

Residency Training Pathways of Program Directors and Chiefs/Chairs in Plastic Surgery

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Background: Medical students interested in plastic surgery may become discouraged by barriers to career development during residency training. This study surveyed plastic surgery program directors (PDs) and chiefs/chairs to highlight the pathway followed by academic leaders in these positions.

Methods: A self-administered anonymous survey was sent to a list of 189 PDs and chiefs/chairs identified via plastic surgery residency programs' websites. Chi-squared tests assessed answer distributions.

Results: Of the 189 recipients (25.9%), 49 completed the survey. Respondents' medical school graduation range was 1973–2009. Seventeen respondents entered a plastic surgery residency directly after medical school, and 32 began in another specialty. Comparison between these two groups showed no significant differences in preference rank of their program ($P = 0.671$). A total of 18 respondents conducted an academic enrichment year, but timing of this year differed significantly based on the initial specialty match ($P = 0.012$). There was no significant perceived difficulty in gaining recognition by gender ($P = 0.107$) or race ($P = 0.125$). Six respondents did not match into the specialty of first choice; five did not complete their initial residency programs; three did not match into plastic surgery at first attempt.

Conclusions: Information on residency training pathways and barriers to career development of current academic leaders will improve transparency as to potential stumbling blocks that current PDs and chief/chairs of plastic surgery residency programs have faced during their initial training. This will help current trainees anticipate these stumbling blocks and place these in perspective based on the experience of senior plastic surgeons. (*Plast Reconstr Surg Glob Open* 2023; 11:e5253; doi: 10.1097/GOX.0000000000005253; Published online 15 September 2023.)

INTRODUCTION

Plastic and reconstructive surgery (plastic surgery) has become the most competitive specialty according to National Resident Matching Program, in which integrated residency programs had 1.7 applicants per spot in 2022.¹ Although plastic surgery is a highly coveted specialty, US medical students' exposure to plastic surgery is highly variable because plastic surgery is an elective rotation that is not offered by all medical schools. Consequently, ill-informed decisions are often made about which residency career pathway to take to become a plastic surgeon.

Although other specialties have a more straightforward career pathway, medical school advisors are less knowledgeable about the options for plastic surgery, and therefore, are not able to guide potential applicants to plastic surgery residency programs as effectively. This is especially true in primary care institutions, which have less experience advising applications into competitive surgical specialties such as plastic surgery.² As such, medical students are largely responsible for educating themselves on their options should they have an interest in pursuing a residency program in plastic surgery.

Given the surge of integrated plastic surgery programs, medical students are increasingly electing to apply to these programs directly out of medical school;³ however, this option often requires demonstrated dedication to plastic surgery early on during medical school.⁴ Alternatively,

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independent programs are offered to residents who began a different surgical specialty training after medical school, and subsequently choose to specialize in plastic surgery.⁵ A recent study done in 2018 analyzed training pathways of 924 academic plastic surgeons. The authors found that 22% graduated from integrated residency programs and 78% graduated from independent residency programs.⁶ Independent graduates had significantly greater funding from the National Institute of Health and were more likely to have a full professor position, whereas integrated graduates required shorter postresidency time to reach their academic positions and were more likely to be a fellowship director.^{4,7,8} Although these findings may be due in part to the historical paucity of integrated training programs compared with independent programs, when our leaders completed their training, they emphasize that residency training pathways influence research output, qualifications, and future academic positions. Therefore, medical students should be made aware of these differences when planning their careers.^{9,10}

Academic leadership spans multiple venues to include grant funding, publication history, leadership within organized societies, leadership in the credentialing and certification of plastic surgeons, and leadership within plastic surgery education. The present study focused on the career pathway of leaders within plastic surgery education who are currently serving as program directors (PDs), chiefs, or chairs of independent or integrated training programs in plastic surgery. We realize that this does not reflect all leaders in plastic surgery education, as these titles do not define the “best teacher” in any residency program, as demonstrated by best teacher awards based on resident selection at graduation. However, we chose to focus on PDs, chiefs, and chairs of plastic surgery residency programs, as this is a group of leaders in plastic surgery education who can clearly be identified within each program. Although having an alternative plan in the case that one may not match into their top-choice residency is important, medical students should also be aware of the various training pathways that lead to similar leadership positions within plastic surgery.^{11,12} The present survey study investigates numerous factors, including demographic diversity and training pathway completed, and asks the respondents to provide subjective perceptions of difficulty that these factors may have played in their career development. By demonstrating the barriers to career development that current PDs/chiefs/chairs experienced during residency, future surgeons who aspire to leadership roles within plastic surgery may have more realistic expectations of their upcoming career development and may therefore be less likely to be dissuaded from persevering in their goals when barriers are encountered.

