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Tiny robots enhance the chances of Surgical Interventions

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MMI S.r.l. Unveils World's Smallest Robotic Wrist

Maker of novel robotic solutions, Medical Microinstruments S.r.l. (MMI) discloses its robotic platform specifically designed for open microsurgery.

The platform allows the surgeon to control two tiny articulated microinstruments that simplify reconstruction procedures after traumatic injuries as well as after tumor removal in soft tissue and bones, and offers the potential for improved surgical success rates and patient outcomes.

MMI's instruments are equipped with the smallest articulated wrist having a 3-millimeter outer diameter and tips just 150 micron in width.

The wrist is the key to performing robotic microsurgery in real clinical settings and allows easy manipulation of small sutures, from 9-0 to 12-0 in size.

"Thanks to the use of advanced materials and novel microfabrication processes, we have designed the smallest articulated wrist to provide microsurgeons unique instrument dexterity and robotic precision," said Massimiliano Simi, Co-founder and VP R&D.

The surgeon operates the microinstruments while sitting at the surgical bedside and looking through the operating microscope.

MMI's robotic platform captures surgeon's hand movements and a scaled-down motion is imposed on the microinstruments.

"We have developed this groundbreaking technology together with microsurgeons from the product's conception and the positive feedback and response that we've received along the way has really been overwhelming and led us to believe that we are on the right track in developing a robot by and for microsurgeons," said Hannah Teichmann, Co-founder and VP Clinical.

Prof. Marco Innocenti, Chief of Plastic and Reconstructive Microsurgery at Careggi University Hospital in Florence and MMI's Clinical Advisor, who has presented preclinical work with MMI's robot at 9th Congress of World Society for Reconstructive

Microsurgery in Seoul, including 0.35mm arterial robotic anastomosis.

According to him, the MMI robotic platform will push the frontier of microsurgery forward and beyond the capabilities of the human hand, thus allowing more surgeons to perform more complex procedures but also enabling supermicrosurgery, such as lymph reconstruction, for the more expert ones.

In a surgery conducted by surgical robots, the incision is small, the loss of blood is very minimal, and the patient has quick recovery, shorter hospital stays and a faster return to normal life.

MMI's President and Co-founder, Giuseppe Maria Prisco, estimates the potential annual market opportunity to be in the order of $2.5 billion.