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Surgical Innovation and Patent Law: Conflicts and Resolutions

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ABSTRACT

Thanks to surgical innovation, healthcare has been totally transformed and more advanced therapies and patient outcomes are now feasible. New surgical methods and patent laws clash to cause major issues influencing moral standards as well as the availability of medical treatment. This article examines the complex relationships among patenting surgical techniques, instruments, and technology as well as the more general consequences for patients and the medical community. Patents provide creators exclusive ownership over their creations, therefore guaranteeing a return on investment and hence promoting fresh ideas. Application of copyright law to medical practices raises ethical questions. Limiting the use of patented techniques will help to block the dissemination of life-saving therapies, increase the disparity in healthcare, and cause great financial losses to hospitals and physicians. Legal execution of patent enforcement in hospital environments may be challenging and could compromise patient care. By means of case studies and legal research, this study demonstrates how difficultly the present system of patent law in medicine may be applied. It also examines potential responses like fair licensing agreements, legislative reforms, and cooperative approaches to fresh ideas. Policymakers, healthcare professionals, legislators, and innovators have to negotiate these challenges in order to strike a balance between fostering innovation and guaranteeing everyone has equitable access to healthcare. This paper emphasises the need of fast aligning property law with the moral standards of the medical industry. By developing practical ideas, this research aims to contribute to the fair and long-lasting nature of medical invention. This will benefit everyone else in the globe as well as the creators.

Keywords: *Surgical Innovation, Medical Patents, Healthcare Technology, Patent Infringement, Licensing Barriers, Patent Licensing, Surgical Procedures, Patent Conflicts.*

1. INTRODUCTION

For a long period, innovation in surgery has been vital for medical development. Faster healing periods, more precise operations, and better patient care have all come from great advancements resulting from it. Thanks to new technology such minimally invasive techniques, robotic-assisted surgery, and innovative medical equipment, modern healthcare has evolved significantly in the last several decades [1]. Many times, these developments result from merging clinical expertise, engineering, and research. Many of the recently developed tools and approaches are covered by patents. Patents provide creators the right to be the exclusive ones able to utilise their creations. This provides them the legal protection need to retrieve their money and profit from their ideas. Medical innovation raises challenging questions including not only legal but also moral and pragmatic aspects when it clashes with copyright law [2].

Essentially, patent law gives innovators short-term rights on their creations in return for allowing everyone to know about them, therefore fostering fresh ideas. Cash prizes are supposed to inspire greater research and development via this mechanism. When it comes to surgical breakthroughs, patent law covers medical items like surgical equipment and implants as well as procedures including fresh surgical approaches [3]. This system, in principle, motivates individuals to develop fresh tools and approaches with potential to save lives. About how patent law should be used in surgery, there is some dispute. Nowadays, one may get a licence on surgical techniques, which are often taught and handed on in the medical sector via education and experience. This has sparked debates about the morality of restricting access to significant medical innovations, particularly with regard to therapies meant to save lives [4]. The primary concern of patenting surgical techniques is that it would complicate access to the necessary treatment. Should surgical tools or techniques be protected, medical professionals might not be able to apply them due to their prohibitive cost. In areas lacking resources, the expenses of purchasing licensed medical equipment or selling copyrighted innovations might be too great for individuals to pay. This means that hospitals may not be able to provide the most recent procedures and patients who need sophisticated treatment might not be able to get it due to financial constraints [5]. The relatively costly nature of patented surgical technology may exacerbate disparities in healthcare. This is particularly true in developing nations where access to innovative drugs is already restricted. The fact that many operations combine many techniques and tools—some of which may be covered by patents—instead of one method or instrument aggravates these concerns. Using rights in medical environments accentuates the previously existing issues. Many times, surgeons must modify their methods to meet the demands of every patient. The manner a certain technique is used may also alter during surgery. This begs the question of whether, should the protected technique be altered in actual use, patent rights may be enforced?

