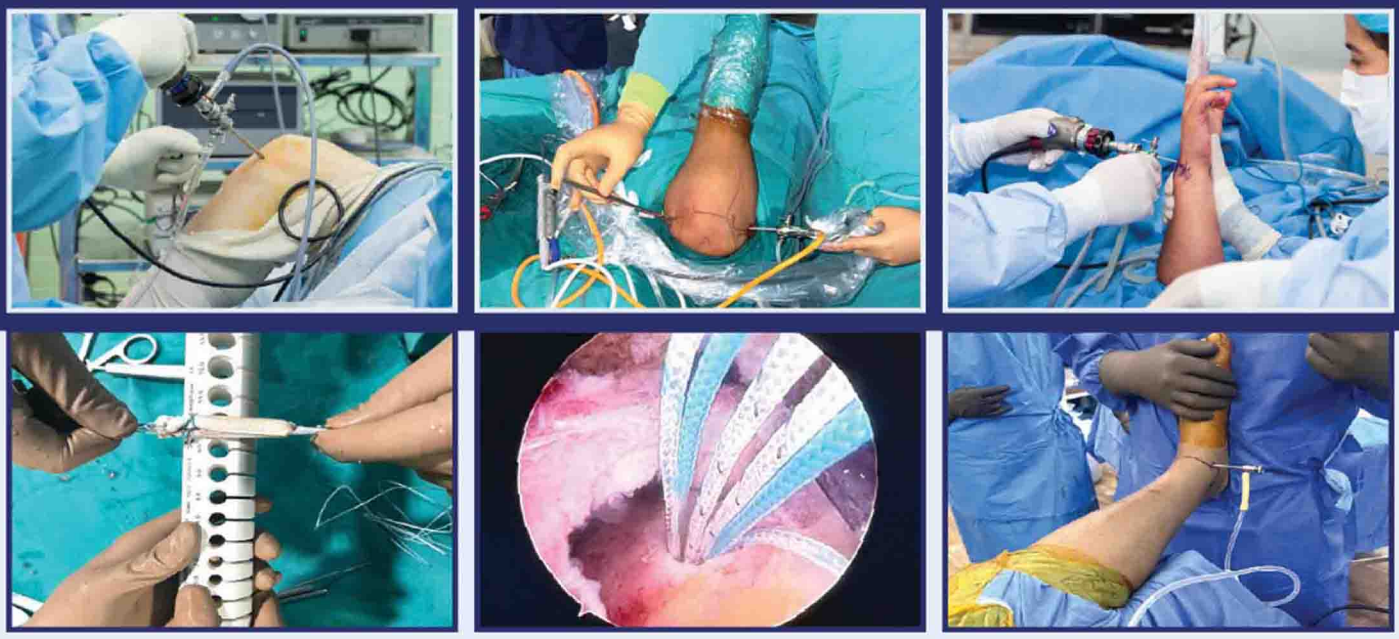
ebsite www.ejaypee.com, for detailed information on orthopedic books, visit our website www.ejaypee.com, for detailed information on orthopedic books, visit our website www.ejaypee.co

Textbook of Arthroscopy



Editors
Parag Sancheti
Sachin Yashwant Kale
Sandeep Deore

Foreword
Anant Joshi

JAYPEE

CONTENTS

SECTION 1: INTRODUCTION AND HISTORICAL EVOLUTION OF ARTHROSCOPY

Section Editors: Parag Sancheti, Sachin Yashwant Kale, Vishal Kumar, Vaibhav Koli, Ashok Shyam

1. Introduction and Historical Evolution **3**
Mainak Roy, Sachin Yashwant Kale, Vishal Kumar, Arvind J Vatkar, Ashok Shyam

SECTION 2: KNEE ARTHROSCOPY

Section Editors: Bhushan Sabnis, Bhushan Patil, Aditya Gunjotikar

2. Functional and Surgical Anatomy of the Knee **9**
Parag Sancheti, Bhushan Patil, Sachin Yashwant Kale, Srividya Sreenivasan, Sachiti Sachin Kale

3. Instruments Operating Room Setup and Positioning for Knee Arthroscopy **21**
Parag Sancheti, Bhushan Patil, Sachin Yashwant Kale, Aditya Gunjotikar

4. Arthroscopic Portals of the Knee **33**
Parag Sancheti, Aditya Gunjotikar, Bhushan Patil, Sachin Yashwant Kale

5. Diagnostic Arthroscopy of the Knee **42**
Parag Sancheti, Bhushan Patil, Aditya Gunjotikar, Sachin Yashwant Kale, Shivam Mehra

