

Strategies to Improve Resident Wellness in Plastic Surgery Training

Jessie L. Koljonen, MD
Alexis M. Ruffolo, MD
Michael W. Neumeister, MD, FACS
Nicole Z. Sommer, MD, FACS

Summary: Residency is known to be a challenging time in a surgeon's career. Surgical residents must learn the breadth of their field and develop technical skills while maintaining relationships and well-being outside their training. High burnout rates are well documented among all medical specialties, particularly during residency. Proven strategies in medical education that help decrease burnout and improve resident well-being, while maintaining quality patient care, have been reported in the medical education literature. However, little has been published specific to plastic surgery training programs. We discuss strategies that can be implemented into the curricula and workflow at plastic surgery residency programs to maximize resident well-being. We advocate for a multifaceted approach that includes a night float system, day call, integrating advanced practice providers to offload noneducational resident tasks, and establishing a wellness program. It is our hope that these strategies may serve as a guide for plastic surgery residency programs to promote general wellness and prevent burnout among trainees. (*Plast Reconstr Surg Glob Open* 2024; 12:e5858; doi: [10.1097/GOX.0000000000005858](https://doi.org/10.1097/GOX.0000000000005858); Published online 4 June 2024.)

INTRODUCTION

Resident training programs are tasked with preparing graduates for independent practice while maintaining quality patient care and overall resident well-being. Residency can be stressful for many reasons, including learning a high volume of material, providing safe patient care, overwhelming responsibilities, changes in life, and family obligations. Mental fatigue and physical exhaustion may lead to withdrawal or burnout. Burnout in trainees is associated with reduced quality of life, higher suicide rates, and lower job satisfaction.^{1,2} Burnout can lead to lower workplace productivity and higher frequency of medical errors, resulting in diminished patient care. Many publications in the medical education literature characterize high rates of resident burnout, but a few propose solutions for this issue, particularly because it relates to plastic surgery residency. We discuss strategies, which have been reported in the literature and successfully incorporated at our training program, that can be implemented into the curricula and workflow at

plastic surgery residency programs to maximize resident well-being.

NIGHT FLOAT

In 2003, the Accreditation Council for Graduate Medical Education (ACGME) mandated duty hour restrictions in all residency programs due to rising concerns that long work hours and sleep deprivation had negative effects on resident performance, well-being, and patient care. This included an 80-hour work week limit, adequate rest periods, and limits on continuous duty.³ As training programs sought ways to adapt to these new restrictions, many adopted a night float system.

One benefit of a night float system is the significant reduction or complete elimination of a 24-hour shift. Numerous studies have shown that lack of sleep leads to detrimental effects. One study found that after 17–19 hours without sleep, performance is equivalent to or worse than a blood alcohol content level of 0.05%, about two standard drinks, with motor response times up to 50% slower in sleep deprived subjects. After longer periods without sleep, performance levels reach blood alcohol content levels higher than the legal driving limit.⁴ These results suggest that lack of sleep leads to a level of fatigue that can compromise safe performance. A study comparing internal medicine and orthopedic surgery residents after a 28-hour call shift and a night float shift demonstrated that trainees had significantly worse postshift brake reaction times after a traditional 28-hour call shift,

From the Institute for Plastic Surgery, Southern Illinois University School of Medicine, Springfield, Ill.

Received for publication November 6, 2023; accepted April 12, 2024.

Copyright © 2024 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. This is an open-access article distributed under the terms of the [Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 \(CCBY-NC-ND\)](https://creativecommons.org/licenses/by-nc-nd/4.0/), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

DOI: [10.1097/GOX.0000000000005858](https://doi.org/10.1097/GOX.0000000000005858)

Disclosure statements are at the end of this article, following the correspondence information.

whereas there was no difference in reaction time pre- or postshift for trainees on night float rotations.⁵

The impact of a night float system on operative case volume in surgical training is contentious. There is concern that a night float system is detrimental to surgical education due to reduced resident operative caseload. A review of caseload during a night rotation at the postgraduate year (PGY) 4 and PGY5 level at a general surgery program found that the average total caseload was 224 under the night float system, compared with 276 in the traditional call schedule where residents took call every 6 nights for a 30-hour period. In contrast, others have reported no difference in operative experience, and there are reports of increased resident case volume under a night float system.^{6,7}

