Total Hip Arthroplasty Wear Behaviour Of Different Articulations Efort Reference In Orthopaedics And Traumatology

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Biomaterials in Orthopedics - Michael J. Yaszemski 2003-10-17

Written by respected experts in the field, Biomaterials in Orthopedics discusses bioabsorbable biomaterials for bone repair, nondegradable materials in orthopaedics and delivery systems. Topics in this text include biocompatibility and the biomaterial/tissue interface; self-reinforced bioabsorbable devices and guided regeneration; bone substitutes,

Biomaterials and Engineering for Implantology - Yoshiki Oshida 2022-02-07

Biomaterials are composed of metallic materials, ceramics, polymers, composites and hybrid materials. Biomaterials used in human beings require safety regulations, toxicity, allergic reaction, etc. When used as implantable materials their biological compatibility, biomechanical compatibility, and morphological compatibility must be acessed. This book explores the design and requirements of biomaterials for the use in implantology.

PEEK Biomaterials Handbook - Steven M. Kurtz 2011-10-28

PEEK biomaterials are currently used in thousands of spinal fusion patients around the world every year. Durability, biocompatibility and excellent resistance to aggressive sterilization procedures make PEEK a polymer of choice, replacing metal in orthopedic implants, from spinal implants and hip replacements to finger joints and dental implants. This Handbook brings together experts in many different facets related to PEEK clinical performance as well as in the areas of materials science, tribology, and biology to provide a complete reference for specialists in the field of plastics, biomaterials, medical device design and surgical applications. Steven Kurtz, author of the well respected UHMWPE Biomaterials Handbook and Director of the Implant Research Center at Drexel University, has developed a one-stop reference covering the processing and blending of PEEK, its properties and biotribology, and the expanding range of medical implants using PEEK: spinal implants, hip and knee replacement, etc. Covering materials science, tribology and applications Provides a complete reference for specialists in the field of plastics, biomaterials, biomedical engineering and medical device design and surgical applications

Applications of Nanocomposite Materials in Orthopedics - Dr Inamuddin 2018-11-09

Applications of Nanocomposite Materials in Orthopedics provides a solid understanding of recent developments in the field of nano-composites used in orthopedics. The book covers joint replacement, the load bearing capability of fractured bones, bone soft tissue regeneration, hard tissue replacement, artificial bone grafting, bone repair, bone tissue transplantations, and related topics, thus helping readers understand how to resolve problems associated with bone fracture and orthopedic surgery. A variety of nanocomposite materials are discussed, with their properties and preparation methods given. Outlines the use of nanotechnology for bone tissue transplantation Describes nanocomposites for bone grafting and artificial bones, also including their properties Includes discussions on tissue engineering of bone and tissue regeneration and transplantation Describes many composite materials and their preparation methods

Medical Dictionary/Diccionario de Medicina/Dicionário de termos médicos - Irmgard Nolte-Schlegel 2004-05-03

The proven concept of the first edition has been continued in the second edition Including many new entries and completely revised A trilingual dictionary with more than 4300 entries Offering an indispensable vocabulary of basic medical terminology For physicians, medical students and everybody connected with the medical profession Contains important expressions and phrases, essential for professional success in foreign countries Enabling communication with patients of different nationalities as well as medical report writing in foreign languages Acknowledges the particularities within intricacies of Brazilian Portuguese

Emerging Trends in Mechanical Engineering - L. Vijayaraghavan 2019-12-11

This book comprises select proceedings of the International Conference on Emerging Trends in Mechanical Engineering (ICETME 2018). The book covers various topics of mechanical engineering like computational fluid dynamics, heat transfer, machine dynamics, tribology, and composite materials. In addition, relevant studies in the allied fields of manufacturing, industrial and production engineering are also covered. The applications of latest tools and techniques in the context of mechanical engineering

problems are discussed in this book. The contents of this book will be useful for students, researchers as well as industry professionals.

