

CONTENTS

Series Foreword.....	v
Preface.....	vii
List of Reviewers.....	viii

Part I: Materials

I.1 Soft tissue and bone

I.1.1	Effect of glutaraldehyde concentration on collagen cross-linking and absorption B.K. Milthorpe, K. Schindhelm and S. Roe.....	1
I.1.2	Fracture behaviour of compact bone M. Dabestani and W. Bonfield.....	7

I.2 Metals

I.2.1	Degradation of metallic biomaterials and the immune system: <i>in vitro</i> effects of iron, nickel and cobalt on the expression of human lymphocyte antigens G.S. Carvalho, I. Bravo, M. DeSousa and M. Barbosa.....	13
I.2.2	Cytocompatibility study of cobalt-chromium alloys using human cell cultures M.-F. Harmand, A. Naji, R. Jeandot and D. Ducassou.....	19
I.2.3	Leukocytes, LTB ₄ , and interleukin-1 content in titanium and PTFE hollow chambers implanted in the rat abdominal wall A.S. Eriksson and P. Thomsen.....	25
I.2.4	Heterogeneity of antigenic and proadhesive activity of fibronectin adsorbed on various metallic or polymeric surfaces P. Vaudaux, X. Clivaz, R. Emch, P. Descouts and D. Lew.....	31
I.2.5	→ Fretting and accelerated fretting corrosion of titanium <i>in vitro</i> and <i>in vivo</i> S.A. Brown, R.W. Margevicius and K. Merritt.....	37
I.2.6	→ Electrochemical behaviour of AISI 316 L stainless steel in a physiological solution containing lactic acid R.A. Silva, M.A. Barbosa, A.M. Costa, M. da Cunha Belo and I. Sutherland.....	43
I.2.7	<i>In vitro</i> and <i>in vivo</i> behaviour of a NiTi shape memory alloy A. Cigada, G. De Santis, A.M. Gatti, G. Rondelli, B. Vincentini and D. Zaffe.....	51
I.2.8	Biological reactions of Fe-Cr-Al alloy with an Al ₂ O ₃ layer on the surface three years after implantation H. Oonishi, E. Tsuji, T. Mizukoshi, S. Kushitani and M. Aono.....	57
I.2.9	Production and mechanical properties of porous sintered specimens of the implant alloy TiAl5Fe2.5 J. Breme, V. Wadewitz and B. Fürbacher.....	63
I.2.10	XPS study of retrieved titanium and Ti alloy implants J.M. Gold, M. Schmidt and S.G. Steinemann.....	69
I.2.11	→ The release of titanium into human bone from a titanium implant coated with plasma-sprayed titanium J.F. Osborn, P. Willich and N. Meenen.....	75
I.2.12	The effect of different insertion locales on the healing-in of pure titanium implants L. Sennerby, R. Olsson, P. Thomsen and L.E. Ericson.....	81
I.2.13	Removal torques of screw-shaped titanium and Ti 6Al 4V implants in rabbit bone C.B. Johansson, T. Albrektsson and P. Thomsen.....	87

I.3 Polymers

I.3.1 Fundamental study of cell migration and adhesion towards different biomaterials with organotypic culture method. Observation of two cell components implicated in these events: actin and integrin
 J.L. Duval, M. Letort and M.F. Sigot-Luizard 93

I.3.2 Bone-bonding polymer (Polyactive™)
 D. Bakker, J.J. Grote, C.M.F. Vrouwenraets, S.C. Hesselings, J.R. de Wijn and C.A. van Blitterswijk 99

I.3.3 Testing of some polyurethanes for calcification and biodegradation: an *in vitro* study
 B. Glasmacher-Seiler, B. Erens, M. Doersch, H. Reul, G. Rau, G. Wick and H. Pietsch 105

I.3.4 Adhesion of *Escherichia coli* onto a series of poly(methacrylates) differing in hydrophobicity and charge
 G. Harkes, J. Dankert and J. Feijen 111

I.3.5 Modification of polymers for the prevention of foreign body infections
 B. Jansen, J. Schierholz, S. Schareina, F. Schumacher-Perdreua, G. Peters and G. Pulverer 117

