

Protected Resident Research Time Does Not Increase the Quantity or Quality of Residency Program Research Publications: A Comparison of 3 Orthopedic Residencies ☆

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INTRODUCTION: The effect of dedicated resident research time in terms of residency program research productivity remains largely unknown. We hypothesize that the quantity and quality of a residency program's peer-reviewed publications (PRPs) increase proportionately with the amount of dedicated research time given to residents.

METHODS: Three residency programs (P1, P2, and P3) were examined. P1 has a mandatory research year for all residents between postgraduate years 3 and 4. P2 has an elective research year for 1 resident between postgraduate years 2 and 3. P3 has no dedicated research time for residents. All publications produced by residents and staff at each program from January 2007 through December were recorded from PUBMED. SCImago Journal Rankings were used as a proxy to measure research quality.

RESULTS: There was no significant difference in the number of publications produced between the institutions on a per-staff ($p = 0.27$) and per-resident ($p = 0.80$) basis. There were no residents at P3 who graduated without at least 1 PRP, whereas there were 7 residents from P1 and 8 residents from P2 who graduated without a PRP. There were no significant differences between programs in terms

of the SCImago Journal Ranking for the journals containing their publications ($p = 0.135$).

DISCUSSION: Residency programs with dedicated research time did not produce significantly ($p > 0.05$) more, or higher quality, PRPs than residencies without dedicated research time. It may be that the quantity and quality of PRPs is related more to faculty engagement, research interest, and mentorship at individual programs rather than the number of residents given dedicated time to complete research.

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COMPETENCIES: Practice-Based Learning and Improvement, Systems-Based Practice

INTRODUCTION

Although more than half of all academically based surgeons spend less than 20% of their time performing research,¹ many consider research to be an important part of resident education.²⁻

⁸ Both the American Board of Orthopaedic Surgery⁹ and the Accreditation Council for Graduate Medical Education (ACGME)¹⁰ require residents to be instructed on the basic principles of research and participate in a clinical or basic science

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research project. However, outside of the self-reported ACGME residency program annual updates, there are few ways to measure resident completion of these requirements. As a result, residency programs vary significantly in dedicated resident research time^{6,11-13} and educational research programs.^{5,6,8,11}

In the current environment of decreased financial reimbursements, resident work-hour restrictions and other persistent and evolving concerns regarding resident education, residency programs need to be able to justify research curricula and protected research time for residents.^{1,14} Although there is growing evidence supporting certain research programs and initiatives within isolated residency programs,^{1,5,6,8,11,12,15} the authors are unaware of any comparative studies evaluating programs with different amounts of dedicated resident research time. Such a study is important to better discern how protected research time affects the productivity and quality of research produced within orthopedic residency programs.

The purpose of this study is to investigate whether increasing amounts of dedicated resident research time increased an orthopedic surgery residency programs' research productivity and quality. Specifically, this was evaluated within the 3 largest military orthopedic residencies. These residencies are analogous to large, civilian institutions with academic affiliations, yet are similar enough to help control for some of the variables, such as staff tenure, institutional review, etc., that are likely to affect the productivity and quality of research produced at different institutions. The null hypotheses were that increasing amounts of dedicated resident research time would neither (1) increase the number of research publications produced within a residency program on a per-staff or per-resident basis nor (2) increase the quality of a research publications within a residency program.

METHODS

Peer-reviewed publications from 3 residency programs (designated for this study as (1) Program 1 [P1], (2) Program 2 [P2], and (3) Program 3 [P3]) were examined retrospectively from January 2007 through December 2014. At P1, the research year is mandatory for all residents and is completed between their postgraduate year (PGY)-3 and PGY-4 years. At P2, all residents have the opportunity to volunteer for an elective research year between their PGY-2 and PGY-3 years. If multiple residents volunteer, an application process is started, and 1 resident is chosen to complete the elective year of research. Before July 2013, all residents at P2, including the resident who elected to do a complete year of research, were also given a 3-month research block during PGY-3. After July 2013, no residents were given protected research time at P2 unless they volunteered for the elective research year. At P3, no residents were given protected research time during their

residency. All 3 programs shared the same research requirement—completing at least 1 publishable research project during residency. However, this project did not need to reach publication in order for residents to graduate.

All peer-reviewed publications produced by members of both staff and residents from each facility were provided by each residency program and confirmed by searching by both individual name and institution affiliation on PUBMED. Additionally, the names of every staff and resident working at these orthopedic surgery programs during the study period were individually searched in PUBMED for peer-reviewed citations. Any publication produced by a staff or resident within 1 year of the individual arriving or departing his/her affiliated institution (either P1, P2, or P3) during the study timeframe was included. If a publication had multiple residents or staff on it from 1 residency, it was only counted once. Any publication that included a staff or resident in any author position that registered in MEDLINE, to include case reports and even letters to editors, was included. The citation was exported from PUBMED and reorganized in Microsoft Excel (Microsoft, CA) for analysis. An author from each institution carefully examined the list of publications to ensure accuracy. The total number of staff years (Staff*years) and the total number of resident years (Resident*years) were calculated by summing the total number of staff and residents present at an institution during the reviewed time period on a per-year basis.

The SCImago Journal Ranking (SJR) of each publication's journal was then determined by using the SJR website (www.scimago.com). The SJR is only available for journals through 2013, as it requires a publication to be at least 2 years out from the date of publication in order to be calculated. The SJR was chosen as surrogate measure of research quality. This tool was chosen because (1) based on the calculation of SJR, higher quality journals should have an increased SJR compared to lower quality journals; (2) it would reason that higher quality journals publish higher quality articles than lower quality journals; (3) recent analyses have shown SJR as at least comparable to, if not better than, impact factor for measuring journal prestige;¹⁶⁻¹⁸ and (4) it is available as open access to increase internal validity of this publication. The SJR of a specific journal is calculated using a unique formula that is based on Google's PageRank algorithm and the transfer of prestige from the citing journal to the cited journal. In this manner, self-citations do not contribute to a journal's SJR. Rather, citations in closely related journals or journals with higher SJR's themselves are weighted higher than publications in nonsimilar texts or lower-rated journals. The SJR of each journal a resident or staff published into during each year was then compared across programs in an effort to compare the quality of research produced at each program.

Analysis of variance was used to determine any differences between programs in terms of total publications, the number of coauthors per publication, the number of

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