The Use of Resident-Run Clinics as an Educational Tool in Orthopaedic Surgery Residency

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Abstract

Background

The use of resident-run clinics to provide operative and clinical training is utilized in orthopaedic surgery, and other specialties (Neaman, Hill, Ebner, & Ford, 2010; Pyle, Angobaldo, Bryant, Marks, & David, 2010). Many orthopaedic residency programs promote resident-run clinics on their websites, but the structure and number of clinics remains unknown.

Objective

The purpose of this study was to provide insight into the current utilization of resident-run clinics in orthopaedic surgery residency programs and to assess program structure. Additionally, in programs that do not utilize a resident-run clinic, this study sought to assess program consideration and perceived barriers for instituting a resident-run clinic.

Accreditation Council for Graduate Medical Education (ACGME) accredited orthopaedic surgery residency programs in the United States were asked to complete an anonymous on-line survey. In 2016, an e-mail was sent to the 150 ACGME accredited orthopaedic surgery residency Program coordinators. The email was unable to be delivered to 4 programs, making the total number of programs 146.

Results

Of the 28 orthopaedic residency PCs that responded to the survey, 18 indicated their programs had resident-run clinics (64%). At 78% of resident-run clinics, residents spent one half-day per week in clinic. At 56% of programs, residents participated in resident-run clinics 4-5 times per month. Residents saw 11+ patients in an individual clinic.
setting (61%) and scheduled on average 6+ surgical cases per month out of clinic (72%).

Conclusions

This study demonstrates that resident-run clinics in orthopaedic surgery residency may provide a valuable learning environment by exposing residents to a reasonable volume and variety of patients with appropriate supervision.

Keywords: Resident-Run Clinic, Resident Education, Orthopaedic Surgery Residency, Surgical Education, Resident Training

Introduction

Orthopaedic residency programs strive to provide excellent operative and clinical training while preparing residents for all aspects of patient care. The use of resident-run clinics to provide excellent operative and clinical training utilized in orthopaedic surgery, and other specialties (Day et al., 2017; Francis et al., 2015; Neaman et al., 2010; Pyle, Angobaldo, Bryant, Marks, & David, 2010). Many orthopaedic residency programs promote resident-run clinics on their websites as a testament to resident autonomy and education, but the structure and number of clinics in use remains unknown.

Resident-run clinics provide an opportunity for residents to function somewhat autonomously, much like they would after graduation, while still having access to attending advice and guidance. Residents serve as the primary physician assigned to the patient, allowing for the development of clinical judgment and technical skills (Day et al., 2017; Neaman et al., 2010; Pyle et al., 2010). Through these clinics, residents learn to manage orthopaedic conditions both operatively and non-operatively. One of the most valuable lessons in training is how to appropriately select a patient for surgery, and how to determine what treatment is indicated for each patient.

In addition to furthering resident education, patients may benefit from resident-run clinics by gaining access to care they may otherwise not have been able to afford (Neaman et al., 2010; Pyle et al., 2010). A study examining the Affordable Care Act (ACA) in Massachusetts has shown that improved access to insurance resulted in a 9.3% increase in the use of discretionary surgeries (Ellimoottil, Miller, Ayanian, & Miller, 2014). As the size of the orthopaedic patient population continues to grow and expanded insurance allows more patients to seek orthopaedic care, there will in turn be an increased demand for orthopaedic surgeons (Ellimoottil et al., 2014; Kurtz, Ong, Lau, Mowat, & Halpern, 2007).

The purpose of this study was to provide insight into the current utilization of resident-run clinics in orthopaedic surgery residency programs and to assess program structure, resident time commitment, and patient characteristics. Additionally, in programs that do not utilize a resident-run clinic, this study sought to assess program consideration for instituting a resident-run clinic and perceived barriers for doing so.

