



AOA Critical Issues in Education

The More Things Change, the More They Stay the Same

Residents Perspectives on Learning to Teach Over 7 Years

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Introduction: Despite increasing emphasis on the development and implementation of Residents-as-Teachers programs, resident perspectives on their roles as teachers have rarely been explored. This paper explores trends across 7 years of data collected from resident leaders across North American orthopaedic residency programs.

Methods: Data were collected during the American Orthopaedic Association's resident-only engagement activity known as the C. McCollister Everts Resident Leadership Forum (RLF). A total of 997 of 1,050 RLF participants responded from 2015 to 2021.

Results: Residents perceived themselves as having a strong influence on medical students' education more so than any other teacher. However, less than one third are provided with any formal instruction from their institutions to support their teaching, and nearly 3 quarters of participants felt there was room for improvement in their teaching effectiveness. For the most part, resident perspectives have stayed relatively consistent over time.

Discussion: Residents are keen and willing to invest time into developing their teaching effectiveness. There may be a need for improved advocacy to program directors to increase the presence and availability of formal Residents-as-Teachers programs to support residents in their roles as teachers. We offer suggestions for the composition of such programs for consideration.

Introduction

There has been an increasing acknowledgement of the critical role residents play in the education of medical students¹⁻³. Coinciding with this shift is the need to effectively prepare residents to teach and support them in this endeavor. It is easy to imagine why this is important, as residents are simultaneously having to balance learner and teacher roles.

Commonly referred to as Residents-as-Teachers (RaT) programs, the first documented study examining the impact of a program aiming to support residents to teach well was conducted by Lawson and Harvil in 1980⁴. Since then, many have written about the need to support residents as teachers^{5,6}, created educational interventions to help residents learn to teach,^{7,8} and called for more support to focus on supporting

Disclosure: The **Disclosure of Potential Conflicts of Interest** forms are provided with the online version of the article (<http://links.lww.com/JBJSOA/A513>).

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TABLE I Resident response rates for survey questions

Year	Attendees	Question 1: Majority of Teaching		Question 2: Career Influence		Question 3: Required Instruction and Evaluation	
		Respondents	Response Rate	Respondents	Response Rate	Respondents	Response Rate
Y2015	144	136	94%	134	93%	136	94%
Y2016	151	135	89%	135	89%	135	89%
Y2017	163	150	92%	150	92%	149	91%
Y2018	175	175	100%	175	100%	175	100%
Y2019	165	152	92%	152	92%	151	92%
Y2020	147	144	98%	145	99%	145	99%
Y2021	105	104	99%	104	99%	104	99%
TOTALS	1,050	996	95%	995	95%	995	95%

clinician educators^{9,10}. Most notable of these studies is a critical review⁵ where authors found that across the 24 articles examined, results demonstrated one consistent finding—that RaT curricula significantly improves residents' teaching skills.

Increased pressure to support residents to become effective educators is not unfounded. For example, in Undergraduate Medical Education, the Liaison Committee on Medical Education which is the accreditation body for all North American medical schools, specifically outlines the need for medical programs to support the “ongoing development for all residents for each year of their residency in which they participate in teaching medical students”¹¹. Further the Accreditation Council for Graduate Medical Education (ACGME) has an expectation that residents contribute to teaching of medical learners¹² and more junior residents, and these expectations are integrated throughout ACGME milestones¹³.

Although we have sufficient examples of studies that evaluate the impact of RaT programs^{5,14-17} on residents teaching competencies, as well as calls from accreditation bodies^{10,11}, there is a paucity of research that examines resident perspectives on their roles as teachers, their perceptions of how well RaT programs are integrated into their residency education programs, and the extent to which such programs support their teacher development. This paper addresses this gap by examining trends across 7 years of data collected from resident leaders across North American orthopaedic residency programs.

Methods

Context

The American Orthopaedic Association's (AOA) annual international conference includes a unique resident-only engagement activity known as the C. McCollister Evarts Resident Leadership Forum (RLF)¹⁸. The RLF supports residents in leadership development, by supporting the development of new perspectives, providing opportunities for residents across North America to share best practices, and helping residents make connections with both leaders and peers¹⁹.