6. Meniscal Pathologies and Arthroscopic Management **50**
Tushar Sawant, Bhushan Sabnis, Anant Joshi

7. Management of Cruciate Ligaments Injuries **69**
Hitarth Gathani, Bhushan Sabnis, Anant Joshi

7.1 Anterior Cruciate Ligament (ACL) Reconstruction *69*

7.2 Posterior Cruciate Ligament (PCL) Injuries *82*

8. Multiligamentous Knee Injuries **95**
Hitarth Gathani, Bhushan Sabnis

9. Articular Cartilage Lesions in Knee and Repair Technique **101**
Nagraj Shetty, Bhushan Sabnis

10. Patellar Instability and Management **115**
Bhushan Sabnis

11. Arthroscopic Management of Synovial Pathologies of the Knee **126**
Amit Meena, Soham Shrikant Ranade, Manish Attri, Soumyadip Sen, Amit Kumar Yadav, Luca Farinelli, Ernest Chew, Sachin Tapasvi

SECTION 3: SHOULDER ARTHROSCOPY

Section Editors: Sandeep Deore, Manit Arora, Gaurav Sharma, Nilesh Vishwakarma

12. Surgical Anatomy of the Shoulder Joint and Its Importance in Arthroscopy **139**
Sachin Yashwant Kale, Srividya Sreenivasan, Gaurav Sharma, Sachiti Sachin Kale

13. Shoulder Positioning Operating Room Setup Portal Making **145**
Tushar Doke

14. Basic Instrumentation in Shoulder Arthroscopy and Knot Tying **149**
Kaustubh Sawant

15. Implants for Shoulder Arthroscopy Procedures **158**
Sanesh Tuteja, Sandeep Deore

16. Shoulder Instability **163**
Aditya Gunjotikar, Vaibhav Koli

17. Management of Anterior Instability **183**
Vaibhav Koli, Aditya Gunjotikar

18. Posterior Labral Lesions **201**
Sanjay Singh

19. Open Latarjet Procedure **207**
Aashay Kekatpure

20. Arthroscopic Bone Block Reconstruction Using Cerclage Fixation for Glenoid Bone Loss in Recurrent Anterior Shoulder Instability **212**
Nilesh Vishwakarma

21. Superior Labral Anterior to Posterior Tear **230**
Abhishek Nerurkar

22. Rotator Cuff Pathology, Clinical Examination, and Diagnosis **240**
Gaurav Sharma, Sachin Yashwant Kale

23. Arthroscopic Rotator Cuff Repair **247**
Sandeep Deore, Sachin Yashwant Kale, Parag Sancheti

24. Subscapularis Tears and their Management **255**
Sanjay Singh

25. Arthroscopic Transosseous Rotator Cuff Repair: The Anchorless Evolution **261**
Aashay Kekatpure, Shegehito Kuroda

26. Superior Capsular Reconstruction: Technique and Outcomes **265**
Manit Arora, Anand Murthi

27. Frozen Shoulder 269
Ajinkya Achalare, Sandeep Deore

28. Arthroscopic Greater Tuberosity Fracture Fixation 276
Parth Agrawal, Sandeep Deore

29. Shoulder Rehabilitation—Conservative and Postoperative Pathways 282
Navjotbir Kaur, Manit Arora

SECTION 4: ELBOW ARTHROSCOPY
Section Editors: Aashay Kekatpure, In-Ho-Jeon, Abhijeet Wahegaonkar

30. Introduction to Elbow Arthroscopy 291
Aashay Kekatpure, In-Ho-Jeon, Abhijeet Wahegaonkar

31. Essential Equipment and Instrumentation 294
Aashay Kekatpure, In-Ho-Jeon, Abhijeet Wahegaonkar

32. Patient Positioning and Operating Room Setup 297
Aashay Kekatpure, In-Ho-Jeon, Abhijeet Wahegaonkar

33. Portal Placement and Safety Zones 300
Aashay Kekatpure, In-Ho-Jeon, Abhijeet Wahegaonkar

34. Step-by-Step Diagnostic Elbow Arthroscopy 304
Aashay Kekatpure, In-Ho-Jeon, Abhijeet Wahegaonkar

35. Common Elbow Pathologies and Arthroscopic Management 308
Aashay Kekatpure, In-Ho-Jeon, Abhijeet Wahegaonkar

36. Complications in Elbow Arthroscopy 315
Aashay Kekatpure, In-Ho-Jeon, Abhijeet Wahegaonkar

37. Postoperative Care and Rehabilitation Protocols 318
Aashay Kekatpure, In-Ho-Jeon, Abhijeet Wahegaonkar

SECTION 5: WRIST ARTHROSCOPY
Section Editors: Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat

