THE FUTURE OF PLASTIC SURGERY

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PLASTIC SURGERY AND ARTIFICIAL INTELLIGENCE

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Introduction

In recent years, artificial intelligence has become a pioneer of groundbreaking innovations in the field of medicine. Subfields such as machine learning (ML), deep learning (DL) and natural language processing (NLP) have made this possible, with AI now being used for diagnosis, treatment planning, patient monitoring and clinical decision support systems. Artificial intelligence has a wide range of applications in medicine. In the field of radiology, the utilisation of algorithms has led to the attainment of accuracy rates that are comparable to those exhibited by radiologists in the detection of lung nodules and the identification of masses in mammograms. Its applications extend to oncology, where it is employed for tumour classification and treatment response

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prediction; cardiology, where it facilitates ECG interpretation and arrhythmia detection; and dermatology, where it contributes to the diagnosis of malignant lesions. Plastic surgery is a multidisciplinary medical field focused on achieving both aesthetic and functional goals. As such, it is directly influenced by the powerful potential of artificial intelligence.

Digital transformation has accelerated significantly in recent years, particularly in the wake of the global pandemic caused by the severe acute respiratory syndrome (SARS-CoV-2) virus. This acceleration has been accompanied by a substantial integration of artificial intelligence (AI) technologies into medical applications. The United Kingdom's National Health Service (NHS) has demonstrated the strategic importance of this transformation by investing £21 million in artificial intelligence technologies alone. It is anticipated that artificial intelligence systems will contribute approximately £235 million to the healthcare economy over the next five years (The NHS, 2024).

The utilisation of artificial intelligence solutions in this domain encompasses a wide range of applications, including robotic surgery and image processing technologies. These solutions encompass patient-specific 3D printed implants and postoperative monitoring systems, among others. A growing body of research has demonstrated the efficacy of artificial intelligence in various domains of plastic surgery. AI-supported systems have the capacity to facilitate the clinical process at each stage, ranging from patient consultation and diagnosis to surgical planning and outcome analysis (Kiwan et al., 2024).

Artificial Intelligence in Physician-Patient Communication

The establishment of a meaningful dialogue between physician and patient is of paramount importance in order to facilitate an accurate diagnosis and the subsequent effective planning

of an appropriate treatment. However, factors such as time constraints, workload, and documentation requirements have the potential to disrupt this communication.

At this juncture, the utilisation of artificial intelligence-based solutions becomes pivotal, as they offer the potential to enhance the efficacy of clinical consultations. Language models such as ChatGPT have been shown to achieve a 49% success rate in providing information at the level of first-year plastic surgery residents, as evidenced by a recent study (Humar et al., 2023). It has also been reported that they are more successful than experienced surgeons in answering patients' most frequently asked questions regarding aesthetic issues such as blepharoptosis (Shiraishi et al., 2024).

Furthermore, the potential of artificial intelligence to demonstrate empathy during clinical interviews is also being evaluated. However, in certain studies, such as in sensitive areas like the procurement of informed consent for surgical procedures, artificial intelligence models have been observed to provide incomplete and misleading information (Al-Sharif et al., 2024). Consequently, the establishment of ethical and legal frameworks is imperative to ensure the responsible integration of artificial intelligence as an independent advisor.

Artificial Intelligence in Diagnosis and Evaluation

The importance of diagnostic accuracy is especially pronounced in complex anatomical regions, such as plastic surgery of the face, skin, and extremities. Artificial intelligence significantly accelerates diagnostic processes and increases accuracy rates thanks to its capabilities in image-based analysis. For instance, deep learning algorithms employed in skin cancer diagnosis have been demonstrated to achieve accuracy rates comparable to dermatologists (Brancaccio et al., 2024). Similarly, models

developed for detecting specific conditions such as lagophthalmos, frostbite and velopharyngeal insufficiency also demonstrate high sensitivity and specificity (Knoedler et al., 2023; Ha et al., 2023).

The integration of artificial intelligence systems with mobile applications has shown promising results in the diagnosis of congenital malformations, such as positional plagiocephaly in infants. A smartphone application supported by AI and developed by Watt and colleagues achieved 87.5% diagnostic accuracy (Watt et al., 2023).

Artificial intelligence is used not only for diagnosis, but also for grading the severity of diseases. Systems developed specifically for grading burn injuries support surgeons in diagnosis and treatment planning. AI models can optimise clinical management by providing predictions such as mortality risk for burn patients, graft success and length of hospital stay (Huang et al., 2023; Yeh et al., 2023).

For functional problems such as facial paralysis, AI algorithms have achieved 100% accuracy in grading according to the House-Brackmann scale (Knoedler et al., 2022). All eight AI models tested for assessing microtia severity showed an accuracy level above 80% (Wang et al., 2022). Most of these systems are trained on specific diagnoses, so they are more suitable for use as supportive tools in real clinical settings. However, as technology has advanced, systems that can perform multiple diagnoses have also begun to be developed. This suggests that artificial intelligence may be able to make more autonomous diagnoses in the future.

Artificial Intelligence in Surgical Planning

The success of surgical interventions largely depends on accurate preoperative planning. In a field such as plastic surgery, where achieving aesthetic and functional balance is so challenging,

even differences of a millimetre or less can have a dramatic effect on the results.

