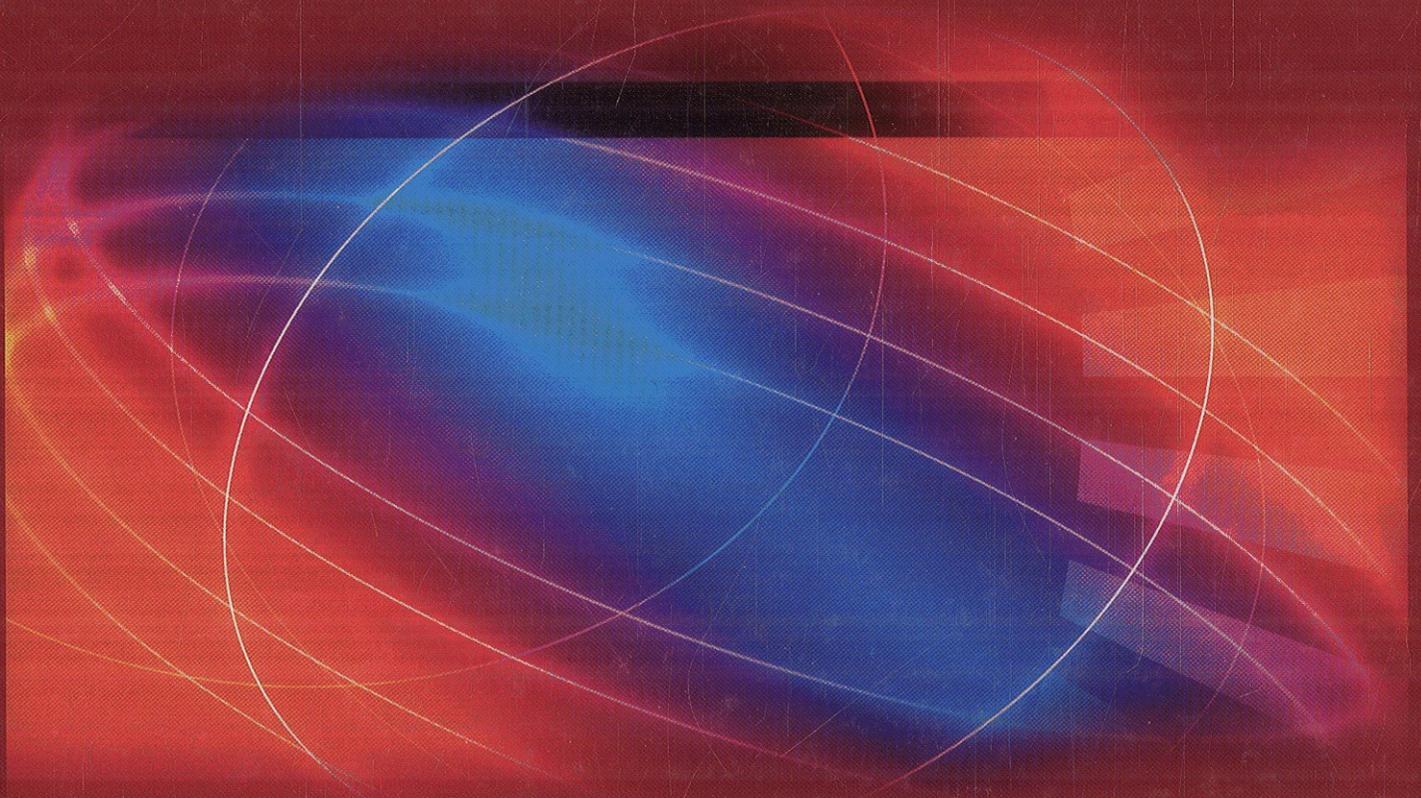


CLINICAL EXERCISE PHYSIOLOGY

SECOND EDITION



Jonathan K. Ehrman • Paul M. Gordon
Paul S. Visich • Steven J. Keteyian

CONTENTS

Foreword	xi
Contributors	xiii
Preface	xvii
Acknowledgments	xix

PART I Introduction to Clinical Exercise Physiology 1

Chapter 1	Introduction	3
	<i>Jonathan K. Ehrman, PhD, FACSM, Paul M. Gordon, PhD, MPH, FACSM, Paul S. Visich, PhD, MPH, and Steven J. Keteyian, PhD, FACSM</i>	
	The Past, Present and Future of Clinical Exercise Physiology	3
	Professional Organizations and Certifications	8
	Professionalization of Clinical Exercise Physiology	11
	Conclusion	15
Chapter 2	Behavioral Approaches to Physical Activity Promotion	17
	<i>Gregory W. Heath, DHSc, MPH</i>	
	Benefits of Physical Activity	17
	Issues Related to Regular Physical Activity Participation	19
	Conclusion	26
Chapter 3	Pharmacotherapy	31
	<i>Diana Kostoff, PharmD, BCPS</i>	
	Metabolic Diseases and Agents	31
	Cardiovascular Diseases and Agents	35
	Pulmonary Diseases and Agents	42
	Immunologic Diseases and Agents	42
	Orthopedic and Musculoskeletal Diseases and Agents	46
	Neuromuscular Diseases and Agents	53
	Psychiatric Diseases and Agents	53
	Conclusion	58
Chapter 4	General Interview and Examination Skills	61
	<i>Steven J. Keteyian, PhD, FACSM</i>	
	General Interview	61
	Physical Examination	65
	Conclusion	74
Chapter 5	Graded Exercise Testing and Exercise Prescription	77
	<i>Paul S. Visich, PhD, MPH, and Jonathan K. Ehrman, PhD, FACSM</i>	
	Exercise Testing	77
	Exercise Prescription	95
	Conclusion	107

Part II Special Populations 109

Chapter 6 Children 111

William Saltarelli, PhD

Scope 111
 Pathophysiology 112
 Assessment of Physical Activity in Children 116
 Recommendations and Anticipated Responses 121
 Exercise Prescription 129
 Conclusion 134

Chapter 7 The Elderly 135

Nicole Y.J.M. Leenders, PhD

Scope 135
 Physiology and Pathology 136
 Medical and Clinical Considerations 138
 Exercise Prescription 141
 Exercise Training 145
 Conclusion 146

Chapter 8 Female-Specific Issues 149