I.3.6 The thermoductility of chopped carbon fiber reinforced PEEK
 S.A. Brown, J.J. Mason, K.A. Jockisch, R.S. Hastings and S. Moet 123

I.3.7 Hydrophilic thermoplastic polyetherurethanes: effects of soft segment content and molecular weight on physical properties
 M. Karakelle, R.A. Taller and D.D. Solomon 129

I.3.8 Relevance of dietary polyunsaturated fatty acids (PUFA) to prevent platelet aggregation of highly thrombogenic vascular prostheses
 G. Galletti, G. Ussia, F. Farruggia and C. Baccarini 135

I.3.9 2-Hydroxyethylmethacrylate modified bone cement
 C. Migliaresi and P. Capuana 141

I.3.10 The strength of the interface developed between biomaterials and bone
 K.E. Tanner, C. Doyle and W. Bonfield 149

I.3.11 Mechanical behaviour of rubber modified bone cement
 M.M. Vila, A. Raya and J.A. Planell 155

I.4 Degradable polymers

I.4.0 Requirements on resorbable implant materials
 L. Claes 161

I.4.1 A new cell-seeded artificial skin for the treatment of deep dermal wounds
 G.J. Beumer, D. Bakker, C.A. van Blitterswijk and M. Ponec 169

I.4.2 Mechanical stability, biodegradability, fatigue behaviour, and creep behaviour of polylactide and polylactide copolymers. An investigation on block polymerized and injection molded material
 J. Eitenmüller, K.L. Gerlach, A. Pommer, H. Offergeld and G. Muhr 175

I.4.3 *In vivo* and *in vitro* study of a biodegradable fracture fixation device of high molecular polyglycolic polydioxanone composite
 I.C. Heyligers, P. Patka, C.P.A.T. Klein, W. den Hollander and K. de Groot 183

I.4.4 Physical characteristics of 'PHB'. A degradable polymer
 J.C. Knowles and G.W. Hastings 191

I.4.5 Hyaluronic acid esters, a new class of semisynthetic biopolymers: chemical and physico-chemical properties
 A. Rastrelli, M. Beccaro, F. Biviano, G. Calderini and A. Pastorello 199

I.4.6 The effect of the molecular weight of polylactic acid on *in vitro* biocompatibility
 A. van Sliedregt, C.A. van Blitterswijk, S.C. Hesselings, J.J. Grote and K. de Groot 207

I.4.7	Morphologic aspects of different cell types during <i>in vitro</i> biocompatibility testing of PLA: a preliminary study A. van Sliedregt, C.A. van Blitterswijk, S.C. Hesselings, J.J. Grote and K. de Groot	213
<i>I.5 Ceramics</i>		
I.5.1	Trace element accumulation after macrophage/material interactions H.K. Koerten, C.A. van Blitterswijk, D. Bakker, S.C. Hesselings, R.A.J. Dalmeijer and J.J. Grote	219
I.5.2	Marrow cell induced osteogenesis and chondrogenesis in porous calcium phosphate ceramics H. Ohgushi, M. Okumura and S. Tamai	225
I.5.3	Adhesion strength and adhesion area of cultured cells on bioceramics T. Ushida, T. Tateishi and N. Moriya	231
I.5.4	Characteristics on the hydroxyapatite ceramics (APS-9) biocompatibility under sustained load bearing H. Yano and S. Takagi	237
I.5.5	Structured implants as bone substitutes P.M. Marquis, S.F. Tarrant, O.G. Titley, S.J. Dipple, Y.P. Bovell, J.E. Davies and L. Lindstrom	243
I.5.6	Prostaglandin concentrations in femoral rat bone following implantation of hydroxyapatite ceramics and alumina J.F. Osborn and J.M. Wittenberg	249
I.5.7	Macroporous calcium phosphate ceramics for long bone surgery in human and dogs — clinical and histological studies N. Passuti, G. Daculsi, S. Martin, M. Basle and S. Roher	255
<i>I.6 Glasses and carbon</i>		
I.6.1	Corrosion of bioactive glass under various <i>in vitro</i> conditions Ö.H. Andersson and K.H. Karlsson	259
I.6.2	Reactions between Bioverit glass ceramics and hard tissue W. Hölland, W. Vogel, E. Beleitens, T. Schubert, K. Naumann, J. Vogel and P. Wange	265
<i>I.7 Coatings</i>		
I.7.1	Alumina and silicium carbide coatings for passivation of alloys M.-F. Harmand, A. Naji, J.-P. Davidas, R. Jeandot and D. Ducassou	271
I.7.2	Solubility of hydroxylapatite, tricalciumphosphate and tetracalciumphosphate coatings on titanium <i>in vitro</i> C.P.A.T. Klein, J.M.A. de Blicke-Hogervorst, J.G.C. Wolke and K. de Groot	277
I.7.3	Bone tissue response to porous hydroxyapatite and wire meshes of stainless steel with and without coatings of hydroxyapatite and titaniumnitride J. Orth, J. Kautzmann and P. Griss	283
I.7.4	HA and non HA coated carbon composite femoral stems in the canine model G.L. Maistrelli, D. Garbuz, V. Fornasier and A. Binnington	289
Part II: Surface effects		
II.1	New aspects of biocompatibility: motion at the interface A.F. von Recum	297
II.2	Implant surface roughness and mode of load transmission influence periimplant bone structure U. Gross, Ch. Müller-Mai, Th. Fritz, Ch. Voigt, W. Knarse and H.J. Schmitz	303

