

1. Record Nr.	UNINA9910791052603321
Autore	Oshida Yoshiki
Titolo	Surface engineering and technology for biomedical implants // Yoshiki Oshida
Pubbl/distr/stampa	New York : , : Momentum Press, LLC, , [2014] ©2014
ISBN	1-60650-628-5
Descrizione fisica	1 online resource (320 p.)
Disciplina	610.28
Soggetti	Biomedical materials Implants, Artificial - Design and construction
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	<p>1. Introduction -- 1.1 Literature review results -- 1.2 Acceptability and prevalence of implants -- 1.3 Overview of implant technology -- References --</p> <p>2. Implantable materials -- 2.1 Introduction -- 2.2 Metallic biomaterials -- 2.3 Polymeric biomaterials -- 2.4 Ceramic biomaterials -- 2.5 Composites -- References --</p> <p>3. Interfacial reactions between vital tissue and nonvital implant surfaces -- 3.1 Introduction -- 3.2 Toxicity -- 3.2.1 Chemical toxicity -- 3.2.2 Biological toxicity -- 3.2.3 Physical toxicity -- 3.3 Allergic reaction -- 3.4 Compatibility -- 3.4.1 Hemocompatibility -- 3.4.2 Cytocompatibility -- 3.5 Bone healing -- 3.5.1 Cellular response to biomaterials -- 3.5.2 Cell attachment, adhesion, and spreading -- 3.5.3 Cell proliferation and differentiation -- 3.5.4 Bone ingrowth -- 3.5.5 Bone healing and grafting -- 3.5.6 Osseointegration -- 3.6 Loosening implants and infection -- References --</p> <p>4. Requirements for successful implant systems -- 4.1 Introduction -- 4.2 Biological compatibility -- 4.3 Biomechanical compatibility -- 4.4 Morphological compatibility -- References --</p> <p>5. Surface modification -- 5.1 Introduction -- 5.2 Nature of surface and interface -- 5.3 Surface modification technologies -- 5.3.1 Mechanical modification -- 5.3.2 Chemical and electrochemical modifications -- 5.3.3 Physical modification -- 5.3.4 Thermal</p>

modification -- 5.3.5 Combined technology -- 5.4 Coating materials and materials preparation -- 5.4.1 Metallic materials -- 5.4.2 Polymeric materials -- 5.4.3 Ceramics--metallic oxides, nitrides, and carbides -- 5.4.4 Ceramics--nonmetallic compounds -- 5.4.5 Composites, hybrids, functional gradient materials, and biomimetic materials -- 5.4.6 Others -- References --

6. Evaluation and characterization of modified surfaces -- 6.1 Introduction -- 6.2 Safety concerns and testing -- 6.3 Magnetic resonance imaging safety and image compatibility -- 6.4 Hydrophilicity and hydrophobicity -- 6.5 Blood compatibility -- 6.6 Cell adhesion and adhesive strength -- 6.7 Osseointegration -- 6.8 Biomimetic coating -- 6.9 Measures against toxic ion elution -- 6.10 Evaluation of biocompatibility -- 6.11 Mechanical properties -- 6.12 Temperature changes -- 6.13 Corrosion behavior -- 6.14 Effect of sterilization -- 6.15 Strontium effect -- 6.16 Characterization of HA -- 6.17 Characterization of other bio-ceramics -- 6.18 Surface texturing and topology -- 6.19 Retrieved implants -- References --

7. New materials, new structures, and new technologies -- 7.1 Introduction -- 7.2 New materials -- 7.2.1 Bone materials -- 7.2.2 Porous materials -- 7.2.3 Nanomaterials -- 7.2.4 Functionally gradient materials -- 7.3 New structures -- 7.3.1 Nanostructures -- 7.3.2 Biomimetic functionalization -- 7.4 New technologies -- 7.4.1 Tissue engineering -- 7.4.2 Three-dimensional printing -- 7.4.3 Laser technologies -- 7.4.4 Electrospinning -- 7.4.5 Atmospheric plasma treatment -- 7.4.6 Friction stir welding -- 7.4.7 Near-net shape (NNS) forming -- 7.4.8 Miscellaneous --

References -- Index.

Sommario/riassunto

As society is increasingly concerned with quality of life for an ever-growing elderly population and those with sports and military injuries, greater attention is being paid to managing diseases and pains, as well as treating these populations. Orthopedics and dental implants still face many challenges to facilitate the aged society, in particular, because implant receiving vital hard tissue gradually deteriorates (in the sense of reduced bone density and quality). In addition, special developments in materials, as well as treatment techniques, are urgently needed for dental/medical implant candidates who have already developed serious or lifestyle-related diseases which are contraindicative to implant treatments.