Within this Leadership Forum, a RaT session had been included yearly from 2015 to 2021. This yearly session changed based on resident feedback but included topics such as giving feedback, supporting medical student learning, asking effective questions, setting learning expectations, diagnosing learner's knowledge, etc.

Participants and Procedures

The residents attending the RLF are post graduate year 4's who have been nominated by their Program Directors and Department Chairs for their outstanding performance and emerging leadership abilities. A maximum of 2 residents per institution are permitted to attend. Each year all residents attending the RLF between the years of 2015 to 2021 were asked to complete an online questionnaire as part of pre-course activities. Embedded within this larger questionnaire was a survey with questions asking participants their opinions and feedback about RaT topics. The embedded survey questions stayed the same over the 7 years.

Results

From 2015 to 2021, a total of 997 of 1,050 RLF participants responded to the survey (95% response rate). Seven Likert survey questions were given to senior residents before attending the AOA RLF (see Appendix 1, <http://links.lww.com/JBJSOA/A514> for questions). Table I offers a breakdown of response rates for each question by each year. We present results in 2 sections, the first reporting general findings among resident responses (i.e., averages of each question across the 7 years) and the second focusing on changes across the 7 years of data (i.e., notable changes between responses for each question over the 7 years).

State of the Art—General Findings

The first 2 survey questions asked residents about who does most medical student teaching and who “most heavily influences” medical students career choice (Tables II and III). Over 7 years, residents perceived themselves as having a

TABLE I (continued)

Question 4: Formal Instruction Provided		Question 5: Knowledge of Adult Learning		Question 6: Rate Teaching Effectiveness		Question 7: Level of Interest	
Respondents	Response Rate	Respondents	Response Rate	Respondents	Response Rate	Respondents	Response Rate
136	94%	135	94%	136	94%	136	94%
135	89%	135	89%	135	89%	135	89%
150	92%	150	92%	150	92%	149	91%
175	100%	175	100%	175	100%	175	100%
151	92%	152	92%	152	92%	152	92%
145	99%	145	99%	145	99%	145	99%
104	99%	104	99%	104	99%	104	99%
996	95%	996	95%	997	95%	996	95%

strong influence on medical students' education. Specifically, on average, participants claimed that residents provided 90% of the teaching medical students receive (53% was believed to come from senior residents and 37% was believed to come from junior residents). What is surprising is that residents perceived to have more of an influence on medical students' career selection (52%) than faculty (41%). In other words, residents felt they had a greater influence on medical students pursuing (or not) a career in orthopedics more so than any other educators including attendings.

However, despite the major influence residents believe to have on their learners, on average, only 32% of residents declared that their institutions provide any formal instruction to residents regarding teaching (Table IV). This is particularly worrisome given that almost two-thirds (57%) of residents could not claim that they were knowledgeable of principles of adult learning, nor their application to teaching medical students, and nearly 3 quarters (74%) of participants felt there was room for improvement in their teaching effectiveness (see Tables V and VI, respectively).

Despite this clear gap between the large proportion of teaching residents provide and the lack of support they receive

in their roles as teachers, residents expressed an overwhelming desire (82%) to excel as a teacher (Table VII).

Trends (and Stagnations)–Changes Over Time

Despite 7 years representing a large amount of time which included a major shift of residency and medical programs toward competency-based education, resident perspectives on most of the survey questions have stayed relatively consistent. Particularly worthy of highlighting within these stable perspectives is that institutions have not made any significant efforts to build their residency programming to include formal instruction on becoming an effective educator. For almost all years except for 2015 where we saw a particularly low number (21%), the percent of residents who belonged to institutions with formal instruction on teaching hovered between 30% and 37% (Table IV).

Also notable is that despite institutions not increasing their programming on resident teaching, residents have steadily increased their own perceptions of how knowledgeable they are about adult learning, increasing from 36% in 2015 to 57% in 2021 (Table V).

