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Education

Plastic Surgery Training: Trends in Hand Surgery Fellowship in the Setting of a Pandemic

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Background: Given the diminishing presence of hand surgeons trained in plastic surgery, we evaluated the associated trends in annual hand meeting educational content and postgraduate job offerings, and analyzed the effect of the coronavirus disease 2019 (COVID-19) pandemic on trainees in hand surgery.
Methods: Hand meeting registration and educational content were analyzed over the past 10 years. Current hand surgery job offerings were evaluated for training requirements, and the annual rates of subspecialty certificate in surgery of the hand board certifications were compared across training backgrounds.
Results: Top categories of annual meeting educational content were "bone/joint," "other," and "professional development." A majority of American Society for Surgery of the Hand presidents had training backgrounds in orthopedics (55%), followed by plastics (23%) and general surgery (22%). The job offerings on the American Society for Surgery of the Hand and Association for Surgery of the Hand websites specified more training requirements in orthopedics than in plastics. Additionally, there were two to three times as many examinees taking the surgery of the hand examination from orthopedic surgery compared with plastics, with an overall higher pass rate. Hand fellowship programs were also predominantly offered for orthopedic surgery (80.8%).
Conclusions: Optimization of training, society membership, and clinical practice profiles may increase the presence of plastic surgery–trained hand surgeons. The extent of the economic impact of the COVID-19 pandemic is yet to be fully determined, but our analysis suggests that a lucrative market for reconstructive/hand surgery may exist in the face of economic downturn. *(Plast Reconstr Surg Glob Open 2023; 11:e5066; doi: 10.1097/GOX.0000000000005066; Published online 19 June 2023.)*

INTRODUCTION

Hand surgery is a regional specialty—the culmination of combined techniques in soft tissue and bony reconstruction. Ideally, practitioners in the discipline are trained in managing problems that affect all components of the hand. Bunnell, often considered the founding father of hand surgery, was an advocate of this concept. He noted that "the hand is so intricate in structure that if dissected in turn by three different specialists, it is likely to be wrecked beyond repair. The bones, joints, muscles, tendons, nerves, and skin are all parts of a composite mechanism in the function of the hand and they can best be repaired by the surgeon who assumes responsibility for the whole. Hand surgery is an area specialty, not a tissue specialty."[1,2]

However, based on referral algorithms, departmental changes, and the trend toward increasing subspecialization, hand surgery is now typically a section of either orthopedic or plastic surgery departments. Over the last two decades, there has been a declining number of plastic surgeons who are pursuing fellowships in hand surgery, attaining board certifications, and applying for membership in the American Society for Surgery of the Hand (ASSH).[3–11] Although the reasons for this are likely multifactorial, it is, unfortunately, likely detrimental to the specialty, given the encompassing nature of the field. This is most apparent when one considers the potential impact of residency training with regard to microsurgical techniques and reconstructive surgery.[6,8,12–14]

We sought to evaluate the participation of plastic surgeons in hand surgery at the national level by first

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determining the number of plastic surgeons obtaining surgery of the hand (SOTH) certification and comparing this to historical data. We then evaluated ASSH and American Association for Surgery of the Hand (AAHS) meeting participation by specialty background and compared this to the educational content of the meetings. It was felt that if the topics covered were "classically orthopedic topics," or topics that are within the scope of practice for orthopedic surgeons, and not plastic surgeons, this likely contributes to the decreased participation of plastic surgeons at the national level. We also reviewed the participation from both plastic and orthopedic surgeons at the national level, in leadership positions, by reviewing the training backgrounds of ASSH and AAHS council members. Lastly, as a further measure of inclusion, we evaluated ASSH and AAHS job postings by required specialty backgrounds.

Takeaways

Question: We sought to analyze the educational, society membership, and board certification trends in plastic surgery–trained hand surgeons.

