**What Influences a Plastic Surgery Resident to Pursue an Academic Career?**

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**Background:** A previous study demonstrated that independent model plastic surgery residents are less likely to pursue a career in academic surgery than those graduating from other surgical fellowships. This study was designed to evaluate whether a significant curriculum change emphasizing academic plastic surgery skills would be significant in influencing a plastic surgery resident's decision to pursue a career in academic plastic surgery.

**Methods:** A survey was sent to 30 consecutive graduates of a university plastic surgery residency program. This program had transitioned from a clinically focused independent residency-training model to an integrated model with a new and structured academic emphasis. Respondents who graduated after this transition (“ACADEMIC” n = 19) were compared with those who graduated before (“CLINICAL” n = 9). Results were analyzed using Fisher’s exact test and Wilcoxon rank sum test.

**Results:** There were a total of 28 respondents (response rate = 93%). A higher percentage of the ACADEMIC group, in contrast to the CLINICAL group reported that they spent time during residency performing clinical research (84% versus 33%, *P* = 0.013), and that they are currently conducting clinical research in their practices (79% versus 0%, *P* < 0.001). These graduates were also more likely to have engaged their mentor both regarding professional issues (61% versus 0%, *P* = 0.016), and as a role model when choosing a career plan (72% versus 17%, *P* = 0.050). Finally, a higher percentage of the ACADEMIC exposed group entered an academic practice after training (44% versus 0%, *P* = 0.026).

**Conclusion:** In a single plastic surgery residency program, the transition to strong academic mentorship with a structured academic educational program focused on academic careers among program graduates. A proactive academically oriented educational and mentoring environment may help attract residents to careers in academic surgery. (*Plast Reconstr Surg Glob Open* 2018;6:e1860; doi: 10.1097/GOX.0000000000001860; Published online 3 October 2018.)

**INTRODUCTION**

The vast majority of graduates from plastic surgery residency programs ultimately pursue careers in private practice. In 1 study, 66.7% of graduates went into private practice, a number that seems intuitively low. A more current estimate is that closer to 90% currently go into private practice. Additionally, results of a survey-based study previously conducted in the same Department of Surgery at the University of Wisconsin suggested that plastic surgery fellows were less likely to enter an academic practice than those graduating from other surgical specialties. Many, if not most, plastic surgery residency programs express an interest in training future innovators and faculty in academic surgery. At the same time, the majority of plastic surgery residency applicants express an interest in academic plastic surgery during their residency interviews. Programmatic challenges in reaching this goal include attracting candidates who have a genuine interest in pursuing academic careers and then creating a training environment that fosters the academic development and engagement of these residents, ultimately applying for faculty positions.

In the early 20th century, Drs. William Halsted and William Osler revolutionized medical student and residency training by developing new educational programs and curricula. The introduction of standardized and structured educational programs led to significant improvements in medical education and practice. Similarly, the transition of the plastic surgery residency program at the University of Wisconsin from a clinically focused independent model to an integrated model with a new and structured academic emphasis was designed to provide residents with a comprehensive and efficient educational experience.

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dent education in the United States. Dr. Halsted adopted the German approach of surgical residency, which gave structure to and standardized the mentor-apprenticeship model of training. Mentorship was just as vital to Dr. Osler’s system of medical education; he advocated for close relationships between mentors and trainees, where instructors would not only pass on medical expertise but also serve as behavioral role models.3

The importance of mentorship on plastic surgery residency graduates’ professional paths has not been formally characterized in a residency cohort as part of a training format transition. Furthermore, few studies have evaluated factors that influence surgery residents’ eventual career choices, and fewer of these publications specifically examined plastic surgical trainees.4-7 Therefore, we sought to identify factors influencing plastic surgery graduates’ career choices, examine the impact of mentoring on these trainees, and evaluate whether a significant curriculum change emphasizing academic plastic surgery skills would be significant in influencing a plastic surgery resident’s decision to pursue a career in academic plastic surgery.

METHODS

Survey Format

The University of Wisconsin Division of Plastic Surgery generated a 32 item web-based survey containing matrix questions, contingency questions, scaled responses, and open questions. The survey was distributed via e-mail containing a hyper-link and to all graduates who matriculated in the University of Wisconsin Plastic Surgery Residency Program between the years 1995 and 2011. Participants’ responses were anonymous, and only deidentified data were visualized and analyzed. The relatively shorter survey time frame (5 years) before the academic curriculum transition was designed to minimize the impact of varying academic production in private practices of progressive surgeon seniority.

