

TECHNIQUES IN ORTHOGNATHIC SURGERY AN ISSUE OF AT Manual

techniques in orthognathic surgery an issue of at Orthognathic surgery, also known as corrective jaw surgery, has revolutionized the treatment of complex dental and skeletal discrepancies, improving both function and aesthetics. As a critical area within maxillofacial surgery, advancements in techniques have significantly enhanced patient outcomes, reduced recovery times, and minimized complications. This article explores the various techniques used in orthognathic surgery, their indications, procedural nuances, and recent innovations that continue to shape the field.

Understanding Orthognathic Surgery

Orthognathic surgery aims to correct congenital or acquired deformities of the jaws and facial skeleton, often in conjunction with orthodontic treatment. These deformities can include prognathism, retrognathism, asymmetries, open bites, deep bites, and transverse discrepancies. The primary goal is to establish a functional occlusion, improve facial harmony, and enhance overall quality of life.

Preoperative Planning and Imaging Techniques

Effective surgical techniques depend heavily on meticulous planning and advanced imaging modalities:

Cephalometric Analysis

- Uses lateral and posteroanterior cephalograms to assess skeletal relationships.
- Guides surgical movements and predicts postoperative outcomes.

3D Imaging and Virtual Surgical Planning (VSP)

- Cone-beam computed tomography (CBCT) provides detailed volumetric data.
- VSP allows for simulation of osteotomies, movement planning, and fabrication of surgical guides.

Model Surgery and Surgical Simulation

- Physical or digital models facilitate preoperative assessment.
- Custom splints and fixation devices are fabricated based on this planning.

Common Surgical Techniques in Orthognathic Surgery

Orthognathic procedures are broadly categorized based on the type of osteotomy performed and the jaw segments involved.

Le Fort I Osteotomy

This technique involves horizontal osteotomy of the maxilla, allowing for repositioning to correct maxillary deformities.

- **Indications:** Maxillary hypoplasia, open bite, transverse discrepancies.
- **Procedure:** The maxilla is mobilized and moved in three dimensions, then stabilized with plates and screws.

Bilateral Sagittal Split Osteotomy (BSSO)

A versatile procedure primarily used to set back or advance the mandible.

- **Indications:** Retrognathism, prognathism, asymmetries.
- **Procedure:** The mandible is split bilaterally along the sagittal plane, allowing horizontal repositioning.

Genioplasty

This involves chin augmentation or reduction, often combined with other jaw surgeries.

- **Indications:** Chin deficiency, asymmetry.
- **Procedure:** Osteotomy of the chin bone, repositioned for aesthetic or functional correction.

Other Techniques

- Segmental Osteotomies: For complex deformities involving vertical or transverse discrepancies.
- Distraction Osteogenesis: Gradual bone lengthening used in severe deformities or deficient bones.

Innovations and Modern Techniques

Recent technological advances have introduced minimally invasive approaches, digital planning, and customized hardware.

Virtual Surgical Planning (VSP) and 3D Printing

- Enable precise preoperative simulation.
- Fabricate patient-specific cutting guides and fixation plates, improving accuracy.

Navigation-Guided Surgery

- Intraoperative real-time navigation enhances precision.
- Particularly useful in complex asymmetries and revision surgeries.

Piezoelectric Osteotomy

- Uses ultrasonic vibrations to perform precise cuts with minimal damage to soft tissues.
- Reduces bleeding, swelling, and recovery time.

Custom-Fabricated Fixation Devices

- 3D printed plates and screws tailored to patient anatomy.
- Improve stability and reduce hardware-related complications.

Postoperative Management and Outcomes

Postoperative care is critical for successful outcomes in orthognathic surgery.

Recovery Protocols

- Pain management, swelling control, and maintaining nutrition.
- Early mobilization and physiotherapy.

Complication Management

Potential issues include bleeding, infection, nerve injury, and relapse.

- Proper surgical technique and planning minimize these risks.

Long-term Results

- Most patients experience significant improvements in function and aesthetics.
- Regular follow-up ensures stability and addresses any relapse or asymmetries.

Conclusion

The landscape of orthognathic surgery continues to evolve with innovations aimed at increasing precision, safety, and patient satisfaction. Techniques such as Le Fort I osteotomy, BSSO, genioplasty, and emerging technologies like virtual planning and 3D printing form the cornerstone of modern practice. As research progresses, minimally invasive approaches and custom hardware are expected to further refine outcomes and reduce recovery times. For clinicians and patients alike, understanding these techniques is essential for informed decision-making and achieving optimal results in the correction of jaw deformities.

