

#TheUglyTruth? A Qualitative Evaluation of Outcomes Photography on Instagram: Introducing the SEPIA Scoring System

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Background: Photographs of cosmetic treatment outcomes on social media are prone to bias and misrepresentation from nonadherence to established photographic standards. However, there is currently insufficient information regarding which norms are most-commonly violated, precluding quality improvement efforts.

Methods: A qualitative study of cosmetic treatment photographs published on Instagram was undertaken in accordance with the Guidelines for Reporting Reliability and Agreement Studies using a newly proposed Standards for the Evaluation of Photographs In Aesthetics (SEPIA) nine-point photograph scoring system and grading scale.

Results: A total of 510 posts encompassing 2020 clinical photographs published by 102 practitioner accounts on Instagram were audited for photographic quality. The average score was 4 out of 9 (medium quality), with approximately 40% of posts scoring in the low-quality range. Zoom, lighting, timing, and presentation of multiple views were the standards most-commonly disregarded. Plastic and Reconstructive Surgery specialty and subspecialty (PRSS) practitioners scored higher (4.5/9 versus 3.1/9, $P = 0.002$) and had fewer low-quality posts (22% versus 54%, $P = 0.001$) than non-PRSS providers. Low-quality photographs were most often seen with rhinoplasty (30% versus 7%, $P < 0.00001$) and lip filler (60% versus 33%, $P = 0.0001$) compared with surgical and nonsurgical treatments, respectively, due to a higher incidence of immediate photographs and selfies.

Conclusions: Before and after photographs of surgical and nonsurgical cosmetic treatment outcomes on social media are frequently of substandard quality. This study outlines specific items frequently neglected in outcomes photography to assist practitioners in maximizing adherence to established standards of photography online. (*Plast Reconstr Surg Glob Open* 2022;10:e4464; doi: [10.1097/GOX.0000000000004464](https://doi.org/10.1097/GOX.0000000000004464); Published online 19 August 2022.)

INTRODUCTION

Since the introduction of photography into the medical field in the 19th century, standardized guidelines have been established that enhance the comparability and transparency of surgical treatment outcomes.¹⁻³ Such norms underlie the ethical foundations in advertising promulgated by the Plastic and Reconstructive Subspecialty

(PRSS) boards of today.^{4,5} However, with the rapid growth in the number of nonsurgical modalities that are now accessible to specialties outside of PRSS, and an explosive growth in the marketing-related utilization of before and after photographs (BAPs) on social media (SM), a trend of declining adherence to photographic norms has been identified.⁶⁻⁹

This progressive decline in the quality of BAPs has been accompanied by a growing incidence of negative body image issues among US adolescents and young adults linked to higher SM utilization and a greater propensity toward seeking cosmetic treatments.¹⁰ Despite the magnitude of this problem, our understanding of the degree to which cosmetic practitioners fail to adhere

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to established standards of photography online has not been qualitatively assessed through a universal scoring system designed to facilitate quality improvement efforts. The present study seeks to rectify this issue through an extensive qualitative analysis of outcomes photography published online by cosmetic practitioners using a newly proposed standardized scoring system and grading scale in facial plastic surgery and aesthetic medicine.

METHODS

A cross-sectional study was designed to assess the quality of randomly sampled BAPs related to facial cosmetic procedures in posts published on Instagram by plastic surgery and aesthetic medicine practitioners in the United States. This study was conducted in accordance with the Guidelines for Reporting Reliability and Agreement Studies endorsed by the Network for Enhancing the Quality of Transparency of Health Research and in conformance with the World Medical Association Declaration of Helsinki.¹¹⁻¹³

Practitioner Search and Screening

A systematic search using multiple terms related to facial plastic surgery and aesthetic medicine was conducted on Instagram with the aim of identifying the top active plastic surgery and aesthetic medicine practitioner accounts featuring facial cosmetic treatments between January 31 and February 20, 2022. The hashtags, *#rhinoplasty*, *#blepharoplasty*, *#facelift*, *#eyelidlift*, *#browlift*, *#liplift*, *#lipfiller*, *#facialfiller*, *#plasticsurgery*, *#aestheticmedicine*, *#aestheticdoctor*, *#facialaesthetics*, were individually queried. Identified accounts were included if they belonged to the professional account of a medical practitioner holding a Doctor of Medicine (MD) or Doctor of Osteopathic Medicine degree with an active license to practice in the US. Accounts with a privacy barrier, fewer than 1000 followers, very low-engagement percentage (<0.1%), and less than five BAPs of patient results were excluded from this study. In addition, accounts lacking sufficient practitioner information or those belonging to multiprovider practices were also excluded.

