The Leaky Pipeline of Women in Plastic Surgery: Embracing Diversity to Close the Gender Disparity Gap

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Abstract

The Balance for Better campaign theme of the 2019 International Women's Day prompted a closer look at diversity within the plastic surgery specialty. Gender balance in the United States has improved through many organizational efforts and enactment of laws. Unfortunately, despite these endeavors, statistics show that men still enjoy greater financial and career success. Within the field of medicine, a similar trend has been observed. Although women constitute 50% of medical school graduates, the majority still enter fields outside of surgical subspecialties. In comparison to other surgical subspecialties, women are most represented in plastic surgery. Unfortunately, significant gender discrepancies remain in postgraduate practice including academic practice rank, societal board membership, invited speaker opportunities, and compensation, to name a few. The "leaky pipeline" of women describes the precipitous decline in the numbers of women at each step up the professional ladder. We explore the multifaceted nature of this phenomenon and highlight factors that contribute to limiting female growth within the plastic surgery profession. We also emphasize the continued growth of female plastic surgeon presence in all sectors despite these existing obstacles. We submit that continued leadership, mentorship, and sponsorship provided by both male and female physicians in the field will facilitate future leadership, advance gender parity, and cultivate a sense of belonging within the plastic surgery community, allowing brilliant minds to flourish and the profession to thrive.

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> The story of women's struggle for equality belongs to no single feminist nor to any one organization but to the collective efforts of all who care about human rights—Gloria Steinem

On March 8, 2019, we celebrated International Women's Day, a global event that both honors the social, economic, cultural, and political achievements of women and focusses attention on the continued lack of gender balance in today's world. This movement asks that we notice the gender discrepancies present in our own spheres of influence and calls on each of us to take action to achieve a better gender balance across all facets of life.[1]

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Gender balance in the United States has improved through organizational efforts and the enactment of laws. The Fair Labor Standards Act of 1938, the Equal Pay Act of 1963, Title VII of the Civil Rights Act of 1964, and the Pregnancy Discrimination Act of 1973 in conjunction with unified efforts of Affirmative Action and other movements aimed at diversity and gender assimilation are a few examples that have provided substantial opportunity to minorities (by gender, race, creed, religion, and handicap) for education and employment opportunities in addition to protecting these individuals throughout the duration of their careers.[2] Unfortunately, despite these endeavors, statistics show that men still enjoy greater financial success and career growth.[3] It has been postulated that choices made by women are responsible for these disparities. For example, Bolotnyy and Emanuel[4] suggest that women value time away from work more than men and subsequently choose to work less overtime, take more unpaid time off, and avoid weekend/holiday shifts, which often pay more than regular work hours, all of which lead to lower pay for women. Similar claims have been made by Hutchinson et al[5] linking decreased female earnings to socially mandated family work. However, a recent study by the International Labour Organization found that, when asked whether they preferred to work in paid jobs, care for their families, or do both, a staggering 70% of women worldwide reported a preference for working in paid jobs, indicating that the male-favoring trends currently observed are unlikely to be due to any lack of desire on the part of women to succeed professionally.[6]

Within the field of medicine, a similar trend has been observed. Although women constitute 50% of medical school matriculants, they represent only 39% of full-time faculty in academic medicine with an even weaker presence seen in leadership roles.[7] Female physicians are more likely to be undercompensated, are less likely to progress in academic rank, and have higher attrition rates than their male counterparts.[8-10] The Balance for Better campaign theme (#BalanceforBetter) of the 2019 International Women's Day prompted a closer look at diversity within our plastic surgery specialty.[1]

A Closer Look at the History and Presence of Women in Plastic Surgery

The first known surgical practices in the world date back to 5000 BCE France when trepanation was used to treat a myriad of intracranial issues.[11] The first evidence of plastic surgery arrived centuries later with writings by the Indian surgeon Sushrata in 600 BCE.[12] Surgical texts from this era offer evidence of women playing active roles in surgery throughout Egypt, Italy, and Greece.[13] However, female presence in surgery shifted drastically in the Middle Ages with the implementation of various regulations and laws across the world, banning women from surgical and medical practices alike.[13]

The return of women to medicine was an arduous journey where secrecy and disguise were required for entry into practice. Dr Miranda Stewart, the first female surgeon in Britain and Canada, concealed her true identity, dressing and practicing as a man to gain entry into medical and surgical training programs. She and Drs Elizabeth Blackwell, Emily Jennings Stowe, and Harriet Jones, to name a few, are significant historical figures, who, through their sacrifices and persistence, paved the way for the re-entry of women into medicine in North America.[13,14] It was not until 1913 that the American College of Surgeons first recognized women surgeons, and another 30 years would pass before the welcome of the first female plastic surgeon, Dr Alma Dea Morani, in 1948.[14,15] Even during her training, Dr Morani was accepted initially with observation-only privileges and was eventually afforded operating privileges only during off-hours when her male colleagues were not using the operating rooms.[14]

