

MICRO-SURGERY

Experimental Techniques in the Rat and Clinical Applications

R. MARQUET - F. HESS - W. KORT - W. BOECKX



1976 European Press -

GHENT - BELGIUM

Contents

Foreword — Sun Lee	11
Chapter I — Introduction to Microvascular Surgery	13
R.L. Marquet, G.A. Heystek and R.H. van Leersum	
1-1 Summary	15
1-2 Introduction	15
1-3 A brief history of vascular and microvascular surgery	16
1-4 The rat as experimental animal in microvascular surgery	18
1-5 The major histocompatibility system (MHS) in the rat	19
1-6 Anesthesia	21
1-7 Instruments and equipment	21
1-8 Immunobiological considerations	23
8-1 Choice of graft	23
8-2 Genetics	24
8-3 Tolerance and enhancement	25
8-4 Graft versus host (GvH) reactions	26
1-9 Literature	27
Chapter II — Kidney Transplantation	31
R.L. Marquet, G.A. Heystek and R.H. van Leersum	
2-1 Summary	33
2-2 Introduction	33
2-3 Pre- and postoperative care and choice of animals	35
2-4 Surgical procedure of kidney transplantation	35
2-5 Function of kidney isografts	43
2-6 Unmodified kidney allograft rejection	44
2-7 The effect of nonspecific immunosuppression on kidney allograft survival	46
2-8 Literature	49
Chapter III — Liver Transplantation	51
F. Hess	
3-1 Summary	53
3-2 Introduction	54
3-3 Pre- and postoperative care and choice of animals	55
3-4 Surgical technique of orthotopic liver transplantation	55
3-5 Heterotopic liver transplantation	57
3-6 Surgical technique of auxiliary liver transplantation	58
3-7 Liver function after transplantation	62

3-8 Functional competition	63
3-9 Biliary outflow reconstruction	66
3-10 Ischemia and preservation	67
3-11 Rejection	68
3-12 Literature	69
Chapter IV — Heart Transplantation	73
W. Boeckx	
4-1 Summary	75
4-2 Introduction	75
4-3 Choice of animals, pre- and postoperative care	78
4-4 Surgical techniques	80
4-1 Heterotopic auxiliary (abdominal) heart transplantation	80
4-2 Non-suturing technique for auxiliary cervical heart transplantation	83
4-3 Heterotopic auxiliary heart transplantation providing a pulmo-portal venous outlet	87
3-1 Introduction	87
3-2 Surgical technique according to Boeckx	87
4-4 Heterotopic heart and lung transplantation according to Lee	89
4-5 Orthotopic heart-lung transplantation	90
4-5 Immunological considerations	90
4-6 Functional considerations	92
4-7 Pathology	94
4-8 Literature	95
Chapter V — Transplantation of the Small Bowel	97
W.J. Kort	
5-1 Summary	99
5-2 Introduction	99
5-3 Animals, pre- and postoperative care	100
5-4 Surgical technique	101
4-1 Heterotopic auxiliar transplantation after Monchik and Russel	101
4-2 Orthotopic transplantation after Kort	101
5-5 Immunologic considerations	105
5-6 Pathology	105
5-7 Function	106
5-8 Literature	107

Chapter VI — Pancreas Transplantation and Transplantation of Islets of Langerhans	109
R.L. Marquet, G.A. Heystek and R.H. van Leersum	
6-1 Summary	111
6-2 Introduction	112
6-3 Pre- and postoperative care and choice of animals	113
6-4 Surgical technique of pancreatico-duodenal transplantation	113
6-5 Surgical technique of pancreas transplantation	115
6-6 Technique of isolation and transplantation of islets of Langerhans	116
6-7 Functional and histopathological studies after pancreas and islets transplantation	117
7-1 Pancreas transplantation	117
7-2 Islet transplantation	118
6-8 Literature	118
Chapter VII — Transplantation of the Spleen	121
W.J. Kort	
7-1 Summary	123
7-2 Introduction	123
7-3 Animals, pre- and postoperative care	124
7-4 Surgical technique after Lee and Orloff	124
7-5 Immunological considerations	124
7-6 Pathology	126
7-7 Function	126
7-8 Literature	127
Chapter VIII — Transplantation of the Testis	129
W.J. Kort	
8-1 Summary	131
8-2 Introduction	131
8-3 Animals, pre- and postoperative care	131
8-4 Surgical technique	131
8-5 Immunology, pathology and function	133
8-6 Literature	134
Chapter IX — Transplantation of Other Organs	135
W.J. Kort	
9-1 Summary	137
9-2 Introduction	137
9-3 Animals, pre- and postoperative care	138
9-4 Surgical techniques	138