Although residents covering the night float rotation miss scheduled daytime cases, they gain operative experience through emergent surgical procedures and late evening cases. In addition, overnight call shifts provide educational opportunities through inpatient care and consultations.^{8,9}

Aside from the educational component, a fundamental benefit of a night float system is resident wellness. There is strong evidence that a night float system improves resident quality of life and program satisfaction.¹⁰ An in-house night float system established at a university hospital general surgery program resulted in reduced resident fatigue and improved quality of life. In addition, this study provided evidence that patient care is improved with a night float system. Nurses reported increased availability of residents, shorter times to physician identification of patient problems, improved resident-nursing communications, and increased ease of nursing duties.¹¹

Night float was identified as one of the favorable “selective innovative approaches” in a review of the new duty hour restrictions by the ACGME. The night resident is still involved in operative procedures, including late elective surgical cases and emergency surgical cases at night.³ Key factors for success in this system are a robust sign-out of patients at shift change, a commitment by faculty and administration to make education the primary focus of a residency, and an understanding that adherence to ACGME duty hour standards improves the educational experience of residents.

At Southern Illinois University School of Medicine, the plastic surgery residency night float system is modeled in a similar fashion to that cited by the ACGME and consists of a primary call resident (PGY-2 through PGY-5) who takes call Sunday through Thursday night from 6 PM to 6 AM. Two separate residents take call over the weekend: one works Friday night and Sunday during the day, the other works Saturday day and night. Both weekend residents have a full 24-hour period to rest following a call shift. The resident is responsible for all new consultations for plastic surgery, including face trauma, hand, and burn, as well as all inpatient floor calls and clinic after-hours patient calls. There is an on-call senior resident (PGY-5 or PGY-6) who is available to assist the primary call resident and cover all operative cases.

We have found that this system allows for better rest during the week. The night team assumes clinical duties at 6 PM, allowing the daytime residents time to complete

Takeaways

Question: How can residency programs improve resident wellness in their workflow?

Findings: We advocate for a multifaceted approach that includes a night float system, day call, integrating advanced practice providers to offload noneducational resident tasks, and establishing a wellness program.

Meaning: To increase well-being and decrease burn-out, plastic surgery residency programs should consider implementing the discussed strategies, which have been proven in the literature in other specialties.

duties from the day, prepare for the next day’s cases, or otherwise spend time at their discretion. Several plastic surgery residency programs have implemented a night float system, but none have published their specific scheduling format, benefits or limitations of this system. Plastic surgery programs, and the wellness of plastic surgery residents, would benefit from further research in this area.

DAY CALL

Beyond instituting night float to adhere to duty hour restrictions, some programs have implemented a day float system. Although there are different interpretations of a day float structure, various studies support improved resident autonomy, decreased work hours, and increased resident satisfaction.¹²⁻¹⁴

One internal medicine program implemented a day float rotation that consists of a senior resident who takes over responsibilities from the previous night’s call team. This resident completes unfinished tasks, so the call team can rest, serves as the medicine consultant for nonmedicine subspecialty services, and assists with educating the inpatient medicine day teams. Analysis after implementing this rotation showed a reduction of hours worked each week by residents on the inpatient service, from 79–90 hours to 67–81 hours per week. The number of hours the day float resident worked was between 58 and 65 hours per week, including protected education time.¹²

One otolaryngology residency program implemented a day float system strongly favored by its residents in which the post-24-hour call residents are allowed to sign out their patients and go home to rest, with their daytime clinical duties covered by the day float resident.¹⁴