Farah A. Ramírez-Marrero, PhD, MSc

Female-Specific Issues 149
 Medical and Clinical Considerations 157
 Exercise Prescription 166
 Conclusion 167

Chapter 9 Depression and Exercise 169

Krista A. Barbour, PhD

Scope 169
 Pathophysiology 170
 Medical and Clinical Considerations 170
 Exercise Prescription 174
 Conclusion 176

Part III Endocrinology and Metabolic Disorders 179

Chapter 10 Metabolic Syndrome 181

David Donley, MS

Scope 181
 Pathophysiology 182
 Medical and Clinical Considerations 183
 Exercise Prescription 186
 Exercise Training 187

Chapter 11 Diabetes 191

Ann L. Albright, PhD, RD

Scope 191
 Pathophysiology 192

Medical and Clinical Considerations	196
Exercise Prescription	203
Exercise Training	207
Conclusion	209

Chapter 12 Obesity 211

David C. Murdy, MD, and Jonathan K. Ehrman, PhD, FACSM

Scope	212
Pathophysiology	215
Medical and Clinical Considerations	217
Exercise Prescription	225
Exercise Training	227
Conclusion	230

Chapter 13 Hypertension 233

A.S. Contractor, MD, and Neil F. Gordon, MD, PhD

Scope	233
Pathophysiology	235
Medical and Clinical Considerations	235
Exercise Prescription	240
Conclusion	244

Chapter 14 Hyperlipidemia and Dyslipidemia 247

Kyle D. Biggerstaff, PhD, and Joshua S. Wooten, MS

Scope	247
Pathophysiology	248
Medical and Clinical Considerations	251
Exercise Prescription	258
Exercise Training	261

Chapter 15 End-Stage Renal Disease 265

Patricia Painter, PhD

Scope	265
Pathophysiology	265
Medical and Clinical Considerations	266
Exercise Prescription	272
Exercise Training	276
Conclusion	276

Part IV Cardiovascular Diseases 279

Chapter 16 Myocardial Infarction 281

Paul S. Visich, PhD, MPH, and Emma Fletcher, MA

Scope	281
Pathophysiology	281
Medical and Clinical Considerations	283
Exercise Prescription	292
Conclusion	298

Chapter 17 Revascularization of the Heart 301

Timothy R. McConnell, PhD, and Karandeep Singh, MD

Coronary Artery Bypass Surgery 301
 Percutaneous Interventions 302
 Medical and Clinical Considerations. 303
 Exercise Testing 304
 Exercise Prescription. 306
 Conclusion. 312

