

CONTENTS

INTRODUCTION 12

CHAPTER 1: HUMAN SKELETAL AND MUSCLE SYSTEMS 19

Human Skeletal System 19

Axial and Visceral
Skeleton 21

The Appendicular
Skeleton 30

Human Muscle System 35

Evolutionary Context 36

Muscles of the Lower Limb 37

Muscles of the Upper Limb 39

Muscles of the Head and
Neck 40

Muscles of the Trunk 41

CHAPTER 2: THE NATURE OF BONE 43

Evolutionary Significance 43

Chemical Composition and
Physical Properties 44

Bone Morphology 46

Compact Bone 48

Cancellous Bone 48

Epiphyses 49

Osteons 50

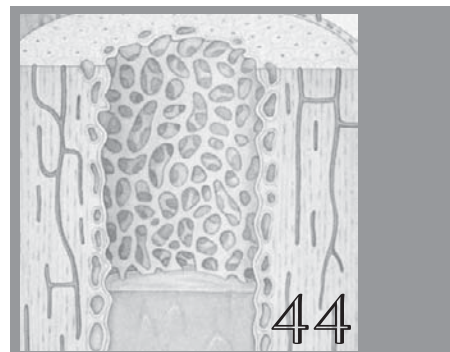
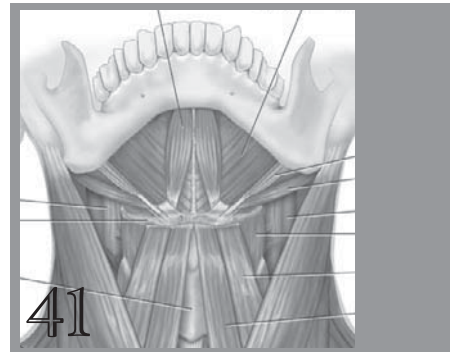
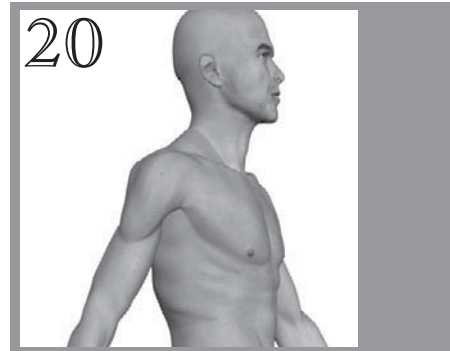
Bone Marrow 53

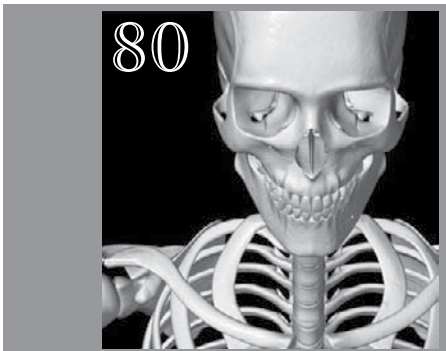
Vascular Supply and
Circulation 55

Bone Resorption and
Renewal 56

Bone Remodeling 59

Bone Formation 60





Physiology of Bone 61
 Calcium and Phosphate
 Equilibrium 61
 Physiological and
 Mechanical Controls 64
 Hormonal Influences 66
 Nutritional Influences 68

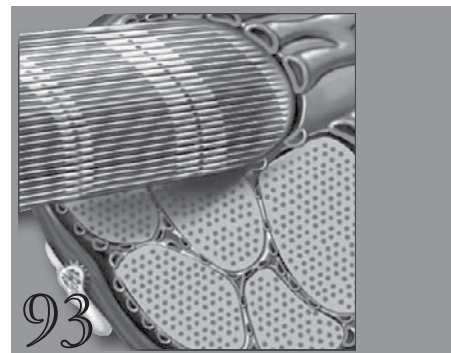
**CHAPTER 3: BONES OF THE
HUMAN ANATOMY 72**