TABLE II Majority of Teaching

Year	Faculty #'s	Faculty %	Senior Residents #'s	Senior Residents %	Junior Residents #'s	Junior Residents %	Fellow Medical Students #'s	Fellow Medical Students %	Residents (Junior & Senior Combined) #'s	Residents (Junior & Senior Combined) %
2015	14	10.3%	76	55.9%	45	33.1%	1	0.7%	121	89.0%
2016	11	8.1%	76	56.3%	48	35.6%	0	0.0%	124	91.9%
2017	18	12.0%	62	41.3%	70	46.7%	0	0.0%	132	88.0%
2018	11	6.3%	98	56.0%	66	37.7%	0	0.0%	164	93.7%
2019	17	11.2%	85	55.9%	49	32.2%	1	0.7%	134	88.2%
2020	16	11.1%	73	50.7%	54	37.5%	1	0.7%	127	88.2%
2021	10	9.6%	56	53.8%	38	36.5%	0	0.0%	94	90.4%
Totals	97		526		370		3		896	
Averages		10%		53%		37%		0%		90%

In my institution, most teaching of medical students during their orthopaedic rotation is performed by.

TABLE III Career Influence

Year	Faculty #'s	Faculty %	Residents #'s	Residents %	Other Medical Students #'s	Other Medical Students %
2015	53	39.6%	69	51.5%	12	9.0%
2016	56	41.5%	74	54.8%	5	3.7%
2017	62	41.3%	76	50.7%	12	8.0%
2018	78	44.6%	86	49.1%	11	6.3%
2019	72	47.4%	75	49.3%	5	3.3%
2020	56	38.6%	81	55.9%	8	5.5%
2021	35	33.7%	58	55.8%	11	10.6%
Totals	412		519		64	
Averages		41%		52%		7%

Among medical students, orthopaedic career selection is most heavily influenced by.

This may be an indication that they are being increasingly exposed to formal instruction on how to teach elsewhere. Where they may be receiving such support as well as other implications of our data are discussed next.

Discussion

What is stark in our data is that although 7 years have passed, residents have been steadfast in their perception that they are the primary teachers of medical students and that they can positively affect medical students' residency specialty choice. This perception is also validated from a medical student perspective in the literature, and in fact, it seems residents in our study are *underestimating* the extent of their impact, as upward of 86% of medical students in one study claimed that interactions with residents during their clerkship years was a key influence on their specialty decision²⁰. Other studies in this area also uniformly found that medical learners view residents as their teachers more so than attendings and claim that residents have more impact on their specialty choice than attendings²¹⁻²³.

TABLE IV Formal Instruction

Year	True #'s	True %	False #'s	False %
2015	29	21.3%	107	78.7%
2016	41	30.4%	94	69.6%
2017	50	33.3%	100	66.7%
2018	58	33.1%	117	66.9%
2019	48	31.8%	103	68.2%
2020	53	36.6%	92	63.4%
2021	38	36.5%	66	63.5%
Totals	317		679	
Averages		32%		68%

My institution provides formal instruction to me in regard to teaching.

What is also clearly consistent in our findings is that although residents want to be good at teaching, most do not receive formal training from their institutions and do not feel properly equipped to teach. Achkar et al.²⁴ examined perceived barriers to implementing RaT programs from a program director perspective, and creating space in an already packed program was the top cited barrier. However, one key implication from our data is that residents are keen and willing to invest time into developing their teaching effectiveness. As such, speaking with residents at forums such as the RLF about the importance of developing their teaching competencies may be akin to "preaching to the choir." Conveying resident perspectives to program directors who can then advocate for RaT programs within their own institutions may be more fruitful.

Overcoming the barriers to designing, developing, and implementing RaT programs into orthopedic residency programs is well worth the effort as RaT programs have consistently shown to increase residents' confidence in teaching^{17,25}, increase residents' clinical knowledge^{2,26} and medical learners have reported an increased perception that their residents were effective teachers²⁷. That said, longer-lasting impacts were seen when interventions were longer than a one-off workshop and supported with frequent reinforcement^{5,17,28}. Based on our extensive collaborative experience in faculty development (S.J.S. and K.W.) and orthopedic surgery (A.A.), we recommend a blended learning, student-centered approach which might include the following foundational topics: orienting to the role of teacher, effective observation and feedback, strategies for clinical teaching, assessing learners, and supporting healthy learning environments/relationships²⁹—all grounded in the context of residency education and patient care. As such, to ensure lasting positive impacts on resident teaching and student learning, programs should include foundational educational topics, be ongoing (i.e., longitudinal), focus on the changing level of knowledge and comfort in teaching over time (i.e., developmental), and be foundationally part of the residency experience (i.e., integrated)⁶.