The intent of the questionnaire was to evaluate factors that influenced career decision making and evaluate whether a significant curriculum change emphasizing academic plastic surgery skills was significant in influencing a plastic surgery resident’s decision to pursue a career in academic plastic surgery. In the year 2000, the University of Wisconsin plastic surgery residency program transitioned from a clinically oriented Independent Model Residency to an Integrated Model Residency with an academic emphasis. This academic emphasis included initiating monthly research conferences teaching academic building blocks including study design, statistics, outcomes models, reference optimization, data base management, institutional review board process education, Animal Care committee considerations, grant writing, manuscript preparation, and academic finance. Additionally, a 1- to 2-year research fellowship was initiated, and funding secured for resident project completion, meeting presentation, and manuscript submission. Faculty and resident research presentations were included in the regular conference sched-

ule, and faculty were similarly encouraged to share their experiences as volunteers in plastic surgery organizations. Finally and significantly, the academic transition was supported by the recruitment of academically oriented faculty with research, writing, and education expertise.

Respondents who graduated after this transition (ACADEMIC) were compared with those who graduated earlier (CLINICAL), but temporally close to the transition. Demographic and career-related information was analyzed between the 2 groups to identify ways in which mentors (and for the academic group), the newer academic curriculum focus, influenced trainees before and after this 16-year time period.

Statistical Analysis

Statistical analysis was performed to determine if significant differences existed between those respondents who graduated from the clinically oriented program compared with those from the more recent academically oriented residency. Categorical results were analyzed using a Fisher’s exact test, and continuous variables were assessed using a Wilcoxon rank sum test. All tests were 2-tailed.

RESULTS

Demographics

A total of 28 respondents (93%) answered the questionnaire (24 men and 4 women). Ninety-six percentage (27/28) of the respondents were either married or partnered when they filled out the questionnaire (21 with a child or children, 6 with none, and 1 not indicated). Sixty-one percentage (17/28) of the respondents identified plastic surgery as their current field, whereas 21% were in a plastics subspecialty (5/28 not indicated). The most prevalent subspecialty was hand (11%) with 4% in a Mohs/skin cancer focused practice, and another 4% practicing only Breast and Aesthetic surgery. Additionally, 64% (18/26) were in private practice, and 31% (8/26) were in a university academic practice. One graduate worked for a health maintenance organization (HMO) as an employed surgeon, and another did not indicate the nature of his or her practice.

Research Activities During Residency

Graduate’s research activities during residency were examined (Table 1). The majority of respondents from both ACADEMIC and CLINICAL groups were unlikely to have dedicated time during residency to full-time basic science or translational research via a research fellowship year. Graduates from the ACADEMIC program, however, were more likely to have spent time during their training performing clinical research (84% versus 33%, P = 0.013).

Important Factors in Choosing Current Field

Factors were analyzed that ACADEMIC and CLINICAL graduates reported as being important in choosing their career paths (Table 2). More than 50% of the respondents indicated that the following factors were either important or very important when determining their types of practice: intellectual appeal, influential mentor, clinical op-
likely to be performing basic science research, but were analyzed (Table 4). The majority of respondents role model (72% versus 17%, \( P = 0.050 \)).

Professional integrity (61% versus 0%, \( P = 0.016 \)), and as a period were more likely to engage their mentor regarding their ultimate practice type selection. Respondents who that their mentors' demonstrating broad expertise and mate career paths was also examined (Table 3). Graduates from the ACADEMIC program, however, were more likely to be conducting clinical research (79% versus 0%, \( P < 0.001 \)). In addition, a higher percentage of this “academic” group entered an academic practice (44% versus 0%, \( P = 0.026 \)). During the study period, none of the plastic surgery resident graduates were known to have transitioned from an initially academic practice to a private practice, or vice versa.

### DISCUSSION

In the year 2000, the University of Wisconsin Plastic Surgery Residency Program transitioned from a clinically oriented Independent Model Residency to an Integrated Model Residency with an academic emphasis and orientation. Modifications included creation of a regular and diverse didactic conference providing the broad spectrum of academic “building blocks,” initiating a monthly research conference, and a quarterly “research progress” conference, and annual resident research day. Additionally, augmented time and financial support for meeting attendance to present research was made possible via philanthropy, allowing implementation of a manuscript publication requirement for each resident during each year of training, and frequent visiting professor invitations addressing both clinical and research topics. Significantly, the division committed to longitudinal funding of an optional 1- to 2-year research fellowship falling between the PGY 3 and PGY 4 years. Support for resident participation and productivity in academic activities was expanded, including access to T32 training grants, administrative and technical assistance with research projects and presentations, support for resident attendance at national meetings, and encouragement of involvement in organized medicine. Coincident with these changes, mentorship within the training program expanded from a clinical emphasis to include counseling on academic endeavors and pursuits. This new academic direction and additional academic mentorship was facilitated by the recruitment of academically oriented new junior faculty. These transitions offered the opportunity to study the impact of program design, academic emphasis, and mentorship on a consecutive series of resident graduates and their career paths.

