

# Perceptions of Preparedness in Plastic Surgery Residency Training

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**Background:** Graduating competent surgical residents requires progressive independence during training. Recent studies in other surgical subspecialties have demonstrated overall fewer opportunities for resident independence due to changes in residency regulations, medical–legal concerns, and financial incentives. A survey study was conducted to assess perceived autonomy and preparedness during plastic surgery residency training and to assess factors affecting autonomy.

**Methods:** Anonymous electronic surveys were sent to attending surgeons and residents of all Accreditation Council for Graduate Medical Education accredited programs during the 2017–2018 academic year. Seventy-two integrated and 42 independent plastic surgery programs were surveyed. Analysis of responses was performed using the Fisher exact and chi-square tests.

**Results:** There were 158 attending surgeon and 129 resident responses. The resident and attending surgeon response rates were 11.7% and 16.8%, respectively. Eighty-seven percent of residents felt their operative experience within residency prepared them for practice. Residents felt least prepared in aesthetics and pediatrics/craniofacial surgery. Attending surgeons perceived that they provided residents graduated autonomy throughout residency. Residents identified the complexity of a procedure, attending surgeon supervision, and time constraints as the largest factors influencing resident autonomy. Attending surgeons noted patient safety as the largest deterrent to autonomy.

**Conclusions:** In our study, a majority of plastic surgery residents were found to feel prepared for practice after residency; however, preparedness gaps within training still exist in aesthetic and craniomaxillofacial surgery. Plastic surgery programs must work to develop training programs that simultaneously promote resident autonomy, while prioritizing patient safety, and maintaining productivity and financial well-being. (*Plast Reconstr Surg Glob Open* 2020;8:e3163; doi: [10.1097/GOX.0000000000003163](https://doi.org/10.1097/GOX.0000000000003163); Published online 22 October 2020.)

## INTRODUCTION

Surgical residency training programs have long been predicated on a gradual learning process with incremental increases in professional responsibility and operative autonomy, designed to create independent and competent surgeons. Within the last 2 decades, operative autonomy in postgraduate surgical training programs has been threatened by duty hour restrictions, increasing hospital regulations, financial constraints, patient concerns with

resident participation in care, and focus on patient safety.<sup>1,2</sup> The new training environment has led to the graduation of residents who are described as undertrained, unprepared, and surgically hesitant.<sup>3</sup> The perceived lack of graduate resident preparedness has been cited as a stimulus for a high percentage of residents pursuing fellowship training.<sup>3</sup> With a changing educational environment and multiple competing demands, surgical residency training programs and faculty are tasked with enhancing operative autonomy while also ensuring patient safety, productivity, and maintaining financial well-being.

In attempt to better understand resident autonomy, many studies and surveys have been conducted. A survey of general surgery program directors demonstrated that

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Received for publication May 15, 2020; accepted August 10, 2020.

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DOI: [10.1097/GOX.0000000000003163](https://doi.org/10.1097/GOX.0000000000003163)

**Disclosure:** The authors have no financial interest to declare in relation to the content of this article. This study was deemed exempt by institutional board review.

Related Digital Media are available in the full-text version of the article on [www.PRSGlobalOpen.com](http://www.PRSGlobalOpen.com).

a program's definition of resident operative autonomy itself is variable, with a majority of programs defining autonomy as completing 75% of a surgical case or performing critical steps of the procedure independently.<sup>4</sup> Within the operating room, research has shown that residents and surgical attendings perceive operative autonomy differently. In certain general and cardiothoracic surgery procedures, attending surgeons perceived they were granting residents more autonomy than residents perceived they were given, resulting in residents achieving less autonomy than expected.<sup>5,6</sup> Factors such as a resident's observed skill and an attending surgeon's comfort level with an operation have been identified as contributors to increasing procedural autonomy, yet some attendings admit they simply trust some residents more than others.<sup>7,8</sup> Solutions to increase autonomy have included improved resident evaluation tools, longer rotations to facilitate trust between attendings and residents, structured and immediate feedback on performance, improved resident preoperative preparation, and more structured intraoperative teaching.<sup>5,9,10</sup> Despite strides in understanding resident-attending dynamics, there is still a need for answers in determining how to better train independent and competent residents.

Although there are numerous studies evaluating resident autonomy in general surgery, orthopedic surgery, vascular surgery, and cardiothoracic residency programs, none to our knowledge have specifically addressed autonomy in plastic surgery training.<sup>5,6,11,12</sup> As plastic surgery training programs are moving toward competency-based training models, understanding perceptions of autonomy and operative independence within plastic surgery residency programs is of utmost importance. The purpose of our study is to examine current perceived autonomy of plastic surgery residents with an ultimate goal of improving resident training and competency.

