

Contents

Series Foreword.....	v
Preface.....	vii
Section 1. Keynote lectures	
Biomaterials and infection: clinical experience	
A. Pizzoferrato.....	1
New trends in implant materials	
W. Bonfield.....	13
Cementless fixation	
L.L. Hench.....	23
Clinical applications of biomaterials in maxillofacial, plastic and reconstructive surgery	
D. Leake.....	35
Polymers and composite materials in biomedical applications	
P. Giusti.....	43
Section 2. Biomaterials for hard tissue applications	
The role of pore size on bone ingrowth and implant substitution in hydroxyapatite and tricalcium phosphate ceramics; a histologic and morphometric study in rabbits	
P.S. Egli, W. Mueller and R.K. Schenk.....	53
Experimental bone ingrowth study of 3-D porous ceramic coating (poral [®]) for cementless hip prosthesis	
A. Toni, A. Pizzoferrato, A. Venturini, A. Sudanese, N. Baldini, G. Ciapetti and S. Stea.....	57
Histological examination of the bone/metal interface in removed porous coated human prostheses using a new processing method	
J.F. Dichiaro and P.A. Higham.....	63
Hydroxylapatite coating on Ti and Al ₂ O ₃ -studies on the biological fixation	
H. Oonishi, S. Miyamoto, A. Kohda, H. Ishimaru and E. Tsuji.....	69
Strength of bonding between A-W glass ceramic and the surface of bone cortex	
S. Yoshii, Y. Kakutani, T. Yamamuro and T. Kokubo.....	75
Calcium phosphate ceramics for bone implants: bioresorption of porous ceramics of strontium-85 labeled hydroxyapatite and tricalcium orthophosphate implanted in dog femora	
H.A. Hoogendoorn, W.J. Visser, S.J. Oldenburg, L.M.A. Akkermans, P. Wittebol and W. Renooij.....	81
Morphological studies on titanium implants inserted in rabbit knee-joints	
P. Thomsen, A.S. Eriksson, R. Olsson, L.M. Bjursten, P.-I. Brånemark and L.E. Ericson.....	87
Ceramics in dental implantology	
G. Heimke, B. D'Hoedt and W. Schulte.....	93
Evaluation of submerged bulk and fibre reinforced bioglass dental implants	
E. Schepers, M. de Clercq and P. Ducheyne.....	105
How to measure strength of dental filling materials	
U. Soltesz, B. Klaiber and J. Sander.....	113
Corrosion and protection of surgical and dental metallic implants	
C. Sella, J.C. Martin, J. Lecoeur, J.P. Bellier and J.P. David.....	119
The influence of cavity diameter on the in vitro toxicity testing of dental materials	
S.D. Meryon.....	125
Cementless prosthesis: clinical experience	
J.O. Galante.....	131

