
Contents

Preface		xiii	
Acknowledgments		xiv	
Contributors		xv	
Section I			
1 Anatomy of the Hip and Surgical Approaches		3	
<i>Brian R. Waterman, Edward C. Beck, Gift Echefu, Ian Clapp, William H. Neal, Shane J. Nho</i>			
Basic Anatomy of the Hip and Pelvis	3	Surgical Approaches	18
Femur	3	Anterior Approach (Smith-Petersen)	18
Pelvis and Acetabulum	5	Anterolateral Approach (Watson Jones)	19
Ilium	7	Direct Lateral Approach (Hardinge)	19
Ischium	7	Posterolateral Approach	20
Pubis	8	Modified Hueter Approach	20
Acetabulum	8	Hip Arthroscopy	20
Joints	8	References	23
Musculature	12	Suggested Readings	24
Surgical Anatomy	12		
Surface Anatomy	12		
2. History and Physical Examination		25	
<i>Edward C. Beck, Brian R. Waterman, Gift Echefu, Jahanzeb Kaikous, William H. Neal, Kyleen Jan, Alexander Newhouse, Shane J. Nho</i>			
History	25	Motion Assessment	26
Diagnosing Disorders of the Hip	25	Range of Motion Assessment	28
Mechanical Symptoms	25	Special Signs and Tests	29
Physical Examination	26	References	32
Inspection	26	Suggested Readings	32
3. Radiographic Anatomy of The Hip		33	
<i>Gift Echefu, Brian R. Waterman, Edward C. Beck, Jahanzeb Kaikous, Shane J. Nho</i>			
General Considerations	33	Ultrasound	38
Plain Film Radiographs	33	References	38
Computed Tomography	37	Suggested Readings	38
Magnetic Resonance Imaging	37		

4. Hip Imaging and Diagnostic Tests.....	39	
<i>Gift Echefu, Brian R. Waterman, Edward C. Beck, Kyleen Jan, Shane J. Nho</i>		
Imaging Modalities.....	39	Magnetic Resonance Imaging..... 51
General Considerations	39	Magnetic Resonance
Plain Radiographs	41	Arthrography
Pelvic Fractures	42	Ultrasound.....
Femoral Head Dislocation	43	Bone Scintigraphy
Femoral Neck Fractures.....	43	References.....
Nontraumatic Hip Conditions.....	43	Suggested Readings
Computed Tomography.....	48	
5. Hip Biomechanics	55	
<i>Brian R. Waterman, Kyle Kunze, Edward C. Beck, Kyleen Jan, Shane J. Nho</i>		
General Considerations.....	55	Gait..... 57
Functional Anatomy	55	Hip Joint Forces and Equilibrium
Hip Joint Motions	55	References.....
Hip–Spine Kinematics	56	Suggested Readings
Lower Limb Axis	56	
6. Hip Pathomechanics.....	63	
<i>Brian R. Waterman, Edward C. Beck, Kyle Kunze, Gift Echefu, Shane J. Nho</i>		
General Considerations.....	63	Suggested Readings 65
References.....	65	
7. Implant Biology.....	67	
<i>Brian R. Waterman, Edward C. Beck, Gift Echefu, Jahanzeb Kaikaus, Shane J. Nho</i>		
General Considerations.....	67	Hip Implant Biomechanics 69
Cartilage Repair Biology.....	67	Implant–Bone Interface
Implant Prosthesis	68	Biology
Hip Replacement Implant Materials	68	References.....
Types of Hip Implants and Fixation	68	Suggested Readings
8. Hip Instability.....	71	
<i>Brian R. Waterman, Kamran Movassaghi, Edward C. Beck, Gift Echefu, Shane J. Nho</i>		
Biomechanics	71	Physical Examination..... 74
Hip Joint Stability	71	Imaging.....
Etiology	72	Diagnostic Intra-articular Injection.....
Traumatic.....	72	Treatment
Atraumatic.....	73	References.....
Diagnosis	74	Suggested Readings
History	74	

Section II

9. Pelvic Fractures 83

Joshua D. Harris, Robert A. Jack II

Introduction	83	Symptoms	90
Pelvic Ring Fractures	83	Physical Examination	90
Acetabular Fractures	84	Diagnostic Imaging	91
Anatomic Considerations	84	Radiographs	91
Pelvic Ring	84	Computed Tomography	92
Acetabulum	87	Treatment	92
Classification	88	Pelvic Ring Injuries	92
Pelvic Ring	88	Acetabulum Fractures	94
Acetabulum	88	Complications	96
History and Examination	88	Pelvic Ring Injuries	96
Information from Emergency		Acetabulum Fractures	96
Medical Transport Professionals	88	References	97
Initial Assessment	88		

10. Intracapsular Hip Fractures 99

Carlos J. Meheux, Luis F. Pulido-Sierra

Femoral Head Fractures	99	Femoral Neck Fractures	105
Introduction	99	Introduction	105
Mechanism	99	Mechanism of Injury	106
Diagnosis	100	Diagnosis	106
Classifications	101	Classification Systems	107
Treatment	103	Treatment	109
Complications	104	Complications	113
		References	114

