
Joseph Lopez, MD, MBA,* Afshin Ameri, BASc,* Srinivas M. Susarla, DMD, MD, MPH,* Sashank Reddy, MD, PhD,* Ashwin Soni, MD,‡ J.W. Tong, MBBS,† Neda Amini, MD,† Rizwan Ahmed, MD,† James W. May Jr., MD,§ W.P. Andrew Lee, MD,* and Amir Dorafshar, MBChB, FACS, FAAP*

*Department of Plastic and Reconstructive Surgery, Johns Hopkins Hospital, Baltimore, Maryland; †Department of General Surgery, Johns Hopkins Hospital, Baltimore, Maryland; ‡Division of Plastic Surgery, University of Washington Medical Center, Seattle, Washington; and §Division of Plastic and Reconstructive Surgery, Massachusetts General Hospital, Boston, Massachusetts

INTRODUCTION: It is currently unknown whether formal research training has an influence on academic advancement in plastic surgery. The purpose of this study was to determine whether formal research training was associated with higher research productivity, academic rank, and procurement of extramural National Institutes of Health (NIH) funding in plastic surgery, comparing academic surgeons who completed said research training with those without.

METHODS: This was a cross-sectional study of full-time academic plastic surgeons in the United States. The main predictor variable was formal research training, defined as completion of a postdoctoral research fellowship or attainment of a Doctor of Philosophy (PhD). The primary outcome was scientific productivity measured by the Hirsh-index (h-index, the number of publications, h that have at least h citations each). The secondary outcomes were academic rank and NIH funding. Descriptive, bivariate, and multiple regression statistics were computed.

RESULTS: A total of 607 academic surgeons were identified from 94 Accreditation Council for Graduate Medical Education-accredited plastic surgery training programs. In all, 179 (29.5%) surgeons completed formal research training. The mean h-index was 11.7 ± 9.9. And, 58 (9.6%) surgeons successfully procured NIH funding. The distribution of academic rank was the following: endowed professor (5.4%), professor (23.9%), associate professor (23.4%), assistant professor (46.0%), and instructor (1.3%). In a multiple regression analysis, completion of formal research training was significantly predictive of a higher h-index and successful procurement of NIH funding.

CONCLUSION: Current evidence demonstrates that formal research training is associated with higher scientific productivity and increased likelihood of future NIH funding. (J Surg Educ 83:64-69. © 2015 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: academic practice, surgical training, research training, residency, h-index, postdoctoral research training

COMPETENCIES: Professionalism, System-Based Practice

INTRODUCTION

Recently, there has been a growing interest in determining the drivers behind plastic surgery residency graduates who chose academic practices.¹⁻³ These studies suggest that dedicated research training, among several other factors, is an important predictive variable of applicants who chose academic practices.⁴ However, with attrition from academic practice still common—40% of new faculty members depart academic practice within 5 years—no study has explored whether formal research training can also be a potential driver for academic success in plastic surgery.⁵

Currently, plastic surgery is second highest (6.8%) for number of students with a Doctor of Medicine-Doctor of...
Philosophy (MD-PhD) qualification (after neurosurgical applicants, 10.3%). Furthermore, several Accreditation Council for Graduate Medical Education (ACGME)-accredited plastic surgery training programs have recently been restructured to include formal research training into their residency curriculum. However, the long-term influence of formalized research training on academic productivity, academic rank, or motivation to continue research pursuits after completion of surgical training are unknown. As ACGME-accredited plastic surgery training programs continue to recruit MD-PhD applicants and contemplate formalizing surgeon-scientist training programs into the residency curriculum, it is important for trainees, program directors, educational institutions, and hospitals to develop an objective assessment of the influence of formal research training on future academic success.

Several objective assessment tools have been developed recently, which can be used to assess the effectiveness of formal research training. For example, several studies in the medical and surgical literature have assessed the application of quantitative metrics and have validated their use in evaluating a researcher’s contribution to their field. Our group, among others, have recently validated the application of the Hirsh-index (h-index), and have found that it is highly associated with academic advancement. As such, its potential as an adjunctive measure in screening candidates for academic posts, promotions, and future National Institutes of Health (NIH) extramural research grants has been advocated. Furthermore, as procurement of NIH research grants is a symbol of scientific achievement in academic medicine, several publically available research grant databases can be utilized to determine the influence of a research fellowship on future grant funding.

In this study, we sought to determine whether participation in a formalized research experience as defined by attainment of a PhD or completion of a postdoctoral research fellowship was associated with academic advancement. We hypothesized that formal research training would be associated with future higher research productivity, higher academic rank, and increased likelihood of NIH funding. The following were the specific aims of this project: (1) to identify a cohort of full-time academic plastic surgeons, (2) to obtain bibliometric, NIH research funding, and academic rank data for each surgeon, and (3) to identify whether formal research training was predictive of success in academic plastic surgery.

**MATERIALS AND METHODS**

**Study Design**

This was a cross-sectional study of full-time academic plastic surgeons in the United States. A query on FREIDA Online (https://freida.ama-assn.org) was performed to identify ACGME-accredited plastic surgery training programs on November 2014. A total of 94 programs were identified across the United States. A list of all these programs was compiled and utilized to query each residency program’s departmental website to obtain the names of all faculty members. The following inclusion criteria was utilized to determine the faculty member’s eligibility for the study: (1) was appointed in a full-time academic faculty position in a plastic surgery department or division of plastic surgery in an ACGME-accredited plastic surgery training program, (2) had a complete faculty profile on a departmental website that included their academic rank and educational background, and (3) was actively practicing as a plastic surgeon. The data collection and revision took place from March 2015-April 2015 by J.L. and A.A. A standardized data collection form was designed a priori using a commercially available database program (Excel, v.2010, Microsoft Inc., Redmond, WA).

**Study Variables—Predictors**

The following surgeon characteristics were reviewed and collected from the faculty member’s departmental websites: (1) postdoctoral research fellowship as defined by at least 1 year of basic science or clinical research training while or after surgical residency, (2) residency training program and year of graduation, (3) completion of clinical fellowship, (4) attainment of a PhD, and (5) attainment of additional degrees. Formal research training, defined as attainment of a PhD or completion of a postdoctoral research fellowship, was designated the main predictor variable. All other surgeon characteristics (location of residency training and year of graduation, completion of clinical fellowship, and attainment of any other additional graduate degrees) were collected to control for confounders.

**Study Variables—Outcomes**

The outcome of interest, “academic success,” was defined by a primary variable (scientific productivity) and 2 secondary variables (academic rank and NIH funded or unfunded status). A proprietary bibliometric database (SCOPUS, Reed-Elsevier, London, UK) was used to examine each surgeon’s scientific productivity as measured by the h-index. The h-index is defined as “the number of papers, h, from a researcher with citation counts of h or greater for each paper,” (e.g., an author with an h-index of 5 has 5 publications that have each been cited at least 5 times). The h-index was devised by Hirsh in 2005, and has been validated for use in the physical and medical sciences, including plastic surgery. The h-index score displayed in the “Create Citation Report” for each surgeon was recorded. The academic rank for each surgeon was reviewed and collected from the faculty member’s departmental websites. Rank was recorded as an ordinal variable (Instructor, Assistant Professor, Associate Professor, Professor, and