In keeping with the tradition set forth by Osler, Dr. Wiley Souba remarks that “mentors teach by modeling the opportunities, family priorities, and lifestyle. No significant differences were noted in these domains between graduates from the ACADEMIC and CLINICAL programs.

More than 50% of the participants reported that the following factors were either not important or less important when choosing their career paths: clinical research opportunities, basic science research opportunities, prestige, and potential remuneration. Again, no significant differences were noted in these responses among ACADEMIC and CLINICAL graduates.

### Mentor Influence

Mentor influence as it influenced respondents’ ultimate career paths was also examined (Table 3). Graduates from both ACADEMIC and CLINICAL programs noted that their mentors’ demonstrating broad expertise and lending career support were important in determining their ultimate practice type selection. Respondents who graduated during the more academically oriented time period were more likely to engage their mentor regarding professional issues (61% versus 0%, \( P = 0.016 \)), and as a role model (72% versus 17%, \( P = 0.050 \)).

### Description of Current Practice

Finally, various aspects of graduates’ current careers were analyzed (Table 4). The majority of respondents from both ACADEMIC and CLINICAL groups were unlikely to be performing basic science research, but were involved in training residents and/or fellows, and/or teaching medical students. Graduates from the ACADEMIC program, however, were more likely to be conducting clinical research (79% versus 0%, \( P < 0.001 \)).

| Table 1. How A Mentor Influenced a Trainee’s Career Path |
| --- |
| Factors | % of ACADEMIC | % of CLINICAL | \( P \) |
| Expertise | 72 | 67 | 1.00 |
| Professional integrity | 67 | 43 | 0.38 |
| Supportive | 78 | 67 | 0.62 |
| Constructive critic | 56 | 50 | 1.00 |
| Motivator | 72 | 33 | 0.15 |
| Guide about professional issues | 61 | 0 | 0.02 |
| Ability to balance professional and personal responsibilities | 28 | 0 | 0.28 |
| Role model | 72 | 17 | 0.05 |
| Advocate | 44 | 17 | 0.35 |

| Table 2. Description of Graduate’s Research Activities during Residency |
| --- |
| Factors | % of ACADEMIC | % of CLINICAL | \( P \) |
| Full-time basic science/translational research | 33 | 22 | 0.68 |
| Clinical research | 84 | 33 | 0.01 |

| Table 3. Description of Graduate’s Current Practice |
| --- |
| Factors | % of ACADEMIC | % of CLINICAL | \( P \) |
| Clinical research | 79 | 0 | < 0.01 |
| Laboratory research | 5 | 0 | 1.00 |
| Training residents/fellows | 53 | 38 | 0.68 |
| Training medical students | 42 | 44 | 1.00 |
| Academic | 44 | 0 | 0.03 |

| Table 4. Important Factors in Choosing Current Field |
| --- |
| Factors | % of ACADEMIC | % of CLINICAL | \( P \) |
| Intellectual appeal | 100 | 100 | 1.00 |
| Influential mentor | 95 | 67 | 0.08 |
| Clinical opportunities | 89 | 78 | 0.57 |
| Clinical research opportunities | 32 | 0 | 0.14 |
| Basic science research opportunities | 21 | 0 | 0.27 |
| Family priorities | 68 | 78 | 1.00 |
| Lifestyle | 74 | 89 | 0.63 |
| Ability to teach residents and students | 33 | 33 | 1.00 |
| Prestige | 26 | 11 | 0.63 |
| Potential remuneration | 47 | 44 | 1.00 |
way. They set an example by behaving and conducting themselves in ways consistent with their values and beliefs.” Dr. S. Eva Singletary, in her Presidential Address to the Society of Surgical Oncology, added that mentors “provide an entrée into the political and networking systems through which a professional surgeon must move in building a career.” The training of surgical residents continues to rely heavily on the presence of excellent mentors.