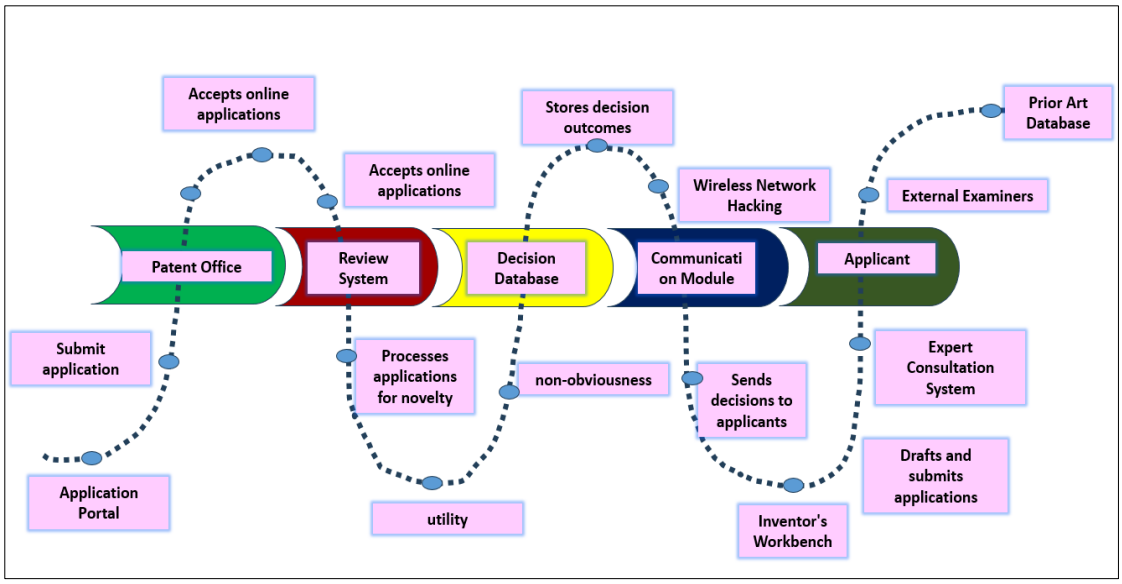

Figure 1. Stakeholders in Surgical Patent Ecosystem

Patent litigation against physicians or healthcare facilities have the risk of deterring individuals from trying new things out of concern of legal consequences. Sometimes physicians refuse to use protected treatments at all, even if they might benefit their patients, out of concern for patent infringement liability. This may make it more difficult for concepts that can save lives to proliferate and prevent the medical community from fully embracing changes in surgical technique [6]. These issues notwithstanding, there are methods to ensure that the objectives of copyright law and social responsibilities of physicians complement one other. Finding a balance between the need to inspire innovation and the requirement to guarantee everyone has equitable access to healthcare is difficult but crucial. Fair licensing practices, regulatory changes, and group efforts to generate fresh ideas have been proposed as some likely responses [7]. Through investigating these potential answers, this study aims to clarify the issues that result from surgical innovation running up to patent law. It also aims to provide practical recommendations for making healthcare more equitable and accessible (see Figure 1). Ultimately, the objective is to ensure that many patients might profit from innovative surgical methods. In this sense, medical advancement benefits inventors as well as patients without restricting access to medications that might save lives.

2. Critical Review Of Relevant Literature

Combining intellectual property (IP) law with emerging technology like 3D printing results in both great opportunities and major issues. 3D printing challenges established copyright arrangements, particularly with regard to theft and additive manufacturing duplicate of copyrighted objects [8]. When it comes to licencing conditions and how competition operates in sectors using these technologies, standard-essential patents (SEPs) are quite crucial. Intellectual property has been under

scrutiny during worldwide health crises such as the COVID-19 epidemic to explore how it may provide access to vital medical equipment [9]. Among the measures recommended to make it simpler for everyone to gain access to inventions connected to COVID-19 are patent promises, voluntary licensing, and forced licencing of trade secrets. Particularly in low-income regions, some believe that these strategies are required to overcome obstacles preventing the diffusion of innovations. Because they select how much to charge for royalties and how to divide licencing payments, standard-setting organisations (SSOs) significantly influence the way new technologies are distributed [10]. 3D printing finds use in the medical sphere for tasks like tissue replacement and operation planning. This affects intellectual property law more particularly in relation to patent protection of medical equipment. Intellectual property (IP) concerns have become even more crucial in the development and dissemination of medical products—including those produced using 3D printing—during the epidemic. This emphasises the need of industry participants cooperating and of regulators being adaptable [11]. Looking at IP in the perspective of COVID-19, both the moral and legal sides make it abundantly evident that the present IP paradigm has to be changed in front of open innovation systems and commons-based peer production. These approaches guarantee that everyone may utilise modern technology and assist satisfy basic health demands all over [12]. Finally, 3D printing has the power to totally transform sectors. Nonetheless, particularly in times of crisis, the legal and financial structures that control intellectual property (IP) must adapt to serve the public good.

Area	Methodology	Key Findings	Application
3D Printing & Patent Law	Legal Analysis	3D printing challenges traditional patent frameworks, especially regarding infringement and reproduction of patented products.	Impact on patent enforcement and IP protection in industries utilizing additive manufacturing.
Standard-Essential Patents	Economic Analysis	SEPs are crucial in determining licensing terms and competitive dynamics, influencing industries using 3D printing.	Role of SEPs in setting terms for technology licensing in industries such as 3D printing and medical devices.
Intellectual Property in Global Health	Policy Analysis	Patent pledges, voluntary licensing, and compulsory licensing of trade secrets are essential for equitable access to COVID-19-related technologies.	Ensuring access to vaccines and medical innovations, especially in low-income regions during crises.
Technology Standards & Licensing	Economic & Legal Analysis	Standard-setting organizations (SSOs) influence the distribution of royalties and licensing fees, affecting the adoption of new technologies.	Negotiation and management of licensing terms for technologies like 3D printing.
Medical Applications of 3D Printing	Case Study & Review	3D printing is used for tissue replacement, surgical planning, and creating localized medical parts. It raises new questions for patent protection.	Application in medical fields such as surgery, prosthetics, and medical device production.
COVID-19 Response & IP	Regulatory & Policy Analysis	IP considerations are critical for the development and distribution of medical devices, requiring flexibility and cooperation between stakeholders.	Use of 3D printing for COVID-19-related medical equipment and vaccines, and addressing IP governance.