Findings: We found that orthopedic surgery training is represented to a greater degree than plastic surgery training in hand surgeons. Furthermore, we found that trainees graduating in the midst of the coronavirus disease 2019 pandemic face unique social, financial, future training, and practice plan challenges.

Meaning: Without optimization of training plastic surgery-trained hand surgeons will remain a minority of the field. Our data suggest that a potentially lucrative market for reconstructive/hand surgery may exist in the face of economic downturn.

RESULTS

The top three categories of ASSH annual meeting educational content averaged over 10 years were bone/joint (26.8%), other (24.6%), and professional development (14%) (Fig. 1). This was followed by soft tissue/flaps/microsurgery (10.6%), nerve (9.8%), shoulder/elbow (9.5%), and tendon (4.8%). Of the 74 ASSH president training backgrounds reviewed, a majority had primary training backgrounds in orthopedic surgery (41, 55%), followed by plastic surgery (17, 23%), and general surgery (16, 22%). Of the 48 past AAHS president training backgrounds reviewed, 27 (56%) had primary training backgrounds in plastic surgery, 18 (38%) in orthopedic surgery, and three (6%) in general surgery. There were 156 full-time, six part-time, and no unspecified job offerings on the ASSH website, for a total of 158 job listings. Twenty-two of the listings specified a training background in plastic surgery (13.9%), 116 (73.4%) in orthopedic surgery, none (0%) in general surgery, three (1.8%) in plastic surgery or orthopedic surgery, and 17 (10.7%) were unspecified (Fig. 2). The AAHS had 14 full-time job offerings; six (42.8%) specified a training background in plastic surgery, four (28.5%) in orthopedic surgery, two (14.2%) in plastic surgery or orthopedic surgery or general surgery, and two (14.2%) were unspecified (Fig. 3). There were two to three times as many examinees taking the SOTH examination with orthopedic surgery training backgrounds compared with plastic surgery, with an overall higher pass rate (Fig. 4). The available SOTH statistics for the last 5 years through the American Board of Orthopaedic Surgery revealed a 96% to 100% pass rate. In comparison, the last 11 years of statistics available through the American Board of Plastic Surgery revealed a 76% to 94.7% pass rate (85.4%–95% in the last 5 years). The pass rate for "first time test takers" ranged from 81.0% to 97.44% over eleven years (86.2%–97.44% in the last 5 years).

Currently, there are 93 hand fellowship programs, with 76 (80.8%%) offered specifically to those with an orthopedic surgery training background and 16 (17.0%) in plastic surgery (Fig. 5).

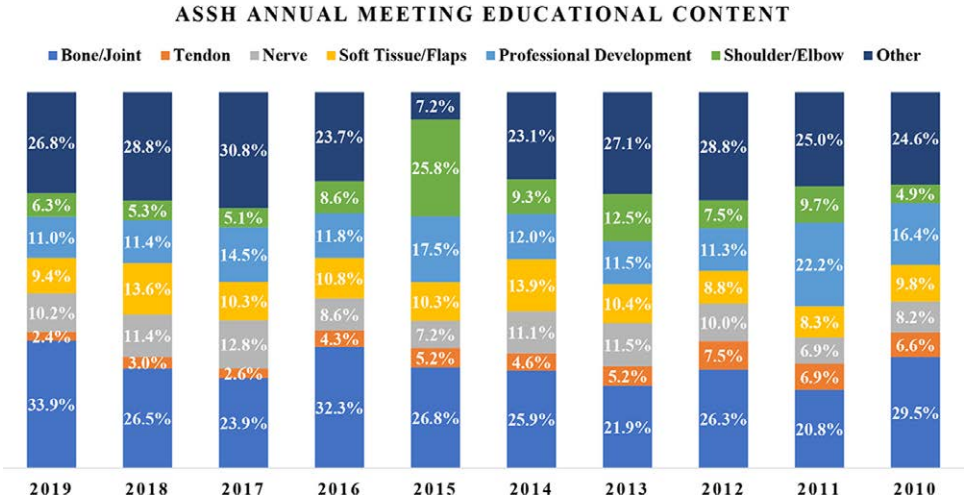

Fig. 1. ASSH Annual Meeting educational content.

