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Society of Asian Academic Surgeons

The effects of tenure and promotion on surgeon productivity

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ARTICLE INFO

Article history:
Received 10 September 2017
Received in revised form
25 January 2018
Accepted 13 February 2018
Available online xxx

Keywords:
Tenure
Promotion
Productivity

ABSTRACT

Background: Studies investigating the impact of promotion and tenure on surgeon productivity are lacking. The aim of this study is to elucidate the relationship of promotion and tenure to surgeon productivity.

Methods: We reviewed data for the Department of Surgery at our institution. Relative value units (RVUs) billed per year, publications per year, and grant funding per year were used to assess productivity from 2010 to 2016. We analyzed tenure-track (TT) and non–tenure-track (NT) surgeons and compared the productivity within these groups by rank: assistant professor (ASST), associate professor (ASSOC), and full professor (FULL). Kruskal–Wallis and Mann–Whitney *U* tests were used to assess significance and relationships between the groups.

Results: A TT faculty was promoted if they produced more research, with the highest publication rates in TT FULL. TT faculty publishing rates increased from ASST to ASSOC (1 *versus* 2, $P = 0.006$) and from ASSOC to FULL (2 *versus* 4, $P < 0.001$). There were no differences in the low publication rates among NT ranks. Grant funding was also highest at the TT FULL level. The clinical production (RVUs) was highest between TT ASSOC and NT FULL. TT faculty increased productivity between ASST and ASSOC (7023 *versus* 8384, $P = 0.001$) and decreased between ASSOC and FULL (8384 *versus* 6877, $P < 0.001$). Among NT faculty, RVUs were stagnant between ASST and ASSOC levels (4877 *versus* 6313, $P = 0.312$) and increased between ASSOC and FULL levels (6313 *versus* 8975, $P < 0.001$).

Conclusions: Tenure and nontenure pathways appear to appropriately incentivize surgical faculty over the course of their advancement. TT FULL has the highest research production and grant funding, whereas NT FULL has the highest clinical production.

Introduction

In the dynamic environment of academia, tenure has come under investigation and inquiry.[1,2] In 1984, Dr Robert Petersdorf, a former president of the Association of American Medical Colleges, wrote a special communication to the Journal of the American Medical Association titled "The Case Against Tenure in Medical Schools." In it, Petersdorf posits that tenure promotes stagnancy and unproductivity, encourages anticollegial behavior among faculty, and limits

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0022-4804/$ – see front matter
https://doi.org/10.1016/j.jss.2018.02.020

university resources for junior faculty recruitment.[3] These and subsequent critiques of tenure have brought about some changes: nationally, more academic faculty members are being appointed to non–tenure-track (NT) positions than tenure-track (TT) positions, with increases in "clinical full-time" nontenure roles at academic institutions.[4] In surgery, a review of surgeon evaluations has suggested there is no statistically significant relationship between operative teaching ability and tenure status.[5] Furthermore, although tenure is available in the majority of medical schools, only a minority of faculty physicians at these schools are tenured or eligible for tenure.[6]

Traditional arguments in favor tenure cite its history of protecting academic freedom from persecution and political influence. The American Association of University Professors established tenure in 1940 after a series of controversial academic firings throughout the country.[7] Seeking to prevent further dismissals without adequate cause, the AAUP developed tenure as an "indefinite-term" contract after a probationary period that protects against unjustified terminations.[8] Such freedom allows faculty to pursue "riskier" research and scholarship that has a greater chance of impacting the academic field. Ceci *et al.* recently reported that fully tenured faculty members were more likely to submit controversial publications than junior nontenured faculty members in the same field, and tenure positions are more commonly associated with leadership in academia.[9,10]

The process of achieving tenure varies among institutions, but it typically involves a probationary period followed by lengthy multi-level review processes.[11] In academic surgery, the process of promotion from assistant to associate and from associate to full professor averaged 5-7 y each.[12] Terms for promotion and tenure are often ambiguous, requiring external guides and close mentorship to navigate the process.[13,14] General criteria for promotion in many academic institutions are excellence in the fields of clinical care, research, and education, but definition of "excellence" is also vague. To further convolute the promotion process, many institutions have differing criteria for promotion in TT *versus* NT.[4]

Although these debates exist evaluating the efficacy of tenure, studies investigating the impact of promotion and tenure on surgeon productivity are lacking. A recent JAMA Surgery article showed that approximately 37% of surgical chairmen were nontenured.[15] The aim of this study is to elucidate the relationship of promotion and tenure to surgeon productivity.