Materials and Methods

Accreditation Council for Graduate Medical Education (ACGME) accredited orthopaedic surgery residency programs in the United States were surveyed to determine the utilization of resident-run clinics. A complete list of accredited programs was obtained from Fellowship and Residency Electronic Interactive Database and Access System (FRIEDA). Osteopathic, military, and non-ACGME accredited orthopaedic surgery residency programs
were excluded. In 2016, the survey was distributed to 150 program coordinators (PCs) via e-mail with instructions on survey completion. The email was unable to be delivered to 4 programs, making the total number of programs who received the survey 146.

The anonymous electronic survey was distributed to all eligible programs via REDCap (Research Electronic Data Capture, Vanderbilt University, Nashville, TN). In order to obtain applicable information from programs that have resident-run clinics and those that do not, branching logic was used to generate two different sets of questions depending on the user's answer to the first question "do you currently utilize a resident-run clinic as an educational tool in your residency program?" For coordinator's who answered "no," the survey then asked questions regarding whether the program had considered implementing such a clinic. For programs with resident-run clinics, the survey focused on program structure, resident time commitment, and patient characteristics (Supplemental Content). Institutional Review Board approval was obtained from the Drexel University Office of Research - IRB ID: 1604004469. Standard descriptive statistics were used to analyze responses to the survey.

Results

Survey responses were received from 28 PCs that received the survey (Response Rate: 19%). Of the respondents, 18 indicated that their programs had resident-run clinics (64%). Of the programs that did not have a resident-run clinic, most had not considered implementing one (90%) and none of these programs foresaw personnel issues (resident or support staff) as a preventative factor in initiating this type of clinic. Half of the respondents that did not have resident-run clinics believed that these clinics could provide effective patient care.

At 78% of programs, residents spent one half-day per week in the resident-run clinic (Fig. 1).

![Figure 1: Time spent in clinic per session (n=18 programs).](image)

At 56% of programs, residents participated in resident-run clinics 4-5 times per month. Most programs indicated that their residents saw 11+ patients in an individual clinic setting (61%) (Fig. 2).
The majority of resident clinics did not have patients assigned to specific residents (61%) and half of the clinics had all residents attend clinic who were available during the designated clinic time. Residents from all postgraduate year (PGY) levels participated in clinic (PGY1, 44%; PGY2, 83%; PGY3, 83%; PGY4, 83%; and PGY5, 94%). Most residents scheduled on average 6+ surgical cases per month out of clinic (72%). Total hip and total knee arthroplasty were booked from all resident-run clinics, while pediatric cases were the least common (24% of programs).

The majority of clinics were considered general orthopaedic clinics (56%); however, some reported having specific subspecialty clinics (44%). Of the eight residency programs with subspecialty clinics, five included 3-4 specialties, two programs had 5-6, and one program had 7-8. The percentage of patients in the resident-run clinics without insurance and with Medicaid insurance is shown in Figure 3.

In seven of 17 programs (41%), more than half of the clinic patients did not have insurance, while in nine of 17 (53%) programs, more than half of the clinic patients had Medicaid.
Discussion

Resident-run clinics are a unique way of providing residents with the responsibility to make independent, yet supervised, clinical decisions regarding patient care. This type of clinic has been used in plastic surgery residency programs as a means of providing safe and effective care to patients, while giving trainees an active role in clinical patient care (Day et al., 2017; Neaman et al., 2010; Pyle et al., 2010). Their use in orthopaedic training programs has not been examined to date, however, they are utilized at several academic institutions including 64% of residency programs who participated in this study. On average, residents saw 11+ patients in one half day of clinic per week. This exposes residents to a broad range of orthopaedic pathology and provides them with the opportunity to develop autonomy and establish stronger relationships with their patients. Additionally, resident-run clinics afford trainees a more active role in operative cases under the guidance of practicing orthopaedic surgeons.

A similar study was conducted in 2010 to determine the utilization of resident-run clinics in plastic surgery residency programs (Neaman et al., 2010). This study found that 57 programs utilized chief resident-run clinics (71% of survey respondents). The majority of current and recently graduated chief residents and program directors surveyed believed the clinics provided an effective means of teaching the six ACGME core competencies (Neaman et al., 2010). All resident respondents strongly agreed that the experience offered through the resident-run clinics contributed significantly to their surgery training.