Artificial intelligence's image processing and tissue modelling capabilities are transforming surgical planning processes. AI algorithms can automatically segment bones and soft tissues from imaging data (CT, MRI, ultrasound, etc.) to identify anatomical markers that form the basis for surgical planning. Systems have been developed, for example, that can automatically identify the median nerve in ultrasound images of the carpal tunnel or adipose tissue prior to liposuction (Cai et al., 2023).

AI is also playing an increasingly important role in operations requiring high precision, such as planning a deep inferior epigastric perforator (DIEP) flap. AI-supported systems analyse CT angiography images to identify suitable vessel perforators, thereby reducing the time taken for surgical preparation and operations (Cevik et al., 2023).

Artificial intelligence can recognise important anatomical structures in facial abnormalities, such as cleft lip and palate, nasal deformities and mandibular anomalies, through photographs and videos. It can also provide surgeons with support in the form of 3D modelling (Sayadi et al., 2022; Verhelst et al., 2021).

Elliott and his colleagues analysed pre- and post-surgery photographs of 226 patients who had undergone facelifts, using a CNN-based algorithm. The system was able to estimate age with 96% accuracy and detect an average rejuvenation of 3.5 years (Elliott et al., 2023). Such analyses greatly facilitate comparisons between surgical techniques, quantitative assessments of patient satisfaction and the production of data for scientific publications.

Additionally, applications that integrate mobile devices and facial recognition algorithms can enable a detailed analysis of facial expressions. This supports the planning of sensitive procedures, such

as facial reanimation surgery (Hartmann et al., 2022). In oculoplastic procedures such as blepharoplasty, the ability to instantly measure parameters such as marginal reflex distance (MRD1) using deep learning models allows for more precise, patient-specific planning (Song et al., 2023).

Artificial Intelligence in Postoperative Monitoring and Complication Management

The postoperative process requires as much attention as the operation itself. The cornerstones of this period are early detection of complications, accurate analysis of follow-up data and objective measurement of patient satisfaction. Artificial intelligence has the potential to enhance patient safety by facilitating objective monitoring and early warning systems throughout the process.

Classifications obtained from consultations for some aesthetic procedures can be achieved using monitoring systems with mobile applications. For example, one application has achieved a similar accuracy rate to that of expert surgeons in the evaluation of results after rhinoplasty (Borsting et al., 2020).

One of the most notable contributions of artificial intelligence is the prediction of complications. In free flap surgeries in particular, AI systems have been integrated with non-invasive techniques such as photoplethysmography to assess perfusion and tissue viability (Fiedler & Daaloul, 2024; Kyriacou et al., 2021).

In patients undergoing breast reconstruction, AI models can predict the risk of infection or expulsion with over 80% accuracy when considering 9–12 different variables (e.g. radiotherapy, obesity and age) (Hassan et al., 2023). Algorithms such as MySurgeryRisk and POTTER can predict complications such as acute kidney injury, sepsis or thromboembolism in advance. In some cases, they can provide more accurate results than surgeons' decisions (Bertsimas et

al., 2018; Brennan et al., 2019). For example, the POTTER algorithm has been trained with data from 380,000 patients and has a higher accuracy rate than the ASA score used by surgeons.

Finally, these technologies can predict complications and have the potential to automatically recommend clinical interventions for those at risk. In this way, artificial intelligence systems can increase patient safety while reducing the workload of healthcare personel.

Ethical Issues and Limitations

The integration of artificial intelligence into plastic surgery has brought with it not only technological issues, but also ethical, legal, and sociocultural problems. If these issues are ignored, it may compromise patient safety and disrupt the integration of technology into the healthcare system.

Data privacy is one of the most important issues in this field. Most plastic surgery procedures are performed on areas of the body that are considered private, such as the face and torso. Training AI systems using these images may require personal data to be shared with third-party software developers. This situation can result in legal liability, particularly under data protection regulations such as the EU's GDPR and Turkey's KVKK (Kenig et al., 2024).

Another weakness of artificial intelligence is its ability to generate data-driven biases. Current algorithms are typically trained using data from younger, white and economically advantaged individuals. This can lead to inaccurate results when applied to different ethnic backgrounds, age groups or genders. A systematic review of 86 publications revealed that AI carries the risk of exacerbating existing healthcare inequalities (d'Elia et al., 2022).

In terms of labour, it has been shown that AI algorithms tend to evaluate surgeons as either incompetent or overly competent. This

can have a demoralising effect on the educational process and undermine trust in fair assessment systems (Kiyasseh et al., 2023).

Conclusion

Artificial intelligence is not just a technological innovation in the practice of plastic surgery; it is the key to providing patients with more accurate, faster and personalised care. However, to realise this vision, it is crucial to foster interdisciplinary collaboration that goes beyond technological development. Multidisciplinary teams consisting of surgeons, software developers, ethics experts and patient representatives will ensure that systems are created which are technically accurate and advance within a framework of human values.

AI-supported systems have achieved remarkable success in diagnosis, surgical planning, monitoring and predicting complications. However, to realise this potential effectively, technical infrastructure, ethical safeguards, legal regulation and professional awareness are all important.

Integrating artificial intelligence into plastic surgery can improve sustainability and quality, benefiting both individual surgeons and healthcare systems. Clearly, this integration will increase in the coming period. However, it is imperative that this process is carried out in a controlled, multi-centred and people-centred manner. In this context, it is crucial for plastic surgeons to recognise that artificial intelligence systems are not just tools, but clinical partners with ethical responsibilities. This ensures the safe and effective use of technology.