Photographic Auditing

All eligible practitioner accounts were surveyed for posts featuring BAPs of facial cosmetic procedures on the snapshot data-collection date of February 26, 2022. The five most recent eligible posts were extracted from each account and compiled into a single photographic database. Posts were included only if they featured photographs documenting the appearance of one adult patient's face before and after treatment following eligible facial cosmetic procedures. Posts featuring videographic documentation of results were excluded from the study unless 2-dimensional (2D) BAPs were included in the video. Eligible treatments included a broad range of surgical and nonsurgical procedures; however, posts consisting of botulinum-only treatments were excluded due to the added complexity relating to the dynamic documentation of facial expressions. Reconstructive procedures,

Takeaways

Question: What is the degree of adherence to established standards of photography by plastic surgery and aesthetic medicine practitioners online?

Findings: This study of two thousand Instagram before and after photographs shows that adherence to well-established photography standards is low with approximately 40% of posts scoring in the low-quality range. Zoom, lighting, timing, and presentation of multiple views were the standards most commonly neglected.

Meaning: Lack of adherence to established standards of photography by US cosmetic medical and surgical practitioners is pervasive on social media.

including scar revisions, and treatments of inflammatory conditions, such as active acne, were excluded. For simplicity, posts featuring nonsurgical treatment results beyond 1 year were omitted to allow objective correlation between photographic posts and a limited number of treatments.

Data Extraction

Multiple data points were independently collected by two authors (D.J.S. and H.N.vH.), including practice location, medical degree, and core specialty as outlined by the American Board of Medical Specialties, and PRSS training. Plastic surgery specialized certification was defined as having completed an approved postgraduate residency or fellowship endorsed by the American Board of Plastic Surgery (ABPS) followed by ABPS certification.¹⁴ Subspecialty training was defined as completion of a facial plastic surgery fellowship endorsed by the American Academy of Facial Plastic and Reconstructive Surgery followed by certification via the American Board of Facial Plastic and Reconstructive Surgery, or completion of an oculoplastic surgery fellowship endorsed by the American Society of Ophthalmic Plastic and Reconstructive Surgery by active, board-certified diplomates of the American Board of Ophthalmology. Certification was verified through each respective agency's online provider database. Additionally, information relating to each Instagram account was collected, including the number of followers, degree of engagement, number of likes and photographs per selected post, and the use of disclaimers by practitioners relating to the photographs in each post.

Digital Photograph Qualitative Scoring and the SEPIA Grading System

Qualitative appraisals of all selected posts were performed by each of the three reviewing authors (D.J.S., H.N.vH., and C.H.Y.) to assess the adequacy of treatment photographs relative to established photographic standards published in the field of plastic surgery and endorsed by the American Society of Plastic Surgeons and (sub)specialty boards.¹⁵⁻²⁰ Each digital image was assessed via our proposed Standards for the Evaluation of Photographs In Aesthetics (SEPIA) Photograph scoring system (Fig. 1) for photographic adequacy pertaining