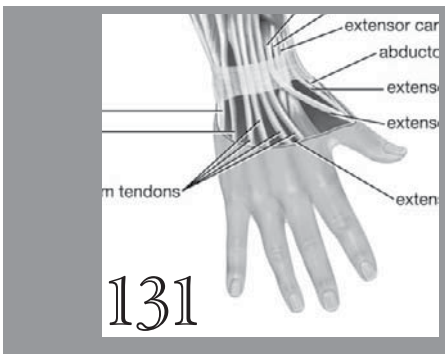
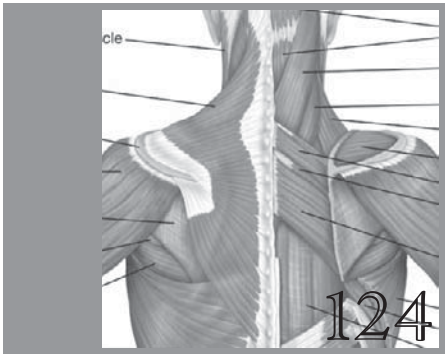
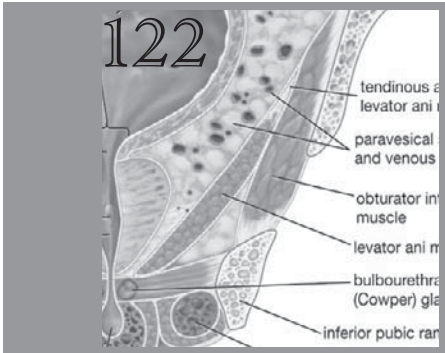
Bones of the Head 72
 The Skull 72
 Fontanel 73
 Zygomatic Bone 73
 Parietal Bone 74
 Occipital Bone 74
 Nasal Conchae 76
Bones of the Vertebral
Column 76
 Vertebrae 76
 The Neck 77
 The Sacrum 78
 The Coccyx 78
Bones of the Upper Body 79
 Clavicle 79
 Scapula 79
 Sternum 81
 The Ribs 82
 Humerus 82
 Radius 83
 Ulna 84
 The Hand 84
Bones of the Lower Body 87
 The Pelvic Girdle 87
 Femur 88

Tibia 89
Fibula 89
The Foot 90

**CHAPTER 4: THE NATURE OF
MUSCLE 93**

Striated Muscle 94
Muscle Fibres 94
Myofibrils 96
Myofilaments 98
Proteins of the
Myofilaments 100
Actin-Myosin Interaction
and Its Regulation 103
Energy Stores 104
Molecular Mechanisms of
Muscle Contraction 105
Smooth Muscle 106
Structure and Organization 107
Initiation of Contraction 109
Cross-Bridge Cycle and
ATP Breakdown 110
Mechanical Properties 111
Cardiac Muscle 112
Structure and Organization 113
The Frequency of
Contraction 114
Excitation/Contraction
Coupling 116
Force and Velocity of
Contraction 117
Response of the Heart to
Stress 117
Muscles of Movement 119
Abductor Muscle 119





Adductor Muscle 120
 Extensor Muscle 120
 Flexor Muscle 121
 Sphincter Muscle 122
 Levator Muscle 123
 Muscles of the Back 123
 Spinalis Muscle 123
 Semispinalis Muscle 124
 Erector Spinae 125
 Iliocostalis Muscle 125
 Coccygeus Muscle 126
 Latissimus Dorsi 126
 Trapezius Muscle 126
 Muscles of the Chest and
 Abdomen 127
 Pectoralis Muscle 127
 Intercostalis Muscle 128
 Abdominal Muscle 128
 Muscles of the Arm 129
 Deltoideus Muscle 130
 Biceps Muscle 131
 Triceps Muscle 132
 Muscles of the Leg 132
 Gluteus Muscle 133
 Quadriceps Femoris
 Muscle 134
 Sartorius Muscle 134
 Gastrocnemius Muscle 134
 Soleus Muscle 135

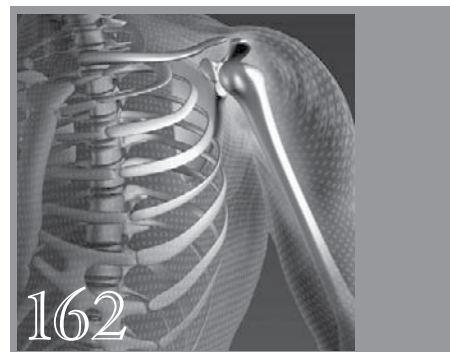
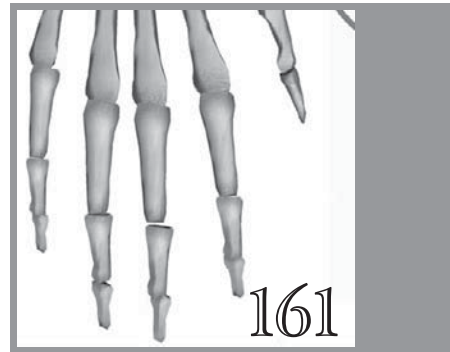
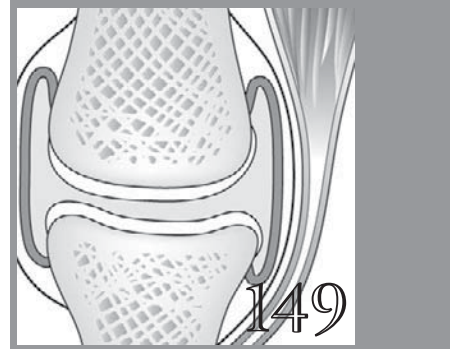
**CHAPTER 5: THE HUMAN
 BODY IN MOTION 136**