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THE ROLE OF MEDICAL ILLUSTRATIONS IN PLASTIC SURGERY PRACTICES

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INTRODUCTION

The field of plastic surgery encompasses a wide range of applications, including the correction of congenital deformities, post-traumatic reconstruction and functional restoration, as well as aesthetic interventions. This specialism requires an in-depth knowledge of human anatomy from both aesthetic and functional standpoints (McCarthy, 1990:10).In regions such as the face, breasts, and limbs, where visual integrity is crucial, surgical success is measured by restoring function and achieving high aesthetic satisfaction. In this context, medical illustrations have become one of the most important visual communication tools for plastic surgeons.

Medical illustration is a visual art discipline designed to convey

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medical information accurately, clearly, and effectively. Its wide range of applications includes depictions of anatomical structures, surgical procedures, educational content, and patient information brochures. Given the inherently complex and highly individualized planning processes in plastic surgery, medical illustrations hold particular significance in this field. As such, they play a crucial role in bridging the gap between clinical knowledge and visual representation, supporting both surgical precision and patient comprehension.

Historically, surgeons have used drawings to improve their understanding of anatomy and enhance knowledge transfer. Examples include surgical illustrations on ancient papyri, Leonardo da Vinci's anatomical studies in the Renaissance, and pioneering figures such as Netter in the 20th century (Choulant, 1920: 10; Persaud, 1997: 10; Netter, 2014: 10). Today, digitization and AI-supported technologies are opening up new possibilities in this area.

This article aims to examine the role of medical illustrations in plastic surgery in the contexts of education, surgical planning, and patient communication. The contributions of illustrations will be evaluated in detail with specific reference to rhinoplasty, reduction mammoplasty, temporal lift, and flap-graft surgeries. Additionally, the advantages of digitization and AI-based visual production will be discussed,as well as the ethical aspects.

Visual communication is an indispensable element of modern medicine. Medical illustrations transcend the limitations of written text by simplifying complex information and enabling rapid comprehension (Novelline, 2004: 10). They have therefore become fundamental tools in the scientific development and clinical practice of plastic surgery.

HISTORY AND DEFINITION OF MEDICAL ILLUSTRATION

Medical illustration is an interdisciplinary field that involves the visual representation of information in the health sciences. The fundamental principles of medical illustration are anatomical accuracy, visual simplicity, and educational effectiveness (Hajar, 2011:10).

Ancient Egyptian papyri contained simple drawings related to the treatment of trauma and disease (Marganne, 1997: 10). Medieval Islamic medicine saw medical illustrations become more systematic, with Ibn Sina's Al-Qanun fi al-Tibb supporting verbal knowledge with visual elements (Pormann & Savage-Smith, 2007: 10).

During the Renaissance, art and anatomical knowledge converged, culminating in the works of Leonardo da Vinci and Andreas Vesalius. Vesalius's De humani corporis fabrica marked a milestone in the scientific visual representation of human anatomy (O'Malley, 1964: 10). Da Vinci's detailed anatomical drawings remain the gold standard today (Clayton & Philo, 2012: 10).

In the 20th century, Frank Netter's anatomical atlases became global references. Netter's illustrations exemplify the marriage of aesthetics and scientific precision (Netter, 2014: 10). Today, illustrations have become multidimensional thanks to digitization, animation, interactive simulations, and 3D modeling (McMenamin et al., 2015: 10).

These developments have increased the importance of medical illustrations in visually intensive fields such as plastic surgery. Today, medical illustration is not only an informative aid but

also a fundamental tool for patient education, surgical planning, and training.

EDUCATIONAL USE – EXAMPLES FROM RHINOPLASTY AND MAMMOPLASTY

Education in plastic surgery requires not only theoretical knowledge but also practical experience and an understanding of anatomy. Medical illustrations are invaluable for teaching surgical techniques, understanding anatomical structures, and assessing risk of complications (McCarthy, 1990: 10).

In rhinoplasty education, illustrations detail nasal cross-sections and explain both the external and internal anatomy. In reduction mammoplasty, they schematically present the Wise-pattern technique and pedicle selection (Thorne et al., 2012: 10).

Digital simulations and illustration-supported education offer cost and logistical advantages compared to cadaver dissections (Trelease, 2016: 10). Visual materials also overcome language barriers, supporting international medical education.

THE ROLE OF MEDICAL ILLUSTRATION IN SURGICAL PLANNING AND TECHNICAL DETAILS

Achieving aesthetic and functional goals in plastic surgery requires detailed planning. This includes subcutaneous tissues, vascularization, and potential complications. Medical illustrations support preoperative vascular mapping and tissue sizing, especially in complex surgeries like temporal lift and flap-graft techniques (Thorne et al., 2012: 10).

Medical illustrations also serve in flap and graft surgeries as visual guides for tissue selection and transfer (Mathes & Nahai, 1997: 10). Integration with 3D-printed models allows for simulation of complex reconstructions (Rengier et al., 2010: 10).

AI-supported anatomical mapping programs are emerging for personalized surgical plans. Digital illustrations can be updated to simulate various surgical scenarios and improve planning flexibility (Mansoor & Ibrahim, 2025: 10).