The collective efforts of past women are now evidenced by nearly a decade of females comprising 50% of medical school graduates.[7] Of these female graduates, the majority still enter fields outside of surgical subspecialties.[15,16] In comparison to other surgical subspecialties, women are most represented in plastic surgery, and their representation has increased from 14% in 1990 to 40% in integrated plastic surgery programs in 2015.[15] Despite this substantial increase in female presence within plastic surgery training, significant gender discrepancies remain within academic postgraduate practice. Overall, 27% of plastic surgery graduates enter academic practice, and, according to the American Medical Association, women comprise only 12.3% of those within academic plastic surgery.[15-17] Multiple studies have demonstrated that women in academic surgery are less likely to gain tenure, hold leadership positions, or participate in research despite holding equal qualifications to their male colleagues.[15-18] Similarly, female representation among national plastic surgery associations remains low, with women constituting only 10.8% of American Board of Plastic Surgery diplomates, 10% of the American Council of Academic Plastic Surgeons, 16% of American Society of Plastic Surgeons (ASPS) members, and 14% of the American Society for Aesthetic Plastic Surgery (ASAPS) (M Simpson, email communication, June 2019).[15,16,19] In addition, women constitute a minority of invited speakers at academic plastic surgery meetings despite the impact of their published work being no different to that of men.[19] Further, recent studies have demonstrated that, when introducing academic speakers,

male introducers are less likely to use formal titles in the first form of address with an even greater discrepancy of formal title use between female (49.2%) and male (72.4%) introductions, a practice that may create the perception that women are of lower status than men, despite having the same professional rank.[20]

Barriers to Females in Plastic Surgery

We currently live in an era where women become CEOs in the technological sector, presidents and founders of their own corporations, and leaders in global business. Unfortunately, although women account for 47% of the US workforce and hold almost 52% of management-level jobs, gender disparity remains present even in the business sector.[21-23] For example, on the 2019 Fortune 500 list, women held only 6.6% of CEO roles in all companies listed.[24] In the legal profession, women make up 45% of legal associates but only 22.7% of firm partners.[23,25] They constitute 61% of accountants and auditors, 53% of financial managers, and 37% of financial analysts, but represent only 12.5% of CFOs on the Fortune 500 list.[23,24,26] Within the US government, females now comprise a historic high of 25% of the US Senate and 23.4% of House members.[27] Interestingly, many of these women who do rise to the top of their respective professions do so by beginning in entry-level jobs within the companies they later run. Over 70% of female CEOs within Fortune 500 companies spend more than 10 years, with a median of 23 years, at that company prior to becoming CEO.[28] By comparison, the same promotional ladder for men in Fortune 500 CEO companies spans a median of 15 years prior to reaching CEO.[28] Despite these disparities, female presence in all of these professions continues to grow.

How it is possible that, in this modern age, women continue to make up less than 20% of the US plastic surgery community, a community that places a great emphasis on female beauty, no less?

A career in plastic surgery requires at least a decade of training and education following undergraduate studies. Not only must one make a long-term decision at, usually, a very young age, but this decision inherently entails long hours of work and study with the perception of little time for personal or social activities. For many young women in college, this path may seem daunting, especially when there remains a paucity of female role models and mentors to encourage their interests and demonstrate that a work-life balance within plastic surgery is possible.[14]

Plastic surgery professional advancement during residency training and early practice years can be rigorous and grueling at a time in life when many women also seek to progress personally. Demands of work pose significant challenges should a woman wish to find a partner or spouse, and have been shown specifically to contribute to divorce amongst female surgeons.[15,18] Further, desire to start a family during biologically optimal reproductive years is not only difficult with regard to work-life balance from a practical standpoint, but also from a medical standpoint.[29,30] Specifically, the Accreditation Council for Graduate Medical Education and the American Board of Plastic Surgery offer only a 4-week maximum for maternity leave during medical training with the option for an additional 2 weeks of maternity leave that are effectively borrowed from another training year's vacation time to maintain the mandated 48 clinical weeks per year residency training requirement. This often poses difficulty for plastic surgery training programs regarding the logistics of arranging reasonable leave for new mothers and allows for very little time away from work immediately following pregnancy. For many women, this poses an incredible emotional dilemma. First, women who do choose to begin families during residency face conflicting desires with regard to spending time nourishing and cultivating a new family versus managing career and patient responsibilities. In addition, rapid return to work that is both physically and mentally demanding may limit her ability to recover from the physical and emotional aspects of pregnancy and childbirth itself. Moreover, care of a new child requires ample support from a partner or spouse, childcare, or other family members as well as financial resources. Alternatively, many women choose to postpone starting a family until after residency training or early career development. Unfortunately, for many women, this may also mean difficulty with fertility, pregnancy, and increased risk of child birth defects secondary to advanced maternal age.[29,30]