## METHODS

Electronic surveys were sent to all Accreditation Council for Graduate Medical Education (ACGME)-accredited plastic and reconstructive surgery residency programs active during the 2017–2018 academic year. A total of 72 integrated and 42 independent programs were surveyed. The surveys were American Council of Academic Plastic Surgeons approved and circulated. Surveys were conducted by SurveyMonkey (SurveyMonkey, Inc., San Mateo, Calif.) and completed in an anonymous fashion. Two surveys were distributed, 1 for residents and the other for attending surgeons. The 2 surveys were similar but featured unique questions based on whether a respondent was currently in residency training or had already completed it. Some questions allowed participants to add comments. The survey requests were sent out 3 times. Survey participants were limited to 1 survey per unique email address. Before dissemination, the questionnaires were tested by volunteers and then revised. The survey was deemed exempt by institutional board review. The survey was accompanied by an incentive to win gift card prizes via a raffle. Deidentified responses were saved in a password-protected database.

Responses were analyzed between resident and attending surgeon surveys. All categorical variables were described with counts and percentages. Differences between survey responses were tested by the Fisher exact and chi-square tests. Tests of significance were performed on outcomes using an alpha of 0.05.

## RESULTS

### Demographic Data

There were 158 attending surgeon and 129 resident responses for a total of 287 respondents. The response rate for residents and attending surgeons were 11.7% and 16.8%, respectively. The demographics of resident and attending surgeon survey participants are shown in [Tables 1](#) and [2](#), respectively. Seventy-nine percent of resident respondents were part of an integrated residency program, 82.1 percent worked within a university-affiliated system, and postgraduation plans were variable with microsurgery and hand surgery fellowships being the most frequently anticipated ([Table 1](#)). Seventy percent of attending surgeon respondents work at a university-affiliated hospital, 62.7 percent teach in an integrated plastic surgery residency program, and most have completed fellowships ([Table 2](#)).

### Perceived Autonomy and Preparedness

Eighty-seven percent of residents showed some level of agreement that the autonomy granted in residency had prepared them for practice, whereas only 3.2% strongly disagreed ([Table 3](#)). A greater number of residents felt their autonomy in training prepared them for careers in burn reconstruction (92.8% agreement), breast reconstruction (90.5% agreement), hand surgery (76.6% agreement), and microsurgery (73% agreement) compared with pediatrics/craniofacial surgery (52.4% agreement) and aesthetics (53.5% agreement). There was no statistically significant difference in age, gender, postgraduate year (PGY) level, geographic training location, or training model in regard to respondents' perception of overall preparedness.

Responses from attending surgeons indicated a perceived increase in granted autonomy throughout residency training ([Fig. 1](#)). On average, 82.4% of attendings allowed PGY1 residents to perform 0%–20% of a procedure. Resident case completion percentage increased slowly as training year increased, with a majority of PGY3 integrated residents performing 21%–60% of a case, and 71% of fifth-year integrated residents/second-year independent residents performing greater than 60% of a case. Chief residents performed 81%–100% of a procedure 65.5% of the time. Still, 2 of every 3 attendings felt there was some degree of decrease in resident operative autonomy compared with 10 years ago. Opinions were mixed as to whether a lack of resident autonomy has pushed residents to seek fellowships, with 57% of attendings in some form of agreement.

### Simultaneous Supervision of Multiple Operating Rooms

Resident experiences with an attending surgeon supervising multiple active operating rooms simultaneously

**Table 1. Demographics of Resident Respondents**

Variable	Number	Percentage
Gender		
Female	52	41.9
Male	72	58.1
Age, y		
24–27	16	12.9
28–30	39	31.5
31–33	40	32.3
34–36	22	17.7
>36	7	5.6
PYG		
PGY1	13	10.5
PGY2	21	16.9
PGY3	14	11.3
PGY4	20	16.2
PGY5	19	15.4
PGY6	18	14.5
PGY7	7	5.6
PGY8	3	2.4
PGY9	4	3.2
PGY10	5	4
Residency training model		
Independent	26	21
Integrated	98	79
Residency training setting		
Community based	6	4.9
Community based with university-affiliated hospital	16	13
University affiliated	101	82.1
Region of training		
Central (ND, SD, MN, IA, NE, KS, MO)	9	7.3
East North Central (WI, MI, IL, IN, OH)	31	25.2
East South Central (KY, TN, MS, AL)	6	4.9
Middle Atlantic (NY, PA, NJ)	22	17.9
Mountain (MT, ID, WY, NV, UT, CO, AZ, NM)	4	3.3
New England (ME, NH, VT, MA, RI, CT)	2	1.6
Pacific (WA, OR, CA, HI, AK)	26	21.1
South Atlantic (DE, WV, VA, MD, DC, NC, SC, GA, FL)	10	8.1
West South Central (OK, TX, AR, LA)	13	10.6
Postgraduation plan		
Academic practice	6	4.7
Aesthetic or breast fellowship	8	6.3
Burn surgery fellowship	1	0.8
Hand surgery fellowship	22	17.2
Hospital-based employment		
Microsurgery fellowship	27	21.1
Pediatric/craniofacial fellowship	20	15.6
Private practice	20	15.6
Unknown	20	15.6

