



Perspective

Navigating cosmetic dermatology in the digital age: Balancing innovation, ethics, and patient care

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ABSTRACT

Cosmetic dermatology is being rapidly reshaped by the digital age, where filtered images, artificial intelligence (AI)-enhanced beauty standards, and social media-driven trends dominate patient expectations. While technological advances such as AI-powered skincare, virtual consultations, and augmented reality previews offer opportunities for personalized care, they also introduce ethical dilemmas related to misinformation, unrealistic goals, and psychological vulnerability. Patients increasingly seek procedures influenced by influencer esthetics and homogenized ideals, often without understanding the risks or limitations. This trend is particularly concerning for individuals with skin of color, who may be disproportionately affected by global beauty norms and algorithmic bias. Dermatologists today must act not only as clinicians but also as educators and gatekeepers. They are tasked with addressing body image concerns, screening for body dysmorphic disorder, and providing ethically sound, evidence-based guidance. Digital marketing practices, especially the use of patient images, further complicate issues around consent and representation. Meanwhile, most commercial AI-based cosmetic tools lack transparency, diverse training datasets, and clinical validation, raising concerns about bias, privacy, and the promotion of unnecessary treatments. To navigate this evolving landscape, dermatologists must uphold patient-centered care, foster informed consent, and critically evaluate emerging technologies. As the cosmetic field becomes increasingly digitized, the imperative remains clear: Innovation must be tempered by ethics, inclusivity, and a deep commitment to the patient's well-being.

Keywords: Artificial intelligence, Body dysmorphic disorder, Cosmetic dermatology, Skin of color, Social media

Cosmetic dermatology is undergoing a rapid and sometimes disorienting evolution. What was once the domain of medical consultation and discreet interventions has been thrust into the hyper-accelerated arena of digital filters, viral trends, influencer esthetics, and artificial intelligence (AI)-enhanced beauty ideals. For dermatologists, this new reality presents both immense opportunity and profound ethical responsibility.

The digital age has democratized access to cosmetic information but not always to its context. Patients arrive in our clinics equipped with before-and-after photos from Instagram, recommendations from anonymous Reddit threads, and expectations shaped by airbrushed realities. At the same time, technology has revolutionized the tools at our disposal. From non-invasive tightening devices and personalized skincare regimens powered by AI algorithms to virtual consultations and augmented-reality treatment previews, innovation is everywhere. But so too is misinformation.

One of the greatest challenges lies in managing patient expectations. Digital platforms promote esthetic ideals that are often unattainable, homogenized, and continuously shifting. For skin-of-

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color patients in particular, globalized beauty standards may disregard cultural diversity and feed into harmful practices such as excessive bleaching or unregulated “whitening” treatments. Reports from the World Health Organization in 2023 highlighted the health risks associated with unregulated skin bleaching products, particularly in African and Asian markets.^[1] As dermatologists, we are tasked with gently yet firmly restoring realism to the conversation – grounding patients in evidence-based outcomes, advocating for informed consent, and resisting the temptation to medicalize every perceived flaw.

Social media’s influence is profound. A 2015 study surveying 500 consecutive patients at a plastic surgery clinic found that almost all (95%) used the internet to gather information before their consultation, with 68% citing it as their first search method; 46% reported using social media, and among these, 40% were strongly influenced by social media content when choosing a specific clinic or doctor.^[2] This digital peer pressure can lead to unrealistic expectations and a surge in demand for procedures that may not be medically indicated or safe. The rise of “Instagram face” – a look characterized by flawless skin, high cheekbones, and full lips – has created a homogenized beauty ideal that is difficult, if not impossible, for most patients to achieve.^[3]

Ethical dilemmas abound. Should we offer a procedure just because a patient demands it, even if the indication is questionable? Where do we draw the line between empowering self-improvement and enabling dysmorphia? To ensure optimal patient outcomes and address underlying psychological factors, the dermatologic and esthetic surgery communities advocate for psychological screening to identify body dysmorphic disorder (BDD) before elective cosmetic procedures. This highlights the need for dermatologists to act as gatekeepers, protecting vulnerable patients from unnecessary or potentially harmful interventions. A 2016 review in *Dermatologic Surgery* emphasizes the importance of identifying BDD to prevent unnecessary or harmful interventions.^[4]

Another ethical challenge concerns the use of patient images online. “Glow-up” photos and before-and-after galleries are now routine marketing tools, but they raise questions about privacy, consent, and the potential for misrepresentation. Informed consent must extend beyond the procedure itself to include how patient images are used and shared in digital spaces.

The rise of AI-driven esthetic tools introduces critical questions about transparency, bias, and accountability. A 2021 scoping review of 70 dermatology AI studies revealed that only 10% included skin tone information in their datasets, and among these, darker skin types (Fitzpatrick V-VI) were consistently underrepresented.^[5] This lack of diversity in training data can lead to algorithmic inaccuracies for skin-of-color patients in cosmetic applications, potentially perpetuating inequities in access to safe and effective care.

Commercial AI-driven skin analysis apps are now widely available to consumers and increasingly used for cosmetic recommendations, but their rapid adoption has outpaced critical evaluation. According to a 2024 scoping review, most of these apps lack transparency about their algorithms, data sources, and user image handling; only a minority have peer-reviewed validation, and very few disclose meaningful information about their training datasets or involve dermatologists in their development.^[6] This lack of transparency and oversight raises concerns about the accuracy of recommendations, potential bias, user privacy, and the risk of pathologizing normal features to promote unnecessary treatments.

Augmented reality previews promise empowerment by visualizing “potential” outcomes, but they risk distorting patient expectations with algorithmic illusions. When these tools overpromise or simulate perfection, they shift informed consent from reality to fantasy. Dermatologists must ask: Are we enhancing decision-making, or subtly manipulating it? These technologies must be deployed with caution, accompanied by clear communication about their limitations and the inherent unpredictability of biological responses.

Patient-centered care remains the compass by which we must navigate these uncharted waters. Maintaining trust requires:

- Transparent communication about the limitations of digital tools and the realities of cosmetic procedures
- Critical evaluation of new technologies, ensuring they are validated and beneficial for diverse patient populations
- Preservation of the therapeutic relationship, even as automated interfaces and virtual platforms become more prevalent.

Our responsibility goes beyond procedures. We must be educators, stewards of science, and champions of skin integrity across all shades, genders, and ages. In a field where transformation is promised with a click or a code, let us be the steady voices advocating for nuance, consent, and care.

The digital age is transforming how beauty is pursued, but it should never change why we practice. As dermatologists, we must embrace innovation while upholding the highest ethical standards, ensuring that every advancement serves the well-being of our patients. By remaining vigilant, compassionate, and evidence-driven, we can help shape a future for cosmetic dermatology that is as inclusive, ethical, and patient-centered as it is technologically advanced.

CONCLUSION

Cosmetic dermatology’s digital surge demands that clinicians embrace innovation while steadfastly protecting ethical standards, inclusivity, and evidence-based care. By coupling transparent communication and rigorous vetting

of new technologies with patient-centred counselling, dermatologists can harness progress without compromising psychological or physical well-being.

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