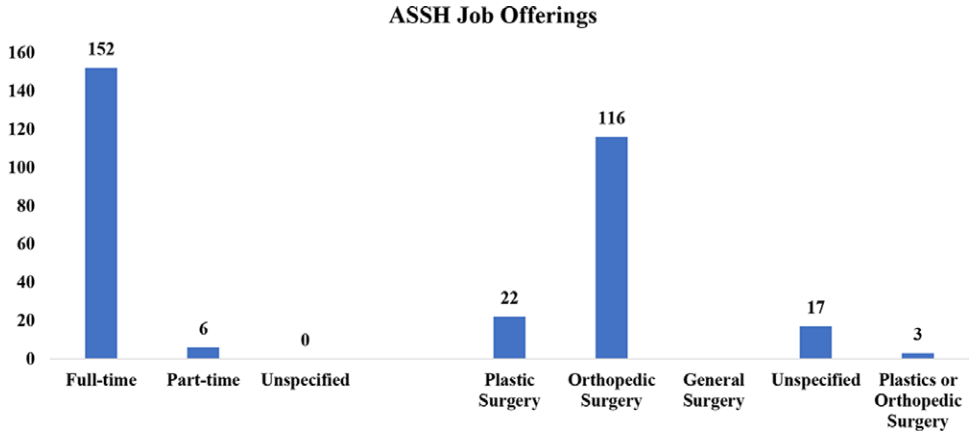

Fig. 2. ASSH job offerings (2022).

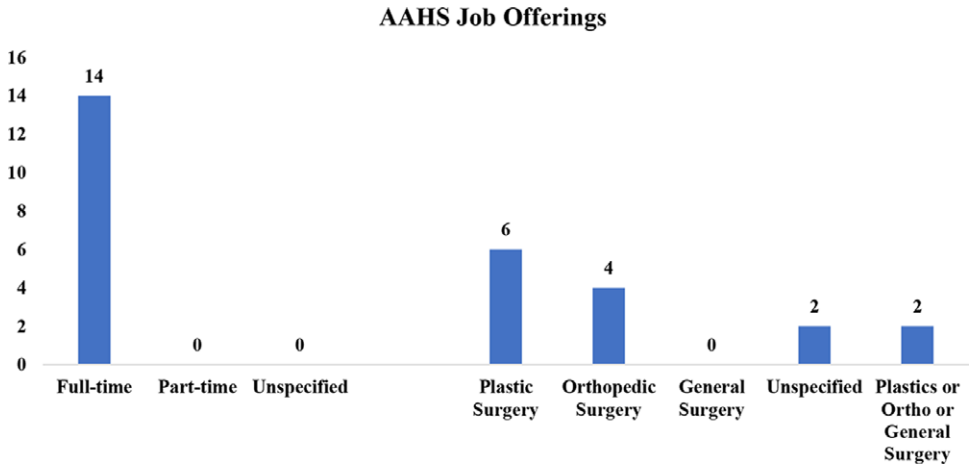

Fig. 3. AAHS job offerings (2022).