38. Introduction to Wrist Arthroscopy 323
Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat

39. Essential Equipment and Setup 325
Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat

40. Patient Positioning and Operating Room Setup 330
Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat, Ashok Ghodke

41. Portal Placement and Safe Zones in Wrist Arthroscopy **333**
Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat, Ashok Ghodke

42. Step-by-Step Diagnostic Wrist Arthroscopy **336**
Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat

43. Basic Therapeutic Procedures **339**
Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat

44. Common Wrist Pathologies for Arthroscopy **342**
Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat

45. Introductory Advanced Techniques **345**
Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat

46. Complications in Wrist Arthroscopy **348**
Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat

47. Postoperative Care and Rehabilitation **351**
Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat

48. Practical Pearls for Beginners **354**
Abhijeet Wahegaonkar, Aashay Kekatpure, Kiran Ladkat

SECTION 6: HIP ARTHROSCOPY

Section Editors: Aditya Kekatpure, Mainak Roy, Vishal Kumar, Pil Whan Yoon

49. Foundations, Progress, and Evaluation of Hip Arthroscopy **359**
Sachin Yashwant Kale, Aditya Kekatpure, Vishal Kumar, Mainak Roy, Pramod Bhor

50. Basics, Positioning, Instrumentation, and Fluoroscopy in Hip Arthroscopy **363**
Aditya Kekatpure, Pil Whan Yoon, Aashay Kekatpure, Sachin Yashwant Kale, Mainak Roy

51. Indications, Pathology-specific Techniques, and Imaging Workflows **370**
Aditya Kekatpure, Pil Whan Yoon, Aashay Kekatpure, Sachin Yashwant Kale, Mainak Roy

SECTION 7: ANKLE AND FOOT ARTHROSCOPY

Section Editors: Girish Motwani, Sachin Yashwant Kale, Chandan Narang

52. Basics of Ankle Arthroscopy **381**
Chandan Narang, Girish Motwani, Sachin Yashwant Kale

53. Arthroscopy-assisted Broström-Gould Procedure **385**
Chandan Narang, Girish Motwani

54. Endoscopic Flexor Hallucis Longus Tendon Transfer **390**
Girish Motwani, Vivek Gupta, Chandan Narang

55. Arthrodesis of the Ankle **394**
Girish Motwani, Chandan Narang, Vivek Gupta

56. Subtalar Arthroscopy **402**
Girish Motwani, Vivek Gupta, Chandan Narang

57. Role of Arthroscopy in Ankle Fracture Fixation **416**
Chandan Narang, Sachin Yashwant Kale, Girish Motwani, Sandeep Deore

58. Arthroscopic-assisted Percutaneous Fixation of Calcaneus Fractures **421**
Chandan Narang, Sachin Yashwant Kale, Girish Motwani, Sandeep Deore

SECTION 8: REHABILITATION PROTOCOLS

Section Editors: Sagar Subhash Deshpande, Sachin Yashwant Kale, Pramod Bhor

59. Rehabilitation in Arthroscopic Shoulder Surgeries **427**
Sagar Subhash Deshpande, Sachin Yashwant Kale, Pramod Bhor

59.1 Rehabilitation Following Arthroscopic SLAP Repair *427*
Sagar Subhash Deshpande, Prerna Vedang Vaidya, Sachin Yashwant Kale, Pramod Bhor, Nindiya Kapoor Mehra

59.2 Rehabilitation Following Arthroscopic Rotator Cuff Repair *437*
Shellette D Almeida, Sagar Subhash Deshpande, Sachin Yashwant Kale, Pramod Bhor, Shivam Mehra, Saanvi Sachin Kale

59.3 Rehabilitation Following Arthroscopic Bankart Repair *442*
Sagar Subhash Deshpande, Shellette D Almeida, Unnati Nikhil Pandit, Sachin Yashwant Kale, Smruti Sachin Kale, Saanvi Sachin Kale

59.4 Rehabilitation Following Arthroscopic Capsular Release for Frozen Shoulder *451*
Shellette D Almeida, Sagar Subhash Deshpande, Sachin Yashwant Kale, Smruti Sachin Kale, Sachiti Sachin Kale

60. Rehabilitation in Arthroscopic Elbow Surgeries **458**
Ajit Surendra Dabholkar, Sagar Subhash Deshpande, Tejashree Ajit Dabholkar, Sachin Yashwant Kale, Smruti Sachin Kale, Sachiti Sachin Kale