II.3	The influence of various titanium surfaces on the interface shear strength between implants and bone H.-J. Wilke, L. Claes and S. Steinemann	309
II.4	Use of excimer laser as possible and valuable tools for surface processing of bioceramic materials H.J. Koort.....	315
II.5	Bacterial adherence to functionalized surfaces K. Merritt, C.N. Sukenik and N. Balachander	321
II.6	The characteristics of protein adsorption onto metallic biomaterials R.L. Williams, S.J. Higgins, A. Hamnett and D.F. Williams	327
II.7	A new method for ultrastructural studies of the intact interface between undecalcified bone and titanium implants L.E. Ericson, L. Sennerby, G. Bokhede, L. Emanuelsson and P. Thomsen.....	333
II.8	An ultra-structural study of the interface between hydroxyapatite/polymer composite and bone C. Doyle, Z.B. Luklinska, K.E. Tanner and W. Bonfield	339

Part III: Clinical applications

III.1 Orthopaedics

III.1.1 General

III.1.1.1.	An SEM study of crystals in articular cartilage taken from arthritic joints A. Hayes, I.G. Turner and K.A. Powell	345
III.1.1.2	Development of an artificial cartilage: evaluation of biocompatibility T. Noguchi, M. Oka, P. Kumar, Y. Kotoura, S.H. Hyon, Y. Ikada and T. Yamamuro	351
III.1.1.3	Failure of diaphyseal implants in endoprosthetic replacement of bone tumors G.O. Hofmann, W. Stöger, Th. Weber and G. Lob.....	355
III.1.1.4	Best weightbearing time after implantation as inferred from interface observation H. Oonishi, E. Tsuji, H. Ishimaru and J. Delecrin	361
III.1.1.5	Clinical application of Tekmilon fiber (ultra high molecular weight polyethylene) in spinal surgery Y. Ueda, S. Nishiyama, H. Yokota, H. Iwasaki and S. Tamai.....	367

III.1.2 Hip replacements

III.1.2.1	Wear resistant properties of various prosthetic joint materials P. Kumar, M. Oka, K. Ikeuchi, T. Yamamuro, H. Okumura and Y. Kotoura.....	373
III.1.2.2	SEM observation on the clinically used gamma-irradiated reinforced HDP socket in total hip replacement H. Oonishi and E. Stuji	379
III.1.2.3	Ion implantation on metal and polymer components for joint prostheses A. Pichat, L.-M. Rabbe, J. Rieu, C. Chabrol, R. Leveque, G. Bousquet and A. Rambert	385
III.1.2.4	Five-year functionality study of carbon fibre reinforced acetabular implants in dogs B. Boenisch, R. Ascherl, A. Liebendörfer, K. Geissdörfer, M.-L. Schmeller, S. Kerschbaumer, M.A. Scherer, W. Erhardt, W. Scheer and G. Blümel.....	391
III.1.2.5	Structural analysis of cemented hip joint replacements. Results from autopsy femora W. Koeller and E.-J. Henssge	397
III.1.2.6	Morphological changes in femoral heads following double-cup arthroplasty L. Claes, S. Faiss, H. Gerngross and H.-J. Wilke.....	403

