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## AOA Critical Issues

# Resident Education Versus Fellowship Training—Conflict or Synergy?

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### Introduction

The fundamental mission of graduate medical education is to train young professionals to become future practitioners and academicians. Orthopaedic surgery training programs are primarily directed toward resident education. The subspecialty training of fellows, however, is arguably equally important. Thus, two constituencies that may compete for educational experience, attention, and resources are inherent to many training programs.

We developed a survey to explore this issue prior to a symposium on this topic presented at the American Orthopaedic Association (AOA) meeting in June of 2009. Questions concerning the relationship between resident and fellowship education were distributed to orthopaedic residents in their fourth postgraduate year (PGY-4) of training who attended the Resident Leadership Forum at the 2009 AOA meeting. Responses were obtained from seventy-seven resident participants, a number that represents 12% of the total PGY-4 orthopaedic residents in 2009. The same survey was distributed to orthopaedic surgery department chairs, program directors, and

fellowship directors across the United States. One hundred sixty-nine of this “faculty” group responded, a number that was 41.6% of the possible total.

### History

In the nineteenth century, surgeons generally were self-trained or learned by way of an apprenticeship<sup>1</sup>. No formal system was in place and few surgeons spent more than one or two years in a hospital setting. In 1889, with the founding of The Johns Hopkins Hospital, Dr. William Halsted transformed surgical training from its loosely organized structure to a university-sponsored, hospital-based model with graduated responsibility that culminated in a period of near autonomy. Formalization of the qualifications requisite of surgical subspecialties soon followed, largely to assure the public of a specialist’s preparation and skill<sup>2</sup>. The American Board of Orthopaedic Surgery (ABOS) was incorporated on February 4, 1934, and gave its first certification examination in 1935<sup>3</sup>.

Oversight of board certification implied the need for more rigorous oversight of orthopaedic residency training

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programs. Meetings among the American Medical Association, the American College of Surgeons, and the ABOS led to the creation of the Residency Review Committee (RRC) for Orthopaedic Surgery in 1953<sup>3</sup>. The Accreditation Council for Graduate Medical Education (ACGME) was founded in 1981 to oversee each specialty's respective RRC. In the 2010-2011 academic year, there were 3437 residents in 152 ACGME-accredited orthopaedic residency programs in the United States<sup>4</sup>.

In contrast to orthopaedic residencies, orthopaedic fellowships remained largely unregulated until the early 1980s. During that time, the RRC began to express concern about the inconsistent educational value of many fellowships, as well as the potentially adverse impact of some fellowships on residency programs<sup>5</sup>. Initially, the ACGME increased oversight by accrediting those fellowship programs that led to a Certificate of Added Qualification (CAQ)<sup>3</sup>. In orthopaedics, and in combination with general surgery and plastic surgery, a CAQ in hand surgery was first awarded in 1989. Separately, the ACGME also agreed to accredit orthopaedic fellowships that did not lead to added certification, and pediatric orthopaedic fellowships first became accredited in 1986. Other orthopaedic subspecialties followed suit, including adult reconstructive orthopaedics, foot and ankle orthopaedics, musculoskeletal oncology, orthopaedic sports medicine, orthopaedic surgery of the spine, and orthopaedic trauma<sup>3</sup>. Currently, only hand surgery and orthopaedic sports medicine fellowships can lead to an added subspecialty certification following successful completion of an examination<sup>6-8</sup>. The number of orthopaedic fellowships has continued to expand and over 90% of orthopaedic residents pursue a fellowship after graduation, up from 60% over a decade ago<sup>9,10</sup>.

### Effect of Fellowships on Residency Programs

There is a paucity of literature exploring the impact of subspecialty fellowships on residency programs. The impact of a fellowship on resident education must be evaluated in the context of whether it enhances or detracts from competency-based education<sup>11</sup>. Furthermore, any potential resident dissatisfaction must be offset by the realization that nearly all residents elect to pursue fellowships after graduation, thereby becoming fellows themselves.