varied greatly. Thirty-nine percent of residents reported operating with an attending surgeon that was supervising multiple operating rooms at least weekly while the same percentage of residents reported doing so less than once per month or never (Table 3). Attending surgeons reported infrequently supervising multiple operating rooms, with 34.4% of respondents reporting they never ran multiple rooms and 24% doing so less than once per month.

### Factors Impacting Autonomy

Residents and attending surgeons ranked factors that they believed most limited resident autonomy (Table 4). Residents cited the complexity of a procedure, lack of familiarity with a procedure, attending supervision, and time constraints during surgery as the most limiting factors. Work-hour restrictions and reimbursement regulations were felt to have the least impact on their autonomy.

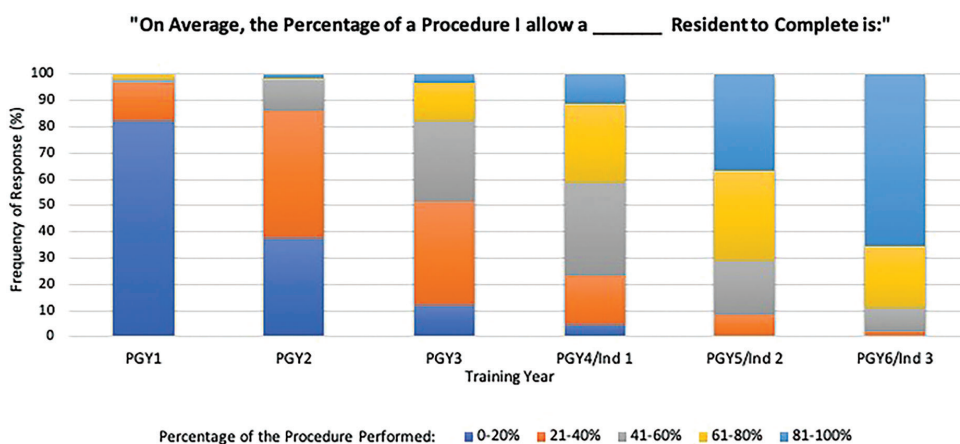
**Table 2. Demographics of Attending Surgeon Respondents**

Variable	Number	Percentage
Gender		
Female	32	21.1
Male	120	78.9
Age, y		
30–40	34	22.5
41–50	46	30.5
51–60	34	22.5
61–70	28	18.5
>70	9	6
Years in practice, y		
0–5	30	19.6
6–10	21	13.7
11–15	30	19.6
16–20	17	11.1
21–30	32	20.9
31–40	17	11.1
>40	6	4
Current practice setting		
Community-based hospital	7	4.6
University-affiliated hospital	106	70.2
Veterans administration hospital	3	2
Multispecialty group	6	4
Private practice	29	19.2
Residency training model of own education		
Combined	26	17.1
Independent	82	53.9
Integrated	43	28.3
Other	1	0.7
Residency training model of current affiliation		
Independent	20	13.1
Integrated	96	62.7
Both	37	24.2
Residency training setting of current affiliation		
Community based	10	6.6
Community based with university-affiliated hospital	34	22.5
University affiliated	107	70.9
Current region of practice		
Central (ND, SD, MN, IA, NE, KS, MO)	8	5.3
East North Central (WI, MI, IL, IN, OH)	41	27
East South Central (KY, TN, MS, AL)	6	3.9
Middle Atlantic (NY, PA, NJ)	28	18.4
Mountain (MT, ID, WY, NV, UT, CO, AZ, NM)	5	3.3
New England (ME, NH, VT, MA, RI, CT)	4	2.6
Pacific (WA, OR, CA, HI, AK)	27	17.8
South Atlantic (DE, WV, VA, MD, DC, NC, SC, GA, FL)	17	11.2
West South Central (OK, TX, AR, LA)	16	10.5
Completed fellowship program(s)		
Aesthetic fellowship	10	6.4
Breast fellowship	9	5.8
Burn surgery fellowship	4	2.6
Hand surgery fellowship	51	32.7
Microsurgery fellowship	33	21.2
Pediatric/craniofacial fellowship	36	23.1

Attending surgeons ranked concern for patient outcomes as the factor that most significantly reduced resident autonomy, followed by attending supervision and productivity concerns (Table 4). Additionally, attending surgeons indicated certain factors that influenced intraoperative resident autonomy (Table 5). A resident's observed technical skills, preoperative preparation, complexity of the procedure, and total time spent with the resident strongly influenced resident autonomy for over two-thirds of attending surgeons. Meanwhile, over one-fourth of attendings cited resident personality traits and patient concerns with resident participation as non-influential in the autonomy granted to residents. Over 85% of attending surgeons felt that time constraints and resident confidence at least somewhat influenced autonomy.