A potential disadvantage of resident-run clinics is the inexperience of residents providing the patient care. Studies have suggested that surgical experience correlates with better patient outcomes (Hannan et al., 2002; Sosa et al., 1998). However, recent studies of resident-run clinics specifically suggest that these clinics do not negatively impact patient care (Neaman et al., 2010; Pyle et al., 2010). A plastic surgery chief resident-run clinic analyzed the overall post-surgical revision rate and complication rate over a 7-year span and found these rates compared favorably to other published reports of the same procedures (Pyle et al., 2010).

With increasing availability of insurance, more patients are seeking access to orthopaedic care. In 2006, approximately 800,000 total joint replacements were performed in the United States and it is estimated that by 2030, this number will increase to 3.5 million (Kurtz et al., 2007). Ellimoottil et al., examined the effect of the Affordable Care Act on elective surgeries, using 2007 as the starting point of increasing availability of government subsidized insurance. In Massachusetts alone, the volume of elective surgeries has increased by 9.3% in 3 years (Ellimoottil et al., 2014). The three most common elective procedures in Massachusetts from 2007-2009 were hip replacement, knee replacement, and spine surgery (Ellimoottil et al., 2014). Resident-run clinics may allow for increased access to orthopaedic care for this large patient population.

As the number of patients with orthopaedic injuries and complaints continues to grow and expanded insurance allows more patients to seek care, there will in turn be a higher demand for orthopaedic surgeons (Ellimoottil et al., 2014; Kurtz et al., 2007). ACGME duty hour restrictions increasingly limit the amount of time per week orthopaedic residents are allowed to spend performing patient care activities (Camp, Martin, Karam, Ryssman, & Turner, 2016; Mir, Cannada, Murray, Black, & Wolf, 2011). Orthopaedic residency programs have sought new ways to train residents, while maintaining compliance with duty hour restrictions (Camp et al., 2016; Mir et al., 2011; Robbins, Bostrom, Craig, & Sculco, 2010). The percentage of orthopaedic residents supplementing their training with a 1-year fellowship following graduation increased from 76% in 2003 to 90% in 2013, which may be in response to the decrease in clinical and operative experiences associated with work hour restrictions (Horst, Choo, Bharucha, & Vail, 2015; Morrell, Mercer, & Moneim, 2012). The independent yet supervised form of clinical decision making provided by resident-run clinics may better prepare residents for post graduate orthopaedic
A recent study of a single plastic surgery resident clinic demonstrated the achievement of progressive surgical autonomy. The study analyzed operative reports from cases booked out of the clinic and assigned the surgery a resident autonomy score based on the dictated phrase for the attending's role (autonomy score of 1 = "attending scrubbed for entire case", autonomy score of 5 = "attending available") (Day et al., 2017). This study also surveyed graduated chief residents. Resident satisfaction of the quantity and variation of operative case exposure from the resident clinic averaged 4.1/5. Resident's impression of autonomy granted pre-, intra-, and postoperatively averaged 4.5/5, 4.4/5, and 4.4/5, respectively (Day et al., 2017).

Limitations to our study include the low response rate (19%). Given the anonymous nature of the survey, we could not determine the geographic location of programs that responded and therefore we could not be certain that all geographic regions were represented. Furthermore, this study was based on data obtained by surveying residency program PCs, and did not directly analyze clinic metrics. Therefore, it is possible that clinic volumes varied over time or that there was reported bias, which may have affected the results. The survey was designed to analyze the proportion of patients with Medicaid or without any insurance in resident-run clinics. Questions were not included to try to differentiate between patients with public or private health insurance, to compare patients seen in resident-run clinics with those seen by residents in an attending physician's clinic, or to evaluate clinical outcomes. Additionally, this study did not investigate the perception of the utility of resident-run clinics by faculty, program directors, or residents. These are all potential areas for future research.