At our program, we developed a day call “consult” rotation to better distribute daily workload and on-call responsibilities. Our program is structured in a mentor model, where each attending is assigned a resident who covers all cases, clinics, and inpatient care for that attending. Compared with a more traditional team approach with team rounding and division of cases and clinics among the residency, our mentor model allows residents to have a more realistic experience of attending responsibilities. Although this model has great educational benefits, it presents a challenge to junior residents simultaneously assigned to mentor and call duties. Before the implementation of a day call system in our program, junior residents

on a mentor rotation who were also on primary call were responsible for managing all new plastic surgery consultations in addition to their baseline clinical duties. In the case of emergent consults, the resident had to leave clinic or the operating room, leaving the attending's service temporarily uncovered. Nonemergent consults often stacked up throughout the day, leading to a large workload at the end of a busy day and long emergency room wait times for patients. Given our success with the night float rotation, we established a dedicated day call month-long rotation to offload call responsibilities of the junior residents. All plastic surgery consultations are covered by the day call resident from 6 AM to 6 PM. This resident can focus on managing new consults in a timely fashion, and during periods of the day without consults, they are welcome to join any operative cases or clinics, engage in other scholarly activity, or practice microsurgery in the laboratory. We have found that this system has greatly improved resident clinical experience, patient care, and well-being.

ADVANCED PRACTICE PROVIDERS

Another strategy to mitigate the balance between resident education and patient care is the utilization of advanced practice providers (APPs), such as nurse practitioners (NPs) or physician assistants. These physician extenders help offset hours to avoid duty hour violations, and assist with administrative duties such as discharging patients, routine floor work, and other noneducational clerical tasks. The addition of nocturnal APPs in a neurology program increased the hours of sleep overnight, decreased the number of pages overnight, and decreased the number of patients the resident was responsible for cross-covering overnight. In total, 94% of residents in this program agreed that the addition of APPs benefited their education by reducing workload and increasing time allotted for reading and formulating plans, and 88% of residents surveyed felt that the addition of APPs improved their overall quality of life and reduced the risk of burnout.¹⁵

Although there is strong evidence that APPs help offset the workload and compliance with duty hour restrictions,¹⁶ improve the clinical experiences of residents,¹⁷ and promote interprofessional collaboration,¹⁸ there is concern that APPs may hinder resident education by reducing resident involvement in patient care, thereby diminishing resident responsibility and decision-making.^{19–21} Residents on an intensive care unit rotation reported reduced resident workload, enhanced patient care, and enhanced communication after the addition of APPs. Yet a minority of these residents felt that APPs detracted from their training, primarily due to residents feeling excluded when nurses preferentially contacted APPs with patient care issues.²²

Residents in a general surgery program were surveyed on their impressions of APPs in surgical practice, and 90% of residents reported leaving the operating room less frequently to manage patients. Most residents felt that APPs made their workload lighter and enhanced patient care.²³

Based on the literature supporting the use of APPs in training programs from other specialties and internal resident feedback, our program created a position for an inpatient NP who functions as a resident extender. The

NP assists with managing floor patients, wound consultations, burns, and dressing changes. There is no expectation for the inpatient NP to cover operative cases. We also use two NPs who solely work in the outpatient clinic, whose role is to see low acuity emergency department follow-ups, screen patients for common procedures, and perform basic office procedures. Although we found that incorporation of APPs at our program yielded similar positive results as shown in other surgical programs, we are not aware of any published reports of utilization of APPs in other plastic surgery residency programs. Additional studies are needed to quantify the value of APPs in plastic surgery training programs.

WELLNESS CURRICULUM

Physician burnout is a well-documented problem in the medical field.²⁴ Particularly for surgical residents, long work hours and taxing clinical demands take a physical and mental toll on overall well-being. Identifiable causes of burnout in residents include social disconnection (amongst residents, and in time spent with family and friends), inadequate time for physical health (sleep, exercise, poor diet), and poor coping strategies. Inadequate time for personal and family life is strongly associated with burnout.²⁵ It is important for residency programs to identify burnout early and equip residents with strategies to overcome the mental and physical challenges they are likely to encounter throughout their careers.

