




Table of Contents

Section 1 Primary Total Knee Arthroplasty

	1	Primary Total Knee Arthroplasty: Medial Parapatellar Approach <i>Stephen J. Incavo, MD</i> <i>Michael R. Dayton, MD</i> <i>Jesse James F. Exaltacion, MD</i>	3
	2	Primary Total Knee Arthroplasty: Lateral Approach <i>Peter A. Keblish, MD</i>	11
	3	Primary Total Knee Arthroplasty: Less Invasive Approaches <i>Mark W. Pagnano, MD</i> <i>Aaron J. Krych, MD</i>	23
	4	Primary Total Knee Arthroplasty: Submuscular Approaches <i>David F. Dalury, MD</i> <i>Kimberly K. Tucker, MD</i>	33
	5	Biomechanics of Total Knee Arthroplasty <i>Timothy Wright, PhD</i> <i>Richard D. Komistek, PhD</i> <i>Carl Imhauser, PhD</i> <i>Adrija Sharma, PhD</i>	41
	6	Bearing Surfaces in Total Knee Arthroplasty <i>Joshua J. Jacobs, MD</i> <i>Alexander P. Sah, MD</i>	55
	7	Preoperative Planning and Templating for Total Knee Arthroplasty <i>Lawrence M. Specht, MD</i> <i>Richard Iorio, MD</i> <i>John F. Tilzey, MD, PhD</i> <i>William L. Healy, MD</i>	61
	8	Cruciate-Retaining Total Knee Arthroplasty <i>Richard D. Scott, MD</i> <i>C. Lowry Barnes, MD</i>	73
	9	Posterior Stabilized Total Knee Arthroplasty <i>Giles R. Scuderi, MD</i> <i>William J. Long, MD, FRCSC</i>	79
	10	Mobile-Bearing Total Knee Arthroplasty <i>John J. Callaghan, MD</i> <i>Steve S. Liu, MD</i>	87
	11	Total Knee Arthroplasty: Tibial Component Design <i>Thomas S. Thornhill, MD</i> <i>John P. Dunleavy, MD</i>	95
	12	Primary Total Knee Arthroplasty: Cemented Fixation <i>Thomas P. Sculco, MD</i> <i>Roberto Rossi, MD</i>	105
	13	Uncemented Total Knee Arthroplasty <i>Aaron A. Hofmann, MD</i> <i>Clifford D. Clark, MD</i>	111
	14	Primary Total Knee Arthroplasty: Patellar Resurfacing <i>Jess H. Lonner, MD</i>	119



15	Pain Management and Rehabilitation After Primary Total Knee Arthroplasty	127
	<i>Michael A. Mont, MD</i>	
	<i>Michael G. Zywiell, MD</i>	
	<i>Mike S. McGrath, MD</i>	
	<i>Anil Bhave, PT</i>	
16	Unicondylar Knee Arthroplasty	137
	<i>Gerard A. Engh, MD</i>	
	<i>William G. Hamilton, MD</i>	
17	Primary Total Knee Arthroplasty: Patient Factors Affecting Outcomes	149
	<i>Douglas K. Ayres, MD, MBA</i>	
	<i>Ayesha Abdeen, MD, FRCSC</i>	

Section 2 Complex Total Knee Arthroplasty

18	Overview and Strategies for Complex Total Knee Arthroplasty	157
	<i>Jay R. Lieberman, MD</i>	
19	Total Knee Arthroplasty: Extra-Articular Deformity	163
	<i>Thomas K. Fehring, MD</i>	
20	Total Knee Arthroplasty: Posttraumatic Osteoarthritis	171
	<i>Michael D. Ries, MD</i>	
21	Total Knee Arthroplasty Following Prior Osteotomy	181
	<i>John F. Tilzey, MD, PhD</i>	
	<i>William L. Healy, MD</i>	
22	Recurvatum/Flexion Contracture in Total Knee Arthroplasty	189
	<i>Adolph V. Lombardi, Jr, MD, FACS</i>	
	<i>Keith R. Berend, MD</i>	
23	Total Knee Arthroplasty: Neuropathic Joint	199
	<i>Terence J. Gioe, MD</i>	
	<i>Patrick Morgan, MD</i>	
24	Total Knee Arthroplasty Following Patellectomy or Other Extensor Mechanism Problems	207
	<i>E. Michael Keating, MD</i>	
	<i>John B. Meding, MD</i>	
	<i>Trevor R. Pickering, MD</i>	
25	Total Knee Arthroplasty in the Obese Patient	215
	<i>Ray C. Wasielewski, MS, MD</i>	
	<i>Sharat K. Kusuma, MD, MBA</i>	
26	Total Knee Arthroplasty in the Valgus Knee	223
	<i>Amar S. Ranawat, MD</i>	
	<i>Chitranjan S. Ranawat, MD</i>	
	<i>Yossef C. Blum, MD</i>	
27	Total Knee Arthroplasty: Varus Knee	235
	<i>Russell E. Windsor, MD</i>	
	<i>Yoowang Choi, MD</i>	