This is the first study to investigate the nature and attitudes towards resident-run clinics in orthopaedic surgery. Of the responding programs, 64% had some form of resident-run clinic and 72% of programs reported that 6+ surgical cases were booked out of clinic each month. Further studies are needed to delineate the appropriate and most effective use of resident-run clinics for both patients and trainees. This study demonstrates that these clinics provide an effective adjunct to orthopaedic education, allowing for increased resident autonomy in a clinical setting, and providing exposure to a diverse spectrum of orthopaedic pathology. Resident-run orthopaedic clinics may also improve access to care for the ever expanding orthopaedic patient population with newly provided public insurance.

**Conclusion**

Resident-run clinics are a unique way of providing residents with the responsibility to make independent, yet supervised, clinical decisions regarding patient care. Further research is needed to determine the efficacy and most appropriate structure for resident clinics. This study demonstrates that resident-run clinics in orthopaedic surgery residency may provide a valuable learning environment by exposing residents to a reasonable volume and variety of patients with appropriate supervision, while also improving patient access to orthopaedic care.

**Take Home Messages**

1. The majority of programs who responded to this survey utilized resident-run clinics as an education tool
2. Resident-run clinics provide a wide array of clinical and surgical opportunities
3. Resident-run clinics may allow for improved patient access to care
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Appendices

Supplemental content contains the survey distributed via E-mail to orthopaedic residency program coordinators.
The Use of Resident Run Clinics as an Educational Tool in Orthopedic Surgery Residency

Please complete the survey below.

Thank you!

Do you currently utilize a resident run clinic as an educational tool in your residency program?  
☐ Yes  ☐ No

Possibility of instituting a resident run clinic

Have you considered the possibility of instituting a resident run clinic in your program?  
☐ Yes  ☐ No

Do you foresee resident availability as a potential barrier to having a resident run clinic?  
☐ Yes  ☐ No

Do you foresee hospital support staff as a potential barrier to having a resident run clinic?  
☐ Yes  ☐ No

Do you believe a resident run clinic could provide effective patient care?  
☐ Yes  ☐ No

Information regarding current resident run clinic

How often do your residents have their clinic?  
☐ 0-1 times/month  ☐ 2-3 times/month  ☐ 4-5 times/month

Does each individual resident have his/her own clinic patients?  
☐ Yes  ☐ No

Does your program have a clinic in which all residents who are available at that time attend?  
☐ Yes  ☐ No

Do residents have responsibility for individual patients throughout residency across years?  
☐ Yes  ☐ No

Approximately how many patients per clinic session do your residents see?  
☐ 0-5  ☐ 6-10  ☐ 11-15  ☐ 16-20

How much time do your residents spend in the clinic per session?  
☐ Half day (eg 4 hrs)  ☐ Full day (eg 8 hrs)  ☐ Other

Please specify how much time your residents spend in the clinic per session (in hours).
What PGY level residents see patients in the clinic? Please check all that apply.

- PGY1
- PGY2
- PGY3
- PGY4
- PGY5

What is the average volume of surgical cases booked from all resident clinics total per month?

- 0-5
- 6-10
- 11-15
- 16-20

What types of pathology are your residents operating on from their clinic? Please check all that apply.

- Trauma
- Total joint
- Spine
- Foot/ankle
- Shoulder/elbow
- Hand
- Sports medicine
- Pediatrics
- Oncology

Does your program have specialty specific clinics (e.g. sports medicine clinic, shoulder clinic, spine clinic) that are overseen by the residents?

- Yes
- No

How many specialty specific clinics does your program have?

- 0-2
- 3-4
- 5-6
- 7-8

What percentage of patients in the resident-run clinics have no insurance?

- 0%-25%
- 26%-50%
- 51%-75%
- 76%-100%

What percentage of patients in the resident-run clinics have Medicaid?

- 0%-25%
- 26%-50%
- 51%-75%
- 76%-100%

Who is most often the primary surgeon for cases booked out of the clinic?

- Resident
- Fellow
- Attending
- Other

Please specify who is most often the primary surgeon for cases booked out of the clinic.

Declaration of Interest

The author has declared that there are no conflicts of interest.