Wellness initiatives have been implemented at residency programs throughout the country, many of which include structured group activities, education, and wellness “check-ins” for residents.^{24,26–30} A systematic review published in 2021 of wellness in plastic surgery found only two studies focused on plastic surgery residents, which examined work hours and perceptions of social wellness.³¹ None of these reported studies discuss strategies for improving plastic surgery trainee wellness. A recently published report from the University of Kansas is the first to our knowledge to describe a wellness program in plastic surgery residents. They described a wellness-inspired resident educational curriculum that consists of formal panels and lectures that were incorporated into the yearly didactic schedule, in addition to a resident wellness retreat and informal events. The resident-driven curriculum includes topics that reflect current interests and stressors of trainees. Their curriculum was found to promote personal and professional wellness, enhance camaraderie, and provide opportunities to network within the field of plastic surgery.³²

To improve the wellness among our residents, our program developed a structured curriculum that involves both formal and informal events. We added biannual wellness lectures on managing stress and developing resiliency into our yearly didactic schedule. These lectures occur in place of a different didactic activity for that week and are not an additional time commitment for residents. We have scheduled check-in sessions with our program director to address resident concerns, in addition to informal check-in sessions amongst residents.

Throughout the year, we incorporate informal wellness events outside work hours to improve resident camaraderie and wellness. Each year after the annual resident in-service examination, we plan a weekend residency retreat, with team-bonding events and group activities. Every month, the residents gather for an informal social event organized by a rotating schedule of residents. Our program has allocated funds for resident wellness, and this allows residents to participate in the activities without additional costs. These events have generally been well-attended by the residents and often include family such as spouses and children.

From a day-to-day standpoint, our program allows residents to take time as needed for personal healthcare appointments. A study of practicing surgeons found that those who saw their primary care provider within the past 12 months had higher quality of life and lower rates of burnout.³³ Yet, a multicenter survey of surgical residents found that 54% of residents reported being unable to maintain basic healthcare maintenance visits, 44% reported undesirable weight gain, and 72% reported work-related stress negatively impacted their overall health.³⁴ Many primary care offices do not offer late or weekend appointments and, therefore, having the freedom to schedule appointments during weekday work hours is important.

RESIDENT-REPORTED WELLNESS

In addition to a night float system that had already been in place for several years, we implemented these additional strategies in the beginning of the 2022–2023 academic year: day call, inpatient NP resident extender, and structured wellness curriculum. We then surveyed our residents using the brief resilience scale (BRS)³⁵ and Physician Well-Being Index (PWBI),³⁶ validated surveys assessing resiliency and physician distress. Surveys were administered twice yearly: the early fall at the beginning of the academic year, and the winter—midway through the academic year, when wellness has anecdotally decreased due to the time of the year and upcoming resident in-service examination.

The BRS is a series of six statements with responses on a five-point Likert scale, and a total score out of 30 is tallied. The higher the score, the higher the degree of resilience and wellness. Throughout the year and a half survey period, the average BRS increased from 0.79 in fall 2022, to 0.83 in winter 2024 (Table 1).

The PWBI consists of seven yes/no items, and respondents receive a score out of 7. The higher the score, the higher the rate of burnout, depression, stress, and decreased quality of life. Like the results seen in the BRS, lower scores on the PWBI (indicating greater wellness) were seen after these strategies had been in effect for a year and a half, from 1.82 in fall 2022, to 1.58 in winter 2024 (Table 2).

Table 1. Brief Resilience Scale

Survey Date	Average Score
Fall (September) 2022	0.794
Winter (February) 2023	0.791
Fall (September) 2023	0.808
Winter (January) 2024	0.833

Table 2. Physician Well-being Index

Survey Date	Average Score
Fall (September) 2022	1.818
Winter (February) 2023	2.417
Fall (September) 2023	1.750
Winter (January) 2024	1.583

When comparing similar time points a year apart, scores improved between fall 2022 and 2023, as well as winter 2023 and 2024 for both the BRS and PWBI. With these promising early findings, we intend to continue assessing and analyzing our results in a future article.

LIMITATIONS

Our program has two residents per year, for a total of 12 residents. Given our small sample size, further surveys over several years would help demonstrate a greater effect from these interventions. Surveys themselves are also subjective, and responses can vary even between the same respondent on different days. In addition, over the survey period, the residency cohort was not the same, given the graduation of the chief residents and the new interns each academic year.

We also understand that implementing all of these strategies may not be possible for every program. Smaller programs may not have the capacity for both day call and night float residents, in addition to residents covering all other clinical duties. Specific responsibilities of APPs are certainly program dependent, and challenges such as level of autonomy, if they take call, and who funds their salaries must be considered.