61. Rehabilitation in Arthroscopic Wrist Surgeries **474**
Ajit Surendra Dabholkar, Sagar Subhash Deshpande, Tejashree Ajit Dabholkar, Sachin Yashwant Kale, Smruti Sachin Kale, Saanvi Sachin Kale

62. Rehabilitation in Arthroscopic Hip Surgeries **487**
Keerthika Ranji, Sagar Subhash Deshpande, Sachin Yashwant Kale, Smruti Sachin Kale, Siddhant Pramod Bhor, Sachiti Sachin Kale

63. Rehabilitation in Arthroscopic Knee Surgeries **497**
Dnyanesh Pramod Patil, Sagar Subhash Deshpande, Sachin Yashwant Kale, Smruti Sachin Kale, Sachiti Sachin Kale, Saanvi Sachin Kale

64. Rehabilitation in Arthroscopic Ankle Surgeries **535**
Sneha Sameer Ganu, Sagar Subhash Deshpande, Unnati Nikhil Pandit, Sachin Yashwant Kale, Smruti Sachin Kale, Sachiti Sachin Kale, Saanvi Sachin Kale

SECTION 9: ADVANCED AND EMERGING TECHNIQUES IN ARTHROSCOPY
Section Editors: Parag Sancheti, Vishal Kumar, Mainak Roy, Pramod Bhor, Ashok Shyam

65. Three-dimensional Navigation, Augmented Reality, Robotics, and Biologic Injections in Arthroscopy **545**
Mainak Roy, Parag Sancheti, Sachin Yashwant Kale, Vishal Kumar, Arvind J Vatkar, Pramod Bhor

66. The Future of Arthroscopy **549**
Mainak Roy, Parag Sancheti, Sachin Yashwant Kale, Vishal Kumar, Pramod Bhor

Index **553**

CHAPTER

66

The Future of Arthroscopy

Mainak Roy, Parag Sancheti, Sachin Yashwant Kale, Vishal Kumar, Pramod Bhor

JAYPEE BROTHERS

INTRODUCTION

The story of arthroscopy is one of continual reinvention, marked by progressive refinement in optics, imaging, and instrumentation. Initially conceived as a diagnostic tool, arthroscopy has evolved into a cornerstone of orthopedic surgery, offering minimally invasive access to joints with therapeutic precision. The modern era has brought video-assisted systems, advanced shavers, and energy devices, which collectively expanded the surgeon's ability to treat conditions that once required open surgery. Looking ahead, the field is poised for another transformative leap. The integration of robotics, artificial intelligence (AI), biologic augmentation, and digital technologies such as augmented reality (AR) and virtual reality (VR) promises to redefine arthroscopy beyond its current boundaries. These advances herald a future where arthroscopy is not only a means of mechanical repair but also a platform for biologic regeneration, precision navigation, and data-driven personalization of care.

This chapter explores emerging concepts that are likely to influence arthroscopy in the coming decades, with a focus on technological, biologic, and ethical dimensions. It draws upon current literature and expert projections to provide an evidence-based roadmap of what lies ahead.

TECHNOLOGICAL EVOLUTION AND DIGITAL INTEGRATION

One of the defining features of arthroscopy has been its ability to incorporate new imaging technologies. Early diagnostic scopes were limited by poor visualization, but advances in fiber optics and chip-on-tip camera systems have made it possible to achieve high-resolution imaging and magnified visualization of joint structures. Modern arthroscopic towers now feature 4K ultra-high-definition cameras, enhanced lighting systems, and digital filters that can adjust color balance to improve visualization of cartilage and vascular structures.

Digital integration has also become central to operating room practice. Arthroscopic systems can now be linked to cloud-based platforms, enabling intraoperative recording and real-time transmission for tele-mentoring or multidisciplinary discussions. This shift has particular importance in medical education, as trainees in remote or resource-limited settings can observe live procedures from experts across the globe. Artificially enhanced visualization, an area of active research, uses computer vision algorithms to overlay landmarks or highlight suspected pathology intraoperatively. For example, meniscal tears or cartilage lesions can be autodetected and marked on screen in real time.

Such integration represents a step toward digitally augmented arthroscopy, where human expertise is supported by computational power. In future practice, arthroscopic towers may double as intelligent platforms that integrate radiological data, surgical planning software, and intraoperative metrics in one ecosystem.