11. Extracapsular Hip Fractures 117

Carlos J. Meheux, Luis F. Pulido-Sierra

Introduction	117	Classification Systems	119
Incidence and Etiology	117	Intertrochanteric Femur Fractures	119
Anatomy	118	Subtrochanteric Femur Fractures	119
Intraosseous Scaffold of Trabecular Bone		Diagnosis	120
Supports Femoral Head and Neck	118	Treatment	121
Numerous Muscle Attachments		Complications	125
to the Intertrochanteric Area	118	References	126
Muscular Forces Dictate Direction			
of Displacement	119		

12. Pediatric Hip Fractures	127
<i>Joshua D. Harris, Robert A. Jack II</i>	
Introduction	127
Proximal Femur Fractures	127
Acetabular Fractures	127
Pelvic Ring Fractures	127
Pelvic Avulsion Fractures	128
Anatomic Considerations.....	129
Classification	130
History and Examination	132
Diagnostic Imaging	133
Differential Diagnosis	134
Treatment	134
Complications	136
References.....	137
13. Adult Hip Dysplasia	139
<i>Luis F. Pulido-Sierra, Carlos J. Meheux</i>	
Introduction	139
Anatomic Considerations.....	140
History and Examination	141
Diagnostic Imaging	143
Treatment	151
References.....	159
14. Legg–Calvé–Perthes Disease	161
<i>Brian D. Lewis, Robert C. Kollmorgen</i>	
Introduction	161
Imaging	162
Prognostic Factors.....	164
Early Interventions	165
Interventions after Early Fragmentation....	166
Sequela of Healed Perthes Hip.....	167
Development of Osteoarthritis	169
References.....	170
15. Slipped Capital Femoral Epiphysis	173
<i>Robert C. Kollmorgen, Brian D. Lewis</i>	
Introduction	173
Anatomical Considerations.....	177
History and Physical Examination.....	177
Diagnostic Testing	177
Differential Diagnosis	178
Nonsurgical Management	179
Surgical Management: Acute	179
Surgical Management: Chronic	181
Outcomes.....	182
Future Directions.....	183
Acknowledgments	183
Suggested Readings	183
16. Femoroacetabular Impingement.....	185
<i>Joshua D. Harris</i>	
Introduction	185
Anatomic Considerations.....	187
History and Examination	189
Diagnostic Imaging	192
Differential Diagnosis	196
Treatment	196
Outcomes.....	199
References.....	200

17. Extra-Articular Impingement 203

Joshua D. Harris

Introduction.....	203	Differential Diagnosis.....	212
Anatomic Considerations.....	203	Treatment.....	212
History and Examination.....	206	Outcomes.....	217
Diagnostic Imaging.....	209	References.....	217

18. Soft-Tissue Hip Injuries..... 221

Joshua D. Harris

Introduction.....	221	Diagnostic Imaging.....	230
Anatomic Considerations.....	223	Differential Diagnosis.....	230
Classification.....	226	Treatment.....	231
History and Examination.....	228		

Section III

19. Hip Osteoarthritis 237

Brian M. Culp, Brett R. Levine

Etiology of Hip Osteoarthritis.....	237	Radiographic Evaluation.....	241
Basic Science.....	238	Treatment Options.....	243
Patient History.....	239	References.....	246
Physical Examination.....	240		

20. Primary Total Hip Arthroplasty 247

Michael A. Flierl, Matthew Knedel, Brett R. Levine

History.....	247	Bearing Surfaces.....	254
Surgical Indications.....	247	Hip Hemiarthroplasty.....	256
Radiographic Evaluation.....	247	Hip Resurfacing.....	257
Surgical Approaches.....	248	Complications.....	257
Preoperative Templating.....	250	Conclusion.....	260
Implant Fixation.....	250	References.....	260

21. Revision Total Hip Arthroplasty..... 263

Brett R. Levine

Etiology.....	263	Bearing Wear.....	282
Diagnosis.....	268	Metal-on-Metal and Trunnion Issues.....	283
Management.....	275	Ceramic Issues.....	284
Infection.....	278	Summary.....	284
Aseptic Loosening.....	280	References.....	285
Femoral Component Loosening.....	281		

22. Hip Rehabilitation	291
<i>David J. Kaufman</i>	
Assessment of Gait Abnormalities.....	291
Rehabilitation Principles for the Painful Hip.....	291
Preoperative Considerations.....	293
Postoperative Rehabilitation after Hip Arthroscopy.....	293
Postoperative Rehabilitation after Total Hip Arthroplasty.....	294
Postacute Rehabilitation Therapy after Total Hip Arthroplasty.....	296
Postrehabilitation.....	297
References.....	298
23. Synovial Proliferative Disorders	301
<i>Hassan Alosch</i>	
Synovial Chondromatosis.....	301
Pigmented Villonodular Synovitis.....	303
Synovial Hemangioma.....	305
References.....	306
24. Primary and Metastatic Tumors of the Hip	309
<i>Yale A. Fillingham, Matthew Colman</i>	
Benign.....	309
Malignant.....	315
Metastatic.....	318
References.....	319
25. Osteonecrosis of the Hip	321
<i>Matthew W. Tetreault, Roshan P. Shah</i>	
Epidemiology.....	321
Anatomy.....	322
Pathophysiology.....	325
Evaluation.....	327
Diagnosis.....	330
Differential Diagnosis.....	330
Classification.....	331
Prognosis.....	333
References.....	336
26. Septic Arthritis of the Hip	343
<i>Robert Axel Sershon, Joshua Alan Bell</i>	
Native Hip.....	343
Periprosthetic Infection of the Hip.....	351
References.....	357
Index	361