Bioceramics in Joint Arthroplasty - Hartmut Zippel 2012-12-06

Dear Colleague and Participant of Bioceramics in Joint Arthroplasty 8'h Biolox" Symposium It is a pleasure for us to be able to present you with the proceedings of this Symposium. This is something that we are very proud of, as it is the first time that we have been able to achieve our objective of distributing this collection of all presentations made at this Symposium in a printed form at this time. The achievement of this goal was reached in great part as a result of the excellent cooperation of all of the speakers as well as the commitment of the publishing house to assist us in every way possible to meet the strict deadlines imposed. Additionally, a special thanks must also be given to some very special people who diligently worked to make sure our objective was met. They are: Gertrud Volkert. M. D. and Petra Elster of the Steinkopff Verlag Publishing company and our own Symposium Administrator, Hedi Kissinger. We believe that you will find this book to be a valuable and useful addition to your reference library. We hope that within its covers, you will find the most up to date scientific and clinical information regarding the use of ceramic solutions to address wear related problems in Orthopedic Surgery.

Perspectives in Total Hip Arthroplasty - Saverio Affatato 2014-05-01

Total hip arthroplasty, the most commonly performed orthopedic procedure, is used to replace or reconstruct the hip with an artificial joint. Perspectives in Total Hip Arthroplasty outlines developments in technologies and biomaterials used for this procedure, with a focus on the tribological interactions of the materials used. Part one outlines the history of total hip arthroplasty and goes on to explore advances in techniques and biomaterials. Part two focuses on the tribology of materials used to perform this procedure, explaining the impact of wear on the load-bearing surface, a major cause of failure in hip prostheses. Chapters review a range of materials, including modern biomaterials, hybrid materials, metal, ceramic, and polyethylene. The book also discusses the tribological interactions of these materials when used in total hip arthroplasty. Perspectives in Total Hip Arthroplasty is a key resource for clinicians, researchers, and academics interested in the tribology of total hip arthroplasty, as well as materials researchers, engineers, and academics concerned with the tribology of biomaterials. Covers techniques from innovative surgeons and designs from multinational manufacturers, as well as information on improvements in technologies and biomaterials Discusses the tribology of all the major materials used in total hip arthroplasty

Shoulder Arthroplasty - Joseph D. Zuckerman 2021-06-18

Covering every aspect of shoulder arthroplasty from initial assessment to comprehensive postoperative rehabilitation, Shoulder Arthroplasty: Principles and Practice, provides highly illustrated, authoritative guidance on the fastest growing arthroplasty procedure. Dr. Joseph Zuckerman, former president of the American Shoulder and Elbow Surgeons and the American Academy of Orthopaedic Surgeons, has assembled a team of world-renowned contributing authors who clearly explain and demonstrate—in print and in video—the techniques they utilize to achieve successful outcomes. This one-stop reference is an ideal resource for surgeons at all levels of experience who wish to further enhance their ability to perform shoulder replacement.

Controversies in Hip Surgery - Robert B. Bourne 2003

The purposes of this book is to give an overview of controversies that orthopaedic surgeons might have to consider when carrying out all levels of hip surgery. Contributions cover such important paediatric problems such as developmental dysplasia of the hip, Perthes disease, slipped capital femoral epiphysis and hip problems associated with neurological diseases. Traumatic conditions of the hip, including acetabular fractures and femoral neck fractures are covered in detail. Considerable emphasis is given to the field of both primarily and revision total hip replacement, with special emphasis on the difference which occur in Europe and North America. Like every other aspect of hip disease, the field of total hip anthroplasty is continuously changing to improve both the quality and durability of the clinical result. Finally, post-operative complications and their avoidance are covered, particularly in the fields of deep vein thrombosis prophylaxis and management of the infected total hip arhtroplasty. The contributions in this volume are from an international array of experts in the field of hip surgery.