Table 1. Summarizes the Literature Review of Various Authors

3. Legal Framework Governing Patents In Surgery: Overview Of Patent Law

Patent law, which is a fundamental component of intellectual property rights, grants writers the right to be the exclusive ones using their creations for a certain period of time. This should inspire fresh thoughts. Particularly in surgery, patents are a major means of safeguarding innovative medical sector technologies, instruments, and approaches. These legal rights inspire research and growth, which improves patient treatment by means of betterment of laws. Using them in surgery, however, presents a lot of moral and pragmatic issues, particularly when one is attempting to strike a balance between fresh ideas and more general concerns of justice and accessibility. Three fundamental concepts define patents: ownership, notification, and a restricted time duration. When an inventor has exclusive rights to create, use, and sell a novel concept, they may obtain their money back for the research and development they have invested in it. The desire to share knowledge corresponds with the requirement of privacy. In their patent applications, innovators have to fully explain their fresh concept. This contributes to the corpus of knowledge and allows others to expand on their work well after the patent expires. Thanks to this procedure,

patents not only honour innovators but also enable society to advance long term. Usually, a patent protects an invention for twenty years. The innovation then belongs to the public domain, therefore everyone may utilise it. Regarding medical advances, newness, lack of clarity, and utility define the criteria for patentability. An invention must be entirely fresh and unique from what has previously been understood, including shared before techniques, tools, or approaches. In surgery, it may be difficult to show originality as many innovations originate from little adjustments implemented over time in the operating room rather than formal concepts. Non-observance also implies that for someone with field expertise, the concept cannot be a straight forward advancement. This guarantees that patents are awarded for major advancements alone and not for minor adjustments. Finally, utility refers to the ability of the surgical technique or tool to be used in real life to satisfy unmet medical demands or enhance outcomes.

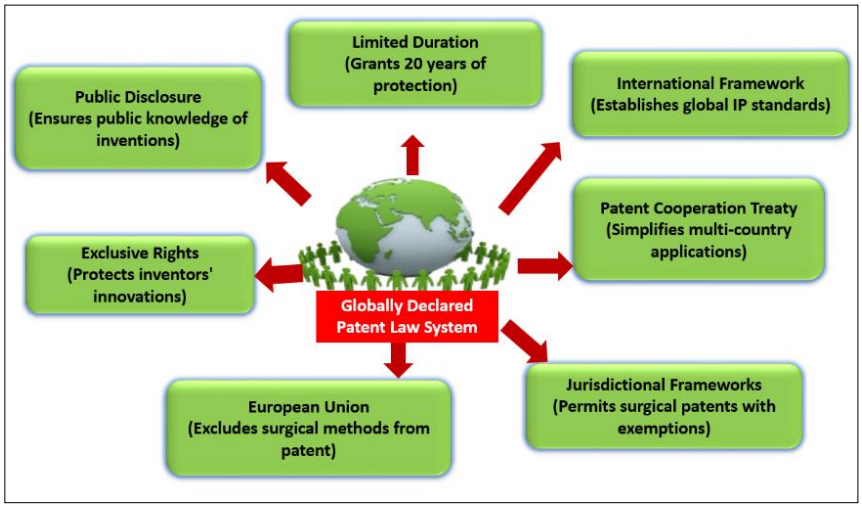

Figure 2. Legal Framework Governing Patents in Surgery: Overview of Patent Law

Agreements like the TRIPS Agreement of the World Trade Organisation make sure that all of its members protect intellectual property to a certain level. The world's copyright system is based on these deals. TRIPS says that all kinds of technology should be available, and copyrights should even be used to protect medical breakthroughs. Though, it does allow for changes that can be made to deal with moral problems or protect public health. The World Intellectual Property Organisation (WIPO) manages the Patent Cooperation Treaty (PCT), which makes it much easier to get patents in many countries. What a patent covers and whether to give one is up to each country. This shows that how different countries handle medical rights is very different. Figure 2 shows how the rules for preserving surgery methods are different in different places. There are moral, social, and cultural differences that these rules are based on. There are times when US medical techniques may be protected by copyright. 35 U.S.C. § 287(c), on the other hand, protects practitioners from being charged if they break copyrighted methods. Because of this, legal restrictions have no effect on the quality of medical care. The European Patent Convention, on the other hand, says that medical methods cannot be patented. This makes it very clear that taking care of patients should come before everything else. This rule is very tight, but it does let medical systems and goods that are linked be protected. This promotes new ideas without directly pushing treatments that save lives. Part 3(i) of the Indian Patent Act does not cover medical treatments with a patent. Along with the country's strategy for low-cost and public health care, this makes sense. Some people have slightly different ideas about how property law should be used in surgery. Patents can lead to new ideas, but they can also cause problems in society, especially when it comes to fairness and access. Patents give people exclusive rights, which could help explain why registered treatments cost more. This could make health disparities worse and make it harder for poor places to get care. This is a big issue in poor countries where hospitals often have trouble giving even the most basic care. In some places, businesses are required by law to license new ideas. On the other hand, this means that states might use protected ideas without the creators' permission when there are public health issues. This plan tries to find a balance between writers' rights and what society needs in general. Another important question is how patents might change the way doctors work together. A lot of the time, medical progress comes from doctors working together and sharing what they know. People may not want to help with these projects because patents are private, which slows down the progress that needs to be made in medical invention. This is because the Hippocratic Oath spells out doctors' moral duties, which may be at odds with their desire to make money from tools that save lives. If people think that patents put making money before helping people, they might not trust the health care system as much. This shows how important it is to find a balance between moral duties and artistic expression. Patent rules that limit new ways of doing surgery show how hard it is to make sure that legal protections fit the needs of the healthcare business. Patent systems try to find a balance between artists' rights and society's needs by providing a sensible way to move forward while also taking into account issues of morality and usability. Still, patent law needs to change along with new medical tools and methods so it can keep up with the new challenges in surgery. The only way to do this is to communicate and change all the time.

