

| | |
|------------------------|-------------|
| <i>Acknowledgments</i> | <i>xi</i> |
| <i>Preface</i> | <i>xiii</i> |

Introduction—Tour Guide Tips 1

| | |
|--|----|
| How to Use This Book | 2 |
| Key | 3 |
| Palpation Hints | 4 |
| Making Contact | 4 |
| Working Hard vs. Working Smart | 5 |
| Less Is More | 5 |
| Rolling and Strumming | 6 |
| Movement and Stillness | 6 |
| Movement as a Palpation Tool | 7 |
| When in Doubt, Ask the Body | 8 |
| Creating Your Palpatory Journal | 9 |
| Exploring the Textural Differences of Structures | 10 |
| Skin | 10 |
| Bone | 10 |
| Muscle | 11 |
| Tendon | 13 |
| Ligament | 13 |
| Fascia | 14 |
| Retinaculum | 15 |
| Artery and Vein | 16 |
| Bursa | 16 |
| Nerve | 17 |
| Lymph Node | 17 |
| Learning Objectives | 18 |

1 Navigating the Body 19

| | |
|--------------------------|----|
| Orientation of the Body | 20 |
| Regions of the Body | 20 |
| Planes of Movement | 21 |
| Directions and Positions | 21 |
| Movement Terminology | 23 |
| Movements of the Body | 26 |
| Spine and Thorax | 26 |
| Neck | 26 |
| Ribs/Thorax | 26 |
| Scapula | 27 |
| Shoulder | 27 |
| Elbow and Forearm | 28 |
| Wrist | 28 |
| Thumb | 29 |

| | |
|---------------------------|----|
| Fingers | 29 |
| Mandible | 29 |
| Pelvis | 30 |
| Hip | 30 |
| Knee | 31 |
| Ankle, Foot, and Toes | 31 |
| Systems of the Body | 32 |
| The Skeletal System | 32 |
| The Muscular System | 35 |
| The Fascial System | 38 |
| The Cardiovascular System | 40 |
| The Nervous System | 42 |
| The Lymphatic System | 43 |

2 Shoulder & Arm 45

| | |
|--|----|
| Topographical Views | 46 |
| Exploring the Skin and Fascia | 47 |
| Bones of the Shoulder and Arm | 48 |
| Bony Landmarks of the Shoulder and Arm | 49 |
| The Scapula | 49 |
| The Humerus and Clavicle | 50 |
| Overview: Bony Landmark Trails | 51 |
| <i>Trail 1—Along the Edges</i> | 52 |
| Spine of the Scapula | 52 |
| Medial Border | 52 |
| Inferior Angle | 53 |
| Superior Angle | 53 |
| Lateral Border | 54 |
| Infraglenoid Tubercle | 54 |
| <i>Trail 2—In the Trenches</i> | 55 |
| Infraspinous Fossa | 55 |
| Supraspinous Fossa | 55 |
| Subscapular Fossa | 56 |
| <i>Trail 3—Springboard Ledge</i> | 57 |
| Acromion | 57 |
| Clavicle | 57 |
| Acromioclavicular and Sternoclavicular Joints | 58 |
| Coracoid Process | 59 |
| Deltoid Tuberosity | 59 |
| <i>Trail 4—Two Hills and a Valley</i> | 60 |
| Greater and Lesser Tubercles, Intertubercular Groove | 60 |
| Overview: Muscles of the Shoulder and Arm | 61 |
| Synergists—Muscles Working Together | 63 |
| Shoulder | 63 |
| Scapula | 65 |