Design rationale of interference-fit total hip prostheses	
I. Oh.....	141
Stem-bone micromotion in non-cemented hip prostheses	
H. McKellop, E. Ebramzadeh, A. Sarmiento, P. Niederer.....	155
Preliminary experience with cementless porous coated anatomic (P.C.A.) total hip replacement: the first 180 consecutive cases	
P.G. Marchetti, R. Binazzi, V. Vaccari and L. Ponziani.....	161
Some aspects of failure analysis of ex vivo cementless implanted ceramic to ceramic total hip joint prostheses	
A. Walter, Th. Mittlmeier and G. Wasmer.....	165
Adaptive bone remodelling in madreporic hip prostheses	
M. Portigliatti Barbos, F. Baudrocco, P. Iulita, P. Ross.....	171
Ten year follow up of uncemented total hip prosthesis with alumina acetabulum and titanium femoral stem by plasma jet technique	
C. Trentani, A. Montagnani and G. Vicenzi.....	177
Modelling of the reamed proximal femur by simple geometrical models	
B. Hoornaert, J. Putzeys and E. Sleenckx.....	183
Tricalcium phosphate ceramics in periodontal therapy: histological results	
P. Passi, A. Miotti and V. Terribile Wiel Marin.....	189
Phycogen hydroxyapatite - A new interconnecting porous biomaterial	
C. Kasperk and R. Ewers.....	197
Osseous regeneration induced by porous hydroxylapatite around periodontally involved lower molars in humans	
L. Sbordone, L. Ramaglia, R.N. Ciaglia and E.B. Kenney.....	205
Co-adsorption of salivary mucins and phosphocompounds to hydroxyapatite	
A.V. Nieuw Amerongen, C.H. Oederkerk, E.C.I. Veerman and K. de Groot.....	211
The bone-hydroxylapatite interface	
G.L. de Lange, C. de Putter, E.H. Burger and K. de Groot.....	217
Bioactive materials for periodontal treatment: a comparative study	
J. Wilson, S. Low, A. Fetner and L.L. Hench.....	223
Rib-connecting pins prepared from poly-L-lactide	
S.-H. Hyon, Y. Ikada, H. Kato, T. Nakamura, S. Watanabe and Y. Shimizu....	229
Osteosynthesis by commercially pure titanium for temporary and permanent reconstructive implantation in limb surgery	
H. Schmid, J. Breme and K. Junger.....	235
Composite ligament made of carbon fibre braid	
D.G. Mendes, M. Roffman, M. Soudry, D. Angel, M. Iusim, D. Mordohovitch, A. Rotem and J. Boss.....	241
Anterior cruciate ligament suture with the "self-anchoring cord" in arthroscopical technique	
A. Schmid and F. Schmid.....	247
Carbon fibre ligaments in human knee joints: evaluation of the reached stability in vitro	
H. Kiefer, L. Dürselen and L. Claes.....	253
Evaluation of contact stresses in metal-plastic total knee replacements	
M.J. Pappas, G. Makris and F.F. Buechel.....	259
Long-term-results of total knee arthroplasty with the Walldius- and the GSB- prostheses	
G.O. Hofmann and F.-W. Hagena.....	265
Biomechanics of the P.C.A. total knee arthroplasty	
P.G. Marchetti, M. Spinelli and M. Marcacci.....	271
Mechanical properties and biocompatibilities of the new glass-fiber composite materials as artificial bone	
M. Morishita, M. Kobayashi, M. Seyama, S. Kondo, K. Kawauchi, H. Arai, H. Tagai and Y. Kuroki.....	275
Mechanical stresses in the case of fibre reinforced hip joint endoprosthesis	
H. Röhrle and W. Sollbach.....	281
Performance of porous polysulfone coated titanium alloy femoral stems in dogs and human patients	
M. Spector, M. Demane, J.R. Roberson, J.R. de Andrade and R.S. Riggins....	287

Performance of organic and inorganic bone replacement materials and their combinations in repair of bony defects in the rat J.M. Rueger, K. Wagner, R. Inglis, H.R. Siebert and A. Pannike.....	293
Studies on mechanical properties and hydrolysis behaviour of absorbable polymers and composites P. Helevirta, J. Laiho, J. Kilpikari, S. Vainonpää, P. Rokkanen and P. Törmälä.....	299
The role of computergraphics in the design of total joints P.S. Walker.....	305