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING IN ARTHROSCOPY

The rise of AI is one of the most exciting frontiers in orthopedics. Machine learning algorithms, which thrive on large datasets, are being applied to arthroscopic video libraries to automatically classify surgical steps, detect errors, and identify pathology. Studies have shown that deep learning can achieve accuracy comparable to human experts in identifying meniscal tears or chondral defects from arthroscopic footage. This not only has educational implications but also may improve intraoperative

decision-making. Beyond intraoperative use, AI is also being developed to predict outcomes. By analyzing preoperative imaging, patient demographics, and intraoperative findings, algorithms can generate predictive models for return to sport, risk of graft failure, or likelihood of osteoarthritis progression. In the long term, surgeons may use such predictive analytics to tailor procedures and rehabilitation protocols to individual patients, moving toward personalized arthroscopy. Another emerging area is automated operative reporting. Traditionally, operative reports are dictated or typed manually, which is time-consuming and prone to omissions. AI-driven software can analyze video footage and automatically generate structured reports that include the pathology identified, procedures performed, and implants used. While these tools are still experimental; they exemplify the potential for AI to streamline workflow.

Challenges remain significant. AI systems require large, diverse datasets to function reliably, and the risk of algorithmic bias persists if training data are not representative of global populations. Issues of data ownership, patient privacy, and regulatory approval also complicate implementation. Nevertheless, as computing power and data availability expand, AI is likely to become a standard adjunct in arthroscopic practice.

ROBOTICS AND NEXT-GENERATION NAVIGATION SYSTEMS

Robotics has already established its role in arthroplasty, and the next frontier is arthroscopy. Current robotic prototypes for knee and hip arthroscopy aim to address the limitations of manual dexterity and consistency in confined joint spaces. Robotic-assisted arthroscopy may provide surgeons with enhanced stability during delicate maneuvers such as labral repair or femoral osteoplasty for femoroacetabular impingement (FAI). Early studies have demonstrated proof-of-concept applications where robotic arms perform precise tunnel drilling in anterior cruciate ligament (ACL) reconstruction, guided by preoperative imaging and intraoperative navigation. Navigation systems have also evolved. Traditional optical trackers required bulky equipment and rigid markers, but new markerless systems use surface recognition algorithms or intraoperative fluoroscopy integrated with augmented reality (AR) overlays. This allows the surgeon to see a virtual map of patient anatomy superimposed onto the arthroscopic field, improving orientation and accuracy. Combined with haptic feedback technology, robotic navigation could potentially reduce the variability of procedures between surgeons, thereby improving outcomes and shortening learning curves. In future practice, an arthroscopic workflow may follow a digitally guided pathway: Preoperative imaging uploaded into a planning software, intraoperative AR overlays providing anatomical roadmaps, robotic instruments executing precise steps, and AI validating accuracy in real time. Such integration represents a paradigm shift toward semiautonomous surgery.

Biologic augmentation and regenerative medicine, while technical precision improves surgical mechanics, the long-term challenge in arthroscopy remains biological healing. Biologic therapies are rapidly emerging as adjuncts to mechanical repair, with the potential to shift the field from reparative to regenerative medicine. Among the most widely used are platelet-rich plasma (PRP) and bone marrow aspirate concentrate (BMAC), both rich in growth factors and stem cells. Arthroscopic techniques allow precise delivery of these biologics into repair sites, such as meniscal tears, chondral defects, or reconstructed ACL tunnels. Evidence is accumulating that biologic augmentation may accelerate healing and improve integration of grafts. Tissue engineering approaches are also being integrated into arthroscopy. For example, scaffold-based cartilage repair techniques use bioresorbable matrices seeded with autologous cells or stem cells, delivered arthroscopically and secured within defects. Gene therapy and exosome-based strategies represent futuristic approaches where molecular signals are directly modulated at the site of injury to enhance regeneration. The vision of future arthroscopy is a procedure where mechanical stabilization is combined with biologic enhancement. For example, an ACL reconstruction may not only involve graft placement but also delivery of stem cells and growth factors to improve graft ligamentization and integration. However, standardization, regulatory approval, and long-term outcome studies remain necessary before widespread adoption.

VIRTUAL REALITY, AUGMENTED REALITY, AND SURGICAL TRAINING

The role of VR and AR in arthroscopy extends beyond intraoperative navigation to education and training. VR simulators allow residents to practice complex tasks such as meniscectomy, labral repair, and graft placement in a safe environment without patient risk. Unlike earlier mechanical box trainers, modern VR platforms, incorporate haptic feedback that mimics tissue resistance, thereby improving skill acquisition. AR systems provide additional intraoperative guidance by overlaying navigation cues directly onto the surgeon's field of view. For example, in ACL reconstruction, AR can project

JAYPEE BROTHERS

tunnel trajectories onto the arthroscopic image, assisting in optimal positioning. Similarly, in hip arthroscopy, AR can outline areas of cam deformity to ensure complete osteoplasty. These technologies also facilitate remote mentoring. With AR headsets, expert surgeons can view a trainee's field of surgery and provide real-time guidance, even across continents. This global connectivity could help reduce the disparities in surgical training between resource-rich and resource-limited settings. As VR and AR become more accessible, they may also serve as tools for credentialing and skill assessment, providing objective metrics of performance for both training and recertification.

