

Contents

Contributors **ix** | Reviewers **x** | Preface **xi** | From the Editors **xii**

PART I Exercise Sciences 1

Chapter 1	Structure and Function of the Muscular, Nervous, and Skeletal Systems	3
	Len Kravitz	
	<i>Muscular System</i>	4
	<i>Nervous System</i>	11
	<i>Skeletal System</i>	15
	<i>Connective Tissue</i>	16
Chapter 2	Structure and Function of the Cardiovascular and Respiratory Systems	19
	Mark A. Williams	
	<i>Cardiovascular Anatomy and Physiology</i>	20
	<i>Respiratory Anatomy and Physiology</i>	28
Chapter 3	Bioenergetics	35
	Travis Triplett-McBride	
	<i>Essential Terminology</i>	36
	<i>Energy Systems</i>	37
	<i>Substrate Depletion and Repletion</i>	46
	<i>Oxygen Uptake and the Aerobic and Anaerobic Contributions to Exercise</i>	47
Chapter 4	Biomechanics	53
	Everett Harman	
	<i>Levers of the Musculoskeletal System</i>	54
	<i>Anatomical Planes of the Human Body</i>	55
	<i>Human Strength and Power</i>	56
	<i>Biomechanical Factors in Human Strength</i>	61
	<i>Sources of Resistance to Muscle Contraction</i>	65
	<i>Movement Analysis and Exercise Prescription</i>	74
Chapter 5	Resistance Training Adaptations	81
	Lee E. Brown and Joseph P. Weir	
	<i>Basic Adaptations to Resistance Training</i>	82
	<i>Acute Adaptations</i>	83
	<i>Chronic Adaptations</i>	85
	<i>Factors That Influence Adaptations to Resistance Training</i>	91
	<i>Overtraining</i>	93
	<i>Detraining</i>	94

Chapter 6	Aerobic Training Adaptations	101
	Lee E. Brown and Matthew J. Comeau	
	<i>Basic Adaptations to Aerobic Training</i>	102
	<i>Cardiovascular Changes</i>	102
	<i>Metabolic Changes</i>	106
	<i>Neurological Changes</i>	111
	<i>Skeletal Changes</i>	111
	<i>Respiratory Changes</i>	112
	<i>Factors That Influence Adaptations to Aerobic Training</i>	113
	<i>Overtraining</i>	115
	<i>Detraining</i>	116
Chapter 7	Nutrition in the Personal Training Setting	121
	Kristin J. Reimers	
	<i>Role of the Personal Trainer Regarding Nutrition</i>	122
	<i>Dietary Assessment</i>	122
	<i>Energy</i>	126
	<i>Nutrients</i>	128
	<i>Weight Gain</i>	134
	<i>Weight Loss</i>	134
	<i>Evaluating Weight Loss Diets</i>	135
	<i>Dietary Supplements</i>	135
	<i>The “Art” of Making Dietary Recommendations</i>	136
Chapter 8	Exercise Psychology for the Personal Trainer	141
	Bradley D. Hatfield and Phil Kaplan	
	<i>Mental Health Aspects of Exercise</i>	142
	<i>Goal Setting</i>	146
	<i>Motivation</i>	149
	<i>Methods to Motivate a Client</i>	153
PART II	Initial Consultation and Evaluation	159
Chapter 9	Client Consultation and Health Appraisal	161
	John A. C. Kordich	
	<i>Purpose of Consultation and Health Appraisal</i>	162
	<i>Delivery Process</i>	162
	<i>Client Consultation</i>	163
	<i>Preparticipation Health Appraisal Screening</i>	163
	<i>Evaluation of Coronary Risk Factors, Disease, and Lifestyle</i>	165
	<i>Interpretation of Results</i>	171
	<i>Referral Process</i>	172
	<i>Medical Clearance</i>	175
Chapter 10	Fitness Assessment Selection and Administration	193
	John A. C. Kordich and Susan L. Heinrich	
	<i>Purposes of Assessment</i>	194
	<i>Formative and Summative Evaluations</i>	195
	<i>Assessment Terminology</i>	198
	<i>Factors That Affect Reliability and Validity</i>	199
	<i>Assessment Case Studies</i>	202
	<i>Administration and Organization of Fitness Assessments</i>	206