SEPIA (Standards for the Evaluation of Photographs In Aesthetics) SCALE

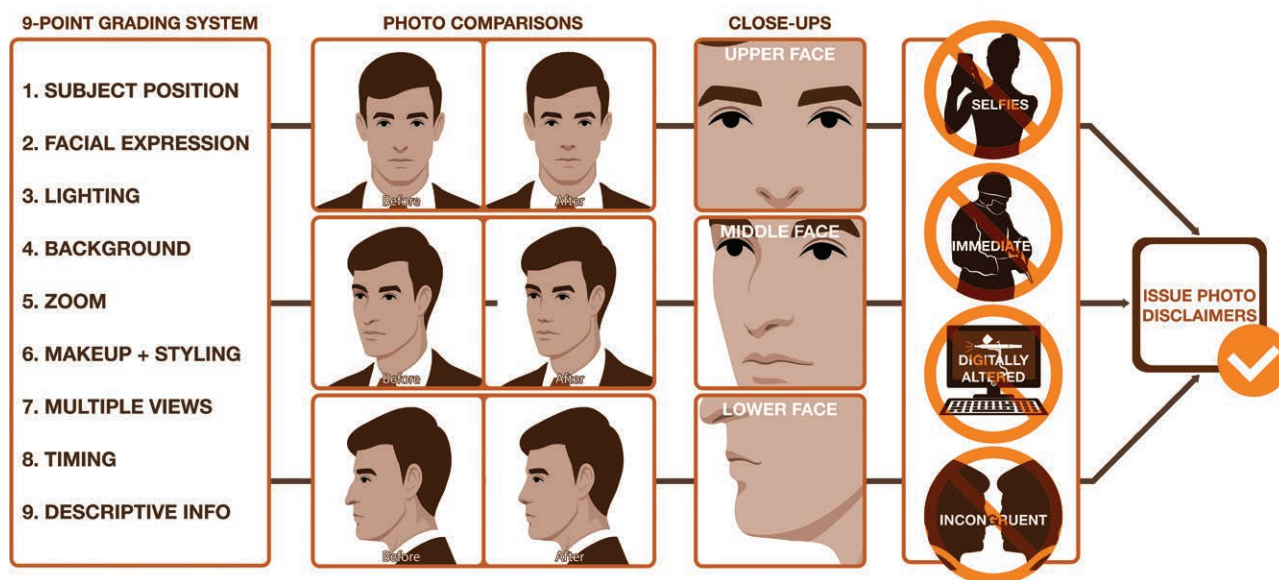


Fig. 1. The SEPIA scale and grading system components. Each before and after photograph is carefully assessed for adherence to nine different quality standards pertaining to subject positioning, facial expression, lighting, background, zoom, makeup and jewelry, multiple views, timing, and procedure-related descriptive information. Standards are applied to full-face and close-up photographs, with a minimum of three different views presented. The use of selfies, isolated immediate postprocedure photographs, digital filters, and incongruent comparisons represent major violations that render photograph comparisons as potentially misleading, earning a final score of 0 unless specific disclaimers are presented to educate the viewer on the possible distortion of the outcomes by the disqualifying component.

to well-established norms of subject positioning, lighting, facial expression, background, zoom, makeup and jewelry, multiple views, timing, and procedure description. (See **figure, Supplemental Digital Content 1**, which provides a detailed summary of the SEPIA standards, <http://links.lww.com/PRSGO/C139>.)

Photograph Scoring

Each photographic post was issued a score from 0 to 9 based on the degree compliance with SEPIA standards, with one point issued for each component sufficiently met in the nine-point SEPIA scoring scale. (See **figure, Supplemental Digital Content 2**, to view the SEPIA scoring sheet, <http://links.lww.com/PRSGO/C140>.) Posts were deemed substandard and issued a score of 0 if any of the following four major violations were identified: selfies, filters, incongruent comparisons, and immediate photographs. Selfies represent a photograph obtained by the subject that is typically captured with a mobile device using a wide-angle lens prone to distortion and with no practitioner control over subject lighting, position, or photograph manipulation. Digital filters represent an intentional camouflage of topographical and pigmentary irregularities of the natural skin while preserving sharp edge contrast to improve one's perceived appearance on digital photography. Incongruent comparisons combine disparate views or subjects—such as left-to-right side comparisons, or two altogether different patients—to imply a transformation in appearance brought on by a specific procedure. Posts

featuring immediate photographs obtained promptly following treatment were deemed inapt due to distortion caused by edema, ecchymosis, and the lack of postsurgical changes that reflect the fully healed state, which have been widely recognized as confounding factors precluding the accurate representation of posttreatment results. Posts with major violations were allowed exemption from the automatic zero-score, and scored normally via the SEPIA system, if they issued disclaimers specifically acknowledging the presence of those major violations and cautioned viewers against extrapolating from the presented BAPs to the final outcome.

A posttreatment timing minimum of 3 months, consistent with the ABPS requirement for examinee photographs during the certification application process, was enforced for all photographs of surgical and laser procedure outcomes. For injectables, a 2-week minimum interval between BAPs was required.⁴ Nonimmediate photographs presented before this minimum timeline, or which did not specify posttreatment timing, simply did not earn a point in the timing category of the SEPIA system but were otherwise scored accordingly. All posts were issued a final score between 0 and 9 established by a three-author consensus, with each practitioner receiving a five-photograph average score that was subsequently translated into a quality grade of high ($6 < \text{score} \leq 9$), medium ($3 < \text{score} \leq 6$), or low ($0 \leq \text{score} \leq 3$). Posts receiving a score of 0 were also independently assessed and labeled as “potentially misleading” for study purposes.

Data Analysis

Data tabulation/graphing and analysis were performed with Microsoft Excel software version 15.51 (Microsoft Corp., Redmond, Wash.) and IBM's SPSS software version 22.0.0 (IBM Corp., Armonk, N.Y.), respectively. Kolmogorov–Smirnov and Shapiro–Wilk tests were used for normality testing of continuous variables. Mann–Whitney U testing was used for the analysis of SEPIA score differences between providers and treatment groups while Fisher's exact testing was used to identify differences in grades among different groups. Linear correlation analysis was performed to identify any relationship between average SEPIA scores and Instagram follower/like counts via Pearson's *r* coefficient. Interrater reliability was evaluated for all components of the SEPIA system with Light's kappa average of all three possible reviewer pairs.