METHODS

A 28-item anonymous survey was developed with a focus group of plastic surgery attendings, residents, and medical students (See survey, Supplemental Digital Content 1, which displays the questionnaire used in the study. <http://links.lww.com/PRSGO/C779>). The survey was sent out

Takeaways

Question: Is there a variety in training pathways among academic leadership in plastic surgery?

Findings: There is a good representation of independent and integrated program trainees, with a variety of pathways that led to the final program.

Meaning: Information on residency training pathways and hardships of current academic leaders will improve transparency and will help current trainees or medical students develop realistic career plans.

twice in September 2022 to the program directors and chairs/chiefs of all US integrated and independent plastic surgery programs (n = 189). Survey testing was performed by surgeons and medical students from multiple institutions to ensure validity. The survey was exempted from full review by the Northwestern University institutional review board. All data were collected in a deidentified manner, and no IP addresses, locations, or emails were collected. No information on the location of the medical school or current job of the respondent was collected.

Demographic information was collected on race/ethnicity, gender, and physical stature. If respondents did not identify as men, White, or having an average or above average physical stature, they were asked about their perceived difficulty gaining recognition for their achievements. Questions asked respondents about the specialty they matched after medical school, their rank list as applicants, whether and when they took a research year(s), pathways after an unsuccessful match, pathways to plastic surgery residency if it was not the initial specialty, and whether respondents transferred between the programs.

Descriptive statistics were used to analyze the different training pathways taken by respondents. Chi-squared analyses determined significant associations between categorical variables. Linear regression was performed to analyze the prevalence of integrated plastic surgery program trainees. SPSS was used to conduct statistical analyses.¹³ Significance was determined at a *P* value less than 0.05.

RESULTS

Forty-nine of the 189 (25.9%) PDs, chairs, or chiefs of plastic surgery residency programs completed the survey. Gender responses included 34 (69%) male, nine (18%) female, and one (2%) nonbinary person; six (12%) preferred not to describe their gender. Race/ethnicity responses included 34 (69%) White, one (2%) Hispanic, one (2%) Black/African American, six (12%) Asian/Pacific Islander, one (2%) person who reported to be of multiple ethnicities, and seven (14%) who preferred not to answer. When asked about perceived stature, four (8%) respondents responded “below average”; 21 (43%), “average”; 17 (34%), “above average”; and five (10%) preferred not to answer. Seventeen (34%) respondents entered an integrated plastic surgery residency directly after medical school (direct pathway), and 32 (65%) followed an indirect pathway by starting in another specialty.