NANOTECHNOLOGY AND SMART IMPLANTS

Nanotechnology has the potential to revolutionize arthroscopy by introducing novel materials and smart implants. Nano-engineered implant surfaces can improve osteointegration by mimicking natural bone structure, reduce infection risk by incorporating antimicrobial nanoparticles, and even release therapeutic agents locally. Smart implants with embedded sensors represent another frontier. These devices can continuously monitor parameters such as graft tension, joint loading, or biochemical markers of inflammation, transmitting data wirelessly to clinicians. Arthroscopy, as a minimally invasive platform, is ideally suited for the placement and monitoring of such implants. In the future, patients may undergo arthroscopic procedures where implants not only restore function but also provide continuous feedback on their performance, enabling personalized rehabilitation and early detection of complications.

GLOBAL TRENDS, ACCESSIBILITY, AND COST CONSIDERATIONS

While high-income countries are embracing robotics and digital integration, the challenge for much of the world is accessibility. Arthroscopy remains underutilized in many low- and middle-income countries due to the high cost of equipment and training. Without careful planning, the rapid expansion of advanced technologies risks widening the global gap in orthopedic care. Innovations such as low-cost arthroscopy towers, portable simulators, and open-access VR training modules may help bridge this divide. Collaborative models where academic centers share training content globally are essential for ensuring equitable distribution of advancements. As cost-effective versions of biologics and navigation systems become available, the reach of arthroscopy will likely expand, but balancing innovation with affordability remains critical.

ETHICAL, LEGAL, AND PATIENT-CENTERED CHALLENGES

The integration of AI, robotics, and biologics into arthroscopy is not without ethical dilemmas. AI-assisted decisions raise questions of liability in the event of adverse outcomes: Who is responsible—the surgeon, the software developer, or the hospital? Similarly, continuous video recording for AI analysis raises privacy concerns and requires explicit patient consent. Robotic and biologic procedures also introduce significant cost implications, potentially limiting access to only those patients with sufficient insurance or financial means. Ethical frameworks must therefore balance innovation with fairness, ensuring that advancements do not exacerbate healthcare inequalities. Importantly, the surgeon's role remains central—technology must support, not replace, human judgment.

CONCLUSION

The future of arthroscopy is defined by convergence: of mechanics with biology, and of human expertise with digital intelligence. Robotics and AI promise unprecedented precision and consistency; biologics and regenerative medicine aim to achieve true tissue restoration. VR and AR will transform both training and intraoperative navigation, and nanotechnology will bring smart implants that provide real-time monitoring. While there are challenges of cost, accessibility, and ethics that remain, the trajectory is clear: Arthroscopy will evolve into a holistic, data-driven, biologically enhanced discipline. Ultimately, the measure of success will not be the sophistication of the tools but their ability to deliver better outcomes for patients worldwide.

SUGGESTED READINGS

1. Jackson RW, DeHaven KE. Arthroscopy of the knee. Clin Orthop Relat Res. 1975;(107):87-92.
2. Watanabe M, Takeda S, Ikeuchi H. Atlas of Arthroscopy. Tōkyō: Igaku-Shoin; 1957. p. 53.
3. Holmes GL. Roberts Bartholow. In search of anatomic localization. N Y State J Med. 1982;82(2):238-41.
4. Caspari RB, Hutton PM, Whipple TL, Meyers JF. The role of arthroscopy in the management of tibial plateau fractures. Arthroscopy. 1985;1(2):76-82.