Section 3. Biomaterials for soft tissues and cardiovascular devices

Presentation of a new highly hydrophilic polymer for extended wear contact lenses G. Ottolini, M. de Grandis and A. Calzavara.....	309
Chemico-physical structural characteristics of PT70 contact lenses before and after continuous wear A. Bertoluzza, P. Monti and R. Simoni.....	315
New kind of keratoprosthesis F. Pintucci and S. Pintucci.....	321
Mesokeratoprotheses: an experimental study with a 5 year follow-up R. Caramazza, A. Bertoluzza, R. Laschi, P. Puddu, M. Cellini, C. Fagnano P. Monti, P. Versura and M.C. Maltarello.....	325
Experimental study on the progression of foreign body reaction after PMMA IOLs implant in anterior chamber P. Versura, P. Puddu, R. Caramazza and R. Laschi.....	331
Silicone oil: biochemical characteristics, techniques and indication in complicated retinal detachment R. Tittarelli, S. Benedetti and C. Mariotti.....	337
Cross linked hyaluronate gels for use in vitreous surgery T. Mälson, P. Algvere, L. Ivert, B. Lindqvist, G. Selen and S. Stenku.....	345
Correlative study of 1.000 and 3.000 Cts. silicone oils injected in rabbit vitreous chamber: morphological and immunohistochemical aspects P. Versura, M.C. Maltarello, M. Cellini, R. Caramazza and R. Lasch.....	349
A composite hydrogel for treatment of skin wounds: skin graft donor sites in pigs and human patients M. Spector, L. Rhineland and F. Nahai.....	355
A new permeable polyetherurethane wound covering: a preliminary study of water vapour permeability and wound healing M.F. Jonkman, H.J. Meijer, J.W. Leenslag, A.J. Pennings, P. Nieuwenhuis and I. Molenaar.....	361
Effect of fibrin seals on human fibroblast attachment and multiplication M.F. Harmand, D. Michel, M. Bagot d'Arc and D. Ducassou.....	367
Purified bovine tendon collagen as a wound dressing in oral surgery C. Mannai, D.L. Leake, L.J. Moore, A. Pizzoferrato, G. Ciapetti and S. Stea.....	373
Arterial wall replacement with a degradable vascular prosthesis S. Gogolewski, G. Galletti and G. Ussja.....	379
Anastomotic intimal hyperplasia T. Curti, O. Paragona, P. Bacchini, A. Stella, L. Pedrini, F. Bertoni and M. d'Addato.....	385
Ultrastructural investigation on Dacron Gelseal grafts implanted in sheep carotid R. Laschi, T. Curti, G. Pasquinelli, P. Preda, R. Angelini and M. d'Addato.....	389
Patency factors of prostheses employed in the reconstruction of the femoro-popliteo-tibial district D.G. Tealdi, A. Odero, M. Borgna and U. Ruberti.....	395
Umbilical vein grafts in arterial reconstructions G. Verzellio, M. Coletti, R. Carlesi and G. Agrifoglio.....	401

Closure of atrial defects with resorbable patch materials	
K.H. Leitz, N. Tsilimingas, J. Holste and H. Oster.....	405
Synthetic vascular prostheses - the evolution of an international standard	
E.G. Brown, J.K. Drury, R. Maini and J.G. Pollock.....	411
Activation of blood coagulation factors after contact with biomaterials	
L. Pratelli, E. Cenni, G. Ciapetti, S. Stea, C. Tarabusi and G. Prosperi.....	415
The mechanical properties of bovine pericardium	
J.C. Barbenel, P. Zioupos and J. Fisher.....	421
Physical properties and biocompatibility of some poly(ether-amidoamine-urea-urethane) block copolymers	
M.C. Tappi, M. Levi, M. Muttoni, G. Tieghi and R. Fumero.....	427
Osteomesh™, a dacron polyetherurethane composite for reconstructive surgery	
D.L. Leake, M.B. Habal, A. Pizzoferrato, H.D. Schwartz, L.J. Moore and C. Mannai.....	433
In vivo evaluation of 8 different polymers for use as osteosynthesis material in maxillo-facial surgery	
K.L. Gerlach and J. Eitenmüller.....	439
First results of computed tomography following lower jaw augmentation with porous hydroxyapatite ceramic granules	
J.F. Osborn.....	447
A new reconstituted connective tissue matrix: properties and application in digestive surgery	
M. Rabaud, M. Aprahamian, C. Dange, E. Loza, M. Wilhelm, R. Schmitthaeusler and J. Marescaux.....	453
Use of absorbable osteosynthesis material for mandibular fracture treatment of dogs	
K.L. Gerlach, H.-R. Krause and J. Eitenmüller.....	459
Surface modification of silicone for tissue adhesion	
T. Okada, Y. Tamada and Y. Ikada.....	465
The degradation of polyhydroxybutyrate (PHB)	
D.F. Williams and N.D. Miller.....	471

Section 4. Structural, chemical - physical and biocompatibility characterization of biomaterials

Physico-chemical characteristics of ceramics for medical applications	
A. Ravaglioli and A. Krajewski.....	477
Comparison of two synthetic routes to synthesize polystyrene-poly(ethylene oxide)-heparin block copolymers	
I. Vulic, T. Okano, S.W. Kim and J. Feijen.....	491
The influence of surface roughness and electrical potential upon the friction and wear of polyethylene	
M. Zaki and D. Dowson.....	497
Design and synthesis of biodegradable poly(ether-esters)	
D. Cohn, G. Marom and H. Younes.....	503
Vibrational (Raman-laser and infrared) study on $\text{Ca}(\text{PO}_3)_2\text{-Al}_2\text{O}_3$ glasses	
A. Bertoluzza, C. Fagnano, A. Marinangeli, R. Simoni, A. Tinti and M.A. Morelli.....	511
Microstructure and mechanical properties of polymethylmethacrylate composite cements	
A. Castaldini, A. Cavallini and D. Cavalcoli.....	517
Different network systems for different glassmaking operations on a bioglass	
C.B. Azzoni, A. Krajewski, A. Ravaglioli and A. Piancastelli.....	523
Chemico-physical characterization of biomaterial structures in relation to their utilization	
A. Bertoluzza, P. Monti, R. Simoni, L. Pratelli and A. Pizzoferrato.....	529
Surface energy measurements on protein layers adsorbed onto synthetic substrata	
C.S. Clay, M.J. Lydon and B.J. Tighe.....	535