Despite the long-term, long-hours commitment with time away from family that might deter surgical interest, most women surgeons are satisfied with their careers and its impact on their personal lives.[31] A recent physician survey found plastic surgeons to be more satisfied with work than doctors in any other specialty. Additionally, respondents in plastic surgery were found to have high levels of self-esteem as well as happy marriages.[32] Accordingly, one would expect continued professional growth of women in later academic practice years. However, female surgical faculty members are far more likely to be represented at lower-ranking academic levels.[33] In a 2012 report by the Association of American Medical Colleges on women in academic medicine, women surgeons represented only 5% of full professors compared with 28% of instructors, 22% of assistant professors, and 15% of associate professors.[16,34] Sasor et al[17] conducted a similar study examining male versus female distribution within professor rankings in academia and reasons for observed discrepancies. Of 206 full professors examined, only 4.4% were women. Approximately 60% of women in the study were assistant

professors, whereas men were more evenly distributed among academic ranks (34% assistant professor versus 22% associate professor versus 29% full professor). In this study, women were noted to be subjected to higher levels of discrimination and harassment, have lower levels of career satisfaction, and have higher rates of burnout, contributing to high rates of attrition. Similar findings have been reported in other studies linking high rates of female attrition to increasing clinical demands, dissatisfaction with work-life balance, low institutional support, and burnout.[15,17] Overcoming these challenges with successful productivity is made more difficult by smaller physical work spaces as well as a lack of academic resources, grant assistance, protected research time, and secretarial staff allocated to women.[33] Furthermore, studies have shown that, even when equal opportunities for career growth and academic achievement exist, women receive fewer awards and grants, are cited less, and have their research regarded as less valuable than that produced by men.[19,35-37]

These findings all contribute to what is known as the "leaky pipeline," which describes a precipitous decline in the numbers of women compared with men at each step up the academic ladder.[19,38] The aforementioned studies highlight the continual obstacles women face throughout the duration of early education in medical school and spanning into later professional years. Without reprieve from such challenges, it is not surprising that many women physicians are subject to burnout at some point in their careers. In recent years, physician burnout has been extensively examined. Numerous studies have underscored the impact of paperwork and computerization of practices; low level of respect from administration, colleagues, and staff; long work hours with poor work-life balance; lack of autonomy; and insufficient compensation as primary factors affecting burnout.[32,39,40] Interestingly, within plastic surgery, the subspecialty of aesthetic surgery has the highest burnout rate alongside microsurgery.[41] In addition to the demands of marketing, operating privately owned facilities, and the business of medicine, this is thought to be attributable to ever-increasing patient expectations of aesthetic surgery results, creating greater long-term dissatisfaction levels for patients and physicians alike.[41] The overall result in both the hospital and private sector is more demand placed on fewer providers.

For most physicians, burnout peaks during midcareer, though many of those affected may not be aware of burnout until the effects have already had a significant, far-reaching impact with devastating consequences both personally and professionally.[32,41-43] Physicians are historically perfectionists, with those in plastic surgery arguably being the most extreme in this regard, and they continue to place patients' needs above personal needs despite exhaustion and sleep deprivation.[44] As a result, physicians' health suffers from chronic neglect. Worse, our current culture of medicine and healthcare assigns physician wellness a low priority, with many physicians fearing repercussions when help is finally requested.[42,44]

Physician burnout ultimately leads to lower job satisfaction, less productivity, less willingness to help colleagues, and higher attrition rates.[42,45] Surgical specialists have been shown to be more likely to reduce work hours or retire early as a result of burnout.[45] Given that females experience higher rates of these contributors to burnout at baseline, one might suppose that females have higher rates of burnout than their male counterparts. Although specific studies have not yet been carried out, it stands to reason that the global impact of career-long obstacles, personal sacrifice, and burnout combined have resulted in lower female representation in medicine, surgery, and plastic surgery alike.