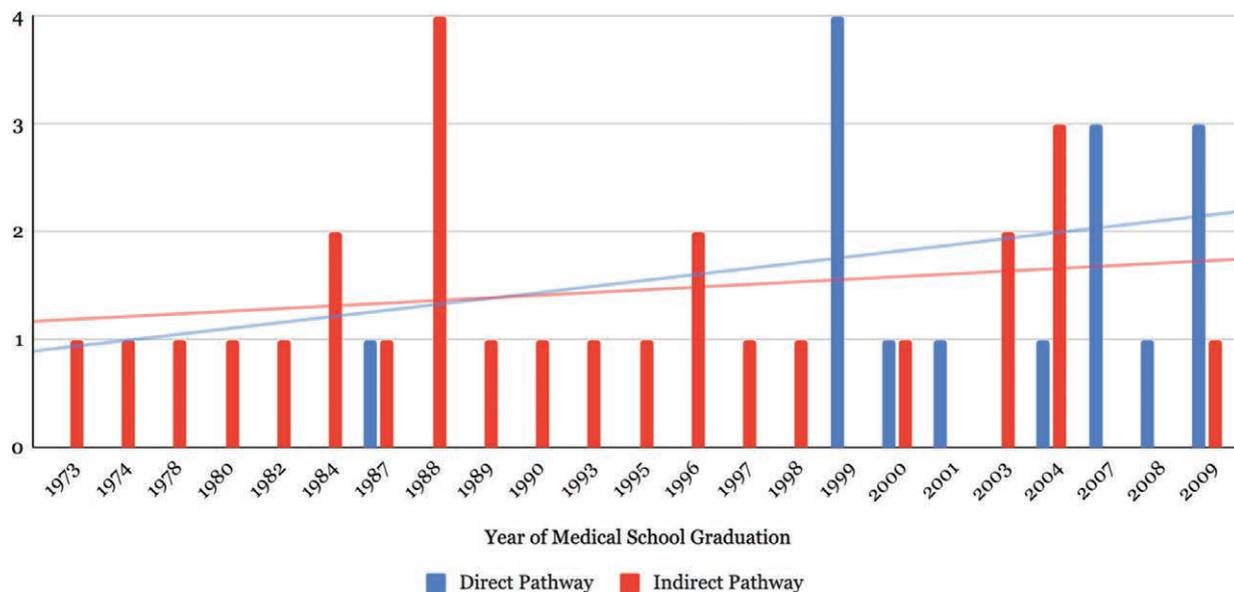


Fig. 1. Number of respondents completing direct vs indirect pathways by year of graduation from medical school.

Of those who started in another specialty, 29 (91%) began their training in general surgery, one (3%) began in oral and maxillofacial surgery, one (3%) began in ophthalmology, and one (3%) began elsewhere. One (6%) respondent from the direct pathway group was an international medical graduate (IMG), whereas five (16%) respondents from the indirect pathway group were IMGs. Respondents' medical school graduation year range was 1973–2009. Median year of medical school graduation by the respondents from the indirect pathway group was 1990. Median year of medical school graduation by the direct pathway group was 2004 (Fig. 1).

Of the 10 nonmale respondents, seven (70%) reported perceived difficulty in gaining recognition compared with their male colleagues, but three (30%) did not ($P = 0.107$; Fig. 2). Of the nine non-White respondents, two (22%) reported perceived difficulty in gaining recognition compared with their White colleagues, but six (67%) did not, and one (11%) chose not to answer ($P = 0.125$; Fig. 3). Only four respondents perceived their stature to be below average; one (25%) reported perceived difficulty in gaining recognition compared with their taller colleagues, two (50%) did not, and one (25%) chose not to answer.

There were a variety of residency training pathways among respondents. Seventeen (34%) of the respondents matched into integrated plastic surgery at first attempt and did not transfer between programs (direct pathway group). The remaining 32 (65%) respondents either matched into a residency program other than the integrated plastic surgery residency or transferred residency programs before completion of plastic surgery training (indirect pathway group). Twenty-six (81%) of the indirect pathway group reported the nonplastic surgery specialty in which they began their residency to be their first choice at the time, and six (19%) reported that their initial residency was not their specialty of choice.

Five (16%) of those in the indirect pathway did not complete their initial nonplastic surgery programs, and all of them transferred to independent plastic surgery programs. Twenty-seven (84%) of those in the indirect pathway completed their nonplastic surgery programs; 23 (85%) of these respondents matched into independent plastic surgery programs, one (4%) went into an integrated plastic surgery program, and three (11%) did not match into plastic surgery at first attempt. The latter group successfully matched after an academic enrichment year, two (67%) of them matching into independent programs, and one (33%) going into an integrated program (Fig. 4).

When comparing those in the direct and indirect pathway groups, no significant difference was observed in the distribution of countries in which they attended medical school, with 16 (94%) from the direct pathway group and 27 (84%) from the indirect pathway having graduated from a US-based medical school ($P = 0.322$). Twelve (71%) respondents from the direct pathway group and 18 (60%) from the indirect pathway group matched into their first-choice residency programs (Table 1; $P = 0.671$). Seven (41%) respondents from the direct pathway group chose to do an academic enrichment/research year, with a majority (4; 57%) conducting it during medical school, whereas 11 (34%) from the indirect pathway group chose to do an academic enrichment/research year, with a majority (10; 91%) conducting it during or after residency (Table 2; $P = 0.012$). Ten (62.5%) respondents of the direct pathway group dual-applied to other specialties, whereas three (11%) from the indirect pathway group dual-applied (Table 3; $P < 0.01$). Out of those who graduated medical school before 2000, more respondents (20 of 25; 80%) started in nonplastic surgery residency, and respondents that graduated after or in 2000 mostly started in an integrated plastic surgery program (10 of 17; 59%); however, the