4-1 Skin with an intact vascular pedicle, after Cho	138
4-2 Transplantation of the uterus / ovary, after Lee	138
4-3 Stomach transplantation, after Lee	139
9-5 Immunological considerations	139
9-6 Pathology	140
9-7 Function	140
9-8 Literature	141
Chapter X — Shunts in the Portal Area	143
F. Hess	
10-1 Summary	145
10-2 Introduction	145
10-3 Pre- and postoperative care and choice of animals	146
10-4 Portacaval shunt	146
4-1 Introduction	146
4-2 Surgical technique of the end-to-side portacaval shunt	149
4-3 Surgical technique of the side-to-side portacaval shunt	150
4-4 Physiological changes due to shunting	150
10-5 Pancreatico-duodenocaval shunt	154
5-1 Introduction	154
5-2 Surgical technique	154
5-3 Physiological changes due to shunting	155
10-6 Mesentericocaval shunt	155
6-1 Introduction	155
6-2 Surgical technique	155
6-3 Physiological changes due to shunting	156
10-7 Splenocaval shunt	156
7-1 Introduction	156
7-2 Surgical technique	156
7-3 Physiological changes due to shunting	157
10-8 Portacaval transposition	157
8-1 Introduction	157
8-2 Surgical technique	159
8-3 Physiological changes due to transposition	160
10-9 Literature	161
Chapter XI — Internal Fistulas	165
W.J. Kort	
11-1 Summary	167
11-2 Introduction	167

11-3	Vaso-cystostomy	169
3-1	Introduction	169
3-2	Animals, pre- and postoperative care	169
3-3	Surgical procedure after Kort	170
3-4	Pathology	170
3-5	Function	170
11-4	Choledocho-urethrostomy	173
4-1	Introduction	173
4-2	Animals pre- and postoperative care	174
4-3	Surgical procedure	174
4-4	Function and pathology	176
11-5	Pancreatico-urethostomy	176
5-1	Introduction	176
5-2	Animals pre- and postoperative care	176
5-3	Surgical procedure	176
5-4	Function and pathology	178
11-6	Literature	179

Chapter XII — Clinical Micro-Surgery

W. Boeckx

12-1	Summary	183
12-2	Introduction	183
12-3	Materials and Methods	184
3-1	Operating microscope	184
3-2	Instruments	184
3-3	Training models in experimental animals	188
12-4	Microvascular anastomosing techniques	189
4-1	Dissection of vessels in the training model	189
4-2	End-to-end arterial anastomosis	189
4-3	End-to-side arterial anastomosis	191
4-4	End-to-end venous anastomosis	193
4-5	Patency testing	194
12-5	Free Flap Transplantation	194
5-1	Introduction	194
5-2	Donor sites	196
5-3	Anatomy and dissection of donor zones	198
5-4	The groin flap and hypogastric flap	198
4-1	Dissection of the flap	200
4-2	Indications of the hypogastric and groin flap	202
5-5	The axillary flap	202
5-1	Dissection of the axillary flap	205
5-2	Indications of the axillary flap	206
5-6	The deltopectoral flap	206
6-1	Dissection of the deltopectoral flap	207

6-2	Indications for the deltopectoral flap	207
5-7	Other donor sites	208
7-1	Forehead flap	208
7-2	The dorsalis pedis arterialized flap	208
7-3	Suprapubic flap	208
7-4	Intercostal island flap	209
7-5	Popliteal flap	209
5-8	Recipient areas	209
8-1	Dissection of recipient vessels	209
8-2	The face	210
8-3	Upper limb	210
8-4	Lower limb	210
5-9	Operation technique for free flap transplantation	211
9-1	Pre-operative care	211
9-2	Transposition of the flap	211
9-3	Postoperative management	212
5-10	Results of free flap transplantation	214
5-11	Indications for free flap transplantation	214
12-6	Fingerreplantations	217
6-1	Introduction	217
6-2	Preservation	218
6-3	Operation technique	218
6-4	Postoperative management	221
6-5	Results	221
6-6	Indications	224
12-7	Limb replantations	224
7-1	Introduction	224
7-2	Preservation	225
7-3	Operation techniques	225
7-4	Postoperative management	225
7-5	Indications for limb replantation	226
12-8	Other clinical applications of microvascular techniques	227
8-1	In plastic surgery	227
1-1	Free digital transfer	227
1-2	Lymphaticovenous anastomosation	229
1-3	Autotransplantation of omentum	229
1-4	Free vascularized bone graft	229
8-2	Microvascular neurosurgery	229
2-1	Introduction	229
2-2	Vascular anastomosation techniques	230
8-3	Gynecological micro-surgery	230
8-4	Urological micro-surgery	231
12-9	Literature	232