| | |
|---|------------|
| Muscles of the Shoulder and Arm | 67 |
| Deltoid | 67 |
| Trapezius | 68 |
| Latissimus Dorsi and Teres Major | 71 |
| Rotator Cuff Muscles | 74 |
| Rotator Cuff Tendons | 79 |
| Rhomboid Major and Minor | 82 |
| Levator Scapula | 83 |
| Serratus Anterior | 86 |
| Sternalis | 88 |
| Pectoralis Major | 89 |
| Pectoralis Minor | 92 |
| Subclavius | 94 |
| Biceps Brachii | 95 |
| Tendon of the Long Head of the Biceps Brachii | 96 |
| Triceps Brachii | 97 |
| Tendon of the Long Head of the Triceps Brachii | 98 |
| Coracobrachialis | 99 |
| Ligaments and Other Structures of the Shoulder and Arm | 100 |
| Axilla | 100 |
| Sternoclavicular Joint | 101 |
| Ligaments of the Shoulder | 102 |
| Glenohumeral Joint | 103 |
| Coracoclavicular Ligament | 104 |
| Coracoacromial Ligament | 104 |
| Subacromial Bursa | 105 |
| Axillary Lymph Nodes | 105 |
| Brachial Artery | 106 |

3 Forearm & Hand 107

| | |
|---|------------|
| Topographical Views | 108 |
| Exploring the Skin and Fascia | 109 |
| Bones of the Forearm and Hand | 110 |
| Bony Landmarks of the Forearm and Hand | 111 |
| The Ulna and Radius | 112 |
| Overview: Bony Landmark Trails | 113 |
| <i>Trail 1—Knob Hill</i> | <i>114</i> |
| Olecranon Process and Fossa | 114 |
| Epicondyles of the Humerus | 114 |
| Supracondylar Ridges of the Humerus | 115 |
| <i>Trail 2—The Razor’s Edge</i> | <i>116</i> |
| Shaft of the Ulna | 116 |
| Head of the Ulna | 116 |
| Styloid Process of the Ulna | 116 |
| <i>Trail 3—Pivot Pass</i> | <i>117</i> |

| | |
|--|------------|
| Head of the Radius | 117 |
| Shaft of the Radius | 117 |
| Styloid Process of the Radius | 118 |
| Lister’s Tubercle | 118 |
| <i>Trail 4—Walking on Your Hands</i> | <i>119</i> |
| Carpals | 119 |
| Pisiform | 121 |
| Triquetrum | 121 |
| Hamate | 122 |
| Scaphoid | 123 |
| Trapezium | 123 |
| Scaphoid and Trapezium Tubercles | 124 |
| Lunate and Capitate | 125 |
| Overview: Muscles of the Forearm and Hand ... | 127 |
| Synergists—Muscles Working Together | 130 |
| Elbow | 130 |
| Forearm | 130 |
| Wrist | 130 |
| Hand and Fingers | 131 |
| Thumb | 131 |
| Muscles of the Forearm and Hand | 132 |
| Brachialis | 132 |
| Brachioradialis | 133 |
| Distinguishing between the Flexor and Extensor Groups of the Forearm | 134 |
| Extensors of the Wrist and Fingers | 135 |
| Anconeus | 139 |
| Extensor Indicis | 139 |
| Flexors of the Wrist and Fingers | 140 |
| Pronator Teres | 146 |
| Pronator Quadratus | 147 |
| Supinator | 147 |
| Overview: Muscles of the Thumb and Hand ... | 149 |
| Muscles of the Thumb and Hand | 151 |
| Long Muscles of the Thumb | 151 |
| Short Muscles of the Thumb | 154 |
| Lumbricals and Interossei | 157 |
| Hypothenar Eminence | 159 |
| Ligaments and Other Structures of the Forearm and Hand | 160 |
| Radial Collateral Ligament | 160 |
| Annular Ligament | 161 |
| Ulnar Collateral Ligament | 161 |
| Ulnar Nerve | 162 |
| Olecranon Bursa | 162 |
| Interosseous Membrane | 162 |
| Retinacula of the Wrist and Palmar Aponeurosis | 163 |
| Radial and Ulnar Arteries | 164 |

| | |
|---|-----|
| Ligaments of the Wrist, Hand, and Fingers | 165 |
|---|-----|

