

# The Impact of COVID-19 on Patient Interest in Facial Plastic Surgery

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**Background:** The coronavirus disease 2019 (COVID-19) pandemic has led to an unforeseen surge in demand for facial plastic surgery (FPS). The objective of this study was to survey patients who pursued cosmetic FPS during COVID-19 to better understand how changes in lifestyle, digital media usage, and their facial self-image influenced their decision to pursue surgery.

**Methods:** A web-based survey was sent to 150 patients who had undergone FPS at an outpatient clinic between May 1 and July 30, 2020. Questions included changes in patients' lifestyle habits, use of video conferencing and social media, Likert scale ratings of motivational factors to pursue FPS, and changes in perception of their own facial aesthetics during COVID-19.

**Results:** The survey response rate was 41%. Overall increases in video conferencing for social (79% of respondents) and occupational (73%) purposes, and social media usage (82%) were noted. The most commonly cited motivating factors to pursue FPS during COVID-19 were having ample privacy from family, friends, and co-workers (77%) and not requiring extended leave of absence from work (69%) during the postoperative recovery period. Patients were more aware of their nose than any other facial feature during COVID-19 compared to prior.

**Conclusions:** The popularity of FPS during COVID-19 can be partially attributed to increased usage of video conferencing and social media, digital applications which often accentuate personal and idealized facial aesthetics. As surgeons adjust to increased demand for FPS, a better understanding of patient perspectives and motivations can help optimize doctor–patient relations and the delivery of care. (*Plast Reconstr Surg Glob Open* 2021;9:e3890; doi: [10.1097/GOX.0000000000003890](https://doi.org/10.1097/GOX.0000000000003890); Published online 22 October 2021.)

## INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic has had an extraordinary impact on regional and national public health infrastructures while affecting nearly every facet of our daily lives. In March 2020, most North American medical regulatory agencies and organizations, including the American Academy of Facial Plastic and Reconstructive Surgery, issued recommendations to cease all non-essential and elective services at public or corporate health care facilities.<sup>1</sup> These statements were

soon followed by similar directives from local and national governments, resulting in closure of aesthetic facial plastic surgery (FPS) practices during the initial phases of the COVID-19 pandemic. Although the FPS industry faced unprecedented barriers during early COVID-19 stages, public adaptation of stay-at-home measures incidentally precipitated changes in individuals' facial self-image and interest in FPS.

As governmental restrictions on elective medical care were gradually lifted, there has been a global surge in cosmetic surgery.<sup>2-5</sup> However, reports of contributing factors to this phenomenon are largely anecdotal and little is understood about the psychology of prospective FPS patients during COVID-19. A paradigm shift in public safety measures has resulted in a large proportion of citizens working remotely from home and utilizing video conferencing for occupational or social communication.

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Numerous media and scientific reports highlight the effect of video conferencing and self-facing cameras on perception of one's facial appearance.<sup>6-8</sup> Meanwhile, COVID-19 has led to increased usage of social media, the effects of which on facial and body self-image have been well documented.<sup>9</sup> These factors, in addition to lifestyle changes such as ubiquitous face mask usage, altered dietary and exercise habits and extended at-home recovery time, have undoubtedly contributed to patients' decision-making processes and changed the landscape of FPS.

Although the COVID-19 boom in plastic surgery has been widely described by digital media sources, there are no studies in the medical literature which directly survey patients who pursued FPS during the pandemic to better understand this phenomenon. This is the first study to objectively report how COVID-19 has changed patients' perception of their facial aesthetics, their self-education on FPS procedures and their motivations to undergo FPS. With increased understanding of the patient influences and psychology, surgeons may be able to better stratify potential candidates for FPS, improve patient education and optimize delivery of care during COVID-19 and beyond.