References

- [Include relevant scholarly articles, textbooks, and clinical guidelines related to orthognathic surgery techniques.]

Techniques in Orthognathic Surgery: An In-Depth Review of Innovations and Challenges

Orthognathic surgery, a specialized branch of maxillofacial surgery, has evolved significantly over the past few decades. It is primarily aimed at correcting dentofacial deformities, improving function, and enhancing facial aesthetics. As the field advances, various surgical techniques have been developed and refined, each with its own indications, advantages, and limitations. This review provides a comprehensive exploration of the current techniques in orthognathic surgery, delving into the nuances, innovations, and ongoing challenges faced by clinicians and researchers alike.

Introduction to Orthognathic Surgery

Orthognathic surgery addresses a spectrum of maxillofacial anomalies, including malocclusions, skeletal discrepancies, and facial asymmetries. These conditions often compromise mastication, speech, breathing, and overall quality of life. The procedure typically involves repositioning the

maxilla, mandible, or both, to achieve optimal functional and aesthetic outcomes.

Historically, orthognathic procedures relied on traditional surgical techniques combined with model surgery and splint fabrication. However, the advent of digital technology, surgical guides, and intraoperative navigation has revolutionized the landscape, leading to increased accuracy, predictability, and safety.

Preoperative Planning and Imaging Techniques

The foundation of successful orthognathic surgery lies in meticulous planning. Modern techniques leverage advanced imaging modalities and computer-aided design to facilitate precise surgical interventions.

3D Imaging and Virtual Surgical Planning

- Cone Beam Computed Tomography (CBCT): Provides high-resolution, three-dimensional images of craniofacial structures with reduced radiation exposure.
- Digital Facial Scanning: Offers detailed surface anatomy for soft tissue analysis.
- Virtual Surgical Planning (VSP): Combines CBCT data with digital models to simulate osteotomies, movements, and postoperative outcomes.

Advantages of VSP include:

- Enhanced accuracy in osteotomy cuts.
- Reduced intraoperative time.
- Improved communication among surgical teams and patients.
- Precise fabrication of surgical guides and splints.

Surgical Simulation and Workflow

The typical workflow involves:

- Acquisition of CBCT scans and digital dental models.
- Integration of data into planning software.
- Simulation of osteotomies and skeletal movements.
- Fabrication of custom surgical guides and splints.
- Intraoperative execution based on virtual plan.

Core Techniques in Orthognathic Surgery

Several surgical techniques have been established to address different skeletal discrepancies. The choice depends on the nature of the deformity, patient-specific anatomy, and surgeon expertise.

Le Fort I Osteotomy

This technique involves horizontal osteotomy of the maxilla, allowing its inferior or superior repositioning.

Indications:

- Maxillary hypoplasia or hypertrophy.
- Vertical maxillary excess.
- Transverse discrepancies requiring expansion.

Procedure Highlights:

- Osteotomy line extends through the lateral nasal wall, pterygomaxillary junction, and palate.
- Maxilla is mobilized and repositioned as per surgical plan.
- Rigid fixation with plates and screws ensures stability.

Advantages:

- Versatility for multiple movement vectors.
- Can be combined with other osteotomies.

Limitations and Challenges:

- Potential for vascular injury.
- Postoperative edema and bleeding.
- Risk of relapse if fixation is inadequate.

Mandibular Osteotomies

Two primary techniques are used for mandibular repositioning:

Sagittal Split Ramus Osteotomy (SSRO)

Overview:

- Most common mandibular osteotomy.
- Allows anterior-posterior movement, vertical adjustments, and yaw corrections.

Technique:

- Vertical osteotomy through the ramus, extending from the mandibular notch.
- Sagittal split facilitates medial and lateral movement.
- Rigid fixation with plates and screws.

Advantages:

- Good control over mandibular repositioning.
- Preservation of the inferior alveolar nerve in most cases.

Challenges:

- Risk of neurosensory deficits.
- Potential for unfavorable fractures or non-union.

Intraoral Vertical Ramus Osteotomy (IVRO)

Overview:

- Alternative to SSRO, especially in patients with high mandibular ramus.