28	Total Knee Arthroplasty for Distal Femoral Fracture in the Elderly Patient <i>Michael E. Berend, MD</i> <i>Keith R. Berend, MD</i>	243
29	Bilateral Total Knee Arthroplasty <i>Robert E. Booth, Jr, MD</i>	249

Section 3 Complications Following Total Knee Arthroplasty



30	Management of the Infected Total Knee Arthroplasty <i>Tad M. Mabry, MD</i> <i>Arlen D. Hanssen, MD</i>	257
31	Management of the Unstable Total Knee Arthroplasty <i>Steven J. MacDonald, MD, FRCSC</i> <i>Keegan P. Au, MD, FRCSC</i>	267
32	Management of Periprosthetic Fractures Around a Total Knee Arthroplasty <i>George J. Haidukewych, MD</i>	277
33	Management of Nerve and Vascular Injuries Associated With Total Knee Arthroplasty <i>James A. Rand, MD</i>	283
34	Prevention and Management of Stiffness Following Total Knee Arthroplasty <i>Michael H. Bourne, MD</i> <i>E. Marc Mariani, MD</i>	293
35	Management of Skin Problems Associated With Total Knee Arthroplasty <i>Fred Cushner, MD</i> <i>William J. Long, MD, FRCSC</i> <i>Michael Nett, MD</i>	303
36	Management of Extensor Mechanism Rupture <i>Craig J. Della Valle, MD</i> <i>Aaron Rosenberg, MD</i> <i>Alexander P. Sah, MD</i> <i>Bryan D. Springer, MD</i>	313
37	Prophylaxis for Deep Vein Thrombosis Following Total Knee Arthroplasty <i>Clifford W. Colwell, Jr, MD</i> <i>Mary E. Hardwick, MSN, RN</i>	321

Section 4 Revision Total Knee Arthroplasty

38	Overview and Strategies for Revision Total Knee Arthroplasty <i>William A. Jiranek, MD</i> <i>John B. Meding, MD</i> <i>E. Michael Keating, MD</i>	333
39	Modes of Failure in Total Knee Arthroplasty <i>Kelly G. Vince, MD, FRCSC</i>	341
40	Revision Total Knee Arthroplasty: Indications and Contraindications <i>Kevin L. Garvin, MD</i>	355



41	Revision Total Knee Arthroplasty: Extensile Surgical Approaches <i>Bassam A. Masri, MD, FRCSC</i> <i>Donald S. Garbuz, MD, FRCSC</i> <i>Muhyeddine Al-Taki, MD</i>	365
42	Revision Total Knee Arthroplasty: Management of Osteolysis <i>William L. Griffin, MD</i>	373
43	Revision Total Knee Arthroplasty: Removing the Well-Fixed Implant <i>Peter F. Sharkey, MD</i> <i>Wadiah Y. Matar, MD, MSc, FRCSC</i>	379
44	Revision Total Knee Arthroplasty: Patellar Treatment <i>R. Stephen J. Burnett, MD, FRCSC</i> <i>Robert L. Barrack, MD</i>	387
45	Conversion of Failed Unicompartmental Knee Arthroplasty to Total Knee Arthroplasty <i>James Benjamin, MD</i>	401
46	Revision Total Knee Arthroplasty: Cemented and Uncemented Stems <i>Thomas Parker Vail, MD</i>	407
47	Revision Total Knee Arthroplasty: Bone Loss Management Using Cancellous Grafts <i>Charles L. Nelson, MD</i>	417
48	Revision Total Knee Arthroplasty: Bone Loss Management Using Structural Grafts <i>David Backstein, MD, MEd, FRCSC</i> <i>Allan E. Gross, MD, FRCSC</i> <i>Oleg Safir, MD, MEd, FRCSC</i> <i>Joseph B. Aderinto, MD, FRCS (Tr and Orth)</i>	423
49	Metal Augments for Bone Loss in Revision Total Knee Arthroplasty <i>Robert T. Trousdale, MD</i> <i>Daniel J. Berry, MD</i>	433
50	Revision Total Knee Arthroplasty: Constraint Level <i>Douglas A. Dennis, MD</i> <i>Derek R. Johnson, MD</i> <i>Raymond H. Kim, MD</i>	439
51	Revision Total Knee Arthroplasty: Hinged Implants <i>Henry D. Clarke, MD</i>	451
52	Knee Arthrodesis <i>James B. Stiehl, MD</i>	461