**Table 3. Resident Perception of Autonomy and Preparedness**

Variable	Number	Percentage
Overall, the autonomy granted to me during residency has adequately prepared me for practice		
Strongly agree	44	34.9
Somewhat agree	65	51.6
Somewhat disagree	13	10.3
Strongly disagree	4	3.2
The autonomy granted to me during residency has adequately prepared me for practice in aesthetic surgery		
Strongly agree	14	11
Somewhat agree	54	42.5
Somewhat disagree	42	33.1
Strongly disagree	17	13.4
The autonomy granted to me during residency has adequately prepared me for practice in hand surgery		
Strongly agree	43	33.6
Somewhat agree	55	43
Somewhat disagree	25	19.5
Strongly disagree	5	3.9
The autonomy granted to me during residency has adequately prepared me for practice in pediatrics/craniofacial surgery		
Strongly agree	19	15.1
Somewhat agree	47	37.3
Somewhat disagree	36	28.6
Strongly disagree	24	19
The autonomy granted to me during residency has adequately prepared me for practice in microsurgery		
Strongly agree	36	28.6
Somewhat agree	56	44.4
Somewhat disagree	27	21.4
Strongly disagree	7	5.6
The autonomy granted to me during residency has adequately prepared me for practice burn reconstructive surgery		
Strongly agree	69	55.7
Somewhat agree	46	37.1
Somewhat disagree	6	4.8
Strongly disagree	3	2.4
The autonomy granted to me during residency has adequately prepared me for practice in breast reconstructive surgery		
Strongly agree	74	58.2
Somewhat agree	41	32.3
Somewhat disagree	9	7.1
Strongly disagree	3	2.4
On average over the last year, how often did you perform procedures in the operating room with an attending surgeon that was simultaneously supervising multiple operating rooms?		
Never	24	18.8
Less than once per month	26	20.3
1-3 times per month	28	21.8
1-3 times per week	26	20.3
3+ times per week	24	18.8



**Fig. 1.** Attending surgeon responses to "On average, the percentage of a procedure I allow a resident to complete is:". Ind, independent resident. As the trainee level increased, attending surgeons noted an increase in autonomy given to residents. Attending surgeons estimated that chief residents performed 81%–100% of a procedure 65.5% of the time.

**Table 4. Factors Limiting Resident Surgical Autonomy**

Resident responses to “Please rank the following in regards to how they limit resident surgical autonomy (1 = most, 8 = least)”	
Category	Median (Range)
Complexity of the case	2 (1–8)
Attending supervision	3 (1–7)
Lack of familiarity with procedure	3 (1–8)
Time constraint during operation	4 (1–8)
Legal concern/hospital regulations	5 (1–8)
Patient concern with resident participation	6 (1–8)
Reimbursement regulations	7 (1–8)
Work-hour restrictions	8 (1–8)

Attending surgeon responses to “Please rank the following factors based on how they reduce resident surgical autonomy in the operating room (1 = most, 8 = least)”	
Category	Median (Range)
Concern for patient outcomes	1 (1–7)
Attending supervision	3 (1–7)
Productivity concerns	3 (1–7)
Hospital policy/regulation	5 (1–7)
Legal concern	5 (1–7)
Work-hour restrictions	5 (1–7)
Reimbursement regulations	6 (1–7)

## DISCUSSION

The main goal of plastic surgery residency training programs is to produce residents with “sufficient competence to enter practice without direct supervision.”<sup>13</sup> Today, perhaps more than ever, plastic surgery training programs face unique challenges that threaten their ability to achieve this goal. Such challenges include work-hour restrictions, financial constraints of programs and attending surgeons, patient concerns with resident participation in care, and focus on patient safety.<sup>1,2,14</sup> To overcome these factors and improve plastic surgery residency training programs, we must first understand the perceptions of participants in current training programs.

