

Moreover, the drug directly delivered in the infected site has fewer side effects than systemic drugs, improving ototoxicity and nephrotoxicity, among other adverse reactions. Then local drugs may be more effective along the treatment, besides reducing costs, allowing only high drug concentrations at the target tissue (Winkler and Haiden, 2016; Nandi et al., 2016; Ter Boo et al., 2015; Snoddy and Jayasuriya, 2016; Wan et al., 2015).

An adequate drug delivery system for bone infections has to have some features to be more effective, such as: (1) no exothermic reactions; (2) allowing local delivery of high drug concentration; (3) having a comprehensive range and prolonged bactericidal effect; (4) suitable mechanical properties in accordance with the specific application; (5) acting as a resorbable scaffold for bone regeneration; (6) inhibiting osteoclast activity; (7) and promoting osteogenesis. The requirement of prolonged action is because debridement is not completely effective against bacteria colonies, and there is a continuous risk of recurrence. If the treatment is not prolonged, the most antibiotic-resistant microorganisms may remain and colonize the bone tissue again (Birt et al., 2017; Li et al., 2016). In case of implants, the local application of antibiotics and controlled release can inhibit bacteria colonization, which is important to the clinical success (Kaur et al., 2014).

Thinking about the drug delivery system as a whole, physical, chemical, and biological properties of the drug delivery components (biomaterial+ drug) and of the target tissue must be taken into account along the development of the system per se (Parent et al., 2017).

The biomaterial's properties and features influence the absorption and release of the drug, such as particle size and morphology, surface defects, grain size, specific surface area, and pores connectivity. The crystallinity can exert influence on the biomaterial dissolution rate and consequently on the drug release

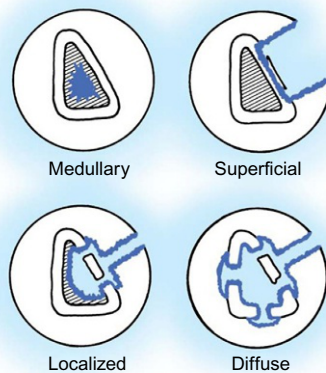


FIG. 14.2 Anatomic representation of osteomyelitis classification in adults. (Adapted from Cierny et al., 2003).