RESULTS

A total of 510 posts encompassing 2020 clinical photographs published by 102 different practitioner accounts were qualitatively evaluated with the SEPIA scoring system. All posts dated between July 25, 2018 and February 20, 2022, with 91% of posts published within 1 year of the snapshot date. Information relating to provider specialty/demographics is shown in Table 1. Surgeons comprised

73% of all audited accounts, with the remainder largely composed of the nonsurgical specialties of dermatology, internal medicine, and family medicine. Plastic surgery, otolaryngology, and ophthalmology represented 25%, 40%, and 5% of top accounts issuing content related to plastic surgery of the face, respectively. PRSS training was confirmed for 63 practitioners, 54% with facial plastic surgery subspecialty certification, 40% with plastic surgery certification, and 6% with oculoplastic surgery subspecialty training.

SEPIA Photograph Scores and Grades

The distribution of SEPIA scores and grades for all photographic posts is shown in Figure 2. The average score for all photographs was 4 out of 9 (medium quality), with approximately 40% of posts scoring in the low-quality range and 35% (179/510) receiving a score of 0; only 27% of photographs scored in the high-quality range. Grade distributions based on each provider's five-photograph average are displayed in Figure 3. The larger proportion (48%) of practitioners scored in the medium-quality range, compared with 34% and 18% in the low- and high-quality categories, respectively. A total of eight (7.8%) providers scored 0 on their five-photograph average, publishing the lowest quality of photographs across all five of their surveyed posts. More than 95% of practitioners did not provide a disclaimer acknowledging the substandard aspects of their published BAPs.

The degree of adherence to SEPIA standards by practitioners displayed significant variation according to each scored norm, as shown in Figure 4. Standards relating to subject positioning (79%), facial expression (88%), and procedure description (89%) were most frequently observed, while timing (16%) and presentation of multiple views (24%) were most often overlooked. Among providers of different specialties, plastic surgeons (4.56/9), facial plastic surgeons (4.53/9), and oculoplastic surgeons (4.46/9) scored the highest. Non-PRSS specialties scored significantly lower (3.08/9, $P = 0.002$) than PRSS and were significantly more likely to publish low-quality (54% versus 22%, $P = 0.001$) or zero-score photographs (47% versus 28%, $P < 0.0001$).

SEPIA scores also significantly differed by procedure type (Table 2), with surgical photographs scoring significantly better than nonsurgical ones (5.1/9 versus 2.6/9, $P < 0.001$). However, rhinoplasty surgical posts scored significantly lower than nonrhinoplasty surgical posts (5.7/9 versus 4.4/9, $P = 0.002$) and were responsible for a significantly greater number of low-quality surgical photographs (38% versus 12%, $P < 0.00001$). In the nonsurgical treatment category, lip filler treatment posts scored significantly lower than other nonsurgical treatments (1.9/9 versus 3.1/9, $P = 0.002$) and were responsible for a significantly greater number of low-quality posts (70% versus 48%, $P = 0.001$). Both rhinoplasty and lip filler posts shared a high incidence of immediate photographs compared with their nonsurgical and surgical correlates (rhinoplasty, 30% versus 7%, $P < 0.00001$; lip filler, 60% versus 33%, $P = 0.0001$). No significant correlation was observed

Table 1. Provider Demographic Information, Specialty, and Audited Procedures

Medical degree	N (%)
Medical degree	
MD	91 (89.3)
DO	11 (10.7)
Core specialty, %	
Plastic surgery	24.5
OHNS	40.2
Ophthalmology	4.9
OMFS	2
General surgery	1
Dermatology	11.8
Internal medicine	4.8
Family medicine	8.8
Pediatrics	1
Anesthesiology	1
Total	n = 102
Plastic and reconstructive surgery specialty and subspecialty training and/or certification, %	
Plastic surgery	24.5
Facial plastic surgery	33.3
Oculoplastic surgery	3.9
None	38.3
Practice location, %	
California	37.3
Florida	14.7
New York	12.7
New Jersey	6.9
Texas	3.9
Michigan	3.9
Other	20.6
Instagram follower count, %	
1,000–10,000	24.5
10,000–25,000	14.7
25,000–50,000	18.6
50,000–100,000	13.7
100,000–250,000	11.8
250,000–500,000	9.8
500,000+	6.9

DO, osteopathic medicine; OHNS, otolaryngology, head and neck surgery; OMFS, oral and maxillofacial surgery.