Metals for Biomedical Devices - Mitsuo Niinomi 2019-05-17

Metals for Biomedical Devices, Second Edition, has been fully updated and builds upon the success of its first edition, discussing the latest techniques in metal processing methods and the behavior of this important material. Initial chapters review the current status and selection of metals for biomedical devices. Subsequent chapters cover mechanical behavior, degradation and testing, corrosion, wear testing and biocompatibility, the processing of metals for biomedical applications, including topics such as forging metals and alloys, surface treatment, coatings and sterilization. Chapters in the final section discuss the clinical applications of metals, such as cardiovascular, orthopedic and new generation biomaterials. With its distinguished editor and team of expert contributors, this book is a standard reference for materials scientists, researchers and engineers working in the medical devices industry and academia. Reviews the latest techniques in metal processing methods, including surface treatment and sterilization Examines metal selection for biomedical devices, considering the biocompatibility of various metals Assesses mechanical behavior and the testing of metals, featuring the latest information on corrosion, fatigue and wear Discusses biodegradable alloys, including a new section on Mg alloys Includes a new section that discusses the use of additive manufacturing in the production of medical devices

Index Medicus - 2003

Bioceramics and Alternative Bearings in Joint Arthroplasty - James A. D'Antonio 2006-03-10

Dear Colleague and Participant in Bioceramics and Alternative Bearings In Joint Arthroplasty: 10*" International BIOLOX® Symposium We are once again very proud that we are able to present to you the proceedings of the Symposiunn as part of your registration materials. This group accomplishment has been made possible by the superb cooperation received from the speakers in sending us their manuscripts on a timely basis as well as by the supporting staff at both CeramTec and at the Publishing House in executing all of the details needed. We specially extend our most heartfelt thanks to the Scientific Committee for their assistance in evaluating and selecting the submissions as well as developing the Symposium program. We are more convinced than ever that the proceedings of this Symposium are a continuation of CeramTec's tradition of providing all members of the orthopedic surgical community with a valuable addition to your reference libraries. We hope that this book will present you with the latest and most up to date source of scientific and clinical information regarding the use of ceramics and other alternative bearings in joint replacement surgery.

Joint Arthroplasty - Shinichi Imura 2012-12-06

The introduction of total joint arthroplasty throughout the world has contributed manifold benefits to patients who suffer from joint diseases. Concurrently, however, there has been an increase in revision surgery. Many orthopedic surgeons agree that durability of prostheses is an eternal problem. In particular, periprosthetic osteolysis recently has been identified as one of the serious problems affecting prosthetic dura bility. To improve durability, osteolysis and many other problems must be investi gated and solved both experimentally and clinically with respect to such aspects as prosthetic material, design, and biological and biomechanical behavior. This book comprises 37 papers that were presented by orthopedic surgeons and biomedical engineers at the 28th Annual Meeting of the Japanese Society for Replace ment Arthroplasty, held in March 1998 in Kanazawa, Japan. The volume is thus a compilation of the latest knowledge about the pathogenesis and reduction of osteolysis and wear, newly developed total hip prostheses, and other current topics of total knee arthroplasty. We earnestly hope that this book will be of benefit to clinicians and researchers, and that it will contribute to the creation of more durable total joint prostheses in the future. SHINICHI IMURA v Contents Preface ..... '" .. .. V List of Contributors. . . . . XI . . . . . Part 1 Wear and Pathogenesis of Osteolysis Friction and Wear of Artificial Joints: A Historical Review N. AKAMATSU ..... , 3 Matrix Degradation in Osteoclastic Bone Resorption Under Pathological Conditions .