Methods

This was a retrospective study using data from the Department of Surgery at the University of Alabama, Birmingham (UAB), from a period of 2010 to 2016. The study was approved by the UAB Institutional Review Board.

Three metrics were used to assess surgeon productivity: relative value units (RVUs) billed per year, grant funding per year, and publications per year from the period of 2010 to 2016. RVU data were collected by internal review of surgeon billing for procedures performed. Grant funding data were also obtained by internal review of reported grants within the Department of Surgery. Publication numbers were measured by Pubmed search, and affiliations were used to verify authorship. Inclusion criteria consisted of actively practicing surgeons at UAB Hospital with a rank of assistant, associate, or full professor. Exclusion criteria consisted of faculty members who billed on average less than 1000 RVUs/year during the study period or faculty members who had no billings in 2016. We analyzed two groups—TT surgeons and NT surgeons—and further stratified productivity within these groups by faculty rank (assistant [ASST], associate [ASSOC], and full [FULL] professorship). To account for promotion during the study period, data for prepromotion and promotion year were assigned to the prepromotion ranking, and data for postpromotion years were assigned to the postpromotion ranking. We assigned promotion-year data to the prepromotion ranking primarily because most promotions in our dataset occurred during the later half of years. Faculty members who were recruited away during the study period were excluded from analysis, as they had no billings in 2016, whereas faculty recruited to our institution during the study period were included in our analysis.

Data were presented as median and range for continuous data. Assuming a nonparametric distribution, the Kruskal–Wallis test was used to assess significance within the dataset. Mann–Whitney *U* tests were used to ascertain relationships between all the groups. The *P* value was set at 0.05 level. Data extraction and statistical analyses were performed using GraphPad Prism, version 7.

Results

Overall, 97 surgeons met our inclusion criteria, representing surgeons from multiple divisions and faculty levels.

When reviewing research production, overall publications were highest at the TT FULL level. In the TT, median publications per year increased from TT ASST to TT ASSOC (1 *versus* 2, $P = 0.006$) and from TT ASSOC to TT FULL (2 *versus* 4, $P < 0.001$). In the NT, median publications per year were 0 for NT ASST, 0.5 for NT ASSOC, and 0 for NT FULL; however, these differences among ranks were not significant ($P = 0.248$ and $P = 0.265$, respectively; Fig. 1).

When further dissecting research production to include only first and senior authorship publications, TT ASSOC and TT FULL had the highest numbers. First and senior author publications increased from TT ASST to TT ASSOC (0 *versus* 1, $P < 0.001$) and were unchanged between TT ASST and TT FULL (1 *versus* 1, $P = 0.055$). Again, there were no differences in the low publication rates among the NT ranks (0 *versus* 0 for ASST *versus* ASSOC, $P = 0.143$, and 0 *versus* 0 for ASSOC *versus* FULL, $P = 0.372$; Fig. 2).

When reviewing grant funding per surgeon per year, funding was highest at the TT FULL level. There was no difference in grant funding between the TT ASST and TT ASSOC levels (0 *versus* 0, $P = 0.268$), but it significantly increased between the TT ASSOC and TT FULL levels (0 *versus* 53,066, $P < 0.001$). Among the NTs, there was a significant difference in funding between the ASST and ASSOC levels (0 *versus* 1237, $P = 0.001$), but no significant difference was found between ASSOC and FULL levels (1237 *versus* 0, $P = 0.079$; Fig. 3).