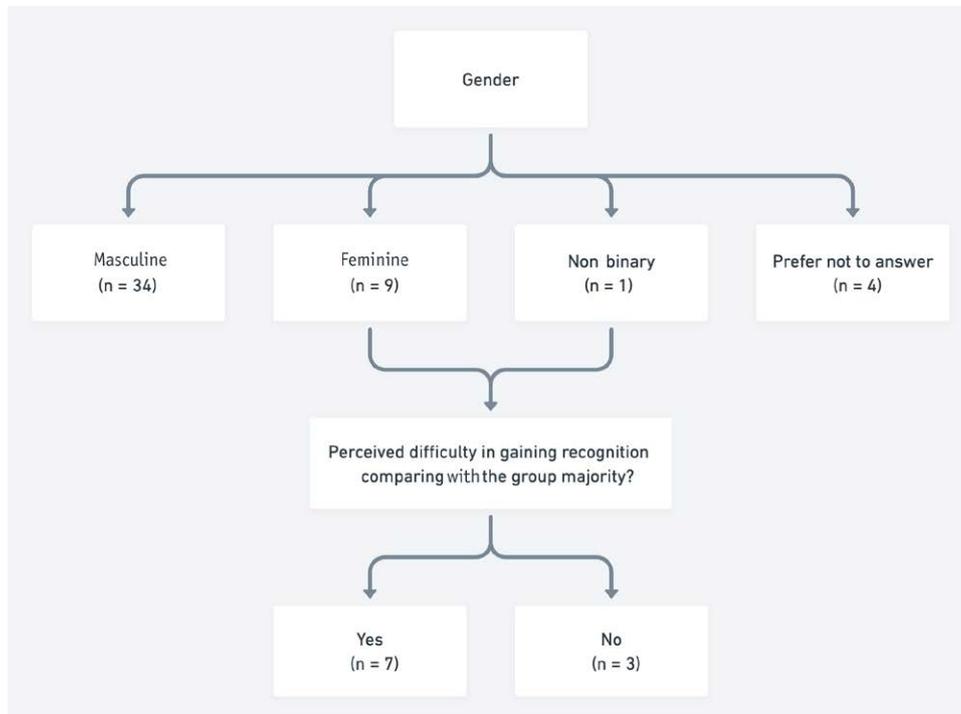


Fig. 2. Demographic distribution of respondents by gender and their perceived difficulty in gaining recognition.

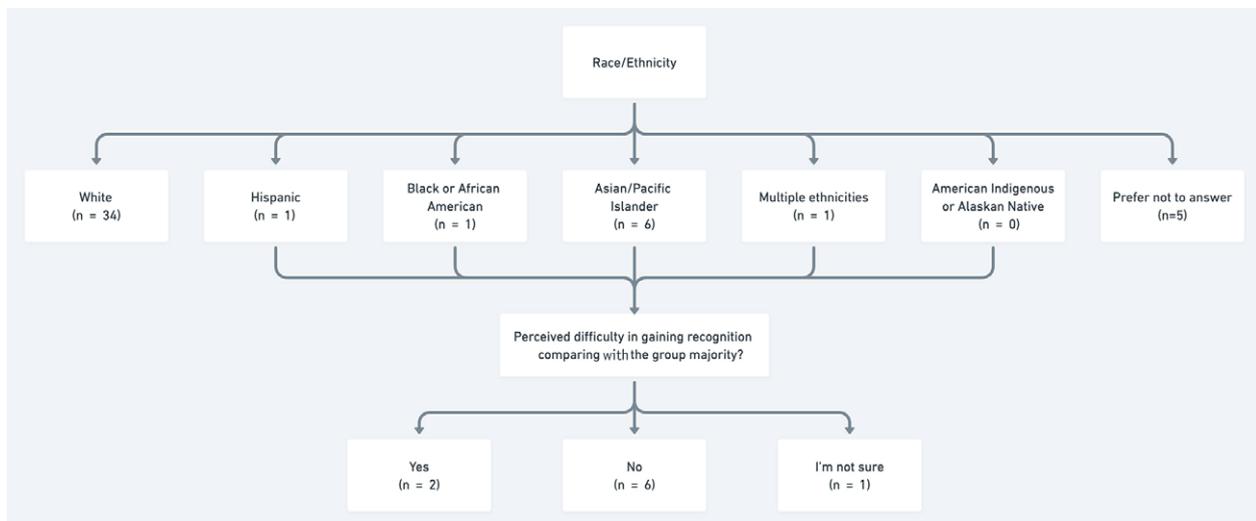


Fig. 3. Demographic distribution of respondents by race/ethnicity and their perceived difficulty in gaining recognition.