	<i>Interpretation and Review of Results</i>	212
	<i>Reassessment</i>	212
Chapter 11	Fitness Testing Protocols and Norms	217
	Joel T. Cramer and Jared W. Coburn	
	<i>Vital Signs</i>	218
	<i>Body Composition</i>	222
	<i>Cardiovascular Endurance</i>	226
	<i>Muscular Strength</i>	234
	<i>Muscular Endurance</i>	236
	<i>Flexibility</i>	237
PART III	Exercise Technique	265
Chapter 12	Flexibility, Body-Weight, and Stability Ball Exercises	267
	Allen Hedrick	
	<i>Flexibility Training</i>	268
	<i>Benefits of Flexibility Training</i>	268
	<i>Factors Affecting Flexibility</i>	269
	<i>Elasticity and Plasticity</i>	270
	<i>Warm-Up</i>	271
	<i>Types of Flexibility Training</i>	273
	<i>Body-Weight and Stability Ball Training</i>	276
	<i>Flexibility, Body-Weight, and Stability Ball Exercises</i>	277
Chapter 13	Resistance Training Exercise Techniques	295
	Thomas R. Baechle and Roger W. Earle	
	<i>Basic Exercise Technique Guidelines</i>	296
	<i>Spotting Resistance Training Exercises</i>	299
	<i>Resistance Training Exercises</i>	301
Chapter 14	Cardiovascular Activity Techniques	333
	J. Henry "Hank" Drought	
	<i>General Guidelines for Safe Participation in Cardiovascular Activities</i>	334
	<i>Cardiovascular Machine Exercise Technique</i>	337
	<i>Cardiovascular Non-Machine Exercise Technique</i>	346
PART IV	Program Design	359
Chapter 15	Resistance Training Program Design	361
	Roger W. Earle and Thomas R. Baechle	
	<i>General Training Principles</i>	362
	<i>Components of a Resistance Training Program</i>	362
	<i>Initial Consultation and Fitness Evaluation</i>	362
	<i>Choice</i>	365
	<i>Frequency</i>	367
	<i>Order</i>	368
	<i>Load and Repetitions</i>	370
	<i>Volume: Repetitions and Sets</i>	379
	<i>Rest Periods</i>	380
	<i>Variation</i>	381
	<i>Progression</i>	383
	<i>Sample Programs</i>	385

Chapter 16	Aerobic Endurance Training Program Design	399
	Patrick S. Hagerman	
	<i>Specificity of Aerobic Endurance Training</i>	400
	<i>Components of an Aerobic Endurance Training Program</i>	400
	<i>Types of Aerobic Training Programs</i>	414
Chapter 17	Plyometric and Speed Training	425
	David H. Potach	
	<i>Plyometric Mechanics and Physiology</i>	426
	<i>When to Use Plyometric Exercise</i>	429
	<i>Plyometric Program Design</i>	430
	<i>Safety Considerations</i>	434
	<i>Speed Training Mechanics and Physiology</i>	439
	<i>Speed Training Safety Considerations</i>	442
	<i>Combining Plyometrics and Speed Training With Other Forms of Exercise</i>	443
	<i>Plyometric and Speed Drills</i>	444
PART V	Clients With Unique Needs	459
Chapter 18	Clients Who Are Pregnant, Older, or Preadolescent	461
	Wayne L. Westcott and Avery D. Faigenbaum	
	<i>Pregnant Women</i>	462
	<i>Older Adults</i>	467
	<i>Preadolescent Youth</i>	472
Chapter 19	Clients With Nutritional and Metabolic Concerns	483
	Christine L. Vega and Carlos E. Jiménez	
	<i>Overweight and Obesity</i>	484
	<i>Eating Disorders</i>	502
	<i>Hyperlipidemia</i>	507
	<i>Metabolic Syndrome</i>	511
	<i>Diabetes Mellitus</i>	512
Chapter 20	Clients With Cardiovascular and Respiratory Conditions	519
	Robert Watine	
	<i>Hypertension</i>	520
	<i>Myocardial Infarction, Stroke, and Peripheral Vascular Disease</i>	524
	<i>Chronic Obstructive Pulmonary Disease</i>	529
	<i>Asthma</i>	529
Chapter 21	Clients With Orthopedic, Injury, and Rehabilitation Concerns	533
	David H. Potach and Todd Ellenbecker	
	<i>Tissue Healing Following Injury</i>	534
	<i>Injury Classification</i>	535
	<i>Orthopedic Concerns and the Personal Trainer</i>	536
	<i>Low Back</i>	537
	<i>Shoulder</i>	540
	<i>Knee</i>	546
	<i>Hip</i>	549
	<i>Arthritis</i>	551

Chapter 22	Clients With Spinal Cord Injury, Multiple Sclerosis, Epilepsy, and Cerebral Palsy	557
	Tom LaFontaine	
	<i>Spinal Cord Injury</i>	558
	<i>Multiple Sclerosis</i>	563
	<i>Epilepsy</i>	567
	<i>Cerebral Palsy</i>	570
Chapter 23	Resistance Training for Clients Who Are Athletes	579
	David Pearson and John F. Graham	
	<i>Factors in Program Design</i>	580
	<i>Periodization of Resistance Training</i>	581
	<i>Linear and Nonlinear Models of Periodized Resistance Training</i>	582

PART VI Safety and Legal Issues **591**

Chapter 24	Facility and Equipment Layout and Maintenance	593
	Mike Greenwood	
	<i>Facility and Equipment Layout</i>	594
	<i>Special Considerations for a Home Facility</i>	597
	<i>Facility and Equipment Maintenance</i>	598
Chapter 25	Legal Issues in Personal Training	607
	Anthony A. Abbott and JoAnn Eickhoff-Shemek	
	<i>The Perils of Litigation</i>	609
	<i>The Legal System</i>	611
	<i>Anatomy of a Lawsuit</i>	612
	<i>Negligence</i>	613
	<i>Strategies for Minimizing Legal Liability Associated With Negligence</i>	624
	<i>Protective Legal Documents</i>	624
	<i>Fitness Facilities and Independent Contractors</i>	626

Appendix: Business Management for the Personal Trainer, by Patrick S.

Hagerman	629		Answers to Study Questions	639		Suggested Solutions
for Applied Knowledge Questions	640		Glossary	654		Credits
Index	665		About the Editors	675		About the NSCA
				676		