### Specialty Literature

#### Obstetrics and Gynecology

A study exploring the perceived impact of fellowships on residency training in obstetrics and gynecology revealed a discrepancy between the perceptions of residents and program directors, wherein residents tended to perceive a negative impact while the program director viewed fellowships in a more positive light<sup>12</sup>. Another study exploring the impact of gynecological oncology fellows on senior resident training at multiple centers found that residents at sites without fellows were more likely to operate with attending surgeons (91% versus 77%) and were more likely to be responsible for complicated cases (39% versus 22%)<sup>13</sup>. While 66% of residents at sites with fellowships reported competition with fellows for cases, 90% of residents across all sites still described their overall residency experience as positive and valuable.

### Urology

A study exploring resident case volume in pediatric urology before and after creation of a pediatric urology fellowship found that the overall number of index cases remained unchanged but that resident case volumes decreased in areas that involved higher level cases<sup>14</sup>. Test scores in the area of pediatric urology on the American Urological Association resident in-service examination were unchanged. Another recent study at a large, academic urology program with established fellowships surveyed faculty, fellows, and residents on the impact of clinical fellows on resident training<sup>15</sup>. Faculty and fellows tended to support the addition of more fellows, believed that certain complex cases should be designated as fellow-level cases, and did not believe that the research opportunities of residents were restricted due to fellows. In contrast, residents generally perceived that fellows "steal" operative cases and that operating with a fellow present was not equivalent to operating with the faculty member alone. Nonetheless, all three groups generally agreed that fellows add value to the residents' overall educational experience and that fellows should participate in the call schedule. Notably, there was also agreement that the role of the fellow in the operating room, especially as it pertains to case volume and selection, should be better defined.

### General Surgery

In a review of operative case logs at an academic program before and after the addition of a laparoscopic fellowship, no change in resident surgical volume was found with the addition of a fellow<sup>16</sup>. Notably, however, creation of the fellowship program coincided with an expansion of the clinical department, resulting in an overall increase in the total number of laparoscopic cases performed. In another study, medical students were surveyed about factors that affected their preference for academic or community-based general-surgery residency programs, and the results of the survey indicated that competition with fellows for cases was a significant reason for not choosing an academic program<sup>17</sup>. On the other hand, the results from a multicenter survey of vascular surgery residency and fellowship program directors indicated that 80% of directors believed that the presence of vascular surgery fellows improved clinical training and only 15% believed that it detracted from the experience of general surgery residents<sup>18</sup>. Furthermore, a comparison of vascular surgery centers with and without fellowships indicated that the number of major vascular procedures that involved resident participation was higher in centers with fellowships, likely because such programs manage more complex cases. This study did not incorporate resident input.

### Orthopaedic Surgery

The literature exploring the impact of fellowships on residency training in orthopaedic surgery is sparse and largely limited to expert commentary<sup>19</sup>. In one such article, Dr. W. C. Allen noted that "there is little question that the educational process that occurs during fellowships can have a beneficial effect on the learning process of residents and vice versa"<sup>25</sup>. He cautioned, however, that "it becomes incumbent on the residency