Polyethylene-Based Blends, Composites and Nanocomposities - Visakh P. M. 2015-07-06

The book focusses on the recent technical research accomplishments in the area of polyethylene-based blends, composites and nanocomposites by looking at the various aspects of processing, morphology, properties and applications. In particular, the book details the important developments in areas such as the structure-properties relationship of polyethylene; modification of polyethylene with radiation and ion implantation processes; stabilization of irradiated polyethylene by the introduction of antioxidants; reinforcement of polyethylene through carbon-based materials as additives; characterization of carbon-based polyethylenes composites, polyethylene-based blends with thermoplastic and thermoset; characterization of polyethylene-based thermoplastic and thermoset blends; polyethylene-based blends with natural rubber and synthetic rubber; characterization of polyethylene-based natural rubber and synthetic rubber blends; characterization of polyethylene-based composites.

Surgery of the Hip E-Book - Daniel J. Berry 2019-09-24

Offering authoritative, comprehensive coverage of hip surgery, the 2nd Edition of Surgery of the Hip is the definitive guide to hip replacement, other open and arthroscopic surgical procedures, and surgical and nonsurgical management of the hip across the lifespan. Modeled after Insall & Scott Surgery of the Knee, it keeps you fully up to date with the latest research, techniques, tools, and implants, enabling you to offer both adults and children the best possible outcomes. Detailed guidance from expert surgeons assists you with your toughest clinical challenges, including total hip arthroplasty, pediatric hip surgery, trauma, and hip tumor surgery. Discusses new topics such as direct anterior approach for total hip arthroplasty, hip pain in the young adult, and hip preservation surgery. Contains new coverage of minimally invasive procedures, bearing surface selection, management of complications associated with metal and metal bearing surfaces, management of bone loss associated with revision THA, and more. Provides expert, personal advice in "Author's Preferred Technique" sections. Helps you make optimal use of the latest imaging techniques, surgical procedures, equipment, and implants available. Covers tumors of the hip, hip instability and displacement in infants and young children, traumatic injuries, degenerative joint disorders, and rehabilitation considerations—all from both a basic science and practical clinical perspective.

Recent Advances in Arthroplasty - Samo Fokter 2012-01-27

The purpose of this book was to offer an overview of recent insights into the current state of arthroplasty. The tremendous long term success of Sir Charnley's total hip arthroplasty has encouraged many researchers to treat pain, improve function and create solutions for higher quality of life. Indeed and as described in a special chapter of this book, arthroplasty is an emerging field in the joints of upper extremity and spine. However, there are inborn complications in any foreign design brought to the human body. First, in the chapter on infections we endeavor to provide a comprehensive, up-to-date analysis and description of the management of

this difficult problem. Second, the immune system is faced with a strange material coming in huge amounts of micro-particles from the tribology code. Therefore, great attention to the problem of aseptic loosening has been addressed in special chapters on loosening and on materials currently available for arthroplasty.

NBS Special Publication - 1981

Journal of Biomimetics, Biomaterials and Tissue Engineering - Trans Tech Publications, Limited 2010-10-25

This volume of the "Journal of Biomimetics, Biomaterials and Biomedical Engineering" covers topical issue of biomimetic approach to the development of modern means of a wide range of industrial applications, the new solutions in the field of biomedical engineering and of pharmacological practice and also illuminates the results of the latest solutions in the field of development of biomaterials and their application.

Crosslinkable Polyethylene - Jince Thomas 2021-05-03

This volume covers various aspects of cross-linked polyethylene (XLPE). The contents include manufacture, morphology, structure, properties, applications, early stage development, cross-linking techniques, recycling process, physical and chemical properties as well as the scope and future aspects of XLPE. It focuses on the life cycle analysis of XLPE and their industrial applications and commercial importance. This book will be of use to academic and industry researchers, as well as graduate students working in the fields of polymer science and engineering, materials science, and chemical engineering.

