BIOENGINEERING AND MEDICAL-SURGICAL SCIENCES

Ammin/DIMEAS - Design of medical devices for spinal and trauma applications

Funded By	Dipartimento DIMEAS Politecnico di TORINO [P.iva/CF:00518460019]
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Context of the research activity	The research theme is the design of new medical devices in the spinal and trauma fields, also characterized by surface coatings. The focus is on the prevention of so-called "peri-implant" failures and infections.
Objectives	The "peri-implant" infections represent a serious complication in orthopedic prosthetic surgery and require an accurate microbiological diagnosis to ensure the correct clinical management of the infectious event. At the same time, the antibacterial characteristic must not negatively affect the mechanical performance of the designed devices. The devices will be designed using in-silico simulations based on Finite Elements Modelling, Multibody analysis, and predictive algorithms of fatigue failure already developed by the research group, in order to optimize their development and design transfer. Particular attention will be paid to the creation of digital twins (digital twins) to integrate and replace in vitro and in vivo experiments with obvious positive effects on the time and costs of introduction into the clinical use.
Skills and competencies for the development of the activity	The candidate must preferably have a Biomedical Engineering background with a biomechanical and orthopedic focus in particular; must be comfortable in an uncertain, dynamic and constantly evolving context, and must be able, collaborating with the entire team, to follow the entire process of placing an orthopedic medical device on the market.