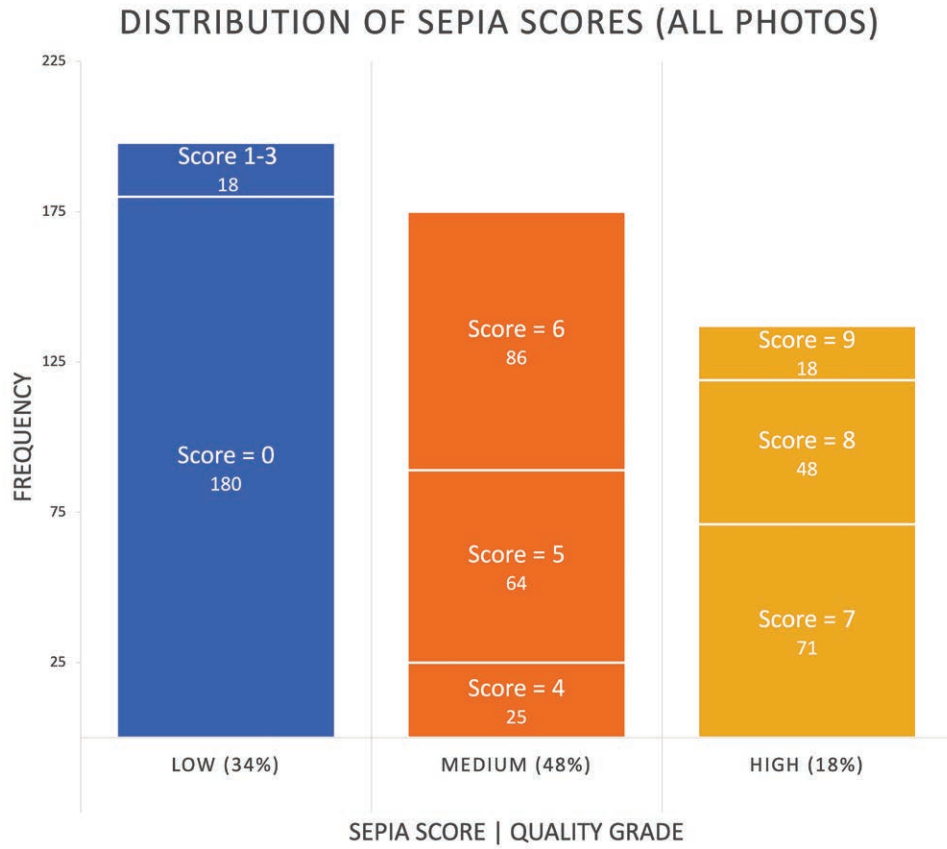


Fig. 2. The distribution of SEPIA scores and quality grades for all audited posts.

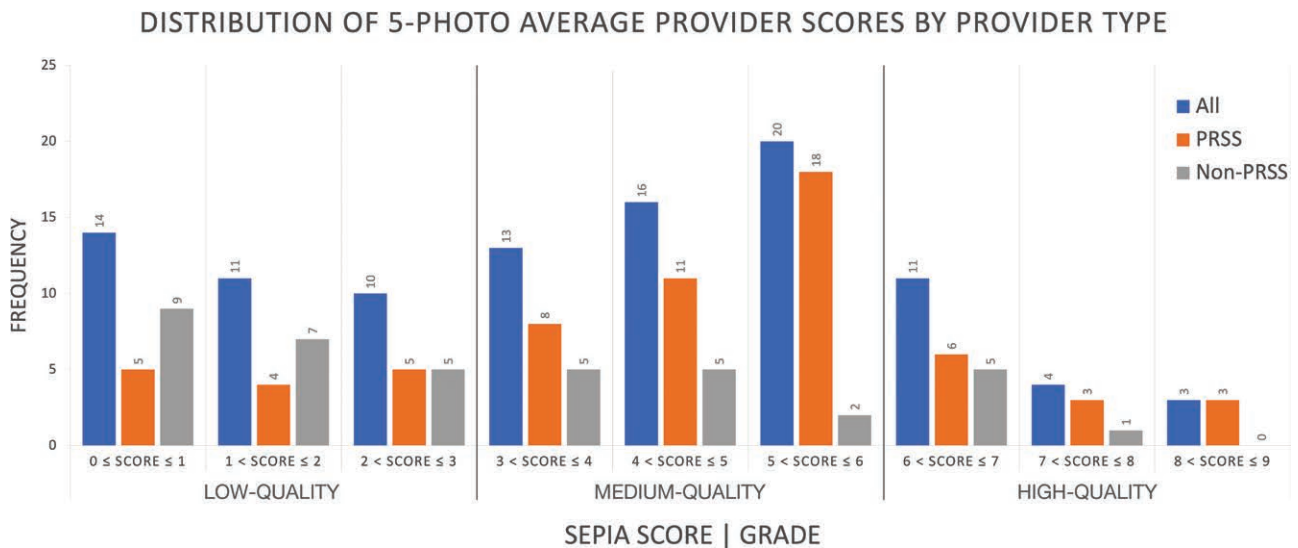


Fig. 3. The distribution of the average five-photograph SEPIA provider score for all providers and for PRSS and non-PRSS practitioners.