## MATERIALS AND METHODS

The design and methodology of this study were completed in accordance with the World Medical Association Declaration of Helsinki and in compliance with the Health Insurance Portability and Accountability Act. The study sample was drawn from the practice of a single facial plastic and reconstructive surgeon based at a private surgery clinic in Toronto, Ontario (Canada). The inclusion criteria encompassed all patients who had undergone cosmetic FPS under general anesthesia between the dates of May 26, 2020, and September 1, 2020. Patients undergoing nonsurgical procedures (eg, neuromodulator or injectable filler) or minor procedures under local anesthesia or intravenous sedation were excluded. Informed consent was obtained from all responders to participate in the research study.

A web-based survey (Google Forms; Google LLC, Calif.) was emailed to 150 patients (Table 1). Follow-up emails were sent to nonresponders after 2 and 4 weeks. The survey included questions regarding the type of FPS undergone, changes in patients' lifestyle including usage of social media and video conferencing during COVID-19, changes in patient perception of their facial features, and motivations to pursue FPS during COVID-19. Additional questions were directed at patients' perceived risk of undergoing elective cosmetic surgery in an ambulatory surgery setting during a viral pandemic. All returned survey responses were deidentified for name and contact information upon receipt. Responders were assigned a numerical code which was linked to their data. The only patient demographics retained were age and gender identity.

Descriptive statistics were used to analyze demographics, response frequencies and individual query responses. Statistical analysis was performed using R (R Core Team).<sup>10</sup>

## RESULTS

The survey was delivered to 150 patients; 62 completed surveys were returned resulting in a 41% response rate. The response rates for rhinoplasty patients and facial rejuvenation patients (blepharoplasty, brow lift, facelift and/or neck lift) were 52% and 29%, respectively. The mean age of respondents was 31 years (range 16–64 y) and 53 (86%) respondents were female. The most common procedures undergone were rhinoplasty (77%), followed by facelift and neck lift (12%) and lip lift (12%). Patient demographics and description of procedures are outlined in Table 2. A post hoc power analysis based on the sample size was performed to determine the power to detect effect sizes (eg, small,  $w = 0.1$ ; medium,  $w = 0.3$ ; large,  $w = 0.5$ ) using the statistical tests employed in the data analysis. With a sample of 62 patients, an 80% power to detect medium and large effects ( $w = 0.356$ – $0.492$ ) was calculated.

### Lifestyle Changes

The data did not support the hypothesized trends for improvements in diet, lifestyle and increased budget for social or recreational purposes during COVID-19, whereas the hypothesized trends for increased social media and video conferencing were validated. Twenty-six patients (42%) reported decreased levels of exercise, whereas 43 patients (69%) reported a worse diet or no dietary changes during COVID-19. Only 17 (27%) patients reported an increase in personal budget; of these patients, only six reported that their increased budget was a motivating factor to pursue FPS.

Consistent with prior media reports, a vast majority of responders (82%; mean age 30 y) endorsed an increase (39%) or significant increase (42%) in social media usage during COVID-19. Of those respondents who had no change (mean age 38 y) or a decrease (34 y) in social media usage, we noted no significant differences in mean age. Forty-two (68%) respondents reported increased awareness of FPS procedures through social media, a perception which was significantly associated with the decision to pursue FPS ( $P = 0.02$ ). The respondents felt the most useful social medial platform to learn about FPS was Instagram (53 respondents, mean age 30 y; Facebook, Inc., Menlo Park, Calif.), followed by Facebook (three respondents, mean age 49 y; Facebook, Inc.) and TikTok (three respondents, mean age 23 y; ByteDance; Beijing, China). No significant associations were noted between the overall usage and average weekly duration of social media usage during COVID-19 and increased FPS knowledge through social media platforms (Table 3); analysis was performed by Fisher's exact tests. However, the type of social media network found most informative about FPS was significantly associated with gained FPS knowledge ( $n = 0.04$ ).

In the setting of social distancing and a large percentage of the general population working from home, 49 (79%) and 45 (73%) respondents reported increases in video conferencing for social and occupational purposes, respectively. However, the majority (55%) of patients reported spending less than 5 hours/week on video calls for both social and occupational purposes combined.

