation. As a teaching hospital, it plays a vital role in training future physicians and medical researchers, fostering innovation and advancing healthcare standards.
Website: https://xysm.csu.edu.cn/EN/Home.htm

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