between SEPIA scores and the number of Instagram followers (Pearson’s $r = -0.127$, $P = 0.1$) or post likes (Pearson’s $r = -0.024$, $P = 0.6$).

The distribution of kappa values for each SEPIA score component is listed in Figure 5. In general, the SEPIA scoring system demonstrated moderate interrater

agreement ($\kappa = 0.69$, $P < 0.001$) with the greatest agreement seen in the items of multiple views ($\kappa = 0.9$), timing ($\kappa = 0.86$), and positioning ($\kappa = 0.73$). The weakest agreement was observed in the areas of makeup and jewelry ($\kappa = 0.42$), procedure description ($\kappa = 0.47$), and lighting ($\kappa = 0.55$).

ADHERENCE TO SEPIA PHOTO STANDARDS BY PROVIDER TYPE

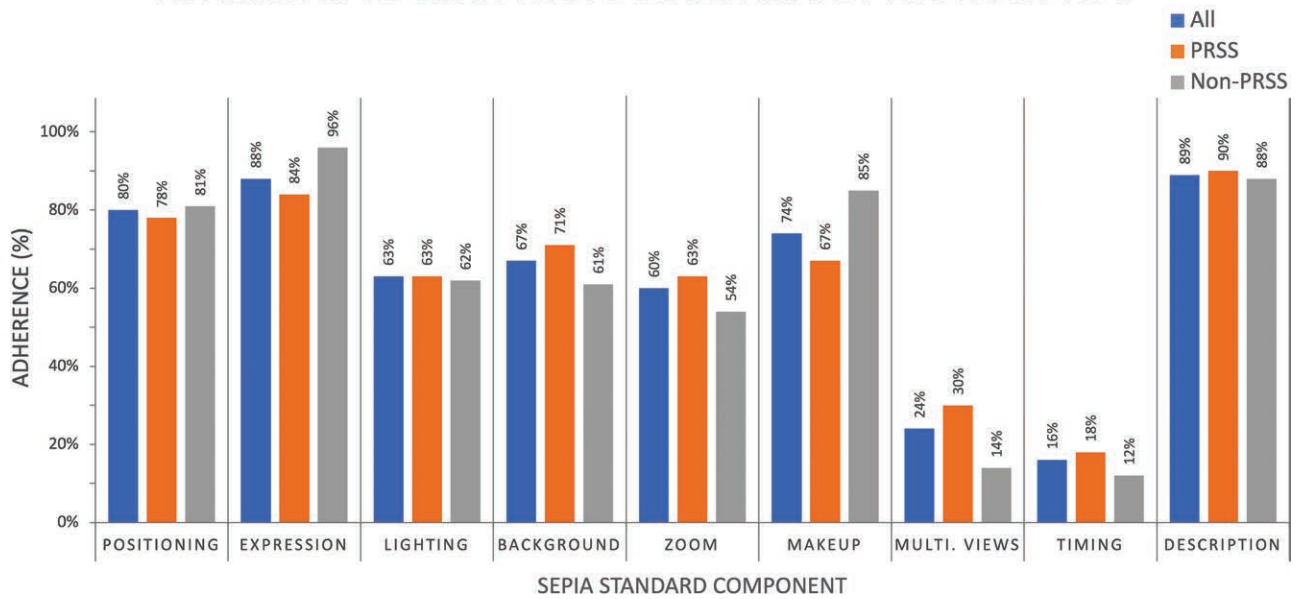


Fig. 4. Degree of adherence to each component of the SEPIA photographic standards by PRSS and non-PRSS practitioners.