Our survey began with an assessment of perceived resident preparedness. On the whole, the majority of residents felt the autonomy they received during training prepared them for their future practice, with no statistically significant difference in the feeling of preparedness by age, gender, PGY level, geographic training location, or training model. Despite obvious differences between programs across the country, this widespread level of perceived preparedness argues for the quality of the current training models and the benefit of standardized ACGME program requirements and benchmarks. A recent survey of “young” plastic surgery attendings found similar preparedness rates.<sup>15</sup>

Within plastic surgery as a whole, residents consistently felt least prepared with aesthetics and craniofacial surgery. These findings are consistent with the concerns of early plastic surgery resident educators<sup>16,17</sup> as well as current studies in which plastic surgery residents had lower confidence in performing facial aesthetic procedures versus more common breast procedures.<sup>18,19</sup> To bolster the aesthetic surgery experience, the ACGME increased the number of minimum required cases for several aesthetic procedures in 2014. Despite this, there was still a significant variability in aesthetic surgery experiences and case numbers across the country, with some residents failing to meet required

**Table 5. Attending Surgeon Responses to “The Following Factors Influence the Operative Autonomy I Grant to Plastic Surgery Residents in the Operating Room”**

Variable	Number	Percentage
Resident confidence		
No influence	7	4.6
Somewhat influences	81	52.9
Strongly influences	65	42.5
Resident’s observed technical skills		
No influence	0	-
Somewhat influences	5	3.3
Strongly influences	148	96.7
Total length of time spent with resident		
No influence	3	2
Somewhat influences	48	31.4
Strongly influences	102	66.6
Resident’s preoperative preparation		
No influence	2	1.3
Somewhat influences	34	22.2
Strongly influences	117	76.5
Level of training (PGY level)		
No influence	8	5.2
Somewhat influences	75	49
Strongly influences	70	45.8
Complexity of the procedure		
No influence	1	0.7
Somewhat influences	27	17.6
Strongly influences	125	81.7
Patients’ concern with resident participation		
No influence	52	34
Somewhat influences	70	45.7
Strongly influences	31	20.3
Time constraints		
No influence	18	11.8
Somewhat influences	101	66
Strongly influences	34	22.2
Attending self-confidence with procedure		
No influence	18	11.8
Somewhat influences	65	42.4
Strongly influences	70	45.8
Resident personality traits		
No influence	39	25.7
Somewhat influences	82	53.9
Strongly influences	31	20.4

minimums.<sup>20</sup> Suggestions to improve aesthetic surgery training included dedicated aesthetic surgery rotations, time with private-practice aesthetic surgeons, and resident cosmetic clinics.<sup>18–20</sup> Studies on the plastic surgery resident experience in craniofacial surgery are limited; however, the recent interest of augmenting craniofacial education with the use of models, surgical videos, and surgical simulators suggests that resident comfort with these procedures is, similar to facial aesthetics, somewhat limited.<sup>21,22</sup>

In addition to preparedness, we sought to identify barriers to resident operative autonomy. When compared side by side, residents and attending surgeons identified similar factors as being the biggest deterrents to autonomy, namely the presence of attending supervision as well as time and productivity concerns (Table 5). Attending surgeons also noted a concern with patient outcomes as a key barrier. Work-hour restrictions and reimbursement regulations were felt to have the least impact on resident operative autonomy. A similar study of general surgery residencies also identified the focus on patient outcomes and desire to finish operations earlier as significant factors preventing resident operative autonomy.<sup>7</sup> In the general surgery survey, however, 47% of general surgery faculty noted work-hour restrictions as a barrier in general

surgery training, with only 13% indicating a lack of autonomy was due to increased supervision.<sup>7</sup> Given that patient safety, productivity concerns, and increased supervision have been identified as barriers to autonomy, any future changes instituted to plastic surgery resident training should be made with these factors in mind.

Although the majority of residents surveyed in this study felt prepared for future practice, there was a portion that did not. Assimilating the above barriers to autonomy and areas in which residents feel least prepared, we pose 2 concrete systems-based changes to address gaps in resident preparedness and confidence. These changes include implementation of early resident exposure to all subspecialties of plastic surgery and focus on improving resident autonomy and case volume through resident-run clinics. Traditionally, many aesthetic and craniofacial rotations have been reserved for senior-level residents; however, early exposure to these cases has been shown to increase interest and comfort level even if residents are not performing the surgeries themselves.<sup>18</sup> Thus, junior-level residents should have diverse plastic surgery rotation schedules. If an institution has a small volume craniofacial center or limited exposure to aesthetic surgery, away rotations would provide increased and early exposure. In regard to plastic surgery resident clinics, they continue to be an arena for the development of senior resident autonomy, decision-making, and maturation.<sup>23</sup> Increased case volume and autonomy have been shown to increase resident confidence and competence,<sup>24</sup> and resident clinics provide an ideal avenue for this. Various resident clinic models have been proposed,<sup>23,25–28</sup> with residents consistently supporting the importance of their role in training. Despite concerns with patient safety in resident clinics, multiple studies have validated the safety and complication profiles in this setting.<sup>27,29–33</sup> Unfortunately, even with the clear benefits of a resident plastic surgery clinic, many programs have not yet started such clinics with only 62%–71% of programs offering such clinics.<sup>34,35</sup> Based on multiple studies including our own, we feel resident cosmetic and reconstructive clinics should be mandatory for all plastic surgery training programs.