THE IMPACT OF MEDICAL ILLUSTRATION IN PATIENT COMMUNICATION

Effective communication between patients and surgeons is crucial. Patients need to visualize outcomes and understand procedures realistically. Preoperative and postoperative simulations increase satisfaction and reduce anxiety (Chiu et al., 2023: 10).

Visual aids help patients comprehend risks, healing processes, and complications (Schenker et al., 2010: 10). Combining visual and verbal explanations supports informed consent and patient engagement (Schenker et al., 2010: 10).

Medical illustrations reduce cultural and linguistic barriers and support inclusive communication. Trust and treatment adherence improve when visual content is used (Hoonakker et al., 2023: 10).

DIGITIZATION, ARTIFICIAL INTELLIGENCE, AND THE FUTURE OF MEDICAL ILLUSTRATION

Digital drawing tools, 3D modeling, and animation have transformed medical education (McMenamin et al., 2015: 10). AI algorithms now generate patient-specific anatomical models from radiologic data (Pinto-Coelho, 2023: 10).

Virtual and augmented reality allow interactive, immersive learning (Barsom et al., 2016: 10). Integration of illustrations into VR/AR platforms enhances surgical preparation and patient safety.

With AI and machine learning, medical illustrations are evolving into automated, tailored content. However, privacy, data

accuracy, and ethical concerns must be addressed (Gerke et al., 2020: 10).

CONCLUSION

Medical illustrations are indispensable in education, surgical planning, and patient communication in plastic surgery. Their role is enhanced by digitization and AI technologies, contributing to precision, standardization, and better patient outcomes. As visual communication evolves, so too must ethical and technical standards that guide it.

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PLASTIC SURGERY AND SOCIAL MEDIA

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Introduction

Plastic surgery has evolved into a multifaceted medical discipline that aims not only to correct physical deformities but also to support individuals' psychosocial integrity. Particularly, aesthetic surgery has gained remarkable momentum over the past two decades due to the direct association of personal appearance with social status and self-confidence. The influence of social media platforms, central to the digital age, is undeniable in this growth.

In a 2021 study, it was demonstrated that the frequency of social media use significantly increases the desire for aesthetic surgery (Walker et al., 2021, p. 3355). Similarly, another study conducted in 2020 identified a positive correlation between the increasing number of Instagram and Facebook users and online search interests in specific cosmetic procedures (Hopkins et al.,

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2020, p. 862; Walker et al., 2021, p. 3355). These findings indicate that social media has become an influential factor affecting the desire for aesthetic interventions.

In a study by Felimban et al., it was reported that frequent exposure to idealized facial and body images on social media increases body dissatisfaction among individuals (Felimban et al., 2025, p. S2). It was particularly noted that filtered images cause individuals to compare themselves with standards presented on social media, thereby increasing their desire to pursue aesthetic interventions. Another study revealed that as the frequency of selfie viewing increases, individuals become more likely to engage in appearance comparisons and experience dissatisfaction with their bodies, which further strengthens the consideration of aesthetic surgery (Li et al., 2025, p. e0318245). In this context, body dissatisfaction has been identified as an internal risk factor in the relationship between selfie viewing and consideration of aesthetic interventions.

On the other hand, plastic surgeons have also taken an active role in social media. It has been emphasized that plastic surgeons use social media not only for promotional purposes but also to ensure online visibility, build brands, expand their practices, and educate patients, making social media an essential tool for professional development and patient communication (Economides et al., 2018, p. 881). However, the ethical and legal boundaries of these digital representations remain highly debated. A 2023 literature review comprehensively evaluated the ethical boundaries of patient representations on social media, highlighting particular shortcomings in privacy, informed consent, and anonymization of digital content (Oregi et al., 2023, p. 530). Issues such as the use of filters, digital manipulation, and patient consent were noted as potentially leading to ethical violations.

This book chapter aims to examine this multilayered relationship between plastic surgery and social media from an interdisciplinary perspective. Starting with the influence of social media on aesthetic demands, it will academically evaluate a broad spectrum ranging from the reconstruction of body perception, surgeons' digital presence, ethical boundaries, to risky tendencies among adolescents. It aims to bridge theory and clinical practice by drawing evidence from contemporary literature.

Social Media and the Demand for Aesthetic Surgery

In recent years, there has been a significant increase in the demand for aesthetic surgery, with one of the strongest sociocultural factors behind this surge being the widespread use of social media. Visually-based digital platforms shape individuals' body perceptions and significantly influence their attitudes towards aesthetic procedures. It has been observed that the frequency of social media use impacts young women's attitudes towards aesthetic surgery, and particularly, individuals exposed to images of people who have undergone cosmetic procedures show a heightened consideration for aesthetic interventions (Walker et al., 2021, p. 3355).

In a 2020 study, a statistically significant relationship was demonstrated between the increase in social media platform user numbers and online search interest in cosmetic procedures (Hopkins et al., 2020, p. 862). These findings indicate that social media has emerged as a factor increasing public interest in aesthetic applications. These data also suggest that social media content does not merely serve informational purposes but directly influences decision-making processes.

In a 2024 study, a significant increase in demand for aesthetic procedures during the COVID-19 pandemic was demonstrated. Comparing pre-pandemic and post-pandemic periods, the consideration of aesthetic procedures rose from 63.8% to 86.4%,

while belief in procedures contributing positively to self-confidence increased from 47.9% to 77.8%. The research also revealed that with the rise in video conferencing, individuals became more focused on their facial appearances, further influencing the consideration of aesthetic interventions (Khan et al., 2024, p. 34).