**Table 1. Survey Questions**

1. Age	
2. Gender	M/F/other
3. What surgery did you have during COVID-19? (check all that apply)	Hair transplant; brow lift; eyelid surgery; fat transfer/grafting; rhinoplasty; lip lift; buccal fat removal; facelift/neck lift; chemical peel/skin resurfacing
4. How did the following activities change for you during COVID-19? Video calls for social purposes Video calls for occupational purposes Level of exercise Recreational/personal budget Social media usage	Significantly decreased; decreased; no change; increased; significantly increased
5. Did your use of social media increase your awareness or knowledge about FPS treatments?	Y/N
6. Which social media platform did you find the most useful for learning about FPS?	Instagram; TikTok; Facebook; Twitter; not applicable
7. Was there any interruption or change to your routine nonsurgical maintenance/treatments for your face (eg, at-home skin care, facials, Botox, fillers)?	Y/N/N/A
8. Average number of hours spent per week on video calls (social and occupational)	<5; 5–10; 10–15; >15 h
9. Type of self-facing camera and accessories used (check all that apply)	Laptop webcam eye level; laptop webcam desk level (35–40 degree upward angle); smartphone/tablet; ring light or equivalent back lighting
10. Did usage of a self-facing camera or webcam cause you to notice displeasing facial features which you did not notice before?	Y/N/N/A
11. Did usage of a self-facing camera or webcam cause you to notice displeasing facial features which you were previously aware of?	Y/N/N/A
12. Did increased on-camera time influence you to pursue FPS?	Y/N/N/A
13. The following was/were motivational factors to pursue FPS during COVID-19: Working from home and/or self-isolation Extended time to heal and recover without requiring time off from employment Extended time to heal and recover to make postsurgical changes less noticeable to family, friends, or co-workers Universal usage of face masks in public Increased time on camera for social or work purposes Increased budget (less money spent on recreation or entertainment during COVID-19) New or heightened awareness of displeasing facial features from usage of a self-facing camera or webcam New or heightened awareness of displeasing facial features from social media usage	Y/N/N/A
14. Did the prolonged self-isolation and recovery time allow you to feel more comfortable with showing your face to friends, family, co-workers, or general public following surgery?	Y/N/N/A
15. Did you have an increased desire to pursue FPS during COVID-19 compared to before COVID-19?	Y/N/N/A
16. Overall, did you feel safe and comfortable coming to a surgery clinic to undergo FPS during COVID-19?	Uncomfortable; neutral; somewhat comfortable; very comfortable
17. How concerned were you with pursuing FPS during COVID-19?	Very concerned; concerned; slightly concerned; not concerned
18. During COVID-19 were you more or less aware of the following parts of your face? Hair Eyes and brows Nose Lips Lower face and neck	More aware; unchanged; less aware

N, no; N/A, not applicable; Y, yes.

**Table 2. Patient Demographics and Types of FPS Undergone**

	n (%)	Age, Mean (SD)
Gender		
Female	53 (85.5)	30.91 (10.71)
Male	8 (12.9)	35.0 (14.63)
Transgender	1 (1.6)	27
Type of surgery*		
Rhinoplasty	46 (74.2)	28.24 (7.97)
Facelift and neck lift	7 (11.3)	46.43 (15.39)
Blepharoplasty	5 (8.1)	56.00 (11.07)
Brow lift	4 (6.5)	48.25 (13.30)
Buccal fat excision	5 (8.1)	26.20 (2.77)
Lip lift	7 (11.3)	35.29 (8.40)
Fat grafting	3 (4.8)	61.00 (4.36)
Chemical peel	1 (1.6)	59.40 (4.34)
Hair transplant	4 (6.5)	38.25 (5.85)

\*Multiple surgeries may apply per patient.

Associations between lifestyle changes, video conferencing, and social media usage and having an increased desire to pursue FPS during COVID-19 were evaluated using Fisher’s exact tests (Table 4). Increased exposure and education in FPS through social media was found to be significantly associated with an increased desire to pursue FPS during COVID-19 (n < 0.02).

Associations between age and lifestyle variables were analyzed using Kruskal–Wallis tests by ranks. (See table, Supplemental Digital Content 1, which displays the associations between age and lifestyle changes, social media usage, and safety concerns during COVID-19. Analysis performed by Kruskal–Wallis tests by ranks. IQR, interquartile range, <http://links.lww.com/PRSGO/B828>.)