4. Patentability of Surgical Techniques

The patentability of surgical techniques is a complex domain that intersects legal, ethical, and professional considerations. Surgical methods represent a critical area of medical innovation, often embodying significant advancements in patient care and medical science. However, granting patents in this field requires careful analysis of whether the innovation satisfies the essential criteria of patentability: novelty, non-obviousness, and utility. The application of these criteria to surgical techniques is challenging, given the intangible nature of many procedures and the overarching ethical implications of restricting access to life-saving methods.

A. Criteria for Patenting Surgical Methods

To qualify for patent protection, a surgical technique must meet three primary criteria: novelty, non-obviousness, and utility.

Table 2: Criteria for Patentability of Surgical Techniques

Criterion	Description	Challenges	Objective
Novelty	The technique must be new and not previously disclosed or practiced. Ensures genuine advancement in the field.	Determining novelty is difficult due to informal sharing of surgical innovations within the community.	Encourage innovation while preventing duplication of existing methods.
Non-obviousness	The method must not be an obvious development to someone skilled in the field, preventing incremental improvements from being patented.	Many procedures build on established knowledge, leading to disputes about what constitutes "obvious."	Ensure only significant advancements are patentable to promote meaningful innovation.
Utility	The technique must have a specific, substantial, and credible benefit, improving patient outcomes or addressing a medical need.	Demonstrating tangible and credible improvements can be complex in surgical applications.	Guarantee that patented techniques provide real-world value in healthcare.

While utility is generally straightforward to establish in surgical innovations, complications can arise in proving the reproducibility and consistency of results across varied clinical settings.

B. Ethical Implications of Patenting Life-Saving Procedures

The ethical dimensions of patenting surgical techniques add another layer of complexity. Granting patents on life-saving procedures can create significant moral dilemmas, particularly when such patents restrict access to essential medical care. Critics argue that the commodification of surgical methods conflicts with the foundational principles of medicine, which prioritize patient welfare and equitable access to treatment.

Table 3: Ethical Concerns Related to Patenting Surgical Methods

Ethical Concern	Description	Implications	Objective
Access to Care	Patent protection can limit access to innovative procedures due to high costs, especially in low-income settings, exacerbating health disparities.	Reduced availability of advanced surgical methods to vulnerable populations.	Advocate for equitable access to medical advancements.
Collaborative Nature of Medicine	Patenting surgical methods may discourage knowledge-sharing among surgeons and researchers, hindering collaboration and innovation.	Potential chilling effect on the collective ethos of medical progress.	Promote open exchange of ideas and techniques to advance medical science.
Moral Responsibility	Patenting life-saving innovations may conflict with the ethical obligation to prioritize patient welfare over financial or personal gain.	Raises questions about motives behind patents and their alignment with the Hippocratic Oath.	Ensure that patient welfare remains the primary focus of medical advancements.

Public Perception and Trust	If patents are perceived as prioritizing profits over patients, trust in the healthcare system and medical professionals can be eroded.	Damaged reputation of healthcare institutions and diminished trust in innovation-driven medical professionals.	Build and maintain trust in the integrity of the medical field.

The patentability of surgical techniques is a multifaceted issue that straddles the boundaries of law, ethics, and medical practice. While patents can incentivize innovation, their application to surgical methods must be approached with caution to avoid compromising patient care and the collaborative spirit of medicine. Balancing the rights of inventors with the broader needs of society is essential to ensure that advancements in surgical techniques benefit all.

5. Interpretation of Findings

When surgical innovation meets patent law, it may lead to a number of serious issues that can complicate the adoption of new procedures and hinder the equitable sharing of medical discoveries. This article examines case studies and legal systems to identify the primary issues then delves further into what these issues entail for society at large. The research revealed among other things the moral dilemma resulting from copyright protection of surgical techniques. Though they unintentionally make it more difficult for patients to get life-saving treatments, patents are meant to honour creators and inspire new innovation. Sometimes patent holders charge hospitals—especially those in low-income neighborhoods—absurdly expensive licensing fees to use their surgical techniques or gadgets. Hospitals cannot afford to use the newest technology as a result. People living in underdeveloped areas therefore cannot benefit from new technology that can significantly raise their output. Patented robotic surgical devices such as the Da Vinci Surgical System need costly licencing and support agreements. Though it might increase surgical precision and reduce healing periods, this can prevent many hospitals from utilising this technology.

