

NIT-K team develops bioactive, anti-microbial coating technology for orthopaedic implants

The patented technology is particularly useful in hip and knee joint replacements, says NIT-K

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THE HINDU BUREAU



Sudhakar C. Jambagi, Associate Professor, Department of Mechanical Engineering, NIT-K and his doctoral student Deep Shankar, who have developed an advanced bioactive, mechanically durable and localised anti-microbial coating

Deep Shankar

NITK develops antimicrobial coating for orthopaedic implants

Researchers Dr Sudhakar, Dr Deep Shankar behind the innovation

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RESEARCHERS at the National Institute of Technology Karnataka (NITK) Surathkal have developed a first-of-its-kind advanced bioactive, mechanically durable, and localised antimicrobial coating technology for orthopaedic implants, with particular application in hip and knee joint replacements.

A press release from NITK said the patented innovation marks a significant milestone in indigenous biomedical engineering and represents a major step forward in improving patient outcomes for millions of orthopaedic implant recipients across India and globally.

The durable bioactive and antimicrobial composite coating can be directly applied onto implant surfaces using an optimised High Velocity Oxy-Fuel (HVOF) thermal spray process thereby addressing the growing challenges of implant-associated infections, implant loosening, and suboptimal long-term performance of conventional implants.

The coating is engineered to deliver localised antimicrobial protection while simultaneously improving the mechanical durability, wear resistance, coating adhesion, and bone integration of the implant. The enhanced osseointegration



Dr. Sudhakar C Jambagi and Dr Deep Shankar who developed the technology

enables stronger bonding between bone and implant, while the antimicrobial functionality combats bacterial growth at the implant site, thereby substantially reducing the risk of post-surgical infections.

Pre-clinical studies conducted by the research team demonstrated promising performance compared to conventional implants currently available in the market. The technology has the potential to significantly re-

duce the need for revision surgeries and improve long-term patient outcomes that carry profound implications for healthcare costs and patient quality of life.

The innovation has resulted in multiple international research publications and the technology has been granted a patent. The research team is currently working toward clinical translation and commercialisation of the technology, with the patented technology having been translated into a deep-tech startup founded to bring this solution to market.

The technology was developed by Dr Sudhakar C Jambagi, Associate Professor, Department of Mechanical Engineering, NITK Surathkal, and his doctoral student Dr Deep Shankar, who completed his PhD under the supervision of Dr Jambagi and has since gone on to found and lead the deep-tech startup established to commercialise this breakthrough technology.

The innovation has been developed under the 'Make in India' initiative, and is fully aligned with the government of India's vision of 'Swastha Bharat' and 'Viksit Bharat' by promoting indigenous biomedical technology and delivering affordable, advanced healthcare solutions to the people of India, added the release.

Deep Shankar