III.1.3 Knee replacements

III.1.3.1	Cementless surface replacement of the knee with different materials L. Claes, H.-J. Wilke, L. Dürselen and H. Kiefer	409
III.1.3.2	A quantitative topographic evaluation of bone ingrowth in tibial components removed from human patients H. Kienapfel, D.R. Sumner, J.J. Jacobs, T.M. Turner, R.M. Urban and J.O. Galante.....	415
III.1.3.3	Cold-flow of tibial component polyethylene after knee arthroplasty L. Ryd, A. Lindstrand, A. Stenström and G. Selvik	421
III.1.3.4	Isoelastic knee prosthesis using laminated composite materials N. Inoue, Y. Hirasawa, F. Yamashita, Y. Watanabe, T. Hirai, T. Katayama and Y. Kida.....	425
III.1.3.5	Application of porous calciumphosphates in depressed tibial plateau fractures P. Brändle and A.F. Leutenegger.....	431
III.1.3.6	Internal fixation of patella osteotomies with biodegradable implants — preliminary results of an experimental trial H.-U. Zieren, W. Holzmüller, J. Rosenberger, H.J. Helling and K.E. Rehm	435

III.1.4 Ligaments and tendon

III.1.4.1	Mechanical properties of artificial ligaments L. Dürselen and L. Claes	439
III.1.4.2	Para-aramid fiber for artificial ligaments M. Dauner, H. Planck, I. Syré and K.K. Dittel.....	445
III.1.4.3	Loss of strength and shortening of the patellar tendon after using the central one third for reconstruction of the anterior cruciate ligament W. Holzmüller, K.E. Rehm, S.M. Perren and B. Rahn	451
III.1.4.4	Late repair of the calcaneal tendon with polypropylene mesh — a new method of operation J. Ozaki, J. Fujiki, K. Sugimoto, S. Tamai and M. Okumura	455
III.1.4.5	Anterior cruciate ligament reconstruction using bone-ligament-bone allografts: an <i>in vitro</i> study S.C. Roe, B.K. Milthorpe and K. Schindhelm	461
III.1.4.6	Teflon felt cuff plasty for global or massive tears of the rotator cuff of the shoulder J. Ozaki, Y. Nakagawa, G. Sakurai, S. Tamai and M. Okumura.....	467

III.2 Vascular materials

III.2.1	Novel segmented polyurethane amides for biomedical applications D. Cohn, S. Bilenkis, A. Penhasi and S. Yitzchaik.....	473
III.2.2	Mechanical properties of a polyester-collagen vascular prosthesis C.C. Berndt, D. Collinson and G. Roberts.....	481
III.2.3	Heparinized cuprophan G.H.M. Engbers, T. van Mechelen, B.M.T. Croonen, L. Robertson, J.M. Courtney and J. Feijen.....	487
III.2.4	Realisation of bioartificial vascular substitutes: morphological study of an original collagenic coating M.Y. Jablonski, Th. Darnis, L. Bordenave, R. Bareille, F. Rouais and Ch. Baquey	493
III.2.5	New arterial prostheses by filament winding D. Cohn, G. Marom and B. Gershon.....	501
III.2.6	Angiogenesis and neovascularization in different prosthetic vascular grafts: the significance of graft porosity M.D. Menger, P. Walter, F. Hammersen and K. Messmer	511

III.2.7 Character and biological behaviour of biocompatible dextran-ironoxide magnetic fluid
M. Hasegawa, S. Maruno, M. Tobita and N. Fujitsuka 517

III.2.8 Fresh and glutaraldehyde preserved frame mounted homograft and porcine bioprosthetic heart valves: leaflet geometry, dynamics and function
M. Butterfield, J. Fisher, G.A. Davies, J.M. Kearney, F. Sureta and D.A. Watson 523