Technique:

- Vertical osteotomy through the ramus without splitting the cortex.
- Mandible is repositioned and stabilized with external fixation.

Advantages:

- Reduced nerve injury risk.
- Suitable for certain cases requiring setback.

Limitations:

- Less precise control compared to SSRO.
- Usually limited to mandibular setbacks.

Genioplasty and Additional Procedures

- Chin augmentation or reduction can be performed via sliding genioplasty.
- Distraction osteogenesis may be used for large maxillary or mandibular advancements.

Innovations and Modern Techniques

The integration of technological advancements has led to novel techniques that aim to improve outcomes.

Patient-Specific Implants and Guides

- Custom titanium plates and cutting guides manufactured through additive manufacturing.
- Offer enhanced fit, stability, and reduced intraoperative time.

Intraoperative Navigation and Robotics

- Navigation systems provide real-time feedback, increasing precision.
- Robotic-assisted surgeries are emerging, though still largely experimental.

Minimally Invasive Approaches

- Endoscopic-assisted techniques for certain osteotomies.
- Aim to reduce surgical morbidity and improve recovery.

Postoperative Considerations and Complications

While techniques continue to improve, complications remain a concern.

Common issues include:

- Relapse: Due to inadequate fixation or muscular forces.
- Neurological deficits: Particularly nerve injury during mandibular osteotomies.
- Infection: Due to intraoral flora or surgical trauma.
- Hemorrhage: From vascular injury.
- Soft tissue complications: Scar formation, wound dehiscence.

Proper case selection, meticulous surgical technique, and postoperative management are vital to minimize these risks.

Conclusion and Future Directions

Orthognathic surgery techniques have advanced remarkably, driven by technological innovations and a deeper understanding of craniofacial biomechanics. The integration of digital planning, patient-specific devices, and navigation systems has enhanced surgical accuracy, predictability, and patient satisfaction.

However, several ongoing challenges warrant attention:

- Managing relapse and stability over the long term.
- Reducing neurovascular complications.
- Making advanced technologies more accessible and cost-effective.
- Training surgeons in the latest techniques to ensure safety and efficacy.

Future research is poised to explore regenerative approaches, bioengineered tissues, and further automation in surgical planning. As the field progresses, a multidisciplinary approach combining surgical expertise, digital technology, and patient-centered care will remain essential for optimizing outcomes in orthognathic surgery.

In summary, the landscape of orthognathic surgery techniques continues to evolve, offering promising avenues for addressing complex craniofacial deformities with increased precision and safety. Continued innovation, research, and clinical vigilance are crucial to overcoming current limitations and advancing patient care in this dynamic field.

QuestionAnswer What are the latest techniques used in orthognathic surgery for improving jaw alignment? Recent advancements include computer-aided surgical planning, 3D printing for surgical guides, and virtual articulation, which enhance precision and predictability in jaw repositioning procedures. How does the use of virtual planning enhance orthognathic surgical outcomes? Virtual

planning allows for accurate simulation of surgical movements, better visualization of anatomical structures, and improved communication among surgical teams, leading to more predictable and efficient procedures. What role do custom surgical guides play in modern orthognathic surgery? Custom surgical guides, created via 3D printing, help ensure precise osteotomies and repositioning, reducing intraoperative time and improving overall surgical accuracy. Are there minimally invasive techniques available in orthognathic surgery? Yes, techniques such as intraoral approaches and the use of piezosurgery devices allow for less invasive procedures, reducing patient morbidity and enhancing recovery times. How is 3D imaging integrated into orthognathic surgical planning? 3D imaging, including CBCT scans, provides detailed anatomical data that facilitate accurate assessment, surgical simulation, and custom treatment planning for complex jaw discrepancies. What are the current challenges in adopting new techniques in orthognathic surgery? Challenges include high costs of technology, the need for specialized training, limited access to advanced imaging and planning tools, and ensuring consistent outcomes across diverse patient cases. How do postoperative stability and relapse rates relate to surgical techniques in orthognathic surgery? Employing precise surgical techniques, rigid fixation, and proper fixation methods, along with thorough planning, helps improve postoperative stability and reduce relapse rates in orthognathic procedures.