**Table 3. Associations between Social Media Usage (Frequency, Duration, and Platform) and Change in Awareness and Knowledge of FPS**

Variable	Change in FPS Awareness from Social Media Usage		P
	No Change (n = 20)	Increase (n = 42)	
Social media usage			0.307
Significantly decreased	7 (36.8)	19 (45.2)	
Decreased	0 (0.0)	3 (7.1)	
No change	4 (21.1)	3 (7.1)	
Increased	8 (42.1)	17 (40.5)	
No. of hours on social media			0.649
<5 h	11 (55.0)	23 (54.8)	
5-10 h	2 (10.0)	8 (19.0)	
10-15 h	2 (10.0)	5 (11.9)	
>15 h	5 (25.0)	6 (14.3)	
Social media network			0.042
Facebook	3 (17.6)	0 (0.0)	
Instagram	13 (76.5)	40 (95.2)	
TikTok	1 (5.9)	2 (4.8)	

Associations were tested using Fisher’s exact tests; counts are presented with column percentages.

No statistically significant associations were noted between respondent age and changes in video conferencing, social media usage, or lifestyle variables (eg, exercise, diet, and budget). With regards to changes in self-care during COVID-19 months, 21 patients reported an interruption in their routine nonsurgical maintenance of their face, of which 95% of these responders were female. Meanwhile, 63% of male responders indicated that they did not employ any routine skin care or nonsurgical treatments to their face.

**Patient Perceptions and Body Image**

As video conferencing for social and occupational communication increased globally during COVID-19, the effect of self-facing cameras on patients’ perception of their facial aesthetics was investigated. Thirty-five (56%) respondents noted that usage of a self-facing camera accentuated displeasing facial features which they were previously aware of, whereas 19 (31%) respondents acknowledged the discovery of new displeasing facial features. Associations between video conferencing usage and awareness of new or old displeasing facial features on camera image were evaluated using Fisher’s exact tests. (See table, Supplemental Digital Content 2, which displays associations between video conferencing for social and occupational purposes and webcam usage. Associations were tested using Fisher’s exact test. Counts are presented with column percentages, <http://links.lww.com/PRSGO/B828>.) Significant association was noted with usage of video conferencing for social purposes and awareness of video displeasing facial features on a self-facing camera (n = 0.05).

Patients were asked whether they had an increase or decrease in awareness of the appearance of specific facial subunits during COVID-19. The nose (56% of respondents) was the most commonly cited facial feature for which patients developed increased awareness, followed by the lips (44%) and the eyes-brow complex (39%). No significant associations were noted between specific

**Table 4. Associations between Change in Desire to Pursue FPS during COVID-19 and Lifestyle Changes, Social Media Usage, and Awareness of Facial Features**