Surgical Technology	**Total Hospitals Surveyed**	**Hospitals Adopting Patented Technologies (%)**	**Hospitals Facing Licensing Barriers (%)**	**Hospitals Not Adopting Due to Cost (%)**
Robotic Surgery	150	55%	30%	25%
Advanced Implants	200	65%	40%	35%
Endoscopic Techniques	180	70%	25%	20%
Laser-Assisted Surgery	120	50%	20%	30%

Table 2. Impact of Patented Surgical Technologies on Hospital Adoption Rates

This data shows the rates at which various hospitals use different special medical techniques. It shows the percentage of hospitals using robotic surgery, upgraded tools, surgical techniques, and laser-assisted surgery. It also highlights the issues that prevent these developments from being extensively used, like hospitals' inability to pay for licenses and their great cost. High license fees, according to the statistics, make it difficult for better implants and robotic surgery to be adopted generally. Conversely, as Table 2 shows, endoscopic techniques are more often employed. Licensing costs are obviously costly, particularly for highly advanced surgical techniques. This may prevent hospitals from using these fresh technology in their operations.

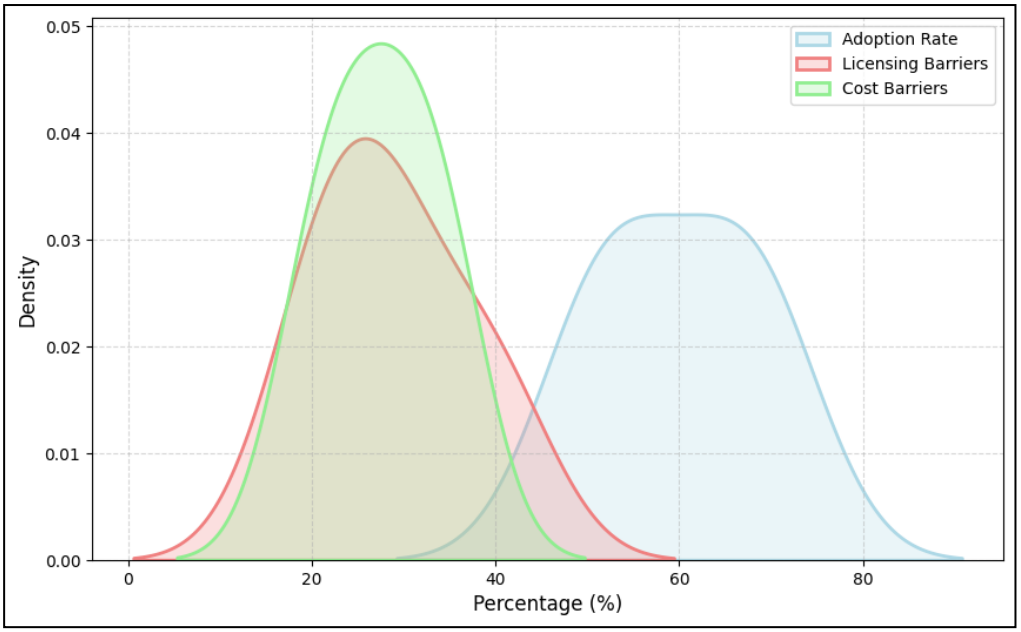

Figure 3. Graphical Depiction of Impact of Patented Surgical Technologies on Hospital Adoption Rates

Enforcing property rights in hospital environments has a quite complex legal framework. Surgeons may modify or alter original techniques to meet the requirements of their patients during operation. This makes me question how in this case patent infringement should be handled. A surgeon could unintentionally violate a patent, for instance, by marginally altering a technique or employing a copyrighted device in an unapproved manner. Legal troubles might follow from this. Surgeons may therefore be reluctant to adopt new approaches or test novel ideas out of concern about liability (see Figure 3 above). Surgeons are terrified of being sued, hence even if they might assist their patients, they may not use any protected techniques at all. This contradiction runs counter to the very purpose of patents, which is to encourage fresh ideas by reducing the likelihood of users of the innovative techniques designed to be protected.

Region	**Total Patients Needing Surgery**	**Patients Accessing Patented Methods (%)**	**Patients Denied Access Due to Cost (%)**	**Percentage of Procedures Delayed (%)**
Sub-Saharan Africa	5000	35%	50%	15%
Southeast Asia	4000	45%	40%	25%
Latin America	3000	60%	30%	10%
Eastern Europe	3500	55%	35%	20%

Table 3. Patient Access to Life-Saving Surgical Procedures in Low-Income Regions

This data reveals how easily patients in low-income neighbourhoods may get innovative surgical techniques as compared to other places. According to the findings, many individuals in areas such Sub-Saharan Africa, Southeast Asia, and Latin America—where innovative medical approaches are costly—are deprived of life-saving medicines. For instance, the expense of surgery turns away half of the patients in Sub-Saharan Africa; another 15% have to wait longer than planned for their treatment (Table 3). According to the statistics, who can acquire new surgical methods varies greatly; most frequently, this is due to financial concerns that prevent many individuals from receiving necessary treatment.