distribution shift was not significant ($P = 0.107$). Linear regression analysis predictably demonstrated a significant positive correlation between year of graduation and number of respondents having gone to integrated plastic surgery programs ($P < 0.01$, $r^2 = 0.309$).

DISCUSSION

There are different residency training pathways beyond matching into the increasingly popular integrated

plastic surgery program directly after medical school. This study elucidated the varied pathways taken by current PDs, chairs, or chiefs, of plastic surgery residency programs. Results revealed that some respondents reached their end goal through other pathways, such as starting with a nonplastic surgery residency or taking academic enrichment/research years. Respondents from indirect and direct pathways did not differ in the distribution in the country of medical school. This shows that training in the United States has no bearing on a particular path for

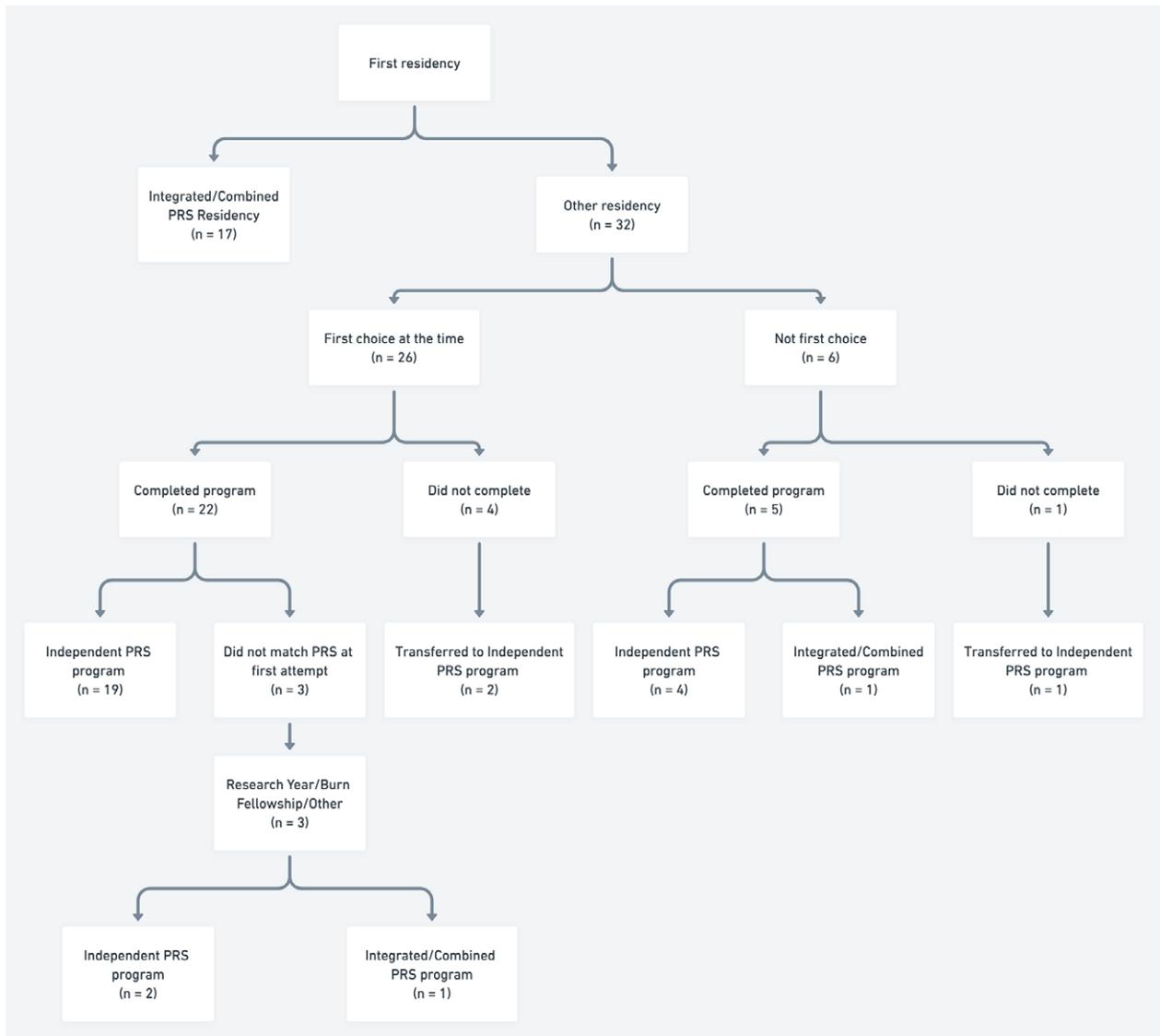


Fig. 4. Variety of residency training pathways of respondents.

Table 1. Applicants' Rank of Matched Plastic Surgery Program in Direct versus Indirect Pathway Groups

		Integrated Plastic Surgery: Direct Pathway	Other Residency: Indirect Pathway	P
Applicants' rank of matched plastic surgery program	# 1	12 (70.59%)	18 (60.00%)	0.671
	# 2–4	4 (23.53%)	8 (26.66%)	
	# 5 or greater	1 (5.88%)	4 (13.33%)	
	Total	17 (100%)	30 (100%)	

pursuing plastic surgery as a career. Between the direct and indirect pathway groups, there were similar distributions in respondents' rank lists of plastic surgery programs at the time of applying, with the majority of both groups matching into their first choices. This is evidence that either pathway does not hold an advantage in matching into preferred programs.^{7,11,14,15} Although most people in the direct pathway group took a research year during medical school, respondents from the indirect pathway group predominantly took it during and after residency.

This result is consistent with previous studies that demonstrated that applicants with completed research fellowships were more likely to match into plastic surgery, partially due to a greater number of publications.^{16–18} However, fewer people from the indirect pathway group completed a research year. This is also consistent with the fact that independent residency applicants tend to have fewer preresidency publications.^{14,19}

A large number of our respondents who followed an indirect pathway matched into their first-choice specialty

Table 2. Timing of an Academic Enrichment Year in Direct versus Indirect Pathway Groups

	Integrated Plastic Surgery: Direct Pathway	Other Residency: Indirect Pathway	P