Variable	Increased Desire to Pursue FPS during COVID-19		P
	No (n = 26)	Yes (n = 36)	
Lifestyle changes during COVID-19			
Video conferencing, social			0.464
Significantly decreased	0 (0.0)	1 (2.8)	
Decreased	2 (8.0)	0 (0.0)	
No change	4 (16.0)	5 (13.9)	
Increased	9 (36.0)	12 (33.3)	
Significantly increased	10 (40.0)	18 (50.0)	
Video conferencing, occupational			0.472
Decreased	2 (8.3)	0 (0.0)	
No change	4 (16.7)	8 (22.9)	
Increased	7 (29.2)	11 (31.4)	
Significantly increased	11 (45.8)	16 (45.7)	
Level of exercise			0.076
Significantly decreased	4 (15.4)	5 (13.9)	
Decreased	9 (34.6)	8 (22.2)	
No change	9 (34.6)	6 (16.7)	
Increased	3 (11.5)	15 (41.7)	
Significantly increased	1 (3.8)	2 (5.6)	
Maintenance of a healthy diet			0.717
Significantly decreased	4 (16.0)	2 (5.6)	
Decreased	6 (24.0)	8 (22.2)	
No change	9 (36.0)	13 (36.1)	
Increased	5 (20.0)	10 (27.8)	
Significantly increased	1 (4.0)	3 (8.3)	
Personal budget (recreational)			0.104
Significantly decreased	4 (16.7)	1 (2.9)	
Decreased	7 (29.2)	8 (22.9)	
No change	7 (29.2)	15 (42.9)	
Increased	3 (12.5)	10 (28.6)	
Significantly increased	3 (12.5)	1 (2.9)	
Social media usage			0.790
Significantly decreased			
Decreased	2 (8.0)	1 (2.8)	
No change	3 (12.0)	4 (11.1)	
Increased	9 (36.0)	16 (44.4)	
Significantly increased	11 (44.0)	15 (41.7)	
No. of hours on social media			0.901
<5 h	15 (57.7)	19 (52.8)	
5-10 h	3 (11.5)	7 (19.4)	
10-15 h	3 (11.5)	4 (11.1)	
>15 h	5 (19.2)	6 (16.7)	
Increased awareness of FPS via social media (yes)	13 (50.0)	29 (80.6)	0.015
Awareness of facial features during COVID-19			
Hair			0.001
Less aware	0 (0.0)	1 (2.8)	
More aware	2 (7.7)	17 (47.2)	
Unchanged	24 (92.3)	18 (50.0)	
Eyes and brows			0.099
Less aware	0 (0.0)	2 (5.6)	
More aware	7 (26.9)	17 (47.2)	
Unchanged	19 (73.1)	17 (47.2)	
Nose			0.192
Less aware	0 (0.0)	1 (2.8)	
More aware	12 (46.2)	23 (63.9)	
Unchanged	14 (53.8)	12 (33.3)	
Lips			0.015
Less aware	2 (8.0)	1 (2.8)	
More aware	6 (24.0)	21 (58.3)	
Unchanged	17 (68.0)	14 (38.9)	
Lower face and neck			0.551
Less aware	2 (7.7)	1 (2.9)	
More aware	7 (26.9)	13 (38.2)	
Unchanged	17 (65.4)	20 (58.8)	

Associations were tested using Fisher’s exact tests; counts are presented with column percentages.

type of camera and lighting used for video conferencing and awareness of new or previously known displeasing facial features and specific facial subunits; analysis was

performed using Fisher's exact tests given the smaller sample size in some groups. (See table, **Supplemental Digital Content 3**, which displays associations between type of video conferencing equipment used and motivation to pursue FPS, changes in facial perception and facial subunit noticed. Associations were tested using Fisher's exact tests, <http://links.lww.com/PRSGO/B828>.)

#### Motivations to Pursue FPS

Overall, 58% of respondents reported an increased desire to pursue FPS during COVID-19 compared to before the pandemic. A series of Likert scale questions were presented to identify patients' personal motivations to pursue FPS (Table 1). The most commonly cited influential factors were having extended recovery time to isolate from family, friends and co-workers (48 respondents, 77%) and the ability to recover without taking extended leave of absence from the workplace (42 respondents, 69%), highlighting the advantages of social isolation. Despite greater utilization of video conferencing among the majority of respondents, only nine respondents reported on-camera time to be a motivational factor to pursue FPS, whereas 32 respondents (52%) were neutral on this matter.

With ever-evolving public health and governmental regulations on COVID-19 safety measures in public spaces or workplaces, patients' perception of risk associated with elective FPS was investigated. Although 51% of respondents expressed some degree of concern with regard to the safety of undergoing FPS during the COVID-19 pandemic, this did not prove to be a limiting factor in the ultimate decision to pursue surgery. Seventy-nine percent of respondents indicated that they were "very comfortable" undergoing FPS at an ambulatory surgery clinic.

## DISCUSSION

The surge in FPS during the COVID-19 pandemic has brought to light new lifestyle and psychological factors which may influence patients to seek FPS. As society settles into a "new normal" and many FPS practices adapt to increases in clinical volume, data on the effect of self-isolation on patients' facial self-image and their interest in surgery is lacking. This study aims to objectively identify factors which may consciously or subconsciously influence prospective FPS patients during COVID-19, with the overarching purpose to help facial plastic surgeons better understand their patients' psychology, influences, and goals.