Evidence of Growth in Modern-Day Plastic Surgery

Despite the many challenges that women have faced throughout their journey in medicine, female presence in plastic surgery is growing. Female representation has increased from 21.84% to 37.31% in both independent and integrated plastic surgery residency training programs over the last decade.[46] From 2008 to 2018, female representation in plastic surgery residency programs increased by 16.7%, second only to vascular surgery which saw an increase of 17.3% in female residents.[47] Of all surgical residency training programs in 2018, plastic surgery was the closest to approaching gender parity with a female-to-male ratio of 38.9% to 61.1%. Orthopedic surgery had the lowest percentage of female residents at only 15.3% female, although this was still a 2.9% growth in female representation compared with 2008 data.[47] On the other end of the spectrum lies obstetrics and gynecology with residency programs dominated by female representation at 82.9%.[47] It is worth noting that this finding represents the opposite form of gender disparity, which is also less than ideal. Overall, female presence is rising in all surgical residency programs, with plastic surgery most closely approaching gender parity. In addition, female residents in plastic surgery have been shown to be happy with their careers and report increasing support for simultaneous personal life progression, including pregnancy, during training.[31,48]

Similarly, the percentage of females in plastic surgery academia is increasing with a nearly 10% rise in practicing female surgeons over the age of 55, indicating not only a greater number of females graduating from plastic surgery training programs but also long-term retention of active surgeons.[47] These practicing female surgeons are also increasingly taking on national roles as evidenced by an

increase in societal female membership and participation. The ASPS has seen a growth of 120% in female membership since 2000.[15] The ASAPS has seen an increase to 14% female representation, up 2% from last year alone.[46] Further, female leadership in these national societies has expanded from 6.78% to 20.29% over the past decade.[46]

Female plastic surgeons in training and in practice are also gaining voice and recognition within the plastic surgery literature. Although previous studies have found that women tend to publish fewer articles than men, publications by female surgical faculty authors are increasing exponentially in all areas of plastic surgery and are more likely to be cited soon after publication, suggesting higher-quality work.[15,33] Further, although women publish fewer articles than their male colleagues in early career years, scholarly productivity for female surgeons has been shown to increase over time, peaking at 15 to 30 years in practice.[15,16] These senior female plastic surgeons are generating more articles and are receiving more grants and greater overall funding than their male counterparts, suggesting that women who remain in academic plastic surgery do overcome gender disparity experienced in career infancy.[17]

Thus, at all levels of career development, plastic surgery is growing in diversity and quality with continual movement towards gender parity. From medical school to residency training, from early to later career years, females continue to join the field of plastic surgery at ever-increasing rates and are demonstrating a lifelong commitment to furthering the specialty in all facets of the profession. More excitingly, this current trend is still in its infancy and will undoubtedly lead to an overall increase in female presence and leadership within our profession over the coming years.

We're Not There Yet: Leadership, Mentorship, and Sponsorship

How Can Women Compete in a Male-Dominated Field Such as Plastic Surgery?

For a woman to compete in any male-dominated arena, she must first *believe* she can compete. That is, she must have the confidence to pursue her passion and demonstrate her competence. There is a growing body of evidence that outlines just how important confidence is for not only achieving success but simply asking for the opportunity, an attribute that most women do not adequately harness.[49,50] Women have been shown to underestimate both their abilities and performance, and routinely pass up opportunities for promotion when they perceive themselves as lacking any qualification.[49] These tendencies begin as early as grade school and, consequently, have resulted in women becoming less visible than men in many facets of life including school classrooms, conferences, and public events.[51] Worse, when women do speak up first or promote themselves, they are often seen as aggressive or bossy rather than assertive or ambitious.

For women to believe they are capable of greatness, they must first be encouraged early in life. This comes not only in the form of individual support but in the presence of leaders with whom young females can identify. As such, women in plastic surgery should remember to encourage other females of all ages. Females in plastic surgery should seek not only to participate in private practice, academic, and professional society pursuits but also to attain leadership in these arenas. Female community and private plastic surgeons, board members, program directors, and senior attendings provide physical, tangible examples of role models to which young women can aspire to become. They may also provide more approachable mentors for young women to discuss professional, academic, and collaborative opportunies.[52]

Secondly, women in plastic surgery must mentor other young females. Previous studies have shown that female role models are the most influential factor for female medical students interested in plastic surgery.[15] Further, women plastic surgeons are more likely than men to benefit from having a same-sex mentor in multiple areas including medicine and professional development opportunities, managerial skills, knowledge, and confidence.[16,52] These relationships foster ambition and provide younger women with the skills needed to advance in academic plastic surgery.[15] This benefit highlights the impact of underrepresentation of women in plastic surgery leadership as this inherently means fewer female mentors and may contribute to gender gaps in leadership in plastic surgery programs.[15,52] As such, it is important for private practice, community employed, and academic plastic surgeons to open their doors to young female physicians. Each of these arenas provides a different and valuable educational opportunity and perspective that may inspire a variety of interests that would otherwise go uncultivated.