CONCLUSIONS

We advocate for a multifaceted approach to improving resident wellness in plastic surgery trainees. This goes beyond a single annual wellness lecture, or ensuring duty hours are not in violation. Proven strategies in medical education that help decrease burnout and improve resident well-being, while maintaining quality patient care have been reported in the medical education literature, but little has been published specific to plastic surgery training programs. We describe strategies that may serve as a model for other plastic surgery programs to promote general wellness and prevent burnout among trainees. The needs of each training program and its residents are unique; thus each strategy may not be feasible for every program. We are currently analyzing the benefits of changes made within our program, and plan to expand further on resident-reported experiences in a future article. Further studies are needed to identify and analyze the most effective strategies to improve resident wellness within plastic surgery residency programs, so that they may be incorporated into training programs nationwide.

Nicole Z. Sommer, MD

Institute for Plastic Surgery
 Southern Illinois University School of Medicine
 747 N. Rutledge St, Third Floor, PO Box 19653
 Springfield, IL 62794-9653
 E-mail: nsommer@siumed.edu

DISCLOSURE

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

REFERENCES

- Ganesh Kumar N, Olinger TA, Drolet BC, et al. The perspective of plastic surgery program directors in managing resident burnout and mental health: are we doing enough? *Plast Reconstr Surg*. 2021;147:923e–924e.
- Santos PJF, Evans GRD. Practical strategies for identifying and managing burnout in plastic surgeons. *Plast Reconstr Surg*. 2020;146:464e–473e.
- Accreditation Council for Graduate Medical Education. The ACGME's approach to limit resident duty hours 12 months after implementation: a summary of achievements. Available at https://www.acgme.org/globalassets/pfassets/publication-spapers/dh_dutyhoursummary2003-04.pdf. Published 2004. Accessed May 24, 2023.
- Williamson AM, Feyer AM. Moderate sleep deprivation produces impairments in cognitive and motor performance equivalent to legally prescribed levels of alcohol intoxication. *Occup Environ Med*. 2000;57:649–655.
- Talusan PG, Long T, Halim A, et al. Effects of fatigue on driving safety: a comparison of brake reaction times in night float and postcall physicians in training. *J Grad Med Educ*. 2014;6:653–657.
- Hamill CS, Cabrera CI, Murthy H, et al. Initiation of a night float system in an otolaryngology residency: resident perception and impact on operative volume. *Laryngoscope*. 2021;131:2211–2218.
- Lazaro TT, Katlowitz KA, Karas PJ, et al. The impact of a night float system on operative experience in neurosurgery residency. *J Neurosurg*. 2023;138:1117–1123.
- Landmann A, Mahnken H, Antonoff MB, et al. Keeping residents in the dark: do night-float rotations provide a valuable educational experience? *J Surg Educ*. 2017;74:e67–e73.
- Scali EP, Strovski E, Forster BB, et al. Sink or night float: University of British Columbia radiology residents' experience with overnight call. *Can Assoc Radiol J*. 2015;66:185–189.
- Mann SM, Borschneck DP, Harrison MM. Implementation of a novel night float call system: resident satisfaction and quality of life. *Can J Surg*. 2014;57:15–20.
- Goldstein MJ, Kim E, Widmann WD, et al. A 360 degrees evaluation of a night-float system for general surgery: a response to mandated work-hours reduction. *Curr Surg*. 2004;61:445–451.
- Wong JG, Holmboe ES, Huot SJ. Teaching and learning in an 80-hour work week: a novel day-float rotation for medical residents. *J Gen Intern Med*. 2004;19(5 Pt 2):519–523.
- Roey S. Medical education and the ACGME duty hour requirements: assessing the effect of a day float system on educational activities. *Teach Learn Med*. 2006;18:28–34.