Related keywords: orthognathic surgery, surgical techniques, jaw correction, maxillofacial surgery, craniofacial surgery, orthodontic-surgical planning, mandibular advancement, maxillary osteotomy, surgical outcomes, postoperative care

Department Of Surgery

Department of Surgery: A Comprehensive Overview

The **department of surgery** is a vital component of any healthcare institution, dedicated to the diagnosis, treatment, and management of a wide range of surgical conditions. This department plays a crucial role in improving patient outcomes through innovative techniques, advanced technology, and skilled surgical professionals. Whether dealing with emergency procedures or elective surgeries, the department of surgery ensures comprehensive care tailored to each patient's needs. In this article, we will explore the various facets of the department of surgery, its specialties, roles, advancements, and how it contributes to overall healthcare.

Understanding the Department of Surgery

Definition and Scope

The department of surgery encompasses a broad spectrum of surgical practices, including the diagnosis, preoperative, intraoperative, and postoperative management of patients requiring surgical intervention. It involves a multidisciplinary team of surgeons, anesthesiologists, nurses, radiologists, and other healthcare professionals working collaboratively to provide optimal patient care.

Key functions include:

- Performing various surgical procedures
- Managing perioperative care
- Conducting surgical research and education
- Implementing new surgical techniques and technologies

Objectives of the Department of Surgery

- To diagnose surgical conditions accurately
- To perform safe and effective surgical procedures
- To minimize surgical risks and complications
- To enhance recovery and postoperative outcomes
- To educate future surgeons and healthcare professionals

Specialties within the Department of Surgery

The department of surgery is typically divided into numerous specialized areas, each focusing on particular types of surgical conditions. These specialties allow surgeons to develop expertise and provide targeted care.

General Surgery

General surgery involves procedures related to the abdominal organs, including:

- Appendectomy
- Cholecystectomy
- Hernia repair
- Gastrointestinal surgeries
- Breast surgeries

Orthopedic Surgery

Focuses on musculoskeletal system disorders such as:

- Fracture fixation
- Joint replacements
- Arthroscopic surgeries
- Spine surgeries

Neurosurgery

Deals with surgical treatment of the brain, spine, and nervous system, including:

- Brain tumor removal
- Spinal surgeries
- Trauma management

Cardiothoracic Surgery

Covers surgeries of the heart, lungs, and chest, such as:

- Coronary artery bypass grafting (CABG)
- Lung resections
- Congenital heart defect repairs

Plastic and Reconstructive Surgery

Involves repairing or reconstructing body parts, including:

- Burn treatment
- Craniofacial surgery
- Hand surgery
- Cosmetic procedures

Vascular Surgery

Focuses on blood vessel disorders, including:

- Aneurysm repair
- Carotid endarterectomy
- Dialysis access surgeries

Roles and Responsibilities of Surgical Professionals

The success of the department of surgery relies on a multidisciplinary team with clearly defined roles.

Surgeons

- Diagnose surgical conditions
- Plan and perform surgical procedures
- Manage perioperative care
- Conduct follow-up and postoperative management

Anesthesiologists

- Administer anesthesia safely
- Monitor patient vital signs
- Manage pain control during and after surgery

Nurses and Surgical Technicians

- Prepare operating rooms
- Assist during surgeries
- Provide perioperative patient care
- Educate patients about postoperative care

Radiologists and Pathologists

- Assist in diagnosis through imaging
- Analyze tissue samples post-surgery

Advancements and Technologies in the Department of Surgery

The field of surgery has seen remarkable advancements that have enhanced precision, safety, and

recovery.

Minimally Invasive Surgery

Procedures like laparoscopic and robotic surgeries reduce patient trauma, scarring, and recovery time.

Robotic Surgery

Utilizes robotic systems such as the da Vinci Surgical System to perform complex surgeries with enhanced dexterity and visualization.

3D Imaging and Navigation

Allows surgeons to plan procedures with high precision, especially in neurosurgery and orthopedic surgeries.

Enhanced Recovery After Surgery (ERAS)

Protocols aimed at reducing hospital stay, pain, and complications through optimized perioperative care.

Telemedicine and Digital Platforms

Facilitate preoperative consultations, postoperative follow-ups, and multidisciplinary collaborations remotely.

Training and Education in the Department of Surgery

Becoming a surgeon requires extensive training, including undergraduate medical education, residency programs, and often fellowship specialization.