III.3 ENT-surgery and related fields

III.3.1 Reconstructive measures in the middle ear and mastoid using a biocompatible cement — a preliminary clinical experience
G. Geyer and J. Helms 529

III.3.2 Biological and functional analysis of hydroxyapatite as clinically applied in otology
C.A. van Blitterswijk, S.C. Hesselink, K. de Groot, H.K. Koerten and J.J. Grote 537

III.3.3 Secondary correction of traumatogenic enophthalmos. An indication for hydroxyapatite blocks
A. Hemprich and J. Hidding 543

III.3.4 Reconstruction of the orbital floor and the skull base with preformed dense hydroxyapatite ceramic (Osprovit)
J.F. Osborn and K.D. Böker 549

III.4 Dentistry, oral and maxillofacial surgery

III.4.1 Histology and microradiography of tissues surrounding dental implants
G.L. de Lange and C. de Putter 555

III.4.2 *In vitro* cytocompatibility assessment of biomaterials towards gingival tissue by organ culture method: fundamental characterization of the epithelial nature of the cultured cell layer
M. Letort, A. Akoum and M.F. Sigot 561

III.4.3 Application of porous hydroxyapatite ceramic in tuberculoplasty of the temporomandibular joint
J.F. Osborn 567

III.4.4 Treatment of zygomatic fractures with biodegradable poly (L-lactide) plates and screws
K.L. Gerlach 573

III.4.5 Biodegradation of three bioactive glasses for the repair of bone defects in dentistry
A.M. Gatti, D. Zaffe, G.P. Poli, A. Ravaglioli and A. Krajewski 579

III.4.6 Shear bond strength of glass-ionomer cements
C. Nucci, C. Prati and M. Chiara Montanari 585

III.4.7 Early and post-24 hour shear bond strength of dentin bonding systems and composite resins
C. Prati, C. Nucci and G. Montanari 591

III.4.8 Shear bond strength of new conventional bonding systems after dentin pretreatments
C. Prati, C. Nucci and F. Fava 597

III.4.9 Factors affecting the lifetime of dental veneers
P.M. Marquis 603

III.5 Percutaneous devices

III.5.1 The ability of deep connective tissue to inhibit epithelialisation of percutaneous implant devices
T.G. Heaney, P.J. Doherty and D.F. Williams 609

III.5.2 Fibroblast and epithelial cell reaction to surface treated implant materials
J.A. Jansen, J.P.C.M. van der Waerden and K. de Groot 615

III.6 Internal medicine

III.6.1	Neoesophageal epithelization on an artificial esophagus with collagen layer structure O. Ike, Y. Shimizu, T. Okada, T. Natsume, S. Watanabe, Y. Ikada and S. Hitomi	621
III.6.2	Clinical studies of adriamycin-containing poly(L-lactic acid) microspheres administered into the pleural cavity of patients with pleuritis carcinomatosa O. Ike, S. Hitomi, R. Wada, S. Watanabe, S.-H. Hyon, Y. Ikada and Y. Shimizu	627
III.6.3	Membranes for a biohybrid pancreas M. Renardy, H. Planck, J. Trauter, P. Zschocke, U. Siebers, T. Zekorn and K. Federlin	633

Part IV: Biomechanics

IV.1	<i>In vivo</i> hip joint force measurements in one patient G. Bergmann, A. Rohlmann and F. Graichen	639
IV.2	An experimental and finite element analysis of the influence of the stem-cement interface in total hip replacements A.W. Miles, S.E. Clift, S. Wainwright and N. Wood	645
IV.3	Visualization methods in biomechanics T. Tateishi, K. Hyodo, K. Homma and M. Yamada.....	651
IV.4	Might biomechanical effects influence biocompatibility tests in bone? U. Soltész, D. Siegele and E. Baudendistel.....	657
IV.5	Biomechanical properties of lumbar spinal ligaments L.-P. Nolte, M.M. Panjabi and T.R. Oxland.....	663

Author Index	669
---------------------------	-----

Subject Index	673
----------------------------	-----