Section 5 Alternative Reconstructive Procedures

53	Overview and Indications for Articular Cartilage Restoration <i>Brian J. Cole, MD, MBA</i> <i>Cecilia Pascual-Garrido, MD</i> <i>Robert C. Grumet, MD</i>	471
54	Arthroscopy for Osteoarthritis of the Knee <i>Matthew J. Matava, MD</i>	479



55	Autologous Chondrocyte Implantation <i>Andreas H. Gomoll, MD</i> <i>Tom Minas, MD, MS</i>	489
56	Osteochondral Autograft Transplantation <i>William Bugbee, MD</i> <i>Simon Görtz, MD</i>	497
57	Osteochondral Allograft Transplantation <i>Bert Mandelbaum, MD</i> <i>Simon Görtz, MD</i> <i>William Bugbee, MD</i>	503
58	The Microfracture Technique <i>J. Richard Steadman, MD</i> <i>Karen K. Briggs, MPH</i> <i>William G. Rodkey, DVM</i>	511
59	Meniscal Transplantation <i>E. Lyle Cain, Jr, MD</i>	519
60	High Tibial Osteotomy <i>David Backstein, MD, MEd, FRCSC</i> <i>Allan E. Gross, MD, FRCSC</i> <i>Oleg Safir, MD, MEd, FRCSC</i> <i>Joseph B. Aderinto, MD, FRCS (Tr and Orth)</i>	527
61	Distal Femoral Osteotomy <i>Kenneth A. Krackow, MD</i>	537

Section 6 Sports Medicine



62	Anterior Cruciate Ligament Reconstruction: Overview of Anatomy, Biomechanics, and Indications for Surgery <i>James R. Andrews, MD</i> <i>Steven W. Meisterling, MD</i>	551
63	Anterior Cruciate Ligament Reconstruction: Overview of Evaluation and Technical Pearls <i>Mark D. Miller, MD</i> <i>Jennifer A. Hart, MPAS, PA-C</i>	555
64	Anterior Cruciate Ligament Reconstruction: Overview of Technique Choices and Complications <i>Rick W. Wright, MD</i>	559
65	Graft Choices for Anterior Cruciate Ligament Reconstruction: Bone–Patellar Tendon–Bone Graft <i>Bernard R. Bach, Jr, MD</i> <i>Dana P. Piasecki, MD</i>	563
66	Graft Choices for Anterior Cruciate Ligament Reconstruction: Hamstring Graft <i>Champ L. Baker, Jr, MD</i> <i>Champ L. Baker III, MD</i>	571
67	Quadriceps Tendon Autograft for Anterior Cruciate Ligament Reconstruction <i>Walter Shelton, MD</i>	579



68 Double-Bundle Anterior Cruciate Ligament Reconstruction 585
Freddie H. Fu, MD, DSc (Hon), DPs (Hon)
Alexis Chiang Colvin, MD

69 Anterior Cruciate Ligament Reconstruction in
the Skeletally Immature Patient 593
Mininder S. Kocher, MD, MPH

70 Anterior Cruciate Ligament Injuries With Bony Avulsion 603
Allen F. Anderson, MD
Christian N. Anderson, MD



71 Complications of Anterior Cruciate Ligament Reconstruction 613
Robert A. Arciero, MD
Drew Fehsenfeld, MD, PhD

72 Revision Anterior Cruciate Ligament Reconstruction 625
K. Donald Shelbourne, MD
Scott E. Urch, MD

PCL Reconstruction

73 Posterior Cruciate Ligament Reconstruction: Overview 635
Frederick M. Azar, MD
Jack Conoley, MD

74 Transtibial Single-Bundle Posterior Cruciate Ligament Reconstruction 643
Gregory C. Fanelli, MD

75 Double-Bundle Posterior Cruciate Ligament Reconstruction 649
Christopher D. Harner, MD
Samuel P. Robinson, MD
James R. Romanowski, MD

76 Tibial Inlay Technique 657
Richard D. Parker, MD
Sam Akhavan, MD

77 Posterior Cruciate Ligament Injury: Bony Avulsion 667
Marc R. Safran, MD
David C. Hay, MD

78 Complications of Posterior Cruciate Ligament Reconstruction 673
David R. McAllister, MD
Tony Quach, MD

Collateral Ligament Reconstruction

79 Collateral Ligament Reconstruction: Overview 681
Frederick M. Azar, MD

80 Treatment of Acute and Chronic Posterolateral Corner Injuries 687
Robert F. LaPrade, MD, PhD

81 Treatment of Acute and Chronic Medial-Side Injuries 697
Christopher Kaeding, MD
David C. Flanigan, MD

Knee Dislocation

- 82 Knee Dislocation: Overview and Strategies 707
Michael J. Stuart, MD
Bruce A. Levy, MD
- 83 Surgical Treatment of Knee Dislocation 715
Eric C. McCarty, MD
Brett Gibson, MD
- 84 Complications of Knee Dislocations 727
Claude T. Moorman III, MD
Gregg T. Nicandri, MD