Multiscale Biomechanics and Tribology of Inorganic and Organic Systems - Georg-Peter Ostermeyer 2020-11-23

This open access book gathers authoritative contributions concerning multiscale problems in biomechanics, geomechanics, materials science and tribology. It is written in memory of Sergey Grigorievich Psakhie to feature various aspects of his multifaceted research interests, ranging from theoretical physics, computer modeling of materials and material characterization at the atomic scale, to applications in space industry, medicine and geotectonics, and including organizational, psychological and philosophical aspects of scientific research and teaching as well. This book covers new advances relating to orthopedic implants, concerning the physiological, tribological and materials aspects of their behavior; medical and geological applications of permeable fluid-saturated materials; earthquake dynamics together with aspects relating to their managed and gentle release; lubrication, wear and material transfer in natural and artificial joints; material research in manufacturing processes; hard-soft matter interaction, including adhesive and capillary effects; using nanostructures for influencing living cells and for cancer treatment; manufacturing of surfaces with desired properties; self-organization of hierarchical structures during plastic deformation and thermal treatment; mechanics of composites and coatings; and many more. Covering established knowledge as well as new models and methods, this book provides readers with a comprehensive overview of the field, yet also with extensive details on each single topic.

Bioceramics and Alternative Bearings in Joint Arthroplasty - Jun-Dong Chang 2007-08-28

This proceedings book of the Biolox Symposium in Seoul is composed of 10 sessions and plenary lectures of the most current knowledge available in the use of Bioceramics and alternative bearings. More than 50 speakers with world-famous reputations from 12 countries cover 52 topics on recent developments in Bioceramic and alternative bearings in arthroplasty.

Joint Replacement Technology - Peter A. Revell 2021-08-09

The third edition of Joint Replacement Technology provides a thoroughly updated review of recent developments in joint replacement technology. Joint replacement is a standard treatment for joint degradation and has improved the quality of life of millions of patients. Collaboration between clinicians and researchers is critical to its continued success and to meet the rising expectations of patients and surgeons. This edition covers a range of updated and new content, ranging from chapters on materials analysis and selection, to methodologies and techniques used for joint replacement and clinical challenges of replacing specific joints. Key topics include tribological considerations and experiments; challenges in joint bearing surfaces; cementless fixation techniques; healing responses to implants. Clinical challenges and perspectives are covered with the aid of case studies. Thanks to its widespread collaboration and international contributors, Joint Replacement Technology, Third Edition is useful for materials scientists and engineers in both academia and the biomedical industry. Chemists, clinicians, and other researchers in this area will also find this text invaluable. This third edition provides an updated comprehensive review of recent developments in joint replacement technology. Reviews a range of specific joints, biological and mechanical issues and fixation techniques. Includes revised and new content, such as sections on regulatory affairs, AI techniques and 3D printing.

Biomechanics and Biomaterials in Orthopedics - Dominique G. Poitout 2016-06-15

With the constant evolution of implant technology, and improvement in the production of allograft and bone substitutes, the armamentarium of the orthopaedic surgeon has significantly expanded. In particular, the recent involvement of nanotechnologies opens up the possibilities of new approaches in the interactive interfaces of implants. With many important developments occurring since the first edition of this well-received book, this updated resource informs orthopaedic practitioners on a wide range of biomechanical advances in one complete reference guide. Biomechanics and Biomaterials in Orthopedics, 2nd edition compiles the most prominent work in the discipline to offer newly-qualified orthopedic surgeons a summary of the fundamental skills that they will need to apply in their day-to-day work, while also updating the knowledge of experienced surgeons.

This book covers both basic concepts concerning biomaterials and biomechanics as well as their clinical application and the experience from everyday practical use. This book will be of great value to specialists in orthopedics and traumatology, while also providing an important basis for graduate and postgraduate learning.

Advanced Biomaterials for Orthopaedic Application - Saverio Affatato 2020-06-18

This book covers a wide range of topics in the orthopaedic fields and can be used as a textbook for the nal undergraduate engineering course or as a topic on tribology at the postgraduate level. This book can serve as a useful reference for academics, tribology, and materials researchers; mechanical, materials, and physics engineers; biomedical scientists and professionals in tribology; and related industries. The scienti c interest in this book will be evident for many important centres of research, including laboratories and universities throughout the world.