JAYPEE BROTHERS

5. Sayad A, Hajifathali A, Omrani MD, Arsang-Jang S, Hamidieh AA, Taheri M. Expression of TNF- and HNRNPL-related immunoregulatory long non-coding RNA (THRIL) in Acute Myeloid Leukemia: Is There Any Correlation?. Iran J Allergy Asthmalmmunol. 2018;17(3):274-80.
6. Liang W, Zhou C, Bai J, Zhang H, Jiang B, Wang J, et al. Current advancements in therapeutic approaches in orthopedic surgery: a review of recent trends. Front Bioeng Biotechnol. 2024:12:1328997.
7. Nguyen DT, van Horssen P, Derriks H, van de Giessen M, van Leeuwen T. Autofluorescence imaging for improved visualization of joint structures duringarthroscopic surgery. J Exp Orthop. 2017;4(1):19.
8. Song J, Wang GC, Wang SC, He CR, Zhang YZ, Chen X, Su JC. Artificial intelligence in orthopedics: fundamentals, current applications, and future perspectives. Mil Med Res. 2025;12(1):42.
9. Kayaalp ME, Konstantinou E, Karaismailoglu B, Lucidi GA, Kaymakoglu M, Vieider R, et al. The metaverse in orthopaedics: Virtual, augmented and mixed reality for advancing surgical training, arthroscopy, arthroplasty and rehabilitation. Knee Surg Sports Traumatol Arthrosc. 2025;33(8):3039-50.
10. Kitaguchi D, Takeshita N, Hasegawa H, Ito M. Artificial intelligence-based computer vision in surgery: Recent advances and future perspectives. Ann Gastroenterol Surg. 2021;6(1):29-36.
11. Egert M, Steward JE, Sundaram CP. Machine Learning and Artificial Intelligence in Surgical Fields. Indian J Surg Oncol. 2020;11(4):573-7.
12. Güngör E, Vehbi H, Cansın A, Ertan MB. Achieving high accuracy in meniscus tear detection using advanced deep learning models with a relatively small data set. KneeSurg Sports Traumatol Arthrosc. 2025;33(2):450-56.
13. Han F, Huang X, Wang X, Chen YF, Lu C, Li S, et al. Artificial Intelligence in Orthopedic Surgery: Current Applications, Challenges, and Future Directions. MedComm (2020). 2025;6(7):e70260.
14. Ou J, Zhang J, Alswadeh M, Zhu Z, Tang J, Sang H, et al. Advancing osteoarthritis research: the role of AI in clinical, imaging and omics fields. Bone Res. 2025;13(1):48.
15. Alzubaidi L, AL-Dulaimi K, Salhi A, Alammar Z, Fadhel MA, Albahri AS, et al. Comprehensive review of deep learning in orthopaedics: Applications, challenges, trustworthiness, and fusion. Artif Intell Med. 2024;155:102935.
16. Kunze KN, Ferguson D, Pareek A, Colyvas N. Robotic-Assisted Arthroscopy Promises Enhanced Procedural Efficiency, Visualization, and Control but Must Overcome Barriers to Adoption. HSS J. 2025:15563316251340983.
17. Cantivalli A, Cottino U, Bonasia DE, Rosso F, Rossi R. Robotic Systems in Knee Surgery: Current Concepts and Future Perspectives. Prosthesis. 2023;5(4):1257-74.
18. Ponna AK, Giakas AM, Khoudary AA, Siddiqi A. Advancements in Robotic Orthopaedic Surgery: A Current Concept. SurgiColl. 2025;3(1).
19. Goulian AJ, Goldstein B, Saad MA. Advancements in Regenerative Therapies for Orthopedics: A Comprehensive Review of Platelet-Rich Plasma, Mesenchymal Stem Cells, Peptide Therapies, and Biomimetic Applications. J Clin Med. 2025;14(6):2061.
20. Dancy ME, Marigi EM, Krych AJ, Werner BC, Camp CL. Impact of Biologic Augmentation on Revision Surgery Rates After Meniscus Repair: A Matched-Cohort Analysis of 3420 Patients. Orthop J Sports Med. 2023;11(8):23259671231186990.
21. Lana JFSD, da Fonseca LF, Macedo RDR, Mosaner T, Murrell W, Kumar A, et al. Platelet-rich plasma vs bone marrow aspirate concentrate: An overview of mechanisms of action and orthobiologic synergistic effects. World J Stem Cells. 2021;13(2):155-67.
22. Makris EA, Gomoll AH, Malizos KN, Hu JC, Athanasiou KA. Repair and tissue engineering techniques for articular cartilage. Nat Rev Rheumatol. 2015;11(1):21-34.
23. Hosseinkhani H, Domb AJ, Sharifzadeh G, Nahum V. Gene Therapy for Regenerative Medicine. Pharmaceutics. 2023;15(3):856.
24. Coxe FR, Stauffer TP, Ast MP. Virtual Reality Simulation in Orthopedic Surgery Education Improves Immediate Procedural Skill and Knowledge Acquisition, But Evidence on Cost-Effectiveness and Skill Retention Remains Lacking. Curr Rev Musculoskelet Med. 2025;18(10):363-378.
25. Chen F, Cui X, Han B, Liu J, Zhang X, Liao H. Augmented reality navigation for minimally invasive knee surgery using enhanced arthroscopy. Comput Methods Programs Biomed. 2021;201:105952.
26. Hakim LK, Yari A, Nikparto N, Mehraban SH, Cheperli S, Asadi A, et al. The current applications of nano and biomaterials in drug delivery of dental implant. BMC Oral Health. 2024;24(1):126.
27. Abyzova E, Dogadina E, Rodriguez RD, Petrov I, Kolesnikova Y, Zhou M, et al. Beyond Tissue replacement: The Emerging role of smart implants in healthcare. Mater Today Bio. 2023;22:100784.
28. Mehta A, Cheng Ng J, Andrew AW, Huang H, Kalmanovich J, Agrawal A, et al. Embracing robotic surgery in low- and middle-income countries: Potential benefits, challenges, and scope in the future. Ann Med Surg (Lond). 2022;84:104803.
29. Bukowiec LG, Damon A, Todderud JE, Morrey ME, Bukowiec LG, Damon A, et al. Development of a Novel, Affordable, and Accessible Simulation for Teaching Rotator Cuff Repair. Cureus 17(8):e91069.
30. Hasan SS, Fury MS, Woo JJ, Kunze KN, Ramkumar PN. Ethical Application of Generative Artificial Intelligence in Medicine. Arthroscopy. 2025;41(4):874-85.
31. Mondal H, Mondal S. Chapter Thirteen - Ethical and social issues related to AI in healthcare. In: Srivastava A, Mishra V (Eds). Methods in Microbiology. New York: Academic Press; 2024. pp. 247-81.
32. Morris B. Robotic surgery: applications, limitations, and impact on surgical education. MedGenMed. 2005;7(3):72.