Such digital interactions have transformed aesthetic surgery from merely a medical intervention into a means of social acceptance and digital validation. It has been noted that the frequency of social media use particularly increases the desire for aesthetic surgery among individuals with lower satisfaction regarding their appearance (Walker et al., 2021, p. 3355). These results underline social media's direct and potent role as a determinant factor.

A positive correlation has been identified between user numbers on social media platforms and online search interest for specific cosmetic procedures. Notably, interest in noninvasive applications such as Botox, Juvederm, and CoolSculpting has increased over time, coinciding with rising social media usage rates (Hopkins et al., 2020, p. 865).

Walker et al. (2021, p. 3359) indicated in their study that if motivations for aesthetic surgery are driven by a desire to resemble individuals seen on social media, surgical outcomes might not be satisfying. Consequently, it is recommended that physicians carefully assess the impact of social media use on patients' aesthetic expectations. Similarly, Khan et al. (2024, p. 36) emphasized that selected content shared on social media could influence patient expectations, which should be considered during the treatment process.

Body Image, Filter Culture, and Psychosocial Effects

Social media platforms significantly reshape both individuals’ self-perceptions and societal beauty norms. This

transformation is a multidimensional process that not only influences users' interest in aesthetic surgery but also affects their psychological well-being. Particularly, the widespread use of social media filters creates a noticeable discrepancy between individuals' actual physical appearance and their digital representations, deepening body dissatisfaction over time.

A systematic review emphasized that social media has become an influential tool in shaping beauty perceptions, an impact recognized by both patients and aesthetic healthcare providers (Felimban et al., 2025, p. S2). The review highlighted social media's role as a significant factor in increasing interest in aesthetic interventions. It also underscored sensitivity among both patients and aesthetic providers towards beauty norms shaped by social media. The use of filters specifically generates idealized perceptions of facial features, resulting in dissatisfaction with real physical representations.

In a study evaluating the impact of social media filters on patient requests and surgical practices from the perspective of plastic surgeons, it was reported that a majority of surgeons indicated patients often use social media-filtered images as references, requesting similar surgical outcomes. However, it was emphasized that filters lead to unrealistic expectations (Veras et al., 2025, p. e80483).

Social media not only constructs a self-perception based on physical appearance but also promotes continuous external validation of this perception. A 2022 study demonstrated that frequency of social media use increased attitudes towards and acceptance of aesthetic surgery. Particularly among young adults, increased time spent on social media was found to foster a normalizing and legitimizing attitude towards cosmetic procedures (Hermans et al., 2022, p. 245).

In this context, social media platforms influence not only aesthetic preferences but also self-esteem, self-worth perceptions, and social validation seeking. Perfected images created with filters can lead individuals to develop critical and negative attitudes towards their physical realities over time. This necessitates an evaluation process in plastic surgery practice that encompasses psychological, as well as physiological considerations.

In summary, the gap between digital reality created by social media filters and an individual's physical reality contributes to distorted body perception, increased demand for aesthetic interventions, and psychosocial problems. This interaction transcends the clinical boundaries of aesthetic surgery, creating a conflicting relationship between individuals' self-identity and digital persona.

The Role of Plastic Surgeons on Social Media

Social media platforms have become more than merely promotional spaces for plastic surgeons, evolving into dynamic media where professional identity is digitally reconstructed. In these digital spaces, surgeons simultaneously manage multifaceted roles such as knowledge sharing, patient communication, professional visibility, and reputation management. However, this digital presence also introduces ethical, legal, and professional responsibilities.

In a study by Economides et al. (2018, p. 881), 61.9% of participating plastic surgeons reported actively using professional social media accounts. Surgeons indicated they use social media for various purposes, including establishing online presence (83.0%), clinical promotion (61.0%), brand building (45.6%), and patient education (47.9%). Overall, participants viewed social media positively within the context of plastic surgery. Similarly, a systematic review by Felimban et al. (2025, p. S2) revealed that a

majority of individuals interested in aesthetic surgery are active on social media, with these platforms significantly influencing their attitudes toward surgery. The reviewed studies indicated that 83.6% of users are active, with Instagram and YouTube being among the most frequently used platforms. The same review identified key content types such as "before-and-after" images, procedural videos, and interaction-enhancing posts.

A systematic review by Shauly et al. (2023, p. ojad024) highlighted visual aesthetics, the surgeon's personal visibility, and informative content production as central to plastic surgeons' social media strategies. It emphasized that platforms like Instagram and YouTube were particularly effective for content aimed at patient education, clinical promotion, and professional brand building.

The review also assessed the value of social media platforms for plastic surgeons in practice development, proposing an algorithm for effective digital marketing strategies. Furthermore, it was noted that social media use has the potential to increase clinical practice revenues (Shauly et al., 2023, p. ojad024), demonstrating that modern plastic surgery success is measured not only clinically but also through digital visibility.

However, digital visibility comes with risks. A 2023 study examining the last 20 posts of the 10 plastic surgeons with the highest follower counts on Instagram found that 64.5% of their content was promotional, whereas only 4.5% was educational. This indicates a tendency among plastic surgeons to favor promotional content in social media postings (Thawanyarat et al., 2023, p. ojac096), potentially framing healthcare as a consumer product rather than a service.

