### Contents

#### Preface xi

#### =1=

Muscular Strength 1 Muscular Endurance 2 Body Composition 2 Flexibility 2 Cardiovascular Endurance 2 Legal Issues in Personal Training 4 Conclusion 6

### <sup>■</sup>2<sup>■</sup> Principles of Exercise ......9

Progressive Overload 9 Specificity 10 Individual Variation 10 FITT Principle 10 Supercompensation 13 Fitness Fatigue Theory 13 Five-Factor Theory of Training 14 Conclusion 15

≡3₌

#### **Risk Stratification and Fitness Assessments . . 17**

Purposes of Stratifying Risk 17 Goal of Risk Stratification 17 Personal Training Forms 18 Risk Factor Assessment 19 Risk Classification 22 Fitness Assessments 23 Active Assessments 32 Using the Results of a Fitness Assessment 52 Conclusion 53



Goal-Setting Guidelines 56 Types of Goals 58 Timeline for Goals 59 Conclusion 61



### Conducting a Personal Training Session . . . . . 63

Guidelines for the Personal Trainer 63 Guidelines for the Client 70 Value of a Personal Trainer 71 Workout Log 72 Conclusion 75



### 

Bones 77 Muscles 80 Conclusion 85

**₌7**≡

### 

Types of Nerves 87 Muscle Contraction Process 87 Motor Unit 89 Factors Affecting Force Production 91 Conclusion 97

#### 

Phosphagen System 99 Glycolysis System 101 Oxidative System 102 Blending of the Energy Systems 104 Replenishment of the Energy Systems 105 Conclusion 106

#### =9= Endocrine System ..... 109 Lock and Key Theory 109 Anabolic Versus Catabolic 109 Anabolic Hormones 110 Catabolic Hormones 114 **Overall Effect of Hormones** 115 Conclusion 115 Flexion 117 Extension 117 Abduction 119 Adduction 120 Horizontal Abduction 120 Horizontal Adduction 121 Determining the Primary Anatomical Plane 122

Additional Movements 122 Exercises, Movements, and Planes 127 Levers 129 Conclusion 133

### 

Pectoralis Major 135 Pectoralis Minor 137 Serratus Anterior 137 Latissimus Dorsi 138 Teres Major 140 Rhomboids 141 Trapezius 141 Deltoids 143 Elbow Flexors 145 Triceps Brachii 148 Rotator Cuff 150 Forearm Muscles 153 Other Upper-Body Muscles 155 Conclusion 156

Glutes 159 Iliopsoas 161 Quadriceps 162 Hamstrings 165 Adductors 168 Abductors 171 Calves 172 Tibialis Anterior 174 Other Lower-Body Muscles 175 Conclusion 178

### 

Rectus Abdominis 181 External Oblique 182 Internal Oblique 183 Transverse Abdominis 184 Erector Spinae 185 Quadratus Lumborum 187 Diaphragm 187 Other Muscles of the Core 188 Other Muscles of the Body 189 Conclusion 189

### 

Carbohydrate 192 Fat 195 Protein 198 Conclusion 203

#### 

Metabolism 205 Water 208 Digestion 211 Micronutrients 214 Conclusion 224

Overweight and Overfat 225 Weight-Loss Practices 226 Underweight 229 Eating Disorders 229 Behavioral Aspects of Weight Management 230 Calculating a Client's Metabolic Rate 231 Energy Balance 232 Weight Loss 233 Weight Gain 236 Preworkout Meal 238 Carbohydrate Loading 238 Postworkout Meal 240 Sample Diets 240 Carbohydrate Cycling 242 Conclusion 243

# ■17<sup>■</sup> Resistance Training Program Design...... 245

Warm-Up 245 Program Design 247 Programs Based on a Client's One-Repetition Maximum 270 Contraindicated Exercises 276 Conclusion 279

# 

Goals of the Beginner Workout 281 Duration of the Beginner Workout Program 281 Principles of the Beginner Workout 282 Determining Loads for the Beginner Workout 282 Adding Cardio to the Beginner Workout 284 Changing or Updating the Beginner Workout 285 Sample Beginner Workouts 286 Analysis of the Beginner Workout 289 Conclusion 291

=19=	Squat	•••	••	••	• •	 • •	••	• •	••	•	••	•	•	• •	•	•	•	•••	•	•	••	293	3

Training Goals 293 Flaws in Squat Technique 297 Muscles Involved in the Squat 299 Nausea During the Squat 300 Exercises That Assist the Squat 300 Spotting the Squat 301 Equipment and Apparel for the Squat 303 Beginning Squat Training Programs 304 Conclusion 304

#### ■20= Bench Press .

Training Goals 307 Bench Press Pause 311 Muscles Involved in the Bench Press 312 Failure During the Bench Press 312 Exercises That Assist the Bench Press 314 Spotting the Bench Press 315 Equipment for the Bench Press 315 Beginning Bench Press Training Programs 315 Conclusion 316

### ≡21⁼ Deadlift ....

Training Goals 319 Flaws in Deadlift Technique 322 Muscles Involved in the Deadlift 323 Failure During the Deadlift 324 Exercises That Assist the Deadlift 326 Equipment and Apparel for the Deadlift 329 Beginning Deadlift Training Programs 329 Conclusion 330

# 

319

Heart 333 Blood 338 Blood Vessels 338 Lungs 338 Additional Adaptations 339 Aerobic Training Zones 340

Factors That Affect Cardiovascular Performance 344 FITT Principle 348 Types of Cardiovascular Training 355 Excess Postexercise Oxygen Consumption 367 Conclusion 368

# 

Common Tests of Flexibility 371 Factors That Affect Flexibility 372 Types of Stretching 374 When to Perform Flexibility Exercises 378 Extreme Stretching 379 Stretching Tools 380 Stretching Order 381 Conclusion 381

# 

Terms Related to Power and Speed 383 Four Categories of Movements 385 Differences Between Strength and Power 385 Training to Improve Power 386 Training to Improve Speed 395 Conclusion 399

# <sup>■</sup>25<sup>■</sup> Advanced Concepts in Program Design . . . . 401

Exercise Routine Selection 401 Optimal Training Frequency 403 Periodization 404 Training Philosophies 405 Evaluation of Training Program or Philosophy 416 Intensity Techniques 416 Conclusion 425

### 

Older Adults 427 Children 429 Women 432 Pre- and Postnatal Women 440 Conclusion 443

Types of Injuries 447 Tissue Healing Process 448 Open- and Closed-Chain Movements 452 Role of Other Health Care Professionals 453 Staying Injury Free 454 Conclusion 460

- Appendix A: Study Questions Answer Sheet 463
- Appendix B: Exercise List 465
- Appendix C: General Resume Format 475
- Appendix D: Interviewing for Fitness-Related Jobs 477
- Appendix E: Sample Introductory Workout 483
- Appendix F: Sample Pricing 485
- Appendix G: Calculating Lean Body Mass and Fat Weight 487
- Appendix H: Skinfold Formulas 489
- Appendix I: NPTI Resting Fitness Assessments 491
- Key Concept References 493
- Index 513
- About the Author 521
- About NPTI 523