JAYPEE BROTHERS

detailed information on orthopedic books, visit our website www.ejaypee.com, for detailed information on orthopedic books, visit our website www.ejaypee.com, for detailed information on

Textbook of Arthroscopy

Arthroscopy has transformed orthopedic surgery with precise diagnosis and minimally invasive treatment.

- *Textbook of Arthroscopy* is a comprehensive reference for postgraduates, fellows, young surgeons, and experienced arthroscopists
- Authored by leading national and international experts with an evidence-based, illustrated approach
- Covers all major joints: Knee, shoulder, hip, elbow, wrist, ankle, and foot
- Includes anatomy, biomechanics, step-by-step techniques, and trauma-related arthroscopy
- Addresses soft-tissue injuries, cartilage lesions, ligament reconstructions, and advanced technologies (biologics, navigation, and robotics)
- Features rehabilitation protocols, complication management, and future trends
- Emphasizes practical tips, clinical decision-making, case examples, and surgical pearls
- Designed as a definitive, clinically relevant guide for practice and academic excellence

Parag Sancheti MBBS MS MCh DNB(Hon) FRCS(Hon) Doctorate is an internationally renowned Orthopedic Surgeon and Chairman of the Sancheti Group of Hospitals, Pune, Maharashtra, India. He is recognized for his pioneering work in knee arthroscopy, sports medicine, and joint replacement. A global leader, educator, and innovator, he has significantly advanced arthroscopic knee surgery in India and the Asia-Pacific region.

Sachin Yashwant Kale MS(Orthopedics) D.Ortho FCPS Fellowship in Arthroplasty is Professor and Unit Head, Department of Orthopedics, Dr DY Patil School of Medicine, Navi Mumbai, Maharashtra, India. A distinguished postgraduate teacher and examiner, Dr Kale serves as Editor of the Journal of Clinical Orthopaedics, Journal of Medical Thesis, and Journal of Orthopaedic Complications and as Associate Editor of the Journal of Orthopaedic Case Reports. He is the former President of the Navi Mumbai Orthopaedic Association and an Executive Council Member of the Bombay Orthopaedic Society. Dr Kale is the editor of 12 orthopedic books, holds two patents and six copyrights, has contributed over 300 scientific publications, and is coordinator of Materiovigilance Programme of India.

Sandeep Deore MS DNB(Orthopedics) is a Professor in the Department of Orthopedics at Dr DY Patil Medical College, Navi Mumbai, Maharashtra, India. He is known for his academic leadership, clinical expertise, and dedication to teaching. As an editor and mentor, he combines evidence-based practice with a practical approach to orthopedic surgery, contributing significantly to education, research, and training of future surgeons.

Buy from ejaypee

JAYPEE BROTHERS

Shelving Recommendation
ORTHOPEDICS

ISBN 978-93-7545-708-4

9 789375 457084