Effective content production on social media requires surgeons to develop non-clinical skills such as media performance abilities, visual presentation quality, and an understanding of

audience psychology. Additionally, protecting patient privacy, clearly distinguishing informative content from promotional messaging, and adhering to ethical standards must remain foundational principles in the digital practice of surgery.

In summary, although social media has become an indispensable showcase for plastic surgeons, it serves not only as a promotional tool but also as a platform for ethical, professional, and scientific responsibilities. Surgeons' activities on these platforms should be viewed as complementary to and balancing professional competence, rather than merely an extension of clinical skills.

Patient–Surgeon Relationship and Expectation Management

One significant impact of social media on aesthetic surgery is the transformation of the patient–surgeon relationship. Particularly, the widespread use of filter technologies has markedly altered patient expectations, directly influencing surgeons' communication and consultation processes.

In a 2025 study, the effects of social media filters on aesthetic surgery requests were assessed from the perspective of plastic surgeons. Among participating surgeons, 61.8% reported that patients frequently presented filtered images as references, while 10.3% noted this occurring constantly. Additionally, a significant portion of surgeons highlighted ethical concerns and unrealistic body perceptions arising from this situation (Veras et al., 2025, p. e80483).

In the same study, 86.6% of surgeons indicated that social media filters have negative psychological impacts on patients. The most frequently observed conditions were body dysmorphia (51.6%), depression (48.4%), anxiety (38.7%), and low self-esteem (35.5%) (Veras et al., 2025, p. e80483). These findings underscore the necessity for plastic surgeons to evaluate patients not only technically but also psychologically.

Additionally, Walker et al. (2021, p. 3355) examined how information and images acquired through social media influence patients' expectations from surgery. The research found that increased social media usage significantly impacts attitudes toward aesthetic surgery, particularly among individuals frequently exposed to images featuring cosmetic procedures.

These studies collectively highlight that social media filters and visuals substantially shape patient expectations, influencing how surgical outcomes are perceived. For plastic surgeons, this requires skills beyond technical proficiency, including expectation management, accurate patient education, and an ability to analyze the influence of digital content.

Aesthetic Trends and Risks During Adolescence

Adolescence, characterized by intensive social media use, represents a critical stage for identity formation, body perception, and the search for social approval. During this period, social media plays a directing role in shaping adolescents' aesthetic preferences and increasing their interest in cosmetic procedures.

In a 2025 study, Ayar et al. examined how adolescents' perceptions of popularity and social appearance anxiety on social media influence their perceptions toward aesthetic procedures. The study found that participants considering cosmetic procedures had higher perceptions of popularity and more pronounced social appearance anxiety. Furthermore, statistically significant positive correlations were observed among these three variables (Ayar et al., 2025, p. 3811).

Similarly, Li et al. (2025, p. e0318245) explored the relationship between adolescent girls' online selfie-viewing behavior and their considerations of aesthetic surgery, as well as the mechanisms behind this relationship. The results indicated that

viewing others' selfies on social media directly or indirectly—through appearance comparisons and body dissatisfaction—affected thoughts about aesthetic surgery.

Another study reported similar findings, noting that frequent social media use, particularly among young adults, increases acceptance and normalization of cosmetic procedures. Additionally, it revealed that young users tend to overestimate the prevalence of cosmetic procedures, indicating a false perception of normalization (Hermans et al., 2022, p. 253).

Collectively, these studies highlight that social media use impacts aesthetic perceptions, increases body dissatisfaction, and fosters interest in aesthetic procedures among younger populations. When adolescents' search for social approval combines with digital systems of likes and validation, seeking aesthetic procedures may become a psychosocial need. Therefore, aesthetic surgeons must give special attention to age-specific monitoring, psychological assessments, and counseling for young patients.

Ethical and Legal Boundaries

The increasing use of social media in plastic surgery necessitates revisiting traditional ethical principles of medical practice. Physicians' digital presence often conflicts with fundamental ethical standards such as information sharing, promotion, privacy, and patient consent. Protecting patient rights and clearly defining the boundaries of physician responsibilities become critical at this juncture.

A 2023 literature review comprehensively addressed the ethical responsibilities regarding plastic surgeons’ social media use. Key ethical issues highlighted included sharing patient images, trivialization of medical content, and breaches of privacy. Moreover,

the review emphasized that such content might significantly influence patient expectations (Oregi et al., 2023, p. 531).

The review suggested that obtaining written consent alone for sharing patient images on social media is insufficient; informed, voluntary, and context-specific consent tailored for digital sharing is required. Even anonymized content carries risks of privacy violation if identifiable features (e.g., facial characteristics or tattoos) remain. Plastic surgeons must ensure informative content does not cross promotional boundaries.

The same study indicated that plastic surgeons' use of "before-and-after" visuals and emotional patient testimonials to enhance social media visibility might conflict with the ethical principles of beneficence and non-maleficence. Such content could foster unrealistic expectations among potential patients and negatively impact their decision-making processes (Oregi et al., 2023, p. 535).

Oregi et al. (2023, p. 538) emphasized that ethical responsibility in social media use extends beyond surgeons to include platform policies and national health regulations. Thus, plastic surgeons managing social media content must adhere not only to ethical standards but also to advertising restrictions, data protection laws, and platform usage terms.