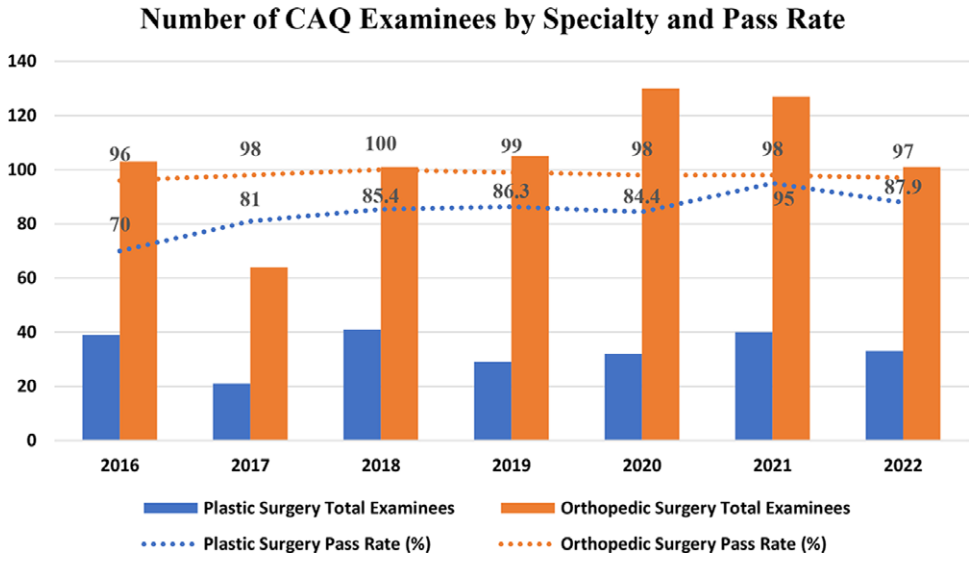

Fig. 4. Number of CAQ examinees by specialty and pass rate.

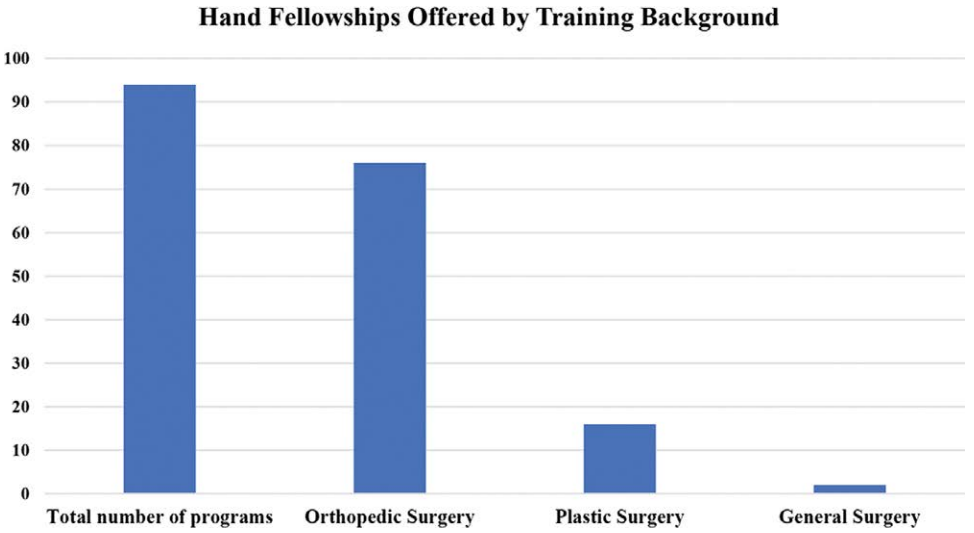

Fig. 5. Hand fellowships offered by training background (2021).

DISCUSSION

Training in the regional specialty of hand surgery should be optimized, particularly in this educational climate. Differences in specialty-specific in-training examination emphases, posttraining clinical practice profiles, fellowship training curriculums, and disparity in training backgrounds for physicians pursuing fellowships in hand surgery, attaining board certifications, and applying for membership in the ASSH exemplify this. As previously outlined by Silvestre et al,[15] optimization of hand surgery training, specifically within plastic surgery, is needed. The establishment of hand surgery as a specialty was a result of a combined collegial effort amongst multiple departments, specialties, and subspecialties.