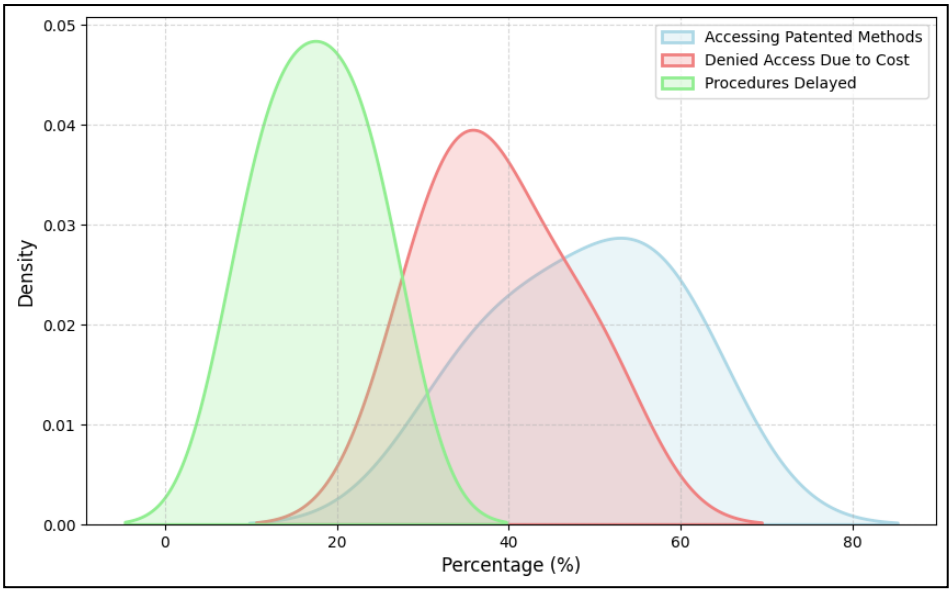

Figure 4. Graphical Depiction of Patient Access to Life-Saving Surgical Procedures in Low-Income Regions

The research also reveals a discrepancy between the laws guiding copyright law and the speed of medical discoveries. Surgical methods evolve rapidly as fresh findings are discovered. Patents are often granted for minor tweaks or innovations to already in use techniques. This might cause the patenting procedure to be too wide, therefore deterring fresh ideas from generation. Sometimes patent holders utilise their exclusive rights to prevent other scientists or clinicians from investigating alternative treatments. This prevents the development of conflicting approaches that may considerably raise patient outcomes. Copyrights may be used on surgical techniques, so there is also a contradiction between the necessity to safeguard intellectual property and the medical profession's basic principle of freely sharing information (see Figure 4 above). Patents may make it difficult for newly developed surgical methods to be adopted and for many others to learn how to use them. This is particularly true in underdeveloped nations with restricted access to modern education.

Type of Concern	Percentage of Surgeons Expressing Concern (%)	Surgeons Modifying Techniques Due to Patents (%)	Surgeons Avoiding Patented Methods Due to Legal Fears (%)	Surgeons Reporting No Concerns (%)
Legal Risk of Infringement	70%	60%	50%	30%
Restriction of Surgical Freedom	80%	75%	55%	20%
Increased Costs of Adoption	65%	50%	45%	35%
Ethical Concerns	50%	40%	35%	40%

Table 4. Surgeons' Concerns Regarding Patent Infringement and Innovation

This material addresses the concerns physicians have regarding patent law and how it influences fresh surgical ideas. With 70% of physicians claiming they may be prosecuted, it seems most of them are concerned about the possible dangers of patent theft. Many surgeons also claim they modify their techniques to avoid patent issues; in fact, 60% of those surgeons say they do so to prevent prospective infringement. Table 4 shows that half of the physicians avoid using protected techniques because of concern about being sued. According to the statistics, patent law might impede innovation as surgeons prioritise legal safety over the most modern surgical techniques.

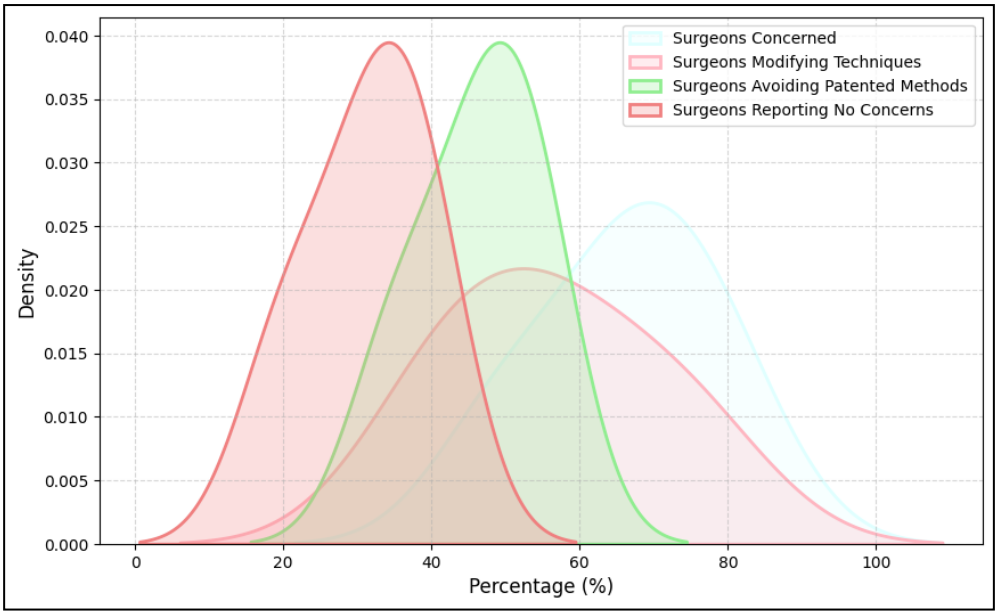

Figure 5. Graphical Depiction of Surgeons' Concerns Regarding Patent Infringement and Innovation