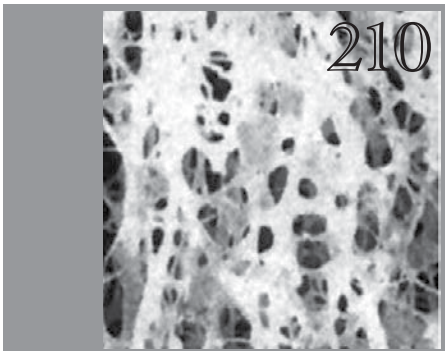
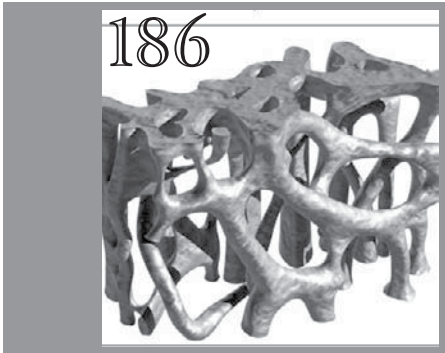
Anatomy of Joints 136
 Joint Movements 136
 Joint Components 137
 Nerve Supply and Blood

Supply of Joints 142
Joint Metabolism and
Nutrition 143
Major Types of Joints 144
Synarthroses 145
Diarthroses 149

**CHAPTER 6: DISEASES AND
INJURIES OF BONE 166**

Principal Types of Diseases
and Injuries 167
Abnormal Stress on Bone 167
Metabolic Bone Disease 167
Deficient Blood Supply to
Bone 169
Ionizing Radiation Injury
to Bone 170
Infectious Diseases of
Bone 170
Bone Tumour 172
Fractures 173
Developmental Abnormalities
and Hereditary Conditions 175
Congenital Bone Diseases 175
Inherited Disorders 177
Dysplasia 177
Bone Cyst 178
Bone Cancer 179
Osteoclastoma 180
Osteosarcoma 181
Enchondroma 181
Curvature of the Spine 182
Metatarsalgia 183
Marble Bone Disease 183
Morquio Syndrome 184
Osteochondrosis 184





Osteomalacia 185
Osteoporosis 186
Paget Disease of Bone 187
Pott Disease 188
Spondylitis 189
Spondylosis 189
Indications of Muscle
Disease 191

CHAPTER 7: DISEASES AND INJURIES OF MUSCLE 193

Primary Diseases and
Disorders 193
Muscular Dystrophy 194
Myasthenia Gravis 196
Toxic Myopathies 197
Myositis 198
Myositis Ossificans 200
Endocrine and Metabolic
Myopathies 200
Indications of Muscle
Disease 201
Periodic Paralysis 205
Tetany 206
Tic 207
Muscle Tumour 208
Fatigue 209
Atrophy of Muscle and
Bone 210
Atrophy in Aging 211
Muscle Weakness 212
Atrophy in Disuse 212
Signs and Symptoms 214
Disease Detection 214
Classification of Muscle
Weakness 215

**CHAPTER 8: DISEASES AND
INJURIES OF JOINTS 218**

- Types of Arthritis 218
 - Bursitis 220
 - Infectious Arthritis 221
 - Rheumatoid Arthritis and Allied Disorders 223
 - Gout 226
 - Collagen Diseases 228
 - Miscellaneous Types of Arthritis 229
- Traumatic Joint Diseases 230
 - Dislocation 231
 - Fracture–Dislocation 232
 - Sprain 233
 - Elbow Injuries 233
 - Knee Injuries 234
- Degenerative Joint Disease 235
- Congenital and Hereditary Joint Abnormalities 237
- Secondary Joint Diseases 240
 - Hemorrhagic Joint Diseases 240
 - Aseptic Necrosis 241
 - Endocrine Factors 242
 - Neurogenic Arthropathy 242
 - Hypertrophic Osteoarthropathy 243
 - Reflex Sympathetic Dystrophy 243
 - Tumours of Joints 244

CONCLUSION 246

GLOSSARY 247

BIBLIOGRAPHY 250

INDEX 252