4 Spine & Thorax 167

| | |
|---|------------|
| Topographical Views | 168 |
| Exploring the Skin and Fascia | 169 |
| Bones of the Spine and Thorax | 170 |
| Bony Landmarks of the Spine and Thorax | 171 |
| Atlas (C-1) | 171 |
| Axis (C-2) | 171 |
| Cervical | 172 |
| Thoracic | 172 |
| Lumbar | 172 |
| Additional Bony Landmarks | 173 |
| Overview: Bony Landmark Trails | 174 |
| <i>Trail 1—Midline Ridge</i> | <i>176</i> |
| Spinous Processes of the Vertebrae | 176 |
| <i>Trail 2—Crossing Paths</i> | <i>177</i> |
| L-4 and Top of the Iliac Crest | 177 |
| T-12 and the Twelfth Rib | 177 |
| T-7 and Inferior Angle | 178 |
| T-2 and Superior Angle | 178 |
| C-7 and Base of the Neck | 178 |
| <i>Trail 3—Nape Lane</i> | <i>179</i> |
| Spinous Processes of the Cervicals | 179 |
| Transverse Processes of the Cervicals | 180 |
| Cervical Lamina Groove | 181 |
| <i>Trail 4—Buried Boulevard</i> | <i>182</i> |
| Transverse Processes of the Thoracic and Lumbar Vertebrae | 182 |
| Lamina Groove of the Thoracic and Lumbar Vertebrae | 183 |
| <i>Trail 5—Breastbone Ridge</i> | <i>184</i> |
| Sternum | 184 |
| <i>Trail 6—One Bumpy Road</i> | <i>185</i> |
| Ribs and Costal Cartilage | 185 |
| First Rib | 186 |
| Eleventh and Twelfth Ribs | 187 |
| Overview: Muscles of the Spine and Thorax | 188 |
| Muscle Layers of the Posterior Neck | 191 |
| Cross Sections of the Neck | 192 |
| Cross Sections of the Thorax | 193 |
| Synergists—Muscles Working Together | 194 |
| Vertebral Column | 194 |
| Ribs/Thorax | 195 |
| Muscles of the Spine and Thorax | 196 |
| Erector Spinae Group | 196 |
| Branches of the Erector Spinae Group | 197 |
| Transversospinalis Group | 200 |

| | |
|---|-----|
| Splenius Capitis and Cervicis | 203 |
| Suboccipitals | 205 |
| Quadratus Lumborum | 207 |
| Abdominals | 209 |
| Diaphragm | 213 |
| Intercostals | 215 |
| Serratus Posterior Superior | 216 |
| Serratus Posterior Inferior | 216 |
| Intertransversarii | 217 |
| Interspinalis | 217 |

| | |
|---|------------|
| Ligaments and Other Structures of the Spine and Thorax | 218 |
| Ligamentum Nuchae | 218 |
| Supraspinous Ligament | 219 |
| Abdominal Aorta | 219 |
| Thoracolumbar Fascia | 220 |
| Craniovertebral Joints—Atlantooccipital and Atlantoaxial Joints | 221 |
| Intervertebral Joints | 222 |
| Costovertebral Joints | 223 |
| Sternocostal Joints | 223 |

5 Head, Neck & Face 225

| | |
|---|------------|
| Topographical View | 226 |
| Exploring the Skin and Fascia | 227 |
| Bones and Bony Landmarks of the Head, Neck, and Face | 228 |
| Overview: Bony Landmark Trails | 230 |
| <i>Trail 1—Around the Globe</i> | <i>231</i> |
| Occiput | 231 |
| Parietal Bones | 232 |
| Temporal Bone | 233 |
| Frontal Bone | 234 |
| Sphenoid Bone | 234 |
| Facial Bones | 234 |
| <i>Trail 2—Jaw Jaunt</i> | <i>235</i> |
| Mandible | 235 |
| <i>Trail 3—Horseshoe Trek</i> | <i>238</i> |
| Trachea | 238 |
| Overview: Muscles of the Head, Neck, and Face | 240 |
| Synergists—Muscles Working Together | 242 |
| Cervical Spine | 242 |
| Mandible | 243 |
| Muscles of the Head, Neck, and Face | 244 |
| Sternocleidomastoid | 244 |
| Scalenes | 246 |
| Masseter | 250 |