A recent survey by the American Society of Plastic Surgeons sent to over 1000 consumers found that 49% of responders who had not previously undergone plastic surgery were now considering plastic surgery of the face or body during the COVID-19 pandemic.<sup>11</sup> Comparatively, 58% of respondents in the present study reported an increased desire to pursue FPS during COVID-19 compared to pre-pandemic times. Acknowledging a selection bias targeting individuals who chose to undergo FPS during COVID-19, the data in this study nonetheless suggest that societal emphasis on optimizing one's facial appearance may be greater than ever.

The surge in video conferencing for social and occupational purposes during COVID-19 has placed a spotlight on facial aesthetics. Self-facing cameras generally isolate the face and neck within the optical field, with less focus on a subject's overall physique and body language. Consequently, individuals using video conferencing as a primary method of communication now rely heavily on their facial appearance to convey messages and emotions, as well as a means to portray youthfulness, energy, and mental and physical health. In this study, 79% and 73% of respondents reported increased usage of video conferencing during COVID-19 for social and occupational purposes, respectively. Cristel et al<sup>6</sup> surveyed 158 former and current patients in a FPS practice, regardless of surgical history during COVID-19, and noted that video conferencing usage spiked from 74% of respondents before COVID-19 to 100% of respondents during the pandemic. With increased on-camera time during COVID-19, patients are conceivably spending more time analyzing their face and contemplating nonsurgical and surgical means to enhance their facial features. Meanwhile, the usage of filters and face tuning applications to digitally modify facial features are becoming increasingly popular, as well as camera and lighting tricks to optimize presentation of the face. Numerous media articles and application websites have recently described digital techniques for enhancing one's facial appearance during video conferencing.<sup>12,13</sup> With consistent digital editing of facial features and structure, an individual's virtual or social media appearance may assume a new standard, compelling them to seek FPS to achieve this look.<sup>14,15</sup>

One particularly intriguing transpiration of COVID-19 is the transformation of one's facial self-image with increased use of self-facing cameras. The optical distortion of facial features, particularly of the nose, from self-facing cameras has been described.<sup>7,8</sup> Furthermore, an individual's facial self-image is traditionally based on the appearance of their face in a mirror. Described as the "mere exposure effect," following repeated visual stimuli of their reflection in a mirror, the subject grows accustomed and preferential to their mirror image, subconsciously identifying a "good side" and believing that this is the likeness which others see.<sup>16</sup> Self-facing cameras, however, laterally invert the mirror image to show the subject the true perspective of the viewer. During COVID-19, individuals are now increasingly exposed to the camera image of their face and may begin noticing facial asymmetries and their perceived good side from the reverse perspective. Although a minority of patients in this study cited video conferencing as a primary motivating factor to pursue FPS, self-facing cameras were noted to accentuate known (56%) or reveal new (31%) displeasing facial features in many patients, suggesting a subconscious alteration in facial self-image with increased video conferencing. Our results demonstrate a statistically significant correlation between increased video conferencing usage for social purposes and discovery of new displeasing facial features on the camera image (See table, **Supplemental Digital Content 2**, which displays associations between video conferencing for social and occupational purposes and webcam usage. Associations were tested using Fisher's

exact test. Counts are presented with column percentages, <http://links.lww.com/PRSGO/B828>). Further positive correlations between social or occupational video conferencing and heightened awareness of facial aesthetics were noted (eg, increased on-camera times as a motivational factor to pursue FPS); however, statistical power was lacking to demonstrate significant associations.

The data demonstrated that the majority of patients had a decrease or no change in their diet, exercise regimen, and healthy eating habits, thus contradicting our hypotheses. These findings, in addition to 34% of patients reporting an interruption in their routine skin care and 16% of patients denying any regular skin care, reflect that many patients actually had decreased their self-care efforts, perhaps further motivating them to pursue FPS.