In vitro and in vivo reactions of various amorphous metals H. Oonishi, E. Tsuji, T. Nabeshima, S. Kushitani, K. Tsuyama, Y. Ukon and N. Murata.....	541
Tissue or cell culture versus in vivo testing of surface-reactive biomaterials U. Gross, H.-J. Schmitz, R. Kinne, F.R. Fendler and V. Strunz.....	547
Development of an in vitro method for assessment of blood compatibility of biomaterials based on quantitative measurements of the adhesiveness of Cr-51-labelled human platelets R. Karwath, M. Schürer and H. Wolf.....	557
Biocompatibility of different bioactive glasses for coating metallic prostheses in relation to cell adhesion mechanics M. Cannas, M.R. Amedeo, A. Krajewski and A. Ravaglioli.....	563
Phagocytosis, ultrastructural evaluation and vibrational spectroscopy of alumina-titania A. Pizzoferrato, S. Stea, G. Ciapetti, C. Tarabusi, A. Ruggeri, S. Guizzardi, M. Morocutti, A. Bertoluzza, P. Monti and A. Tinti.....	569
Evaluation of biological properties of the polyhema-collagen composites in a popliteal region of rats M. Stol, I. Cífková, R. Holusa and M. Adam.....	575
Interaction between primary bone cell cultures and biomaterials Part 1: Method; the in vitro and in vivo stages J.E. Davies, S.F. Tarrant and T. Matsuda.....	579
Interactions between primary bone cell cultures and biomaterials Part 2: Osteoblast behaviour S.F. Tarrant and J.E. Davies.....	585
Interaction between primary bone cell cultures and biomaterials Part 3: A comparison of dense and macroporous hydroxyapatite P.G.J. Rout, S.F. Tarrant, J.W. Frame and J.E. Davies.....	591
Interaction between primary bone cell cultures and biomaterials Part 4: Colonization of charged polymer surfaces R.M. Shelton, I.M. Whyte and J.E. Davies.....	597
Morphological studies of new bone formation favoured by β -TCMP implants A. Ruggeri, M. Franchi, A. Evangelisti, V. de Pasquale, A. Bigi, A. Ripamonti and N. Roveri.....	603
Tissue reaction and biodegradation behavior of various calcium phosphate materials W. Wagner, U.W. Wahlmann and D. Heidemann.....	609
Quantitative studies on the early inflammatory cell response to implants in the abdominal wall of the rat P. Thomsen, A.S. Eriksson, R. Olsson, L.M. Bjursten and L.E. Ericson.....	615
Thermoplastic polyurethanes. Hydrophilic-hydrophobic balance R.J. Zdrachala, D.D. Solomon, D.J. Lentz and C.W. McGary, Jr.....	621
Comparison of calciumhydroxylapatite ceros 80^R and -tricalciumphosphate ceros 82^R in vivo with stable soft tissue interface V. Geret, W. Mueller, M. Tepic, B.A. Rahn and S.M. Perren.....	627

Section 5. Drug delivery, infections and immunological aspects of biomaterials

Preclinical studies using a methotrexate loaded bone cement E. Dingeldein, H. Wahlig, A. Metallinos, G. Jochmann, G. Weisse and Z. Simane.....	633
Biodegradable hollow fiber for the controlled release of drugs: a preliminary report on tissue reaction J.M. Schakenraad, M.J.D. Eenink, J.A. Oosterbaan, J. Feijen, W. Potman, J. Olijslager, P.J. Greidanus, I. Molenaar and P. Nieuwenhuis.....	637
Polyalkylcyanoacrylate nanocapsules as drug carriers: advantage in insulin treatment of streptozotocin-induced diabetic rats C. Dange, C. Michel, M. Aprahamian and P. Couvreur.....	643
Bioactive polymers XL1. Studies in vivo on chloramphenicol retard releasing Cr. Simionescu, M.I. Popa and S. Dumitriu.....	649