Lastly, and most importantly, women in plastic surgery must sponsor other women. One egregious behavior that cannot be tolerated is not offering a woman an opportunity because you think she is too busy or will not want it.[53] Sponsorship has been defined by Snyder Warwick et al as the synergistic combination of mentorship and endorsement through connections and pitches by a more experienced and networked mentor.[19] Whereas males have cultivated a long history of sponsorship among themselves, females have yet to perfect this art.[54] Female leaders in all areas of plastic surgery must take mentorship a step further and create sponsorship. We must not only invite young plastic surgery women to meetings, but ask them to speak; we must not only invite these women to sit on various organizational boards, but listen to their ideas; we must not only make them an important member of the

team, but ask them to lead the team. Our accomplished female leaders in plastic surgery must help young women weave their professional webs within existing networks so that they might become a part of female camaraderie in the same manner our male counterparts have fostered among themselves. Seasoned female mentors must begin to give their ideas away to new plastic surgeons, encouraging hard work borne out of passion and celebrating success.

What Role Do Men Play in the Plastic Surgery Gender Disparity Crisis?

The role of men in the current gender disparity crisis is just as important as, perhaps in some respects even more than, that of women. Just as with women, the role of male encouragement for women begins on an individual level early in life. For fathers; for men in elementary, undergraduate, and graduate level college education; and for men in the plastic surgery community, encouraging women to simply attempt a new task or goal is key to them gaining of confidence at an early age. Studies have shown that inferior performance of women on psychological tests or puzzles is often the result of lack of attempt to even answer questions.[49,55] In these studies, sex differences were eliminated by controlling or manipulating participants' confidence. That is, when women *believed* they had done well on the aforementioned initial examinations, they attempted to answer more questions and matched male scoring on subsequent testing.[49,55] This illustrates an extremely important point that low confidence results in inaction. What holds women back is the choice not to try. These choices become habit at a young age for most girls. Importantly, girls who are supported by male figures in childhood are more likely to have higher self-esteem and self-confidence, graduate from college, and enter higher-paying, more demanding jobs traditionally held by males.[56] In short, positive male influence on girls at young ages is the first step to future female success.

For young women to display confidence, they must be exposed to opportunities to do so. For the first female plastic surgery leaders to exist in a male-dominated profession, at least one male was required to recognize the importance and value of female presence in the field and to provide an opportunity for female participation within the profession. Without that male support and respect, the female role in plastic surgery might be very different today. As such, male mentorship and sponsorship has been instrumental in the current growth of female presence seen in today's landscape. Because plastic surgery is still largely male dominated, higher-ranking positions in private practice, academia, and national societies have been chiefly offered to and occupied by males. Although female mentorship provides young female surgeons with invaluable skillset knowledge, studies have shown that females with high-ranking male mentors report more career sponsorship precisely because of these powerful positions held by men and the opportunities they afford.[54,57] As females continue to enter the profession of plastic surgery, male mentorship and sponsorship will continue to play a vital role in furthering their career success. Continued respect and awareness of gender bias with "a carefully considerate mind" will enhance that success exponentially.[20] Along with their female colleagues, males in plastic surgery should boost female presence in our community by offering the young female surgeon encouragement in her career pursuits, opportunities to participate in larger-scale endeavors, a voice at leadership tables, and, most importantly, an example of change that supports diversity and acceptance for a more well-rounded profession.

In turn, the young female plastic surgeon of today needs to seize these opportunities. Her responsibilities lie in publishing her work, presenting at symposia, speaking on the podium, promoting her work and publications through networks and on social media, and getting involved in societies and mentorship for the future generation. She should honor those who have come before her by maintaining grace and paying it forward. It is this type of environment that creates opportunities that facilitate future leadership, advance gender parity, and cultivate a sense of belonging within the plastic surgery community.[58] It is this type of environment that allows all brilliant minds to flourish.

CONCLUSIONS

International Women's Day this past year celebrated a multitude of female achievements and success. Although we have accomplished a great deal in the way of gender parity, there is still more work to be done to achieve balance within plastic surgery. Leadership, mentorship, and, most importantly, continued sponsorship are vital means by which we can achieve this worthy goal.

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