The critical role of plastic surgeons in the founding and development of American hand surgery was emphasized in the essay written by Chang et al in 1999.[7] At that time, the diminishing role of plastic surgeons was already evident. In 1999, the majority of accredited hand surgery fellowship programs were administered through orthopedic surgery departments.[7] Correspondingly, discrepancies in board pass rates existed, as well. In the years from 1989 to 1998, the American Board of Orthopedic Surgery pass rate was 96.4%, whereas the American Board of Plastic Surgery pass rate was 65%.[7,16] At that time, ASSH and AAHS membership also reflected a decrease in plastic surgery presence, with only two of the past 10 presidents of the ASSH trained in plastic surgery.[7] Plastic surgeons only made up 21% of the ASSH membership at that time, with nine orthopedic surgeons versus three plastic surgeons being officers from 1998 to 1999.[7]

For the 2022 match, there were 94 hand surgery fellowship programs registered with the National Resident Matching Program, with one that withdrew from the 2021 match—leaving 93 certified programs. Of the programs, 90 were filled (96.8%) and three went unfilled (3.2%). In total, there were 193 certified positions with 189 (97.9%) positions filled and four unfilled (2.1%). There were 10 (5.2%) matched applicants for general surgery, 156 (82.5%) for orthopedic hand surgery, and 23 (12.1%) for plastics hand surgery.

Some of this disparity in the number of plastic surgery-trained hand fellowship applicants is due to differences in exposure to hand surgery. Although programs vary widely in the time spent in hand rotations, the ACGME minimum number of hand cases to complete residency in orthopedics (250) is much higher than plastic surgery (122), likely reflecting the difference in exposure between these training programs. Beyond the amount of time spent in hand rotations, the exposure varies widely depending on the scope of practice at each institution and the trauma centers where residents are able to train. Testa et al discuss the significant difference in hand trauma exposure between orthopedic residents and plastic surgery residents and demonstrate that the volume of trauma is much higher in orthopedics compared with plastic surgery.[17] We believe that trauma exposure is integral for optimal exposure to the field, as a large proportion of hand surgery cases are trauma-based. Further, the structure and split of hand call diminish the exposure that plastic surgery residents have to the field, as many institutions relegate the scope of plastics hand call to hand and distal radius and no longer include elbow pathologies. Plastic surgery residents who do not have the opportunity to train in a level 1 trauma facility or gain exposure to a limb salvage program may not understand the full breadth of the field and thus do not gain sufficient experience or mentorship to prepare for a career in hand surgery.

Differences in training backgrounds are further exemplified in hand surgery didactics, with regard to the Plastic Surgery In-Service Training Examination and the Orthopaedic In-Training Examination.[15] Although there were some common references, there were notable differences in representation, question style, topics covered, and publication lag.[15] In addition to didactic focus, orthopedic and plastic surgery residencies are unique in hand surgery case variety. While these differences in training can be due to case volume variability and attending surgeon practice,

most orthopedic surgery residents perform more hand, wrist, and forearm bony trauma cases compared with plastic surgery residents.[17] Plastic surgery trainees often have more experience with peripheral nerve repair, amputation, and microsurgery.[17] These overarching differences in plastic surgery and orthopedic surgery training lead to differences in hand surgery exposure that may correlate to clinical practice patterns.

Furthermore, disparities in passage rates for the SOTH examination exist, based on data from respective plastic surgery and orthopedic specialty boards, with plastic-surgery–trained hand fellowship graduates ultimately less likely to achieve subspecialty certification in hand surgery.[7,15,16,18,19] Although pass rates for the hand examination have improved over the last 5 years, there still exists a discrepancy between plastic surgery hand fellows and orthopedic counterparts.