Future Perspectives and Academic Reflections

The intersection of plastic surgery and social media is becoming increasingly pronounced. This interaction not only heightens aesthetic demands but also reshapes surgical practices, patient profiles, expectation levels, and ethical considerations. Current literature findings indicate this relationship is not merely a transient trend but a permanent dynamic within the evolutionary process of plastic surgery. Social media's influence in shaping beauty

perceptions has become an influential tool acknowledged by both patients and aesthetic healthcare providers, significantly enhancing interest in aesthetic procedures (Felimban et al., 2025, p. S2).

A comprehensive analysis of social media and digital marketing tools in aesthetic surgical practice emphasized the necessity of developing effective social media strategies centered around age-specific platform preferences, aesthetic content presentation, and direct involvement by surgeons as content providers. It was stated that aesthetically focused, professionally presented content and appropriate platforms could enhance patient engagement (Shauly et al., 2023, p. ojad024).

In a 2025 study, Ayar et al. identified positive correlations between adolescents' perceptions of popularity on social media and social appearance anxiety, significantly affecting their perceptions toward aesthetic procedures. Particularly, adolescents using social media filters, considering aesthetic procedures, or spending more time on social media had higher perceptions of popularity and more positive attitudes toward cosmetic interventions (Ayar et al., 2025, p. 3814).

In this context, aesthetic surgical practices that ignore social media dynamics may fail to meet the expectations of younger generations adequately. These literature findings suggest that academic circles will increasingly debate the social media–art–aesthetics triangle. Clearly, plastic surgery's communicational and ethical dimensions need multidisciplinary approaches alongside its clinical aspects. Ensuring plastic surgeons’ social media literacy is crucial for maintaining professional competence and ethical integrity.

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ANESTHESIA TECHNİQUES IN PLASTIC SURGERY

MELIKE DEMIR ISIKTEKIN[1]

Introduction

Plastic surgery encompasses a diverse range of procedures, from minimally invasive cosmetic enhancements to complex reconstructive operations. As such, it requires a similarly diverse array of anesthetic techniques tailored to the specific needs of each case. Factors such as the surgical site, the expected duration of the procedure, patient comorbidities, and desired recovery profile all influence the anesthetic plan. This chapter aims to provide a concise yet comprehensive overview of the anesthesia modalities most frequently employed in plastic surgery: local anesthesia, regional nerve blocks, and procedural sedation. The emphasis is on efficacy, safety, and practicality, particularly in office-based and ambulatory settings where many plastic surgery procedures are now performed.

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Minor Nerve Blocks

Minor nerve blocks involve the targeted injection of anesthetic near specific peripheral nerves to provide localized analgesia. Compared to field infiltration, these blocks allow broader dermatomal coverage with smaller volumes, making them ideal for procedures involving fingers, hands, facial structures, and minor soft tissue interventions.They are particularly beneficial in:

- Facial reconstructive procedures (e.g., cleft lip repair, scar revision)
- Skin cancer excisions and reconstructions (e.g., Mohs surgery)
- Injectable cosmetic procedures requiring sensory nerve blockade

Common Facial Nerve Blocks

- Infraorbital nerve block: Useful for upper lip, cheek, and lateral nose procedures.
- Mental nerve block: Appropriate for lower lip and chin.
- Supraorbital and supratrochlear blocks: Employed in brow lifts or forehead lesion excisions.

Accurate anatomical knowledge is critical to achieving effective blocks while minimizing complications. In plastic surgery, minimizing tissue distortion is often desirable, making nerve blocks preferable to infiltrative techniques for maintaining symmetry and visibility during reconstruction.

Regional Anesthesia

Regional anesthesia provides profound sensory and/or motor blockade over a wider anatomical area, such as an entire limb or quadrant of the trunk. This is typically achieved through anesthetic

deposition near nerve plexuses or spinal roots, often under ultrasound guidance [Ilfeld et al., 2011]. Regional techniques are particularly valuable in ambulatory and office-based settings where avoiding general anesthesia is preferable.

Commonly Used Regional Blocks in Plastic Surgery

Brachial Plexus Block

- Indications: Hand, forearm, elbow, and shoulder procedures.
- Advantages: Avoids general anesthesia, reduces postoperative opioid use, improves early recovery.
- Approaches:Interscalene,supraclavicular, infraclavicular, or axillary, depending on surgical site.

Transversus Abdominis Plane (TAP) Block

- Indications: Abdominoplasty, abdominal wall reconstruction, and breast reconstruction using abdominal tissue.
- Technique: Anesthetic is deposited between the internal oblique and transversus abdominis muscles.
- Benefits: Reduced postoperative pain, opioid consumption, and earlier return of gastrointestinal function. [Mavarez et al., 2025]

Paravertebral and Pectoral Nerve Blocks

- Applications: Breast surgery, including mastectomy and augmentation.
- Mechanism: Blocks intercostal and pectoral nerves supplying the chest wall and breast region.

Outcome: Decreased pain scores and reduced opioid requirements postoperatively.

Safety and Monitoring

Due to high vascularity in regions such as the abdominal wall or brachial plexus, systemic absorption is a concern. Epinephrine may be added to reduce this risk. Real-time imaging (ultrasound) significantly enhances the safety and precision of these blocks.