The results of this study suggest that mentorship is significant in career path selection and may encourage trainees to pursue careers in academia. The results also support that an academically oriented and focused residency program can stimulate a resident’s decision to pursue an academic plastic surgery career. The earlier clinically oriented program endeavored to, and very much succeeded at, training excellent clinical plastic surgeons, both technically superb and thoughtful physicians. Graduates from the clinically oriented program noted that their mentors demonstrated expertise and provided support. Graduates from the more academically oriented program viewed their mentors as also providing support and demonstrating expertise and were likely to approach their mentors when grappling with professional issues (Table 1).

The proverbial “triple threat,” comprised of research, clinical work, and educational accomplishments, while progressively elusive, remains fundamental to a successful academic career and the academic promotions process. Balancing these endeavors, however, can be challenging even for the most organized, focused, efficient, and hardworking faculty member. In addition, success in academia requires building relationships with current leaders in surgery. A mentor who assists trainees in navigating the pressures of academia through wise counseling and teaching by example, and can facilitate introductions to current surgical leaders and colleagues, is invaluable.

Graduates who trained during the more academic time period were also more likely to conduct clinical research both during residency and in their current careers (Table 2). Respondents from this group were also more likely to hold academic positions at university hospitals (Table 3). The transition to an academic residency program focus inclusive of strong mentorship within an integrated residency program is consistent with these study outcomes.

Few previous studies have examined the eventual career choices of plastic surgery residents. Umansky et al.1, in a retrospective review of application files of former residents, found that candidates who conducted research (or had children) were more likely pursue academic careers. The study by Umansky et al.1 differed from this one in that it did not address the specific role of mentorship, nor survey graduates on factors felt to be important when making professional choices. It focused on specific attributes of applicants before entering a training program.

There are several limitations to this study. Although there was a favorable high 93% response rate compared with similar studies based on survey data, there are some limitations in this analysis due to smaller sample size, particularly of the clinical graduates. This may have underestimated the significance of some findings, while overestimating others. The evolution of individual practices within the study period could also distort the data. A new or seasoned academic or private practice plastic surgeon may have varying degrees of academic productivity at different times in their practice life. Furthermore, respondents may have interpreted the terminology of the survey differently. The word “lifestyle” is somewhat vague and may have a specific meaning to 1 graduate, and a completely different meaning to another respondent. Additionally, these data were analyzed from a survey administered to consecutive graduates from a single large university training program located in the Midwest. The results may not be transferable to training programs of different sizes in various geographic locations.

It is also possible that applicants with academic interests were more drawn to the program after it transitioned from a more clinically oriented independent residency, to an academically focused integrated residency. Additionally, the more academic program shifted to actively recruit trainees with stronger academic potential and interest. Either way, the adage “if you build it, they will come,” is apropos. Residency directors who are interested in recruiting and cultivating future leaders in academic medicine should develop training programs that emphasize research, innovation, and education. Programs that succeed in these endeavors will more likely both attract and retain applicants with longer term academic interests. In addition, plastic surgery residency applications became more competitive and desirable during the study time period when the program transitioned to a more academic training environment. It is possible, therefore, that the program may have been able to match more academically oriented applicants regardless of the local shifts in academic focus and mentorship.

Finally, the differences identified in mentor influence may be due to the change in the length of residency. Under the more clinical “independent” program, residents worked with mentors for only 2 years. In contrast, during the academic “integrated” program, residents interacted with mentors for 5–7 years. This increased exposure may have resulted in increased influence of mentors on their trainees. Given that the study was retrospective and based upon recalling experiences years ago, there is the possibility of some element of recall bias. Recent graduates of the more academic program may have stronger memories about the impact of their mentors, whereas older graduates who are more distant may have forgotten past influences of their mentors.

Nevertheless, our findings suggest that developing an academically focused residency program with a strong emphasis on mentorship may help recruit and cultivate future academic plastic surgeons, paving the way for them to become leaders in academic medicine. At the least, this study serves as a good starting point for conversations about how to attract residency applicants with academic interests, and create an environment where these trainees can and will flourish. The collective goal should be that all plastic surgery residency programs will strive to produce academic surgery innovators and educators who will continue to push the field of surgery forward, appreciating, however, that significant contribution have been made, and continue to be made by the large and important private practice community.
CONCLUSIONS
Among graduates of a university plastic surgery residency program that transitioned from a clinically oriented independent residency model to an academically oriented integrated model, those who graduated from the more “academic” program were more likely to perform clinical research both during residency, and subsequently in their current careers. The “academic” residency graduates were also more likely to identify their mentor as a guide about professional issues and as a role model. Finally, the graduates of the “academic” program were more likely to pursue careers in academia. Strong mentorship, and an academic residency program emphasis, may help create interest in, and attract residents to, careers in academic medicine.

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