Residency Programs

- Typically last 5-7 years
- Include rotations across various surgical specialties
- Emphasize hands-on training and surgical skills development

Fellowships

- Provide advanced training in subspecialties such as vascular, pediatric, or transplant surgery
- Enhance expertise and research capabilities

Continuous Medical Education (CME)

- Keeps surgeons updated on emerging techniques and guidelines
- Ensures adherence to best practices and patient safety

Challenges Faced by the Department of Surgery

Despite technological advancements, the department faces several challenges, including:

- Managing complex and high-risk cases
- Ensuring patient safety and reducing surgical errors
- Addressing healthcare disparities
- Keeping pace with rapid technological changes
- Managing resource limitations in certain regions

The Future of the Department of Surgery

The future of the department of surgery is promising, with ongoing innovations aimed at improving patient outcomes.

Personalized Surgery

Leveraging genomics and biomarker research to tailor surgical interventions.

Artificial Intelligence (AI) and Machine Learning

Improving diagnostic accuracy and surgical planning.

Regenerative Medicine

Using stem cells and tissue engineering to enhance healing and tissue regeneration.

Global Surgical Initiatives

Addressing disparities in surgical care worldwide through training and resource sharing.

Conclusion

The **department of surgery** remains a cornerstone of modern healthcare, continually evolving to incorporate cutting-edge technology and innovative practices. Its multifaceted specialties, dedicated professionals, and commitment to patient-centered care make it indispensable in treating a wide array of conditions. As medicine advances, the department of surgery will continue to adapt, striving for safer, more effective, and less invasive surgical options. For patients and healthcare providers alike, understanding the role and scope of the department of surgery is essential for appreciating its vital contribution to health and well-being.

Keywords: department of surgery, surgical specialties, minimally invasive surgery, surgical technologies, surgical training, healthcare, patient care, surgical innovations

Department of Surgery: A Comprehensive Guide to Its Role, Functions, and Future Directions

The department of surgery is a fundamental pillar within the broader landscape of healthcare, responsible for diagnosing, treating, and managing a wide spectrum of medical conditions through operative and non-operative means. As a specialized discipline, it encompasses various surgical subspecialties, innovative techniques, and multidisciplinary collaborations aimed at improving patient outcomes. This article provides an in-depth exploration of the department of surgery, its core functions, organizational structure, subspecialties, advancements, and future challenges.

Understanding the Department of Surgery

What Is the Department of Surgery?

The department of surgery is an academic and clinical division within hospitals and medical schools dedicated to the surgical treatment of diseases. It involves a team of surgeons, surgical residents, nurses, anesthesiologists, radiologists, and other healthcare professionals working collaboratively to deliver comprehensive surgical care.

Core Objectives

- Diagnosis and management of surgical conditions
- Training and education of future surgeons
- Research to innovate and improve surgical techniques
- Patient-centered care emphasizing safety and quality

Organizational Structure and Roles

Leadership and Staffing

- Chairperson or Department Head: Oversees departmental operations, strategic planning, and academic activities.
- Surgical Faculty: Experienced surgeons specializing in various fields.
- Residents and Fellows: Trainee surgeons gaining hands-on experience.
- Nursing and Support Staff: Critical for perioperative care and patient safety.

Key Units within the Department

- General Surgery: Covers broad surgical procedures like appendectomy, hernia repair.
- Subspecialties:
 - Cardiothoracic Surgery
 - Neurosurgery
 - Orthopedic Surgery
 - Pediatric Surgery
 - Surgical Oncology
 - Transplant Surgery
 - Vascular Surgery

Collaboration with Other Departments

- Anesthesiology
- Radiology
- Pathology
- Critical Care
- Oncology

Subspecialties of Surgery

General Surgery

Focuses on abdominal organs, including the stomach, intestines, liver, gallbladder, and hernias. It often serves as the foundational training for surgeons.

Cardiothoracic Surgery

Deals with surgical treatment of the heart, lungs, and mediastinal structures. Procedures include

coronary artery bypass grafting, valve repairs, and lung resections.

Neurosurgery

Involves operative management of brain, spinal cord, and nervous system disorders like tumors, trauma, and degenerative diseases.

Orthopedic Surgery

Addresses musculoskeletal issues, including fractures, joint replacements, and sports injuries.

Pediatric Surgery

Specializes in surgical care for infants, children, and adolescents with congenital or acquired conditions.

Surgical Oncology

Focuses on the surgical management of tumors, including biopsies, resections, and reconstructive procedures.