Bioceramics and Alternative Bearings in Joint Arthroplasty - Francesco Benazzo 2006-10-18

Dear Colleague and Participant in Bioceramics and Alternative Bearings in Joint th ® Arthroplasty: 11 International BIOLOX Symposium We are once again very proud of the fact that we have been able to provide you with the proceedings of this Symposium as a part of your registration materials. This is a mayor achievement that could only be made possible by the excellent cooperation of all of the speakers, the publishing house and their staff and the Symposium Administrator and her support staff. Our special thanks to all of them for their hard work and dedication to meet the difficult deadlines required to make this a reality. The proceedings for this Symposium continue the on-going tradition to provide all of us with a valuable and useful addition to our reference library. We hope that within its covers, you will find the most up to date scientific and clinical information regarding the use of ceramic solutions to address wear related problems in Orthopedic Surgery. This is the first time that the symposium takes place in Italy. The reason we chose Italy and in particular Rome is obvious as CeramTec has had a long term and close relationship with the Italian. CeramTec is pleased that our Symposium Chairmen, Professors F. Benazzo and F. Falez have collaborated with us in the preparation and in th the execution of Bioceramics and Alternative Bearings in Joint Arthroplasty - 11 ® International BIOLOX Symposium.

Effect of Surface Degradation on Wear Behaviour of 3Y-TZP Ceramics - Ravi Kiran Chintapalli 2008

3Y-TZP ceramics used in biomedical applications, such as total hip replacement and dental restorations, are of large technological interest. The tendency of these ceramics to transform from tetragonal to monoclinic phase in the surface at temperatures close to room temperature is of huge concern, and is referred as hydrothermal degradation or low temperature degradation in aqueous environments. Due to this degradation many in vivo failure of femoral heads occurred in hip prosthesis in recent years. The goal of this work is to study the effect of hydrothermal temperature degradation on Zirconia/Zirconia wear behaviour under dry sliding conditions, analyse the wear rates and also to detect the surface degradation by means of variation in friction and wear behaviour. Zirconia ceramics doped with 3 molar % of yittria are used in this study. Samples are made using 3Y-TZP powder, cold pressed and sintered at 1450oC. Sintered samples are subjected to low temperature degradation for 10 & 60 hours in autoclave at temperature 131oC and pressure 2 bars. As a first approach to investigate the wear behaviour of the sintered, 10 and 60 hour degraded samples, single pass scratch experiments were performed using an automatic scratch tester. Blunt and sharp indenters were used for increasing loads and different constant loads respectively. Ball on disc tribology tests were performed using Zirconia/Zirconia couple. All the tribology tests are done in an automated tribometer by varying sliding distance and keeping the sliding velocity and load constant. The wear micromechanisms are observed using scanning electron microscope and profiles are obtained using optical interferometer. A single pass scratch test can detect the surface degradation with a clear variation in acoustic emission under sharp indenter tests, but coefficient of friction does not vary. In case of blunt indenter test coefficient of friction for 60hour sample exhibits a rise at load around 75N, which is not seen in sintered sample. The wear micromecahnisms observed are plastic ploughing in sintered sample and chipping associated with severe grain pullout in 60 hours degraded sample as is the same case in 10 hour degraded sample with mild grain pullout. Under tribological tests the wear micromecanisms are abrasion and plastic deformation in sintered sample and grain pullout with intergrannular fracture in 60 hour degraded sample. The wear rates under both experiments show a clear variation in all samples. By showing variation in coefficient of friction, acoustic emission, wear micromechanisms and wear rates a simple method has been established to detect the surface degradation.