| | |
|---|------------|
| Temporalis | 251 |
| Suprahyoids and Digastric | 253 |
| Infrahyoids | 255 |
| Platysma | 257 |
| Occipitofrontalis (Frontalis and Occipitalis) | 258 |
| Medial and Lateral Pterygoids | 259 |
| Longus Capitis and Longus Colli | 260 |
| Overview: Muscles of Facial Expression | 261 |
| Muscles of the Mouth | 263 |
| Muscles of the Nasal Region | 267 |
| Muscles of the Eyes | 268 |
| Muscles of the Scalp | 269 |
| Other Structures of the Head, Neck, and Face | 270 |
| Common Carotid Artery | 271 |
| Superficial Temporal Artery | 271 |
| Facial Artery | 271 |
| Facial Nerve | 272 |
| Vertebral Artery | 272 |
| Parotid Gland and Duct, Submandibular Gland | 272 |
| Thyroid Gland | 273 |
| Cervical Lymph Nodes | 274 |
| Brachial Plexus | 274 |

6 Pelvis & Thigh 275

| | |
|---|------------|
| Topographical Views | 276 |
| Exploring the Skin and Fascia | 277 |
| Bones of the Pelvis and Thigh | 278 |
| Bony Landmarks of the Pelvis and Thigh | 279 |
| The Hip | 281 |
| The Sacrum and Coccyx | 282 |
| The Femur | 283 |
| Overview: Bony Landmark Trails | 284 |
| <i>Trail 1—Solo Pass</i> | 285 |
| Anterior Superior Iliac Spine (ASIS) | 285 |
| Iliac Crest | 285 |
| Posterior Superior Iliac Spine (PSIS) | 286 |
| Pubic Crest | 286 |
| Ischial Tuberosity | 287 |
| Greater Trochanter of the Femur | 287 |
| <i>Trail 2—Iliac Avenue</i> | 288 |
| Anterior Superior Iliac Spine (ASIS) | 288 |
| Anterior Inferior Iliac Spine (AIIS) | 288 |
| Iliac Crest | 289 |
| Iliac Fossa | 289 |
| Posterior Superior Iliac Spine (PSIS) | 289 |
| <i>Trail 3—Tailbone Trail</i> | 290 |

| | |
|---|------------|
| Sacrum | 290 |
| Coccyx | 291 |
| Sacroiliac Joint | 291 |
| <i>Trail 4—Hip Hike</i> | 292 |
| Greater Trochanter | 292 |
| Gluteal Tuberosity | 292 |
| <i>Trail 5—The Underpass</i> | 293 |
| Umbilicus | 293 |
| Pubic Crest and Tubercles | 293 |
| Superior Ramus of the Pubis | 294 |
| Inferior Ramus of the Pubis and Ramus of the Ischium | 294 |
| Ischial Tuberosity | 295 |
| Overview: Muscles of the Pelvis and Thigh | 296 |
| Perineum and Pelvic Floor | 300 |
| Synergists—Muscles Working Together | 302 |
| Coxal | 302 |
| Knee | 305 |
| Muscles of the Pelvis and Thigh | 306 |
| Quadriceps Femoris Group | 306 |
| Hamstrings | 311 |
| Gluteals | 315 |
| Adductor Group | 319 |
| Tensor Fasciae Latae and Iliotibial Tract | 324 |
| Sartorius | 326 |
| Tendons of the Posterior Knee | 327 |
| Lateral Rotators of the Hip | 328 |
| Iliopsoas | 332 |
| Ligaments and Other Structures of the Pelvis and Thigh | 336 |
| Ligaments of the Pelvis | 337 |
| Ligaments of the Coxal Joint | 338 |
| Inguinal Ligament | 339 |
| Femoral Artery, Nerve, and Vein | 339 |
| Inguinal Lymph Nodes | 340 |
| Sacrotuberous Ligament | 340 |
| Posterior Sacroiliac Ligaments | 340 |
| Iliolumbar Ligament | 341 |
| Sciatic Nerve | 341 |
| Trochanteric Bursa | 342 |