Possible role of perfluorochemical particles as drug delivery agents in liver	
S. Calazza, C. Fanizza and M. Ferrari.....	655
Microbial adhesion and molecular mechanisms in biomaterial and compromised tissue centered infection	
A.G. Gristina, E. Barth and L.X. Webb.....	661
Microbiology of porous hydroxylapatite implants in human periodontal osseous defects	
L. Ramaglia, L. Sbordone, F. Lenci, E. Gulletta, G. Amato and E.B. Kenney.....	675
The removal of the prosthesis (Girdlestone procedure) for infected cemented total hip replacement: a clinical evaluation of 67 cases	
P.G. Marchetti, R. Binazzi, L. d'Elia, A. Moroni and A. Toni.....	681
Microbial contamination during vascular surgery	
L. Pratelli, T. Curti, F. Fiori, S. Stea, G. Ciapetti, O. Paragona, D. Cavedagna and M. Rodio.....	687
In vitro bacterial phagocytosis of macrophages after contact with biomaterials	
L. Pratelli, G. Ciapetti, S. Stea, C. Tarabusi and A. Pizzoferrato.....	693
Interactions between <u>S. epidermis</u> isolated from catheter infections and medical grade polyurethane	
B. Jansen, F. Schumacher-Perdreau, G. Peters and G. Pulverer.....	699
Infection at the site of implants with various materials and organisms	
K. Merritt.....	705
Allergic reactions to materials used in prosthetic surgery	
K. Merritt.....	711
An in vivo model for quantification of metal ion release and transport	
S.A. Brown, K. Merritt, L.J. Farnsworth and T.D. Crowe.....	717
Quantitative expression of T-lymphocyte surface antigens in chronic dialysis patients	
A. Stefoni, A. Nanni Costa, S. Iannelli, L.C. Borgnino, T. d'Atena, M.P. Scolari and V. Bonomini.....	723
Metal ions levels in organic fluids of patients with Co-Cr-Mo alloy hip prostheses	
G. Gualtieri, I. Gualtieri, S. Gagliardi, U.E. Pazzaglia, C. Minoia and L. Cecilian.....	729

Section 6. Experimental applications of prosthetic materials

Vibration spectra and biocompatibility of 4 artificial drum membrane materials	
D. Bakker, C.A. van Blitterswijk, W.L.C. Rutten, J.C. Bots, J.H. Kuit, W.Th. Daems and J.J. Grote.....	735
Tissue reaction to alumina powder injected into the joints of a pig	
G. Gualtieri, I. Gualtieri, N. Bettini, G. Ciapetti, S. Stea, A. Pizzoferrato and G. Galletti.....	741
Is there a homology or a species specificity of bone gelatine's active fraction?	
J.M. Rueger, K. Wagner, H.R. Siebert and A. Pannike.....	747
Histomorphometrical and roentgenological evaluations of bone reactions to cementless niobium femoral stems in dogs	
F. Gottsauner-Wolf, P. Dallant, G. Pflüger, H. Plenck Jr., F. Grundschober and S. Schider.....	753
Surgical application of biodegradable films prepared from lactide- ϵ -caprolactone copolymers	
T. Nakamura, S. Hitome, T. Shimamoto, S.-H. Hyon, Y. Ikada, S. Watanabe and Y. Shimizu.....	759
Behavior of differently sterilized allogenic lyophilized cartilage implants in dogs	
K. Wangerin, R. Ewers and A. Bumann.....	765

Section 7. Standards and assessment of biomaterials

In vitro assessment of the blood compatibility and mechanical properties of membrane biomaterials	
J.M. Courtney, M. Travers, D.L. Mwaniki, J.P. Paul, G.D.O. Lowe and C.D. Forbes.....	771
Standard for hard tissue evaluation	
H. Plenk, Jr.....	777
Standard tests for soft tissue evaluation	
D.F. Williams.....	783
Non-destructive structural analysis for non-metallic biomaterials	
A. Bertoluzza.....	791
Author index.....	801
Subject index.....	805