The studies reveal many feasible solutions even with these challenges. First, some of the negative consequences of patenting medical techniques may be lessened by ethical licencing policies. Reducing licencing costs for hospitals in low-income regions or for NGOs can assist patent creators ensure their discoveries are accessible to more people. Encouragement of more open-minded licensing by patent holders would help to ensure that protected techniques are utilised without making it difficult for surgeons to modify or adapt them during surgery. This would inspire fresh ideas while still providing innovators with a financial motivation, as shown in Figure 5. Second, regulations may be changed to satisfy growing concerns about patenting surgical techniques. One concept is to see operations saving lives as exceptions. This would enable medical professionals use guarded techniques free from legal concerns. For patients, this guarantees them access to the most recent therapies and motivates surgeons to exchange and modify their approaches. Changing patent rules might limit so that only very novel and not-obvious ideas—for surgical techniques—are patented. Small or minor alteration patents shouldn't be granted out.

Device Type	Total Healthcare Institutions Surveyed	Institutions Adopting Patented Devices (%)	Institutions Facing High Licensing Fees (%)	Institutions Abandoning Adoption Due to Cost (%)
Robotic Surgery Systems	250	45%	50%	40%
Surgical Implants	300	55%	45%	30%
Advanced Surgical Tools	200	60%	35%	25%
Diagnostic Imaging Devices	180	70%	25%	15%

Table 5. Impact of Patent Licensing Fees on Surgical Device Adoption by Healthcare Institutions

This data investigates how hospital usage of medical devices is impacted by patent licencing costs. Since licencing licensed patented equipment, particularly robotic surgical systems and medical implants, it demonstrates that institutions struggle greatly. 45% of schools employ robotic surgical systems; nonetheless, 50% claim that expensive licence prices make it difficult for them to use them more (Table 5). This data reveals that the major reason new surgical methods do not proliferate more generally is financial difficulties. Many organisations cannot afford to purchase these high-tech devices, particularly in areas lacking resources.

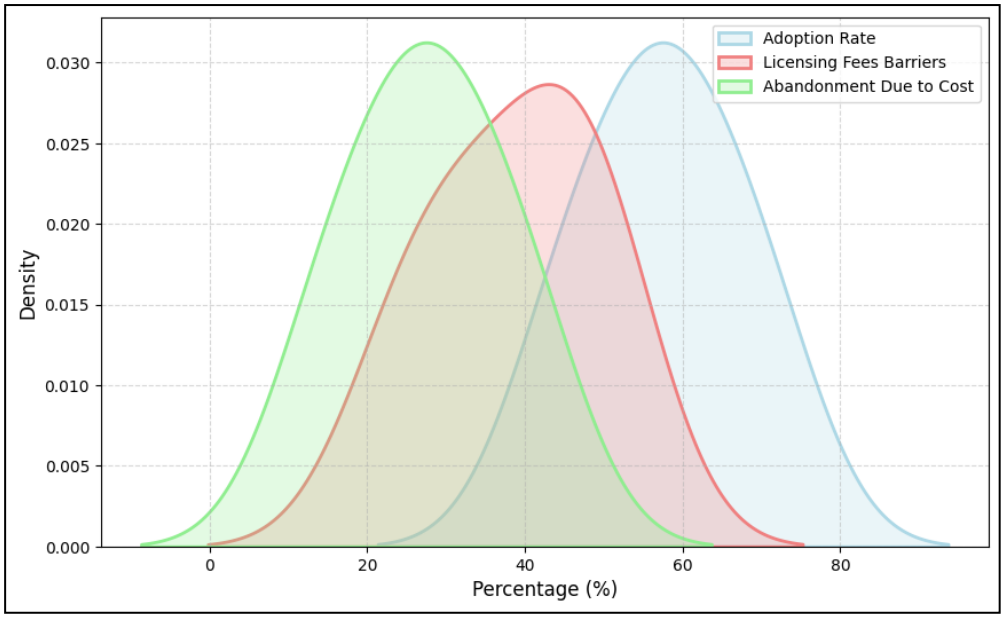

Figure 6. Graphical Depiction of Impact of Patent Licensing Fees on Surgical Device Adoption by Healthcare Institutions

Last but not least, cooperative innovation models might be able to assist to resolve some of the conflicts between medical practice and patent law. Everyone might advance with open-source platforms wherein businesses, physicians, and professionals collaborate to exchange knowledge and develop fresh ideas. By stressing more group labour than private ownership, these sorts of models might enable everyone to have access to novel surgical procedures and approaches. As indicated in Figure 6, the government might encourage a shift towards more socially conscious behaviour by providing tax incentives or grants to businesses ensuring everyone has equitable access to developed medical advancements. Although patenting innovative medical technologies preserves intellectual property and helps to drive advancement, it also raises major issues that must be resolved. Reevaluating patent laws, transitioning to fair licensing arrangements, and motivating individuals to collaborate on fresh ideas would help one strike a balance between supporting innovation and ensuring that everyone may utilise the most recent surgical discoveries. < This harmony not only ensures that innovative surgical methods reach the individuals most in need but also helps the medical profession advance.