Further conveying the need to advocate for more integrative RaT programs is imagining the consequence of not

TABLE V Knowledgeable of Adult Learning Principles

Year	Yes #'s	Yes %	No #'s	No %	Uncertain #'s	Uncertain %	No and Uncertain #'s	No and Uncertain %
2015	48	35.6%	45	33.3%	42	31.1%	87	64.4%
2016	51	37.8%	27	20.0%	57	42.2%	84	62.2%
2017	59	39.3%	39	26.0%	52	34.7%	91	60.7%
2018	63	36.0%	39	22.3%	73	41.7%	112	64.0%
2019	66	43.4%	34	22.4%	52	34.2%	86	56.6%
2020	78	53.8%	19	13.1%	48	33.1%	67	46.2%
2021	59	56.7%	14	13.5%	31	29.8%	45	43.3%
Totals	424		217		355		572	
Averages		43%		22%		35%		57%

I am knowledgeable of principles of adult learning and their application to teaching medical students and other residents.

TABLE VI Teaching Effectiveness

Year	Outstanding #'s	Outstanding %	Good but Room for Improvement #'s	Good but Room for Improvement %	Fair #'s	Fair %	Don't Know What I Don't Know #'s	Don't Know What I Don't Know %
2015	4	2.9%	108	79.4%	21	15.4%	3	2.2%
2016	4	3.0%	95	70.4%	29	21.5%	7	5.2%
2017	4	2.7%	108	72.0%	35	23.3%	3	2.0%
2018	4	2.3%	120	68.6%	45	25.7%	6	3.4%
2019	8	5.3%	114	75.0%	28	18.4%	2	1.3%
2020	8	5.5%	111	76.6%	22	15.2%	4	2.8%
2021	4	3.8%	81	77.9%	17	16.3%	2	1.9%
Totals	36		737		197		27	
Averages		4%		74%		19%		3%

I would grade my own teaching effectiveness as.

TABLE VII Interest in Teaching

Year	High and I Want To Excel #'s	High And I Want To Excel %	Somewhat High, But It is Often a Distraction and Not What I Signed up for #'s	Somewhat High, But It is Often a Distraction and Not What I Signed up for %	Low and I Would Much Rather Have Other Residents Do This #'s	Low and I Would Much Rather Have Other Residents Do This %
2015	110	80.9%	25	18.4%	1	0.7%
2016	118	87.4%	16	11.9%	1	0.7%
2017	117	78.5%	31	20.8%	1	0.7%
2018	146	83.4%	27	15.4%	2	1.1%
2019	124	81.6%	28	18.4%	0	0.0%
2020	114	78.6%	31	21.4%	0	0.0%
2021	83	79.8%	21	20.2%	0	0.0%
Totals	812		179		5	
Averages		81%		18%		0%

My level of interest in teaching is.


doing so. For example, if one goal of resident teaching in orthopedic education is to attract the next generation of excellent orthopedic surgeons, there exists the unfortunate chance that some medical students who would make outstanding surgeons avoid the specialty due to suboptimal resident teaching, an outcome that could and should be avoided with the inclusion of foundational teacher education in residency programs. RaT programs could spark residents to continuously refine their teaching skills, cultivate and promote a culture of excellent teaching within their practice contexts, and perhaps even become champions who teach others. Without a focus on supporting RaT through “in-house” educational programming, residents seem to be turning outside of their own institutions to learn how to teach, which reflects a resourcefulness on their end, and their keenness to excel at teaching. However, accessing educational resources outside of their own institution runs the risk of such resources lacking the specific institutional context that is important for medical students' learning.

Conclusion

Residents are near peers who perceive themselves to be highly influential to medical students^{1,2,15}. They are the on-the-ground teachers and thus are deserving of Resident-as-Teachers programs that support them to develop teaching competencies.

That 7 years of data show little movement in this regard and illustrate there is much work to be performed at a programmatic level across residency programs. We view these results as a “call to action” to all institutions to consider implementing residents as teachers' programs. We owe it to our learners.

Appendix

 Supporting material provided by the authors is posted with the online version of this article as a data supplement at [jbjs.org \(http://links.lww.com/JBJSOA/A514\)](http://links.lww.com/JBJSOA/A514). This content was not copy edited or verified by JBJS. ■

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