Significant differences in practices also exist. In a 2007 summary of microsurgery practice by members of the ASSH, a majority of respondents had completed residency training in orthopedics (N = 460, 82%), 14% had completed training in plastic surgery (N = 79), and a majority completed a hand fellowship in an orthopedic program (N = 363, 62%); 30% completed a combined program (N = 170).[14] Although a majority of respondents rated their fellowship as excellent (N = 393, 70%) or good (N = 135, 24%), only 315 (56%) considered their present microsurgical skills to be above average.[14] Their study concluded that many hand surgeons (N = 316, 56%) believed that their practice could benefit from longitudinal training through continuing education courses.[14]

A 2011–2015 review of ASSH membership applications again showed that a majority of applicants were orthopedic surgeons (73.8%), 16.0% were plastic surgeons, and 10.2% were general surgeons.[6] This study sought to identify the relationship between the type of residency training and clinical practice profiles of hand surgeons in the United States during that time period. Plastic surgeons were more likely to be in an academic practice; perform nearly 20% of their cases outside of the field of hand surgery; and were more likely to perform skin and wound, congenital, and microvascular cases.[6] As specialization is becoming more prevalent, surgeons are unable to maintain a broad practice, and most of the surgeons who had a "part-time" hand practice are later in their careers.[20] Orthopedic surgeons were more likely to be in private practice; perform the highest volume of cases; and were more likely to perform bone and joint, nerve, tendon and muscle, and tumor cases.[6] Additionally, there are significant variations and differences in the density of specialist hand surgeons per state.[21] In 2019, the specialist hand surgeons identified were 72.1% orthopedic surgeons, 18.3% plastic surgeons, and 9.6% general surgeons.[21] The ASSH has developed the Hand Trauma Network and an Emergency Hand Care Committee to refine care for hand trauma patients. Surveys were administered to members of the ASSH regarding the provision of emergency hand call in 2010 and 2019 which revealed a decrease in surgeons with obligatory hand call from 2010 to 2019 (70% versus 50%, $P < 0.05$) and an increase in the number of surgeons not taking hand call in 2019 (34%) compared with 2010 (18%, $P < 0.05$).[22]

The current climate in healthcare, amidst the COVID-19 pandemic poses an additional layer of complexity for those choosing what fellowship to pursue. As was seen after the Great Recession (December 2007–June 2009), a significant financial burden has been placed on the healthcare industry. Our current reality has been redefined by assessing what work is "essential," and searching for stability in a healthcare system not immune to economic downturns. Fujihara et al[23] did a systematic review of the effect of the economic downturn on the volume of surgical procedures in 2017 and characterized the wide range of effects on medicine at both individual and national levels. Surgery volume generally decreased for both elective and nonelective cases when economic indicators declined. Most common hand procedural volumes were found to correlate significantly with the unemployment rate, which can be used to estimate the macroeconomic environment.[24] In multiple studies that they referenced, macroeconomic events were found to have a significant impact on the field of hand surgery.[24–28] Gordon et al specifically presented data that suggested that plastic surgeons are increasing their cosmetic surgery to reconstructive/hand surgery ratio during strong economic times and vice versa during times of economic slowdown.[27]

In another study published by Gordon, et al,[29] cosmetic and noncosmetic procedures were correlated with trends of three major stock market indices (S&P 500, Dow Jones, and NASDAQ). Three of four cosmetic procedures (rhytidectomy, breast augmentation, and liposuction) demonstrated a direct statistical correlation to all three major stock market indices, forehead lift did not.[29] In the noncosmetic comparison groups, including breast reduction (n = 1063) and breast reconstruction (n = 205), these showed a significant correlation to two major stock market indices (NASDAQ and S&P 500). However, carpal tunnel release volumes, performed strictly by plastic surgery staff, showed a negative correlation to two major stock market indices (NASDAQ and S&P 500), which suggested a volume relationship that was inversely proportional to the rise and fall of the stock market indices.[27–29] This negative correlation argues that a lucrative market for reconstructive/hand surgery may exist in the face of economic downturn.

The U.S. Bureau of Labor Statistics describes the characteristics of a recession as "a general slowdown in economic activity, a downturn in the business cycle, a reduction in the amount of goods and services produced and sold."[30] This includes the medical "marketplace" of choice.[31] In general, it seems that plastic surgeons tend to shift their practice patterns from noncosmetic procedures, namely reconstructive or hand surgery, towards cosmetic procedures as the U.S. economy strengthens.[27,29,31–37] The national unemployment rate, as of December 2022 is 3.5%.[30] As the unemployment rate in the U.S. is predicted to increase, and the effects of quarantine and social distancing shape how we interact, what the future holds for the practice patterns of plastic surgeons at all stages in their careers remains to be determined.