DISCUSSION

In 1898, George H. Monks, MD, became the first surgeon to publish a facial plastic surgery BAP to describe the management of nasal tip bifidity in a 14-year-old patient, illustrating the power of photography to communicate outcomes in plastic surgery (Fig. 6).²¹ Nearly 125 years later, in 2022, the influence of outcomes photography in plastic surgery has perhaps reached its zenith, magnified by the rapid ascension of SM applications into our everyday life online, with BAPs currently rated as the most important factor considered by prospective patients in choosing a plastic surgeon.^{22,23} Visual platforms like Instagram, with

billions of plastic surgery-related content views annually, have become powerful marketing tools for practices to engage with and recruit new patients but are also prone to magnifying the dissemination of health misinformation.^{24,25} The content-driven algorithms, combined with a lack of regulatory standards and a preponderance of posts featuring inaccurate/misleading content issued by non-medical persons and nonspecialized providers, have seemingly drowned out the principled voices of the specialty.^{26–28} Despite the need for better adherence to standards, recent evidence has pointed to a decline in the quality of BAPs issued by PRSS practitioners as well, showing an overall 97% prevalence of biased photographic misrepresentations that positively correlates with follower count.⁸ These findings suggest that photographic misrepresentation is pervasive online and rewarded with greater viewership, potentially being disseminated to the largest audiences.⁸

The boom in illusory content mirrors the rise in the incidence of mental health issues in the adolescent and young adult US population—including depression, anxiety, and body image disorders—that has been partially attributed to the increased use of SM.^{29–32} Compared with nonusers, SM users demonstrate a propensity toward lower self-esteem, dysmorphia, and reliance on external validation. With such vulnerability, the use of selfies/filters—which inherently distort and misrepresent one’s own facial features—has predictably been associated with a greater tendency toward seeking cosmetic procedures, sparking the use of the term “Snapchat Dysmorphia.”^{33–36}

This study describes the first proposed comprehensive scoring system and grading scale for BAPs in facial plastic surgery intended for use as a quality improvement tool to help guide practitioners. Our findings demonstrate that, in 2022, there is poor adherence to standards of photography by all providers, especially with regard to timing of

Table 2. Average SEPIA Score by Procedure Type

Surgical Procedures	Count	Average SEPIA Score	SEPIA Score = 0 (%)
Rhinoplasty	134	4.54	48 (35.8)
Upper blepharoplasty	40	5.43	6 (15.0)
Lower blepharoplasty	25	5.16	1 (4.0)
Frontal rhytidectomy/brow lift	14	6.14	1 (7.1)
Cervical/facial rhytidectomy	93	5.74	9 (9.7)
Otoplasty	3	7.33	0 (0.0)
Cheiloplasty	18	4.89	3 (16.7)
Genioplasty	25	4.64	6 (24.0)
Other (surgical)	28	4.14	9 (32.1)
All surgical	284	5.1	62 (21.8)
Nonsurgical Procedures	Count	Average SEPIA Score	SEPIA Score = 0 (%)
Filler—lip	104	1.92	65 (62.5)
Filler—all	205	2.47	113 (55.1)
Laser skin resurfacing	31	4.97	5 (16.1)
Radiofrequency skin tightening	16	5	1 (6.3)
Other (nonsurgical)	37	5.1	7 (18.9)
All (nonsurgical)	226	2.58	65 (28.8)