Total Hip Arthroplasty - Karl Knahr 2012-04-05

During the 2011 EFORT Congress in Copenhagen, many interesting topics relating to tribology in total hip arthroplasty were discussed during a special day devoted entirely to the subject. EFORT decided that, given the wide interest in these discussions, publication of the presentations would be warmly welcomed by all fellow professionals who were unable to attend. This book is the result. It provides detailed information on currently used articulating materials and their wear performance. Clinical outcomes are discussed, and important new frontiers are carefully considered. The book will be of interest both to novices who want to learn more about the field and to experienced orthopaedic surgeons wishing to keep abreast of the latest developments.

Tribological Performance of Artificial Joints - Amir Kamali 2019-07-01

Joint replacement is a very successful medical treatment. However, the survivorship of the implants could be adversely affected due to the loss of

materials in the form of particles or ions as the bearing surfaces articulate against earch other. The consequent tissue and immune response to the wear products, remain one of the key factors of their failure. Tribology has been defined as the science and technology of interacting surfaces in relative motion and all related wear products (e.g., particles, ions, etc.). Over the last few decades, in an attempt to understand and improve joint replacement technology, the tribological performance of several material combinations have been studied experimentally and assessed clinically. In addition, research has focused on the biological effects and long term consequences of wear products. Improvements have been made in manufacturing processes, precision engineering capabilities, device designs and materials properties in order to minimize wear and friction and maximize component longevity in vivo. This book investigates the in vivo and in vitro performance of the orthopaedic implants and their advanced bearings. Contributions are solicited from the researchers working in the field of biotribology and bioengineering

Performance of Metals and Ceramics in Total Hip Arthroplasty - Armando Reyes Rojas 2023-03-10

This book offers expert guidance on materials for total hip arthroplasty (THA), providing readers with quick access to well-organized summaries on biomaterials such as metals, ceramics, polymers, and composites. It also includes in-depth coverage of biocompatibility and implant problems such as necrosis, ulceration, high toxicity with metals, and allergic reactions. Coverage also emphasizes the mechanical properties of the materials used for prostheses applications, immunity to corrosion, enhanced biocompatibility, complete inertness to the body environment, and the high capacity to join with the bone and other tissues. Performance of Metals and Ceramics in Total Hip Arthroplasty is an essential reference for engineers and scientists specializing in prostheses design and manufacturing and orthopedic medical professionals. The book can also be used as a study guide for materials science and orthopedics students.

Mechanical Behavior of Biomaterials - J. Paulo Davim 2019-06-13

Mechanical Behaviour of Biomaterials focuses on the interface between engineering and medicine, where new insights into engineering aspects will prove to be extremely useful in their relation to the biomedical sciences and their applications. The book's main objective focuses on the mechanical behavior of biomaterials, covering key aspects, such as mechanical properties, characterization and performance. Particular emphasis is given to fatigue, creep and wear, fracture, and stress and strain relationships in biomaterials. Chapters look at both experimental and theoretical results. Readers will find this to be an essential reference for academics, biomechanical researchers, medical doctors, biologists, chemists, physicists, mechanical, biomedical and materials engineers and industrial professionals. Presents contributions from international experts Provides insights at the interface of disciplines, such as engineering and the medical and dental sciences Presents a comprehensive understanding on the mechanical properties of biomaterials Covers surface and bulk properties

Alternative Bearing Surfaces in Total Joint Replacement - Joshua J. Jacobs 1998

Contains 18 papers presented at the Symposium on Alternative Bearing Surfaces in Total Joint Replacement, held in San Diego, California, in November 1997. Focus is on development and utilization of alternative bearing surfaces in orthopedics and prosthetics to mitigate the effects of particulate pol