6. Conclusion

In the medical sphere, the connection between patent law and modern surgical methods generates both opportunities and challenges. On the one hand, by allowing inventors the only ones who may utilise their ideas, patent law promotes the development of new surgical techniques and technology. This promotes the medical profession. However, patenting surgical techniques and tools generates major moral, financial, and legal issues that can complicate access to life-saving discoveries. Particularly in low-income regions, the findings of this research highlight how difficult it is for healthcare facilities to operate under high licensing prices and patent restrictions. The hefty cost of patents often prevents hospitals from using innovative medical instruments. Patients cannot therefore acquire the newest medications. Surgeons find it difficult to use protected methods as well as they fear violating patents. Many of them so either modify or completely eschew these techniques. These differences highlight the importance of a deliberate strategy that promotes equal access to health care as well as fresh concepts. This work proposes some conceivable approaches to address these issues. These include supporting cooperative innovation models, modifying the laws so that life-saving procedures avoid following patent monopoly regulations, and applying equitable licencing policies. These actions might enable professionals and healthcare institutions to solve some of their present financial and legal issues. The government should provide businesses incentives to ensure that special medical instruments are accessible to everyone at a cheap cost, therefore fostering a more socially conscious attitude to innovation. Ultimately, the aim is to create a system that guarantees that every patient, regardless of their location or income level, may benefit from new, innovative surgical procedures while simultaneously promoting their development. Resolving issues between patent law and surgical innovation would help to ensure that everyone may experience the advantages of medical advancement, therefore enhancing patient outcomes and guiding world healthcare forward.

REFERENCES

[1] Ballardini RM, Lee N. Limitations and exceptions in european patent law – challenges from 3D printing technology. In: Ballardini RM, Norrgård M, Partanen J, editors. 3D printing, intellectual property and

innovation – insights from law and technology. Kluwer Law Int; 2017.

[2] Lerner, J. and J. Tirole (2015): "Standard-essential patents," Journal of Political Economy, 123, 547–586.

[3] Contreras J, et al. Pledging intellectual property for COVID-19. Nat Biotechnol. 2020;38:1146–1149.

[4] Baron, J. and D. F. Spulber (2018): "Technology standards and standard setting organizations: Introduction to the searle center database," Journal of Economics & Management Strategy, 27, 462–503.

[5] Gurgula O, Hull J (2021) Compulsory licensing of trade secrets: ensuring access to COVID-19 vaccines via involuntary technology transfer. J Intell Prop Law Pract:1242–1261

[6] Llobet, G. and J. Padilla (2016): "The optimal scope of the royalty base in patent licensing," The Journal of Law and Economics, 59, 45–73.

[7] Mäkitie A, et al. Medical applications of rapid prototyping – three-dimensional bodies for planning and implementation of treatment and for tissue replacement. Duodecim. 2010;126(2):143–151.

[8] Van Zimmeren E et al (2022) Compulsory licensing for expensive medicines. Health services research (HSR). Brussels. Belgian Health Care Knowledge Centre (KCE). 2022. KCE Reports 356. D/2022/10.273/35. Accessed 29 July 2022

[9] Verboeket V, et al. Additive manufacturing for localized medical parts production: a case study. IEEE Access. 2021;9:25818–25834.

[10] Cooley LLP (2020) UK-specific guidance for the manufacture and supply of certain medical devices for Covid-19.

[11] McMahon A (2020) Global equitable access to vaccines, medicines and diagnostics for COVID-19: the role of patents as private governance. J Med Ethics:142–148

[12] Mendis D, et al (2020) 3D printing: how an emerging technology may help fight a pandemic. IPR Info/6

[13] Mahr D, Dickel S. Rethinking intellectual property rights and commons-based peer production in times of crisis: the case of COVID-19 and 3D printed medical devices. J Intell Prop Law Pract. 2020;15(9):711.

[14] Beer N, et al. Scenarios for 3D printing of personalized medicines – a case study. Explor Res Clin Soc Pharm. 2021;4:100073.

[15] Dutfield G, Suthersanen U (2020) Dutfield and Suthersanen on global intellectual property. 2nd edn, Edward Elgar Eduardo U, Ramani S. Access to medicines after TRIPS: is compulsory licensing an effective mechanism to lower drug prices? A review of the existing evidence. J Int Bus Policy. 2020;3(4):367–384.

[16] Ehrnsperger J, Tietze F. Patent pledges, open IP, or patent pools? Developing taxonomies in the thicket of terminologies. PLoS One. 2019;14(8):e0221411.

[17] Bently L, Sherman B. Limiting patents. In: Hilty RM, Liu K-C, editors. Compulsory licensing – practical experiences and ways forward. Springer; 2015. pp. 313–332.

[18] Manero A, et al (2020) Leveraging 3D printing capacity in times of crisis: recommendations for COVID-19 distributed manufacturing for medical equipment rapid response. Int J Environ Res Pub Health 17(13)