- Suryadevara AC, Zandifar H, Guyer M, et al. Day float: an alternative to the night float coverage system for residency programs. *Laryngoscope*. 2008;118:1257–1259.
- Yu AT, Jepsen N, Prasad S, et al. Adding nocturnal advanced practice providers to an academic inpatient neurology service improves residents' educational experience. *Neurohospitalist*. 2023;13:130–136.
- Dies N, Rashid S, Shandling M, et al. Physician assistants reduce resident workload and improve care in an academic surgical setting. *JAAPA*. 2016;29:41–46.
- Fang M, Linson E, Suneja M, et al. Impact of adding additional providers to resident workload and the resident experience on a medical consultation rotation. *BMC Med Educ*. 2017;17:44.
- Gettenborg E, Limes J, Olson A, et al. Learning together: integration of advanced practice providers into a general medicine ward team. *J Gen Intern Med*. 2019;34:769–772.
- Coverdill JE, Shelton JS, Alseidi A, et al. The promise and problems of non-physician practitioners in general surgery education: results of a multi-center, mixed-methods study of faculty. *Am J Surg*. 2018;215:222–226.
- Buch KE, Genovese MY, Conigliaro JL, et al. Non-physician practitioners' overall enhancement to a surgical resident's experience. *J Surg Educ*. 2008;65:50–53.
- Eaton B, Hessler L, O'Meara L, et al. The impact of advanced practice providers on the surgical resident experience: agree to disagree? *Am J Surg*. 2019;217:1107–1111.
- Kahn SA, Davis SA, Baner CT, et al. Impact of advanced practice providers (nurse practitioners and physician assistants) on surgical residents' critical care experience. *J Surg Res*. 2015;199:7–12.
- Kang R, Columbo JA, Kunkel ST, et al. Residents' impressions of the impact of advanced practice providers on surgical training. *J Am Coll Surg*. 2018;226:1036–1043.
- Johnson WR, Davidson M, Nagler A, et al. Take 10: a resident well-being initiative and burnout mitigation strategy. *J Surg Educ*. 2022;79:322–329.
- Bean AC, Schroeder AN, McKernan GP, et al. Factors associated with burnout in physical medicine and rehabilitation residents in the United States. *Am J Phys Med Rehabil*. 2022;101:674–684.
- Chaukos D, Zebrowski JP, Benson NM, et al. "One size does not fit all"—lessons learned from a multiple-methods study of a resident wellness curriculum across sites and specialties. *BMC Med Educ*. 2021;21:576.
- Brown KB, Jr, Cook A, Chen F, et al. A perspective on wellness in anesthesiology residency programs: a multi-strategy approach. *Anesthesiol Clin*. 2022;40:257–274.
- Haber MA, Gaviola GC, Mann JR, et al. Reducing burnout among radiology trainees: a novel residency retreat curriculum to improve camaraderie and personal wellness—3 strategies for success. *Curr Probl Diagn Radiol*. 2020;49:89–95.
- Fischer J, Alpert A, Rao P. Promoting intern resilience: individual chief wellness check-ins. *MedEdPORTAL*. 2019;15:10848.
- Spiotta AM, Fargen KM, Patel S, et al. Impact of a residency-integrated wellness program on resident mental health, sleepiness, and quality of life. *Neurosurgery*. 2019;84:341–346.
- Grome LJ, Reul RM, Agrawal N, et al. A systematic review of wellness in plastic surgery training. *Aesthet Surg J*. 2021;41:969–977.
- Guest RA, Miller MA, Bergman H, et al. Creating and implementing a novel wellness-inspired resident educational RG (WIRE) curriculum. *J Surg Educ*. 2023;80:629–632.
- Shanafelt TD, Oreskovich MR, Dyrbye LN, et al. Avoiding burnout: the personal health habits and wellness practices of US surgeons. *Ann Surg*. 2012;255:625–633.
- Yoo PS, Tackett JJ, Maxfield MW, et al. Personal and professional well-being of surgical residents in New England. *J Am Coll Surg*. 2017;224:1015–1019.
- Smith BW, Dalen J, Wiggins K, et al. The brief resilience scale: assessing the ability to bounce back. *Int J Behav Med*. 2008;15:194–200.
- Dyrbye LN, Satele D, Sloan J, et al. Ability of the physician well-being index to identify residents in distress. *J Grad Med Educ*. 2014;6:78–84.