Perhaps the area in which the greatest advancements can be made in resident autonomy is the intraoperative resident experience. Numerous studies have detailed best practices for intraoperative teaching by attending surgeons and the results of implementing these practices.<sup>36</sup> These teaching methods usually consist of three phases: preoperative, intraoperative, and postoperative. Perhaps more than anything, these teaching methods improve resident and attending dialogue. Although attending surgeons should continue to refine their teaching styles, the responsibility equally rests on residents to maximize their own learning opportunities. In our survey, over two-thirds of attending surgeons indicated that a resident's observed technical skills, preoperative preparation, and total time spent with that resident strongly influenced their decision to grant autonomy. These factors should not be surprising to residents and should be used to maximize opportunities in the operating room. Continual refinement of operative skills, rigorous preoperative

preparation, and increased time spent with attending surgeons are certainly obtainable for residents.

One of the inherent difficulties of this study is the subjectivity of autonomy. Our study consisted of collecting perceptions and attitudes regarding the plastic surgery resident experience rather than quantitative data. For example, attending surgeons surveyed in this study reported a gradual increase in granted autonomy as resident year increased (Fig. 1), with chief residents performing an estimated 81%–100% of an operation over 65% of the time; however, residents were not surveyed on their perceptions of granted autonomy over time. This was done intentionally as many residents had not yet completed their training. Interestingly, operative autonomy studies in general surgery and cardiothoracic surgery have shown that residents and surgical attendings perceive operative autonomy differently. In these studies, attending surgeons and residents had similar expectations for resident operative autonomy yet actual observed resident performance was significantly below expectation levels.<sup>5,6</sup> To convert the subjective measure of operative autonomy into an objective measure, these surgery programs utilized the 4-point Zwisch scale to measure the level of attending surgeon involvement necessary for the resident to perform the operation safely.<sup>5,6</sup> The scale progresses from “show and tell,” to “active help,” to “passive help,” and to “supervision only.”<sup>37</sup> The general surgery faculty and residents then agreed upon expected Zwisch scale levels for a specific resident training year performing a specific surgery. For example, a PGY3 general surgery resident was expected to perform a laparoscopic cholecystectomy with “passive help.” These expectations generated performance curves for specific surgeries throughout residency against which a resident's progress and autonomy could be tracked. With several plastic surgery residencies moving toward competency-based graduation, it seems a sensible idea to track operative proficiency and autonomy on Zwisch scale performance curves for common plastic surgery procedures, including carpal tunnel release, abdominoplasty, breast reduction, breast reconstruction, free flaps, and burn debridement and grafting. This would add objectivity to the evaluation of a resident's progression and development, in addition to the American Board of Plastic Surgery and ACGME's “Plastic Surgery Milestone Project.”<sup>38</sup>

Other limitations to this study include its survey nature and low response rate. Once again, survey responses regarding autonomy and preparedness are based on respondents' own definitions of preparedness. There is subjectivity here, as the perception of feeling prepared as a plastic surgeon varies from resident to resident. Moreover, feeling prepared and actually being competent are not necessarily the same. Interestingly, prior studies of plastic surgery residents have shown resident confidence to be lower than attending surgeon confidence in residents for certain procedures.<sup>18,19</sup> Perhaps residents are more prepared than they believe. In regard to response rate, our calculations assumed that all program coordinators disseminated the survey to all residents of their program although this may not have been the case. Our response rates of 11.7%–16.8% are not dissimilar from other plastic surgery resident survey studies

that have had varying response rates from 12% to nearly 70%.<sup>39–43</sup> The response rate may have been improved by disseminating the survey at conferences or national meetings. Additionally, some of the residents surveyed had only been training for a limited number of years. Thus, they were making predictions on their preparedness upon graduation. Sampling of all training levels was done intentionally to gather longitudinal information on the perceptions of all level trainees. Further studies would potentially prove more beneficial if they were limited to senior-level residents. Despite the low response rate and survey nature of the study, we believe there was a representative sample of residents and attending surgeons surveyed that still make the results applicable. (See table, **Supplemental Digital Content 1**, which displays a nonresponder analysis for resident survey participants. The analysis demonstrates a resident responder population that is nearly identical to the survey population in terms of distribution of PGY year, residency training model, and region of training. Thus, despite the low participation rate, the responder group is representative of the survey population, <http://links.lww.com/PRSGO/B484>.) (See table, **Supplemental Digital Content 2**, which displays the nonresponder analysis of attending surgeon participants. The analysis demonstrates an attending surgeon responder population that is representative of the survey population in terms of geography. The regions with the highest volume of attending surgeons are most represented in the survey responses, <http://links.lww.com/PRSGO/B485>.)