Reimbursement often drives practice patterns and subspecialty choice. Hand surgeons are not compensated at the same rate as their colleagues in plastic surgery, which is partly due to the nature of the conditions treated by hand surgeons and the reliance on workers' compensation to increase volume. Furthermore, hand surgeons also do not have the same opportunities to increase income and clinic volume compared with plastic surgery colleagues who offer injectables and noninvasive cosmetic procedures. Compensation for hand surgeons is negatively impacted by the increased litigation directed at hand surgeons compared with plastic surgeons and is often cited as a barrier to taking hand call.[22] Lawsuits brought against hand surgeons are primarily based upon claims of failure to diagnose/treat, whereas malpractice claims in plastic surgery are more likely to be related to the outcome of the surgery and unmet expectations.[38] Feldman et al suggest that this difference relates to effective management of cosmetic expectations when considering malpractice risk reduction in plastic surgery.[39] In hand surgery, malpractice risk is mitigated by timely recognition of hand conditions, referral to subspecialty-trained hand surgeons, and coordinated multidisciplinary care. Hand surgeons often treat patients whose care was initially triaged by general surgery, trauma surgery, or orthopedics. These patients may seek out care from a hand surgeon for a complication from their initial surgery, which obscures the rates of lawsuits in the field but nonetheless raises the stakes and makes hand surgeons a target for litigation.

While the lack of plastic surgeons in hand surgery is a complex and multifactorial problem, we believe that there are three main levels for plastic surgeons to focus on developing to increase interest in hand fellowship training. First, we believe that hand surgery exposure during residency is crucial for recruiting plastic surgery–trained residents for hand fellowships. Residency programs vary in rotation structure, trauma exposure, and institution practice patterns. While the ACGME does not provide guidelines for the structure of plastic surgery hand rotations, some training programs collaborate with orthopedic colleagues to provide this exposure, broadening the experience for trainees. Second, hand surgery visibility during national meetings could be improved, as hand-specific educational content is often delivered at the beginning or end of the meeting and not during the higher profile scheduling days. Lastly, reimbursement is a consistent barrier to plastic surgery–trained residents entering the field of hand surgery. The current reimbursement structure for hand surgery often is not reflective of the complexity of the cases, which are aimed at maximizing outcomes for patients. Updates to the coding structure to accurately represent the procedures and level of care required for patients would alleviate the financial burden that surgeons/hand surgery departments bear to achieve long-term outcomes for their patients.

Our study has limitations; however, we hope that revisitation of these topics will elicit discussion regarding the multifactorial causes contributing to the persistent decline of plastic surgery presence in hand surgery. Although we reviewed all currently available jobs on the ASSH and AAHS websites, there are various methods of advertising for hand surgery positions, including multiple other websites and societies. Further, pursuing a hand surgery fellowship, hand society membership, and obtaining SOTH certification are not the only means of participation in hand surgery. We have not accounted for a population of general, orthopedic, or plastic surgeons who incorporate hand surgery into their practice but did not receive SOTH certification. Additionally, burn surgeons may perform procedures that would be considered to be within the scope of hand surgery.

CONCLUSIONS

The diminishing presence of plastic surgeons in the regional specialty of hand surgery is likely to persist without optimization of training to continue the multidisciplinary, collegial atmosphere that it originated from. Our analysis suggests that a potentially lucrative market for reconstructive/hand surgery may exist in the face of economic downturn.[27,29–32] Although there has been a general trend in plastic surgeons shifting their practice patterns from noncosmetic toward cosmetic procedures as the US economy strengthens,[27,29,31–37] this climate may provide a unique environment for plastic surgeons to maintain or re-establish presence within hand surgery.

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DISCLOSURE

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

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