Materials for Total Joint Arthroplasty - Robert Sonntag 2015-10-14

"The replacement of a degenerated joint such as the hip and knee is one of the most outstanding interventions that allows the medical community to restore the patient's quality of life. However, today's patient is increasingly younger and more active and this presents a challenge for the orthopaedic community as a greater demand has been created for a longer lasting artificial joint that can allow the patient to maintain their lifestyle and thus new approaches in biotribology have been focused on this area of research. This invaluable book provides a broad introduction to the boundary conditions, developments and latest research activities already available to the surgeon and offers an insight into solutions being developed for new high performance bearings in joint replacements. The contributors are leading experts in their field and this is the first complete volume to bring together such unique insights. Orthopaedic engineers, surgeons and researchers concerned with new biomaterials would find this a vital reference volume to evaluate the latest state of research in the area."--

Cumulated Index Medicus - 1994

Tribology in Biomechanical Systems - Friedrich Franek 2001

Interfaces in Total Hip Arthroplasty - Ian D. Learmonth 2012-12-06

This book incorporates the experience of numerous experts who explore contemporary opinion of how best to rationalise and optimise the interfaces at total hip replacement to provide the most favourable and durable results. The survival of a total hip replacement depends principally on the enduring integrity of the fixation interfaces and of the articular interface. The design of the stem and the material properties of cement largely determine the state of the component-cement inter face, while the bone-cement interface is significantly influenced by both mechanical and biological factors. The surface finish and shape of cementless implants are designed to preserve the integrity of biological fixation (osseo-integration) at the bone-component interface. Once again, both mechanical and biological factors have to be considered, while bioactive coatings accelerate bone ongrowth. Metal-on-polyethylene is the most widely used articular interface. However, it has been suggested that wear of polyethylene is one of the major factors contributing to failure of total hip

replacements. The increasing prevalence of total hip replacement in younger patients has stimulated the investigation of alternative, more durable couples -including ceramic-polyethylene, ceramic-ceramic and metal-on-metal. Modularity provides greater intra-operative flexibility, but each new modular interface introduces new mechanisms of failure. These need to be anticipated and appropriate measures taken to avoid them. Hopefully this book will provide a better understanding of the factors that contribute to stable interfaces and long-term survival of total hip arthroplasty.

Wear of Materials - American Society of Mechanical Engineers 2001

Tribology in Total Hip and Knee Arthroplasty - Karl Knahr 2014-04-23

Wear and osteolysis are still the most important potential problems in total hip and knee arthroplasty. Although technology in arthroplasty has been improved dramatically during the past decade, the clinical data relating to some implants reveal that many concerns remain. During the “Tribology Day” within the scientific programme of the 2013 EFORT Congress in Istanbul, the main topics included these concerns as well as the benefits of the materials most commonly used in total hip and knee arthroplasty. This book includes the presentations delivered on the day and covers a range of interesting issues regarding metal, ceramic, and polyethylene articulations. It provides information on the current concepts relating to tribology in total hip arthroplasty and offers a critical outlook on possible improvements in total knee arthroplasty.

Bioceramics in Joint Arthroplasty - Jonathan P. Garino 2002

Friction, Lubrication and Wear of Artificial Joints - Ian M. Hutchings 2003-02-14

Tribology has been central to the development of this field of engineering and Friction, Lubrication, and Wear of Artificial Joints brings together the work of the foremost authorities. Recent key work, particularly on hip and knee replacement prostheses form the major part of this book. Artificial joint technology, clinical practice, and the monitoring of on-going wear in use have progressed by leaps and bounds in the last few years. Medical research engineers, tribology specialists, and materials technologists each play an important role in ensuring that this marriage of engineering and medicine delivers the best possible outcome for the patients who receive the implants. Contents of this book include: Biotribology - A personal view The influence of component geometry on the measurement of wear A tribological study of metal-on-metal total replacement hip joints The lubrication and friction of conventional UHMWPE, novel compliant layer and hard bearing surfaces for use in total hip prostheses Prediction of lubricating film thickness in UHMWPE hip joint replacements Wear of ceramic-on-ceramic hip prostheses under micro-separation simulation conditions Friction and wear testing of DLC type coatings on total hip replacement prostheses Simulator testing of total knee replacement A new measurement method for wear scars generated with knee simulators