7 Leg & Foot 343

| | |
|---|------------|
| Topographical Views | 344 |
| Exploring the Skin and Fascia | 345 |
| Bones of the Knee, Leg, and Foot | 346 |
| The Tibia, Fibula, and Patella | 347 |
| Bony Landmarks of the Knee and Leg | 348 |

| | |
|--|------------|
| Overview: Bony Landmark Trails | 349 |
| <i>Trail 1—Landmark Trail</i> | 350 |
| Patella | 350 |
| Tibial Tuberosity and Shaft of the Tibia | 350 |
| Head of the Fibula | 351 |
| <i>Trail 2—Waddle Walk</i> | 351 |
| Tibial Plateaus | 351 |
| Pes Anserinus Attachment Site | 352 |
| <i>Trail 3—Hills on Both Sides</i> | 352 |
| Edges of Femoral Condyles | 352 |
| Epicondyles of the Femur | 353 |
| Adductor Tubercle | 353 |
| Bones of the Ankle and Foot | 354 |
| Bony Landmarks of the Ankle and Foot | 355 |
| Overview: Bony Landmark Trails | 356 |
| <i>Trail 1—The Back Road</i> | 357 |
| Lateral and Medial Malleoli | 357 |
| Malleolar Grooves | 357 |
| Calcaneus | 358 |
| Talus | 360 |
| <i>Trail 2—Little Piggies</i> | 361 |
| Hallux | 361 |
| First Metatarsal | 362 |
| Second through Fifth Digits (Toes) | 362 |
| Second through Fifth Metatarsals | 363 |
| <i>Trail 3—The Archway</i> | 364 |
| Medial, Middle, and Lateral Cuneiforms | 364 |
| Navicular | 365 |
| Cuboid | 365 |
| Overview: Muscles of the Leg and Foot | 366 |
| Synergists—Muscles Working Together | 369 |
| Ankle | 369 |
| Foot and Toes | 370 |
| Muscles of the Leg and Foot | 371 |
| Gastrocnemius and Soleus | 371 |
| Plantaris | 374 |
| Popliteus | 375 |
| Fibularis Longus and Brevis | 376 |
| Extensors of the Ankle and Toes | 378 |

| | |
|---|------------|
| Flexors of the Ankle and Toes | 381 |
| Overview: Muscles of the Foot | 384 |
| Muscles of the Foot | 387 |
| Other Muscles of the Foot | 390 |
| Ligaments and Other Structures of the Knee and Leg | 392 |
| Tibiofemoral Joint | 392 |
| Tibiofemoral and Tibiofibular Joints | 393 |
| Fibular and Tibial Collateral Ligaments | 394 |
| Menisci of the Knee | 395 |
| Bursae of the Knee | 396 |
| Popliteal Artery | 396 |
| Common Fibular Nerve | 397 |
| Ligaments and Other Structures of the Ankle and Foot | 398 |
| Talocrural Joint | 398 |
| Talotarsal Joints and Ligaments of the Foot | 399 |
| Ligaments of the Foot | 400 |
| Deltoid Ligament | 401 |
| Plantar Calcaneonavicular (Spring) Ligament | 401 |
| Lateral Collateral Ligaments of the Ankle | 402 |
| Retinacula of the Ankle | 403 |
| Plantar Aponeurosis | 404 |
| Posterior Tibial Artery | 404 |
| Dorsalis Pedis Artery | 405 |
| Sesamoid Bones of First Metatarsal | 405 |
| Calcaneal Bursae | 405 |

Appendixes 407

| | |
|---|--------------------------|
| <i>Muscles of Facial Expression Attachment Sites</i> | 408 |
| <i>Synergists—Muscles Working Together</i> | 409 |
| <i>Glossary</i> | 413 |
| <i>Pronunciation and Etymology</i> | 415 |
| <i>Bibliography</i> | 419 |
| <i>Index</i> | 421 |
| <i>About the Author and Illustrator</i> | 435 |
| <i>Bones: Quick Reference Index</i> | 440 |
| <i>Muscles of the Human Body:</i> <i>Quick Reference Index</i> | <i>Inside Back Cover</i> |