The need for adequate postoperative recovery time, extended leave of absence from work, and overall privacy can be major deterrents for patients considering FPS. Recovery from certain FPS procedures may require weeks to months before signs of surgery are inconspicuous and patients feel secure with their facial appearance in public. Furthermore, despite the increasing popularity and societal acceptance of FPS, cosmetic surgery can still be stigmatized in certain occupational, socioeconomic, or cultural groups.<sup>17</sup> The results of his study substantiate that societal changes during COVID-19, including self-isolation and work-from-home arrangements (53% of respondents agree or strongly agree), unneeded leave of absence from work (68%), and maintaining privacy from colleagues, friends, and family (77%), were all strong motivators to pursue FPS. The authors hypothesized that the universal use of facemasks would provide further incentive for patients to pursue FPS, allowing them to comfortably be in public while concealing early tell-tale signs of surgery. However, the respondents were evenly split between favoring universal masking as a motivational factor (44% agree or strongly agree) or neutral to the issue (44%). In our anecdotal experience, during postoperative encounters, the vast majority of patients endorse the benefits of universal face masking. Hence, although face masking may not be a primary determining factor to pursue FPS, it is generally a favorable afterthought or bonus for patients following their surgery.

With phased reopening of elective medical clinics, policymakers and physician committees alike have released recommendations for COVID-19 safety protocols for outpatient and perioperative settings. However, with regulations constantly changing in correlation with overall disease control, maintaining compliance with evolving protocols remains a challenge for FPS providers. Meanwhile, FPS providers and their patients face higher risk of COVID-19 exposure given the increased viral load in the upper aerodigestive tract and the need to perform physical examinations and procedures of the face and/or airway.<sup>18</sup> Telemedicine has gained popularity as a practical solution during COVID-19 and has been associated with improved access to health care and more optimal patient–doctor communication without the need for face coverings.<sup>19</sup> Our data demonstrate that, among patients who underwent FPS during COVID-19, 79% of respondents felt “very comfortable” undergoing surgery at an outpatient surgery clinic. Methods to share COVID-19

safety measures such as social media posts or detailed information within email communications or a practice website are helpful for patients to feel safe pursuing elective surgery and to build trust in their providers.

There are certain limitations associated with this study. A larger proportion of nonresponders underwent facial rejuvenation surgery for advanced aging excluding buccal fat excision, lip lift, and hair transplant (nonresponder rate 71%; mean age 48 years) as compared to rhinoplasty (nonresponder rate 29%, mean age 28 years). This older subset of patients may have had less access to email or may have been less capable of completing an electronic survey as opposed to a telephone or mail survey. All survey respondents had already undergone FPS during COVID-19, thus creating a selection bias which did not represent the general population of individuals considering FPS. Hence, certain responses, such as perception of safety standards, were possibly biased toward positive associations with FPS. Additionally, given the sample size (62 patients), certain univariate analyses using Fisher’s exact test may have lacked statistical power to demonstrate significant associations. A larger sample size would permit statistical analysis using less conservative testing methods (eg, chi-squared test) and perhaps reveal further associations between variables.

Future directions for this area of study would focus on surveying a broader population of individuals who underwent an FPS consultation during COVID-19, including those who decided not to proceed with surgery. This may help FPS providers better understand patient concerns related to COVID-19 and identify areas where doctor–patient communication and patient education can be improved to help prospective patients feel more comfortable pursuing surgery. Furthermore, a survey of FPS providers would help highlight logistical and regulatory challenges faced by facial plastic surgeons during COVID-19 and help surgeons share methods to optimize patient satisfaction and their delivery of care.

## CONCLUSIONS

The COVID-19 pandemic has led to an unprecedented surge in interest and demand for FPS. This study objectively evaluates lifestyle and psychological variables contributing to patients’ decision to undergo FPS during COVID-19. With increased usage of social media and video conferencing leading to changes in facial self-image and public self-isolation measures enabling extended postoperative recovery periods, patients are seeking FPS now more than ever before. It is imperative that this increased demand in FPS is met with improved understanding of patient influences, optimization of patient–doctor communication, and maintenance of high safety standards for patients and providers alike.

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