Chapter 18 Chronic Heart Failure 315

Steven J. Keteyian, PhD, FACSM

Scope. 315
 Pathophysiology. 315
 Medical and Clinical Considerations. 317
 Exercise Testing 319
 Exercise Prescription. 322
 Exercise Training. 327
 Conclusion. 331

Chapter 19 Peripheral Arterial Disease 333

Richard M. Lampman, PhD, and Seth W. Wolk, MD

Scope. 333
 Pathophysiology. 334
 Medical and Clinical Considerations. 335
 Exercise Prescription. 342
 Exercise Training. 345
 Conclusion. 348

Chapter 20 Pacemakers and Internal Cardiac Defibrillators 351

Kerry J. Stewart, EdD

Scope and Pathophysiology 351
 Pacing System 352
 Exercise Physiology 353
 Exercise Testing 358
 Exercise Prescription. 358
 Conclusion. 365

Part V Diseases of the Respiratory System 369

Chapter 21 Chronic Obstructive Pulmonary Disease 371

Ann M. Swank, PhD, Michael J. Berry, PhD, and C. Mark Woodard, MS

Scope. 372
 Pathophysiology. 372
 Medical and Clinical Considerations. 374
 Exercise Prescription. 380
 Exercise Training. 382
 Conclusion. 387

Chapter 22 Asthma 391

Brian W. Carlin, MD, and Anil Singh, MD

Scope. 391
 Pathophysiology. 391
 Medical and Clinical Considerations. 392
 Exercise Prescription. 397
 Exercise Training. 397
 Conclusion. 400

Chapter 23 Cystic Fibrosis 403

Michael J. Danduran, MS, and Julie Biller, MD

Scope. 403
 Pathophysiology. 403
 Medical and Clinical Considerations. 405
 Exercise Prescription. 414
 Conclusion. 420

Part VI Oncology and the Immune System 423

Chapter 24 Cancer 425

John R. Schairer, DO, and Steven J. Keteyian, PhD, FACSM

Scope. 425
 Pathophysiology. 426
 Medical and Clinical Considerations. 431
 Exercise Prescription. 435
 Exercise Training. 439
 Conclusion. 440

Chapter 25 Human Immunodeficiency Virus 443

*Barbara Smith, RN, PhD, FACSM, James Raper, CFNP, DNS,
 and Michael Saag, MD*

Scope. 444
 Pathophysiology. 445
 Medical and Clinical Considerations. 446
 Exercise Prescription. 450
 Exercise Training. 453
 Conclusion. 455

Part VII Disorders of the Bone and the Joints 459

Chapter 26 Arthritis 461

Virginia B. Kraus, MD, PhD, and Kim M. Huffman, MD, PhD

Scope. 461
 Pathophysiology. 461
 Medical and Clinical Considerations. 462
 Exercise Prescription. 469
 Exercise Training. 478
 Conclusion. 482

Chapter 27 Osteoporosis 485

David L. Nichols, PhD, and Chad D. Swank, MS

Scope 485
 Pathophysiology 485
 Medical and Clinical Considerations 486
 Exercise Prescription 491
 Conclusion 495

Chapter 28 Nonspecific Low-Back Pain 497

Jan Perkins, PhD, and J. Tim Zippel, DScPT, OCS

Scope 497
 Pathophysiology 498
 Medical and Clinical Considerations 498
 History 502
 Physical Examination 502
 Exercise Prescription 507
 Conclusion 518

Part VIII Selected Neuromuscular Disorders 521

Chapter 29 Spinal Cord Injury 523

David R. Gater, Jr., MD, PhD

Scope 523
 Pathophysiology 524
 Medical and Clinical Considerations 528
 Exercise Prescription 534
 Conclusion 539

Chapter 30 Multiple Sclerosis 543

Chad C. Carroll, PhD, and Charles P. Lambert, PhD

Scope 543
 Pathophysiology 543
 Medical and Clinical Considerations 544
 Exercise Prescription 550
 Exercise Training 553
 Conclusion 554

Chapter 31 Cerebral Palsy 557

Amy E. Rauworth, MS, and James H. Rimmer, PhD

Scope 557
 Pathophysiology 558
 Medical and Clinical Considerations 558
 Exercise Testing 572
 Exercise Prescription 578
 Exercise Training 579
 Conclusion 581

Chapter 32 Stroke 583*Christopher J. Womack, PhD, FACSM*

Scope	583
Pathophysiology	584
Medical and Clinical Considerations	585
Exercise Prescription	587
Exercise Training	589
Conclusion	590

Glossary 593

References 611

Index 679

About the Editors 691