Meniscal Injuries

- 85 Meniscal Injuries: Overview and Management Strategies 735
Scott A. Rodeo, MD
- 86 Arthroscopic Meniscectomy 741
Frederick M. Azar, MD
Robert H. Miller III, MD
Seth Rosenzweig, MD
- 87 Meniscal Repair: All-Inside Technique 751
Annunziato Amendola, MD
Davide Edoardo Bonasia, MD
- 88 Meniscal Repair: Outside-In Technique 759
Thomas Carter, MD
- 89 Meniscal Repair: Inside-Out Technique 765
Jason L. Koh, MD
Dukhwan Ko, MD
- 90 Discoid Meniscus 773
Sherwin S.W. Ho, MD
Joshua T. Snyder, MD

Patellofemoral Injuries

- 91 Patellofemoral Injuries: Overview and Strategies 781
Kurt P. Spindler, MD
Joseph P. DeAngelis, MD
- 92 Medial Patellofemoral Ligament Repair for Acute Patellar Instability 787
Keith Kenter, MD
- 93 Chronic Patellar Instability 793
John P. Fulkerson, MD
- 94 Rupture of the Extensor Mechanism 803
Thomas M. DeBerardino, MD

Index

811




SECTION 1

Primary Total Knee Arthroplasty

Section Editors

Jay R. Lieberman, MD

Daniel J. Berry, MD

1	Primary Total Knee Arthroplasty: Medial Parapatellar Approach <i>Stephen J. Incavo, MD</i> <i>Michael R. Dayton, MD</i> <i>Jesse James F. Exaltacion, MD</i>	3
2	Primary Total Knee Arthroplasty: Lateral Approach <i>Peter A. Keblish, MD</i>	11
3	Primary Total Knee Arthroplasty: Less Invasive Approaches <i>Mark W. Pagnano, MD</i> <i>Aaron J. Krych, MD</i>	23
	4 Primary Total Knee Arthroplasty: Submuscular Approaches <i>David F. Dalury, MD</i> <i>Kimberly K. Tucker, MD</i>	33
5	Biomechanics of Total Knee Arthroplasty <i>Timothy Wright, PhD</i> <i>Richard D. Komistek, PhD</i> <i>Carl Imhauser, PhD</i> <i>Adrija Sharma, PhD</i>	41
6	Bearing Surfaces in Total Knee Arthroplasty <i>Joshua J. Jacobs, MD</i> <i>Alexander P. Sah, MD</i>	55
7	Preoperative Planning and Templating for Total Knee Arthroplasty <i>Lawrence M. Specht, MD</i> <i>Richard Iorio, MD</i> <i>John F. Tilzey, MD, PhD</i> <i>William L. Healy, MD</i>	61
8	Cruciate-Retaining Total Knee Arthroplasty <i>Richard D. Scott, MD</i> <i>C. Lowry Barnes, MD</i>	73
9	Posterior Stabilized Total Knee Arthroplasty <i>Giles R. Scuderi, MD</i> <i>William J. Long, MD, FRCSC</i>	79
10	Mobile-Bearing Total Knee Arthroplasty <i>John J. Callaghan, MD</i> <i>Steve S. Liu, MD</i>	87
11	Total Knee Arthroplasty: Tibial Component Design <i>Thomas S. Thornhill, MD</i> <i>John P. Dunleavy, MD</i>	95
	12 Primary Total Knee Arthroplasty: Cemented Fixation <i>Thomas P. Sculco, MD</i> <i>Roberto Rossi, MD</i>	105
13	Uncemented Total Knee Arthroplasty <i>Aaron A. Hofmann, MD</i> <i>Clifford D. Clark, MD</i>	111
	14 Primary Total Knee Arthroplasty: Patellar Resurfacing <i>Jess H. Lonner, MD</i>	119



15	Pain Management and Rehabilitation After Primary Total Knee Arthroplasty	127
	<i>Michael A. Mont, MD</i>	
	<i>Michael G. Zywiell, MD</i>	
	<i>Mike S. McGrath, MD</i>	
	<i>Anil Bhawe, PT</i>	
16	Unicondylar Knee Arthroplasty	137
	<i>Gerard A. Engh, MD</i>	
	<i>William G. Hamilton, MD</i>	
17	Primary Total Knee Arthroplasty: Patient Factors Affecting Outcomes	149
	<i>Douglas K. Ayres, MD, MBA</i>	
	<i>Ayesha Abdeen, MD, FRCSC</i>	