Time of academic enrichment/ research year	During medical school	4 (23.53%)	1 (3.12%)
	Between medical school and residency	1 (5.88%)	0 (0%)
	During residency	2 (11.76%)	5 (15.63%)
	After residency	0 (0%)	5 (15.63%)
	Did not do research year	10 (58.82%)	21 (65.62%)
	Total	17 (100%)	32 (100%)

Table 3. Dual Application among Respondents from Direct versus Indirect Pathway Groups

	Integrated Plastic Surgery: Direct Pathway	Other Residency: Indirect Pathway	P
Dual-applied	10 (62.50%)	3 (11.11%)	
Did not dual-apply	6 (37.50%)	24 (88.89%)	
Total	16 (100%)	27 (100%)	<0.01

at the time and proceeded with plastic surgery training later. Given that most people in this group also subsequently matched into their first-choice plastic surgery programs, it is likely that these applicants were already strong candidates from medical school and possessed a high level of intrinsic motivation and perseverance throughout their initial residency. Historical predominance of independent plastic surgery programs before 2000 with a gradual shift from independent to integrated plastic surgery programs thereafter may also explain these results. The number of integrated positions has surpassed the number of independent positions in 2014.^{6,11,15} The general trend of plastic surgery training reflects this change, with the number of integrated positions increasing every year (91 programs offering 207 positions in 2023) and number of independent positions decreasing every year (36 programs offering 57 positions in 2022), as a greater number of academic centers have opted to shut down their independent program.^{1,7,20} The present study surveyed current PDs, chairs, and chiefs of plastic surgery residency programs, all of whom graduated medical schools by 2009 or earlier. Therefore, some of these individuals trained during the transition period in which integrated plastic surgery programs became the popular choice. Among those surveyed, the combination of independent and integrated program graduates does not have a statistically significant distribution by year of graduation. However, one can observe a natural increase in number of integrated program graduates. Numerous other factors may play a role in selection to plastic surgery residency in the future, such as decrease in the number of medical schools participating in Alpha Omega Alpha, an increase in the number of medical schools relying on pass/fail grading, and conversion to pass/fail grading for US Medical Licensing Examination Step I. We realize that these factors will impact how students are selected into plastic surgery residency programs and the residency pathway (integrated versus independent) that these students pursue. Although these factors

