

Contents

Chapter 1 The Skeleton

Functions of the Skeleton	1
Structure of the Skeleton	2
Modelling and Remodelling	3
Bone Cells	6
Steps (or Phases) of Bone Remodelling	10
Regulation of Bone Remodelling	12
The RANK/RANKL/Osteoprotegerin System	18
Age and Bone Mass	20

Chapter 2 Disorders of Bone

Manifestations of Abnormalities in Remodelling	23
Osteoclasts: The Leading Actors in Disorders of Bone	23
Classification of Osteopathies According to Spread (Topography)	25
Classification According to Underlying Pathologic Anatomy of the Bones Involved	26
Diagnostic Investigation	28

Chapter 3 Bisphosphonates

Historical Review	33
Chemistry	34
Pharmacodynamics	35
Actions of Bisphosphonates	46
Structure-Related Actions	58
Side Effects	61
Practical Recommendations and Guidelines	68

Chapter 4
Osteoporotic Syndrome

Definition	71
Classification According to Extent of Spread	72
Classification According to Rate of Bone Turnover	72
Classification According to Age and Sex	72
Secondary Osteoporoses	73
Diagnosis	76
Therapeutic Strategies	82
Bisphosphonates	86
Intravenous Therapy of Osteoporosis	89
Practical Recommendations	95

Chapter 5
Glucocorticoid Induced Osteoporosis

Definition	99
Diseases Treated with Glucocorticoids	99
Pathophysiology	100
Prevention	101
Treatment Strategies	101
Bisphosphonates	102

Chapter 6
Tumor and Chemotherapy Induced Osteoporosis

Definition	103
Pathophysiology	103
Types of Tumor Therapy with Direct Effects on Bone	104
Treatment Strategies	107
Bisphosphonates	107

Chapter 7
Transplantation Osteoporosis

Definition	109
Pathogenesis	109
Treatment Strategies	110
Bisphosphonates	110

Chapter 8
Immobilisation Osteoporosis

Examples of Bone Loss 111
 Therapy of Immobilisation Osteoporosis 112

Chapter 9
Pregnancy Associated Osteoporosis

Pathogenesis 115
 Prevention and Therapy 115

Chapter 10
Osteogenesis Imperfecta (OI)

Definition 117
 Pathophysiology 117
 Diagnosis 118
 Treatment Strategies 118
 Bisphosphonates 119
 Osteopenia of Prematurity 120

Chapter 11
AIDS Osteopathy

Clinical Settings of Disorders of Bone in AIDS 123
 Manifestations of AIDS Osteopathy 123
 Diagnosis 124
 Treatment Strategies 125

Chapter 12
Renal Osteopathy

Definition 127
 Pathophysiology 127
 Diagnosis 128
 Treatment Strategies 129
 Bisphosphonates 130

Chapter 13
Paget's Disease of Bone

Definition	131
Clinical Findings	131
Diagnosis	132
Treatment Strategies	135
Bisphosphonates	136

Chapter 14
Complex Regional Pain Syndrome (CRPS)

Definition	139
Clinical Findings	139
Diagnosis	139
Course of Disease	140
Treatment Strategies	141
Bisphosphonates	141

Chapter 15
Transient Osteoporosis
and the Bone Marrow Edema Syndrome (BMES)

Transient Osteoporosis	143
Diagnosis	143
Treatment Strategies	144
Bisphosphonates	145
Bone Marrow Edema Syndrome (BMES)	145
Diagnosis	146
Treatment Strategies	147
Bisphosphonates	147

Chapter 16
Vanishing Bone Disease
(Gorham-Stout Syndrome)

Definition	151
Etiology and Pathophysiology	151
Clinical Findings	151
Diagnosis	153
Treatment Strategies	153
Bisphosphonates	153

Chapter 17
Fibrous Dysplasia

Definition 155
 Clinical Findings 156
 Treatment Strategies 156
 Bisphosphonates 157

Chapter 18
SAPHO Syndrome

Definition 159
 Diagnosis 159
 Therapy 160

Chapter 19
Heterotopic Calcification and Ossification

Definition 163
 Sites and Conditions of Occurrence 163
 Treatment Strategies 163
 Bisphosphonates 164

Chapter 20
**Periprosthetic Osteolysis and Aseptic Loosening
 of Prostheses in Total Joint Arthroplasty**

Pathogenesis 165
 Diagnosis 167
 Treatment Strategies 168
 Bisphosphonates 169

Chapter 21
Alveolar Bone Loss due to Periodontitis

Definition 173
 Pathogenesis 173
 Clinical Findings 173
 Treatment Strategies 173
 Bisphosphonates 174
 Necrosis of the Jaw Bones and Non-traumatic Avascular Necrosis
 of the Femoral Head 175

Chapter 22
Hypercalcemia

Definition	177
Frequency	177
Differential Diagnosis	178
Symptoms	179
Treatment Strategies	179
Bisphosphonates	179
Hypercalcemia of Malignancy	180

Chapter 23
Bone Pain

Frequency	183
Differential Diagnosis	183
Pathogenesis	184
Diagnosis	185
Treatment Strategies	186
Bisphosphonates	186

Chapter 24
Multiple Myeloma

Definition	189
Frequency	189
Pathogenesis	189
Clinical Findings	190
Diagnosis of Skeletal Manifestations	192
Myeloma Variants	193
Treatment Strategies	194
Bisphosphonates	195

Chapter 25
Bone Metastases

Introduction	199
Frequency	199
Regional Distribution within the Skeleton	201
Development of Skeletal Metastases	201
Osseous Reactions	203
Bisphosphonates	205

Chapter 26
Skeletal Metastases of Breast Cancer

Frequency	209
Circulating Tumor Cells	209
Complications	209
Treatment Strategies	210
Bisphosphonates for Prevention of Metastasis	210
Bisphosphonates for Prevention of Skeletal Complications	212
Bisphosphonates for Treatment of Skeletal Complications	212

Chapter 27
Other Carcinomas with Osteotropic Metastases

Prostatic Carcinoma	215
Bronchial Carcinoma, Lung Cancer	217
Renal Cell Carcinoma	217
Other Malignancies with Implications for Skeletal Involvement	218

Chapter 28
Bisphosphonates from A–Z

List of Indications	221
List of Subgroups of Bisphosphonates	226
List According to Different Modes of Action	227
List of Commercial Bisphosphonate Preparations from A to Z	227
List of Authorised Bisphosphonates from A to Z	228

Chapter 29
Summary and Perspectives

229

Chapter 30
Literature Survey

235

Subject Index

259