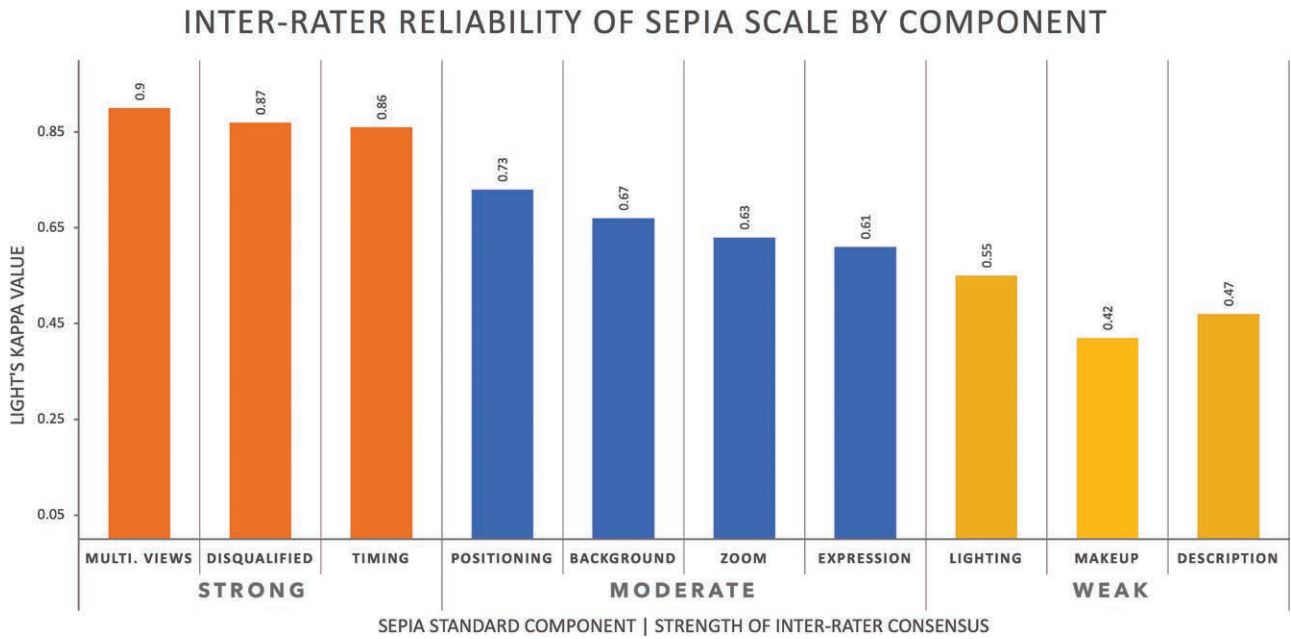


Fig. 5. Strength of interrater reliability for the SEPIA scoring system by component standard.



Fig. 6. A before and after composite photograph depicting the treatment of nasal tip bifidity before and after tip rhinoplasty published by George H. Monks, MD, in 1898, representing one of the first uses of photography to convey treatment outcomes in plastic surgery. Today, this composite photograph would receive a score of 5 of 9 on the SEPIA scale. Reprinted with permission from *Boston Med Surg J.* 1898:139:262.

photographs, issuance of multiple views, and the use of proper zoom and lighting. The significant difference in BAP quality between PRSS and non-PRSS practitioners identified in this study suggests that a lack of training in photography standards, long-established in plastic surgery, is also contributing to the lower quality of posts seen online, warranting consideration toward future educational outreach efforts on this issue.

In the present study, a significant proportion of audited posts featured photographs deemed as potentially

misleading (score = 0, 179/510) largely due to the use of immediate-only photographs (82%) and selfies (16%). These photographs represent the lowest standard of BAPs, depicting outcomes in a manner that is inaccurate, misleading, and possibly deceptive. The appearance of surgical outcomes on immediate/intraoperative photographs has long been considered unrepresentative of the final outcome, as tissue edema and subsequent posttreatment tissue changes, known to be impactful, have not had a chance to resolve or settle. Specifically, procedures, such

as rhinoplasty and filler augmentation of the lips, were most commonly associated with immediate photographs.

Although the use of intraoperative and immediate posttreatment photographs serves an important role in patient/trainee education, the absence of disclaimers or addition of nonimmediate photographs implies finality of results, misinforming the viewer. The need to continuously create content for SM promotes an approach that favors quantity over quality and may encourage the use of purposely deceptive and misleading content for the benefit of the practitioner while endangering susceptible audiences. Practitioners are urged to conduct a responsible self-audit, instituting the routine use of disclaimers to ensure that outcomes are not being misperceived by patients and to maximize the educational value offered to the viewer.³⁷ The enforcement of these standards, whether by existing boards and academies or online platforms hosting practitioner accounts, may be necessary to ensure that treatment transparency in advertisement is maintained.

Although this study is characterized by the largest sample size of photographs relative to similar studies to date and the application of an objective scoring system and grading scale for the specific purpose of BAP scoring, several weaknesses must be recognized. First, the exclusion of video content, though representative of only a fraction of treatment outcomes published online, deprives the study of an additionally valid form of visual documentation. Although videography, with its ability to capture the dynamic motions of facial expression, is slated to eventually become the standard form of visual documentation in plastic surgery, less than 10% of surgeons report the routine use of video, citing barriers such as the lack of standards and time-consuming process.³⁸ Second, though the SEPIA score demonstrated a favorable overall degree of interrater reliability, weaker agreement in the categories of lighting, makeup, and procedure description suggests that additional enhancements could be made in the future by further strengthening the rating guidelines for these components. Finally, though the SEPIA scoring system uses well-known standards of photography, the grading scale may benefit from additional external validation studies correlating SEPIA grades to surgeon perceptions of BAP quality.

CONCLUSIONS

Photography has long been held as a standard of visual documentation for surgical outcomes in plastic surgery. This study, the largest qualitative analysis of photographs depicting treatment outcomes in facial plastic surgery and aesthetic medicine, suggests that adherence to well-established photography standards is low among the majority of US practitioners on SM. The SEPIA scoring system introduced in this study outlines specific areas that would benefit from improved adherence by practitioners of all specializations and offers a potential tool for future qualitative assessment of before and after photographs.

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