

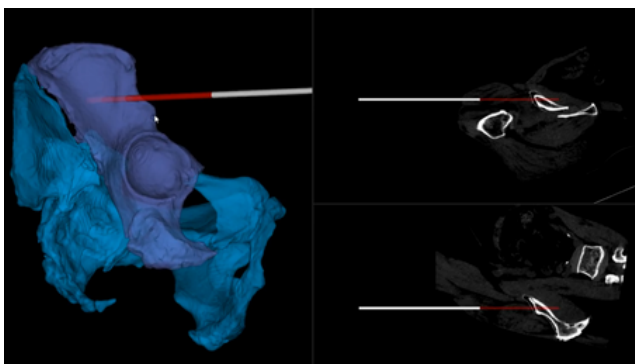
# ROBOTICS IN FRACTURE SURGERIES: A PAIR OF MORE BRILLIANT EYES AND A PAIR OF MORE PRECISE HANDS

In the realm of orthopedic surgery, the integration of robotic technology has ushered in a new era of precision, efficiency, and improved patient outcomes. One area where this technological advancement has made a significant impact is in fracture fixation surgeries. Utilising robots in fracture fixation surgeries offer surgeons unprecedented levels of accuracy and control, revolutionising the way fractures are treated and managed.

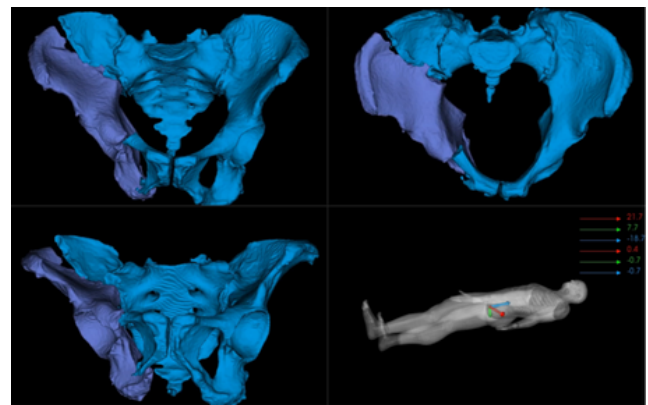
## Traditional Method

Traditionally, the treatment of fractures has relied on manual manipulation and the placement of fixation devices such as screws, plates, and rods. While effective, these methods are inherently reliant on the skill and experience of the surgeon, leading to variability in outcomes and the potential for human error.

Robotic technology has emerged as a game-changer in fracture fixation, offering precise guidance and enhanced capabilities that were previously unimaginable. Robotic systems are utilised in various aspects of fracture fixation, from preoperative planning to intra-operative navigation and post-operative rehabilitation. One of the key applications is in pre-operative planning, where robots generate detailed 3D models of the fracture site based on imaging data. This allows surgeons to meticulously analyse the fracture pattern, plan the surgical approach, and simulate the placement of fixation devices with unparalleled accuracy.



Picture showing screw trajectory on 3D reconstruction scan



3D reconstruction scan of a patient with pelvic fracture

## Benefits of Robotic Technology

During surgery, robotic systems provide real-time guidance and feedback to assist surgeons in navigating complex fracture patterns. By tracking the position of surgical instruments and implants, robots ensure precise alignment and placement, minimising soft tissue damage and optimising stability. This level of precision is particularly beneficial in minimally invasive procedures, where smaller incisions and reduced tissue trauma lead to faster recovery times and improved patient outcomes.

## For Patients

The integration of robotic technology into fracture fixation offers numerous benefits for both patients and surgeons. For patients, robotic-assisted procedures result in shorter hospital stays, reduced pain and discomfort, and faster return to daily activities. The precision and accuracy of robotic systems also lead to improved fracture alignment, reduced risk of complications, and enhanced long-term outcomes, ultimately improving quality of life.



The robotic arm that helps to navigate surgery

### For Surgeons

For surgeons, robotic fracture fixation techniques streamline surgical workflows, reduce procedural time, and mitigate the challenges associated with complex fracture patterns. By providing real-time feedback and guidance, robots empower surgeons to achieve optimal results with greater confidence and efficiency. Moreover, the standardized approach facilitated by robotic technology ensures consistency in surgical outcomes, regardless of the surgeon's experience level.

As robotic technology continues to advance, the future of robotic fracture fixation holds even greater promise. Innovations such as artificial intelligence, augmented reality, and haptic feedback systems are poised to further enhance the capabilities of robotic systems, enabling even more precise and personalized care for orthopaedic trauma patients. Additionally, ongoing research and development efforts aim to expand the applications of robotic technology beyond traditional fracture fixation, paving the way for new treatment modalities and improved patient care.



Both pictures show using robotic arm to reduce the pelvic fracture

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