Transplant Surgery

Involves organ transplantation such as kidneys, liver, and pancreas.

Vascular Surgery

Deals with diseases of the vascular system, including aneurysms, blockages, and varicose veins.

Advancements and Innovations in Surgery

Minimally Invasive Techniques

- Laparoscopy: Small incisions, camera-guided procedures reducing recovery time.
- Robotic Surgery: Enhanced precision with robotic systems like the Da Vinci Surgical System.
- Endovascular Procedures: Catheter-based interventions for vascular conditions.

Enhanced Recovery After Surgery (ERAS)

Protocols designed to reduce surgical stress, minimize complications, and speed up recovery

through optimized perioperative management.

Personalized and Precision Surgery

Utilizes genetic and molecular profiling to tailor surgical interventions, especially in oncology.

Use of Artificial Intelligence and Data Analytics

Improving surgical planning, intraoperative navigation, and postoperative outcomes through AI-driven tools.

Education and Training in the Department of Surgery

Residency Programs

Typically spanning 5-7 years, surgical residencies provide extensive hands-on experience, didactic learning, and research opportunities.

Fellowships

Subspecialty training for further expertise, e.g., cardiothoracic, pediatric, or surgical oncology fellowships.

Continuing Medical Education (CME)

Ongoing education ensures surgeons stay current with evolving techniques, guidelines, and technologies.

Challenges and Future Directions

Addressing Surgical Disparities

Ensuring equitable access to surgical care across different populations and regions.

Incorporating Technological Innovations

Balancing cutting-edge techniques with safety, cost, and training requirements.

Enhancing Patient Safety and Quality

Implementing standardized protocols, checklists, and quality improvement initiatives.

Preparing for Emerging Diseases and Pandemics

Adapting surgical practices during crises like COVID-19 to maintain essential services while safeguarding patients and staff.

Sustainable Surgical Practices

Reducing waste, energy consumption, and environmental impact of surgical procedures.

The Future of the Department of Surgery

The department of surgery is poised to evolve with technological advancements, personalized medicine, and a focus on holistic patient care. Emerging trends include:

- Greater integration of digital health records and tele-surgery
- Development of biodegradable and smart surgical materials
- Expansion of minimally invasive and outpatient surgical procedures
- Emphasis on multidisciplinary approaches for complex conditions

Conclusion

The department of surgery remains a cornerstone of modern medicine, continuously advancing to meet the growing and diverse needs of patients. Its success hinges on a well-trained workforce, innovative research, and a commitment to delivering safe, effective, and compassionate care. As surgical techniques and technologies evolve, the department will undoubtedly play a pivotal role in shaping the future of healthcare, improving outcomes, and expanding access to life-saving interventions worldwide.

Question What are the latest advancements in minimally invasive surgery within the department of surgery? Recent advancements include the increased use of robotic-assisted surgeries, enhanced imaging techniques for better precision, and the development of new laparoscopic tools that reduce patient recovery time and improve surgical outcomes. How is the department of surgery adapting to COVID-19 challenges? The department has implemented strict infection control protocols, prioritized urgent and elective surgeries based on COVID-19 status, and expanded telemedicine services for pre- and post-operative consultations to ensure patient safety and continuity of care. What role does the department of surgery play in cancer treatment? The department is integral in oncologic surgeries, including tumor resections and complex reconstructive procedures, often working in multidisciplinary teams to provide comprehensive cancer care from diagnosis to post-operative management. Are there new training programs or fellowships available in the department of surgery? Yes, many departments have introduced specialized fellowship

programs in areas such as minimally invasive surgery, surgical oncology, and transplant surgery to enhance surgical expertise and meet emerging healthcare needs. How is the department of surgery incorporating personalized medicine into surgical care? The department is increasingly utilizing genetic and molecular profiling to tailor surgical approaches, improve patient selection, and develop targeted therapies that enhance treatment efficacy and reduce adverse effects. What are the current research priorities within the department of surgery? Research priorities include developing innovative surgical techniques, improving postoperative recovery protocols, exploring regenerative medicine approaches, and studying outcomes related to new technologies like augmented reality and AI-assisted surgery.

Related keywords: surgical department, surgical services, general surgery, surgical specialties, operating room, surgical team, surgical procedures, surgical residency, surgical clinics, outpatient surgery

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