## CONCLUSIONS

Plastic surgery residents and attending surgeons of both integrated and independent residency programs were surveyed on their perceptions of the current training environment. On the whole, a majority of residents felt the current training program to be successful in preparing them for their future practices. Several preparedness gaps were demonstrated as well as factors that influence attending surgeons toward granting operative autonomy. Suggestions to improve current residency programs were discussed on a systems as well as resident-attending interaction level. Changes to plastic surgery residency programs should simultaneously promote resident autonomy as well as prioritize patient safety, productivity, and financial well-being.

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## REFERENCES

- Lewis FR, Klingensmith ME. Issues in general surgery residency training—2012. *Ann Surg.* 2012;256:553–559.
- Kempenich JW, Willis RE, Rakosi R, et al. How do perceptions of autonomy differ in general surgery training between faculty, senior residents, hospital administrators, and the general public? A multi-institutional study. *J Surg Educ.* 2015;72:e193–e201.
- Mattar SG, Alseidi AA, Jones DB, et al. General surgery residency inadequately prepares trainees for fellowship: results of a survey of fellowship program directors. *Ann Surg.* 2013;258:440–449.
- Patel M, Bhullar JS, Subhas G, et al. Present status of autonomy in surgical residency—a program director’s perspective. *Am Surg.* 2015;81:786–790.
- Meyerson SL, Teitelbaum EN, George BC, et al. Defining the autonomy gap: When expectations do not meet reality in the operating room. *J Surg Educ.* 2014;71:e64–e72.
- Meyerson SL, Sternbach JM, Zwischenberger JB, et al. Resident autonomy in the operating room: expectations versus reality. *Ann Thorac Surg.* 2017;104:1062–1068.
- Temam NR, Gauger PG, Mullan PB, et al. Entrustment of general surgery residents in the operating room: factors contributing to provision of resident autonomy. *J Am Coll Surg.* 2014;219:778–787.
- Chen XP, Williams RG, Sanfey HA, et al. How do supervising surgeons evaluate guidance provided in the operating room? *Am J Surg.* 2012;203:44–48.
- Torbeck L, Wilson A, Choi J, et al. Identification of behaviors and techniques for promoting autonomy in the operating room. *Surgery.* 2015;158:1102–1110; discussion 1110.
- Snyder RA, Tarpley MJ, Tarpley JL, et al. Teaching in the operating room: results of a national survey. *J Surg Educ.* 2012;69:643–649.
- Odell DD, Macke RA, Tchantchaleishvili V, et al. Resident perception of technical skills education and preparation for independent practice. *Ann Thorac Surg.* 2015;100:2305–2313.
- Cogbill TH, Shapiro SB. Transition from training to surgical practice. *Surg Clin North Am.* 2016;96:25–33.
- Accreditation Council for Graduate Medical Education. Plastic surgery program requirements. Available at: [https://www.acgme.org/Specialties/Program-Requirements-and-FAQs-and-Applications/pfcatid/19/Plastic Surgery](https://www.acgme.org/Specialties/Program-Requirements-and-FAQs-and-Applications/pfcatid/19/Plastic%20Surgery). Accessed April 16, 2020.
- Counihan TC, Nye D, Wu JJ. Surgeons’ experiences with patients’ concerns regarding trainees. *J Surg Educ.* 2015;72:974–978.
- Hultman CS, Lowenstein A, Glasser R, et al. Efficacy of residency training pathways: the young plastic surgeons national survey. *Plast Reconstr Surg.* 2006;118:68–69.
- Baker TJ. Esthetic surgery and the plastic surgeon. *Plast Reconstr Surg.* 1970;46:389.
- Baker TJ, Gordon HL. The training of aesthetic surgeons in a private practice. *Plast Reconstr Surg.* 1981;68:774–775.
- McNichols CHL, Diaconu S, Alfadil S, et al. Cosmetic surgery training in plastic surgery residency programs. *Plast Reconstr Surg Glob Open.* 2017;5:e1491.
- Morrison CM, Rotemberg SC, Moreira-Gonzalez A, et al. A survey of cosmetic surgery training in plastic surgery programs in the United States. *Plast Reconstr Surg.* 2008;122:1570–1578.
- Silvestre J, Serletti JM, Chang B. Disparities in aesthetic procedures performed by plastic surgery residents. *Aesthet Surg J.* 2017;37:582–587.
- Volk AS, Eisemann BS, Dibbs RP, et al. The utility of an open-access surgical simulator to enhance surgeon training. *J Craniofac Surg.* 2019;31:72–76.
- Grunzweig KA, Son J, Kumar AR. Craniofacial skills: a 2-site validation of assessments to aid plastic surgery resident milestone achievement in technical skills and instrument knowledge. *J Craniofac Surg.* 2019;30:1678–1682.
- Day KM, Scott JK, Gao L, et al. Progressive surgical autonomy in a plastic surgery resident clinic. *Plast Reconstr Surg Glob Open.* 2017;5:e1318.
- Fillmore WJ, Teeple TJ, Cha S, et al. Chief resident case experience and autonomy are associated with resident confidence and future practice plans. *J Oral Maxillofac Surg.* 2013;71:448–461.
- Schulman NH. Aesthetic surgical training: the Lenox Hill model. *Ann Plast Surg.* 1997;38:309–313; discussion 313.
- Pu LLQ, Baker JL, Peters CR, et al. Resident aesthetic surgery training: the University of South Florida model. *Aesthetic Surg J.* 1999;19:465–468.