Tumescent Anesthesia

Tumescent anesthesia [Klein et al., 1990] involves the subcutaneous infiltration of large volumes of diluted local anesthetic solution—typically lidocaine combined with epinephrine—into adipose tissue. This technique is commonly used in liposuction, but also plays a critical role in abdominoplasty, fat grafting, and minor skin excisions. The solution typically contains, lidocaine, epinephrine, normal saline or lactated ringer's solution.

Subcutaneous fat acts as a reservoir, leading to slow systemic absorption and extended anesthetic effects. This delayed absorption, however, necessitates vigilance, as peak plasma levels may not occur until 12–24 hours post-injection—especially in low-perfusion areas below the clavicles.

The maximum safe dose of lidocaine in tumescent anesthesia is often cited as 55 mg/kg during liposuction procedures. For non-liposuction cases, more conservative limits (28–45 mg/kg) are recommended.

Systemic toxicity is rare but serious when it occurs. Practitioners should be prepared for delayed onset symptoms and counsel patients accordingly, especially when discharging them shortly after a procedure.

Procedural Sedation

Procedural sedation involves the administration of sedative or dissociative agents to facilitate minor surgical or diagnostic interventions by reducing anxiety, discomfort, and memory of the procedure.

Sedative Agents in Plastic Surgery

- Benzodiazepines (e.g., midazolam): Provide anxiolysis and amnesia.
- Opioids (e.g., fentanyl): Manage procedural pain but carry risks of respiratory depression.
- Propofol: Rapid onset and recovery; excellent for brief interventions but requires close monitoring.
- Ketamine: Unique dissociative anesthetic ideal for pediatric and emergency cases; preserves airway reflexes and causes minimal respiratory depression.[Green et al., 2011]

Ketamine's side effects, such as hypersalivation or emergence phenomena, can be managed with anticholinergics or benzodiazepines, respectively.

Monitoring and Emergency Preparedness

Sedation should only be performed by trained clinicians with appropriate monitoring:

- Continuous pulse oximetry
- Non-invasive blood pressure
- ECG (if moderate to deep sedation)
- Capnography for high-risk patients or deep sedation

- Reversal agents such as naloxone (opioids) and flumazenil (benzodiazepines) must be readily available.

Liposomal Bupivacaine

Liposomal bupivacaine [Vyas et al., 2016] (e.g., Exparel®) is a sustained-release formulation that provides postoperative analgesia for up to 72 hours from a single injection. It is encapsulated in multivesicular liposomes, allowing gradual release and prolonged nerve blockade.

Applications in Plastic Surgery

- Breast reconstruction
- Abdominal wall surgery
- Orthoplastic procedures (e.g., wrist fracture repair)

While initial results suggest reduced opioid use and improved comfort, recent systematic reviews show no clear superiority over standard bupivacaine. Thus, its use should be individualized and balanced against cost and availability.

Caution: It should not be mixed with non-bupivacaine anesthetics, as these may destabilize the liposomal formulation and trigger early systemic absorption.

Office-Based Anesthesia: Considerations

With the shift toward outpatient and office-based procedures in plastic surgery, anesthesia practices must emphasize safety, simplicity, and rapid recovery. This environment necessitates:

- Minimal reliance on general anesthesia
- Utilization of local and regional blocks

- Judicious use of sedation tailored to patient risk
- Clear discharge criteria and post-procedure monitoring

The practitioner must have a structured emergency protocol in place, especially when using sedatives outside traditional operating room settings.

Conclusion and Practical Guidelines

Anesthesia in plastic surgery must be adapted to a wide range of procedures and practice environments. The modern anesthesiologist must be versatile, balancing efficacy and safety while optimizing patient experience.

Key principles include:

- Understanding pharmacology and safe dosing of local anesthetics
- Judicious use of epinephrine to prolong effects and reduce bleeding
- Mastery of anatomical landmarks for minor and regional nerve blocks
- Familiarity with procedural sedation protocols and reversal agents
- Cautious adoption of newer technologies like liposomal formulations
- By applying these principles, anesthesiologists can enhance surgical outcomes, reduce recovery times, and contribute meaningfully to the evolving field of plastic surgery. [Hollmann et al., 2000]

The Growing Role of Plastic Surgery Interventions Under Local Anesthesia in the Future

In contemporary plastic surgery practice, patient-specific approaches have become the prevailing paradigm. An increasing number of patients are opting for surgical interventions that offer reduced risk, enhanced comfort, and expedited recovery. This trend has precipitated the development of strategies aimed at minimizing the risks of complications associated with general anesthesia. In the contemporary medical landscape, interventions that are performed under local anesthesia have evolved beyond the scope of minor procedures. These interventions now encompass a broad spectrum of medical operations, including facial aesthetic treatments, the excision of cutaneous neoplasms, liposuction, and eyelid surgery.

Local anesthesia confers a number of notable advantages, including the capacity to avert systemic consequences, enhance intraoperative patient safety, and expedite mobilization in the postoperative period. Moreover, it facilitates same-day discharge, reducing the economic strain on healthcare systems by diminishing the necessity for prolonged inpatient care.

In the future, with technological advances and improvements in the formulation of local anesthetic agents, it is expected that a much larger proportion of plastic surgery procedures will be performed under local anesthesia. This approach will increase patient satisfaction and make surgical practice more accessible and sustainable. However, in order to realize this transformation effectively, it is of great importance for plastic surgeons to master local and regional anesthesia techniques and to select patients meticulously.

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THE FUTURE OF PLASTIC SURGERY

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