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# Reconstructive Science in Orthopedic Oncology

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## Abstract

Limb salvage is widely practiced as standard of care in most cases of extremity bone sarcoma. Allograft and endoprosthesis reconstructions are the most widely utilized modalities for the reconstruction of large segment defects, however complication rates remain high. Aseptic loosening and infection remain the most common modes of failure. Implant integration, soft-tissue function, and infection prevention are crucial for implant longevity and function. Macro and micro alterations in implant design are reviewed in this manuscript. Tissue engineering principles using nanoparticles, cell-based, and biological augments have been utilized to develop implant coatings that improve osseointegration and decrease infection. Similar techniques have been used to improve the interaction between soft tissues and implants. Tissue engineered constructs (TEC) used in combination with, or in place of, traditional reconstructive techniques may represent the next major advancement in orthopaedic oncology reconstructive science, although preclinical results have yet to achieve durable translation to the bedside.

**Keywords:** Osseointegration; biofilm; implant coatings; periprosthetic infection; soft tissue attachments.