27. Pu LL, Thornton BP, Vasconez HC. The educational value of a resident aesthetic surgery clinic: a 10-year review. *Aesthet Surg J*. 2006;26:41–44.
28. Weissler JM, Carney MJ, Yan C, et al. The value of a resident aesthetic clinic: a 7-year institutional review and survey of the chief resident experience. *Aesthet Surg J*. 2017;37:1188–1198.
29. Pyle JW, Angobaldo JO, Bryant AK, et al. Outcomes analysis of a resident cosmetic clinic: safety and feasibility after 7 years. *Ann Plast Surg*. 2010;64:270–274.
30. Koulaxouzidis G, Momeni A, Simunovic F, et al. Aesthetic surgery performed by plastic surgery residents: an analysis of safety and patient satisfaction. *Ann Plast Surg*. 2014;73:696–700.
31. Qureshi AA, Parikh RP, Myckatyn TM, et al. Resident cosmetic clinic: practice patterns, safety, and outcomes at an academic plastic surgery institution. *Aesthet Surg J*. 2016;36:NP273–NP280.
32. Walker NJ, Crantford JC, Rudolph MA, et al. Outcomes analysis of chief cosmetic clinic over 13 Years. *Ann Plast Surg*. 2018;80:600–606.
33. Kaplan J, Volk AS, Ashley JR, et al. A systematic review of resident aesthetic clinic outcomes. *Aesthet Surg J*. 2019;39:NP387–NP395.
34. Ingargiola MJ, Molina Burbano F, Yao A, et al. Plastic surgery resident-run cosmetic clinics: a survey of current practices. *Aesthet Surg J*. 2018;38:793–799.
35. Neaman KC, Hill BC, Ebner B, et al. Plastic surgery chief resident clinics: the current state of affairs. *Plast Reconstr Surg*. 2010;126:626–633.
36. Timberlake MD, Mayo HG, Scott L, et al. What do we know about intraoperative teaching?: a systematic review. *Ann Surg*. 2017;266:251–259.
37. DaRosa DA, Zwischenberger JB, Meyerson SL, et al. A theory-based model for teaching and assessing residents in the operating room. *J Surg Educ*. 2013;70:24–30.
38. Accreditation Council for Graduate Medical Education. The Plastic Surgery Milestone Project. Available at: [https://www.acgme.org/Specialties/Milestones/pfcatid/19/Plastic\\_Surgery](https://www.acgme.org/Specialties/Milestones/pfcatid/19/Plastic_Surgery). Accessed April 16, 2020.
39. Chetta MD, Shakir A, Paek LS, et al. Evaluating resident perspectives on international humanitarian missions. *J Craniofac Surg*. 2018;29:279–285.
40. Hashem AM, Waltzman JT, D'Souza GF, et al. Resident and program director perceptions of aesthetic training in plastic surgery residency: an update. *Aesthet Surg J*. 2017;37:837–846.
41. Kraft CT, Harake MS, Janis JE. Longitudinal assessment of aesthetic plastic surgery training in the United States: the effect of increased ACGME case log minimum requirements. *Aesthet Surg J*. 2019;39:NP76–NP82.
42. Pfaff MJ, Morrison SD, Rezzadeh K, et al; Integrated Plastic and Reconstructive Surgery Resident Education Study Group. Evaluation of the integrated plastic and reconstructive surgery prerequisite core surgical training experience: a residents' perspective. *Ann Plast Surg*. 2018;81:475–481.
43. Hashmi A, Khan FA, Herman F, et al. A survey of current state of training of plastic surgery residents. *BMC Res Notes*. 2017;10:234.