will vary with changes in the educational paradigm, potential barriers to career development as reflected by the demographic data collected from current PDs, chairs, and chiefs will remain. The present study is focused on highlighting the adversities that these individuals had to overcome to reach their current position, realizing that training paradigms are continually changing. Irrespective of training paradigm, success in career development requires recognition of adversity and the ability to overcome these circumstances.

Prior studies demonstrated that integrated graduates were more likely to choose a career in academia compared with independent residency graduates.^{7,14,21,22} Furthermore, among all plastic surgeons, those who graduated from an integrated program are more likely to pursue a fellowship and have an additional advanced degree. Given the difference in training length, more integrated graduates in academic medicine may be younger and more willing to undergo additional years of training.^{6,23-25} As PDs, chairs, and chiefs in plastic surgery residency programs evolve to having more integrated program graduates, independent residency trainees can continue to diversify this cohort by bringing in broader surgical background and academic exposure.²⁶ In addition, our study's demographics data support continued need for gender and ethnic diversity, as the current milieu of recognized leaders in plastic surgery continue to be dominated by White men.²⁷

Presence of IMGs among PDs, chairs, and chiefs in plastic surgery residency programs is an encouraging sign for current IMG applicants. According to Lujan-Hernandez et al, the most important factors for plastic surgery programs when considering an IMG applicant was previous experience working with this applicant and strong recommendation letters from known writers.²⁸ The factors that strongly decrease the perception of an IMG as a competitive applicant included US visa and immigration issues, poor English language proficiency and communication skills, low US Medical Licensing Examination scores, and lack of US clinical experience.²⁸ In terms of osteopathic physicians, two plastic surgeons out of 189 in our cohort had DO degrees, consistent with ongoing low match rates of DO applicants in plastic surgery.^{29,30}

Older plastic surgery match literature demonstrated that successful match rates were associated with Alpha Omega Alpha status and graduating from a top-40 ranked medical school.^{14,18,19,31,32} This is likely due to the fact that medical schools not ranked in the top 40 provided poorer exposure to plastic surgery. Stoehr et al looked at residency

pathways taken by current plastic surgery residents in the United States, focusing on the routes taken by those residents who were unsuccessful in their initial efforts to match.¹¹ Residents who did not match into integrated plastic surgery programs pursued a preliminary or categorical year in general surgery, and then matched into independent plastic surgery programs or transferred into integrated plastic surgery programs.¹¹ Although there are many factors influencing how an applicant is selected for a particular program, it is apparent that the will of applicants to reach their desired goals empowers their ability to become plastic surgeons and, ultimately, leaders in the field.

A limitation of this study is that only 26% of current plastic surgery PDs, chairs, or chiefs responded to this survey. As the survey was distributed to a large sample size (189) via email using publicly available addresses, it is not surprising that a large portion did not see the email due to spam filters or a large amount of daily correspondence. However, the respondents consisted of a relatively diverse group, given the overall homogeneity of the academic plastic surgery leadership. Additionally, the study only surveyed plastic surgeons who were successful in matching into plastic surgery. Because the present study focused on the career trajectory of our current PDs, chairs, or chiefs of plastic surgery residency programs, the eventual career of physicians who were unsuccessful in matching into plastic surgery is not known. Were it possible to identify those physicians who entered another specialty after being unsuccessful in their application to plastic surgery, this may serve to further clarify those characteristics that lead to success in a career in plastic surgery. The level of exposure to plastic surgery during medical school is another factor that deserves further investigation when identifying factors that contribute to the career development of plastic surgeons.

CONCLUSIONS

Information on residency training pathways and barriers to career development faced by the current PDs, chairs, and chiefs of plastic surgery residency programs can serve as a reference for future generations of plastic surgeons who may aspire to some type of leadership role within our specialty. These data may help inform medical students and residents who did not begin their plastic surgery training in an integrated residency pathway to use the different training pathways available for plastic surgery residency to their advantage despite continual change in the paradigm of training options that can lead to a successful career in plastic surgery.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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