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Implant Engineering in the Age of Biologics

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Abstract

Implants and their technological advances have been a critical component of musculoskeletal care for almost a century. Modern implants are designed to enhance bone ingrowth, promote soft-tissue healing, and prevent infection. Porous metals and short-stem fixation devices have rendered previously unreconstructable bony deficits reconstructable. Stem cells, growth factors, and novel biocompatible compounds have been designed to promote and enhance soft tissue attachment to implants. Antimicrobial modifications have been engineered onto implants to deter bacterial attachment, and innovative surface modifications and eluting technologies may be in our near future. Yet, given the enormous economic pressures in orthopaedics, marketing claims of innovation often exceed scientific accomplishment. Vigilance is thus required in distinguishing transformational discovery from unsubstantiated claims.