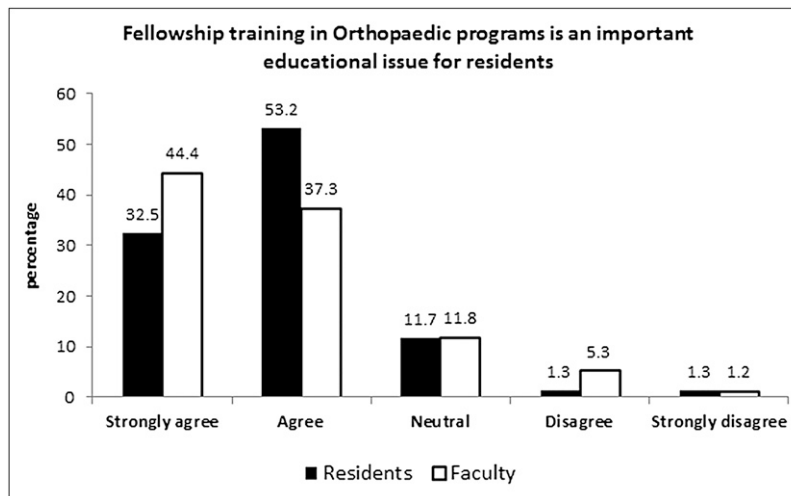


Fig. 1

Graph showing the percentage of residents and faculty who agree or disagree with the statement “Fellowship training in orthopaedic programs is an important educational issue for residents.”

program director to adjust the program so that the educational quality of both the fellowship and the residency are enhanced, not diminished.”

In other commentary, Dr. R. R. Cooper discussed the potential advantages and disadvantages of orthopaedic fellowships as they relate to residency programs and orthopaedic surgery as a whole<sup>6</sup>. Dr. Cooper noted the potential for fellows to provide education and role-modeling in specific areas, but he cautioned that fellows should not be trainees making up for deficits in residency training and that fellowships have the potential to fragment orthopaedics if educational goals are not clearly defined. Ultimately, Dr. Cooper advocated for limited goals in fellowship—namely, to teach residents, to participate in orthopaedic research, and to treat only those complex cases that a faculty member would directly treat were there no fellows available or that an orthopaedic surgeon would not treat without supplementary training in a given subspecialty.

Additional commentary by Dr. J. R. Urbaniak underscored the beneficial role that fellows play in the education of subspecialists as well as the potential for fellows to serve as conduits of information and techniques across academic programs<sup>10</sup>. Dr. Urbaniak also described fellow participation in peer learning as an extension of the manner in which junior residents learn from senior residents and as an opportunity to develop fellows’ teaching skills accordingly. He underscored, however, the importance of senior leadership in coordinating residency and fellowship programs so that fellowships are properly structured and integrated into residency programs in a manner that will enhance the residency experience. Along this line, he noted that at his own program, “. . . all fellows who apply are informed that residents come first and fellows, second.”

In a separate commentary, Dr. J. H. Herndon argued that integrating the years of subspecialty education into residency training would be desirable for financial reasons, but expressed concern that the volume of cases for various subspecialties may

not be high enough at a given residency program to support this<sup>19</sup>. In his opinion, the ideal academic subspecialty fellowship would be accredited by the ACGME and would lead to subspecialty certification.

#### *American Orthopaedic Association*

Questionnaires completed by PGY-4 orthopaedic residents attending the 2009 meeting of the AOA and from an electronic survey of orthopaedic department chairpersons, program directors, and fellowship directors afford more quantitative insight into the relationship between fellowships and their respective residency programs. While these data were drawn from survey results and important information is still lacking, the data offer a degree of focus to the ongoing interplay between fellowship and residency education.

#### *Education*

Both residents and faculty overwhelmingly agreed (86% and 82%, respectively) that fellowship training in orthopaedic programs is an important educational issue for residency programs (Fig. 1). Of the faculty surveyed, approximately 81% agreed (44% strongly agreed and 37% agreed) that orthopaedic training programs should be concerned about possible conflict in resident and fellow education and 83% were taking active steps to manage potential conflicts. Among the residents, 73% shared this sentiment (20% strongly agreed and 53% agreed) and 72% felt their program was taking active steps to manage potential conflict.

#### *Operative Procedures*

A majority of residents underscored the role of a fellow in the operating room as a major source of conflict (Fig. 2). Of the residents surveyed, approximately 42% described cases taken by fellows that should have been performed by residents (Fig. 3). Ultimately, a total of approximately 29% of residents believed that their educational experience on a rotation had been compromised

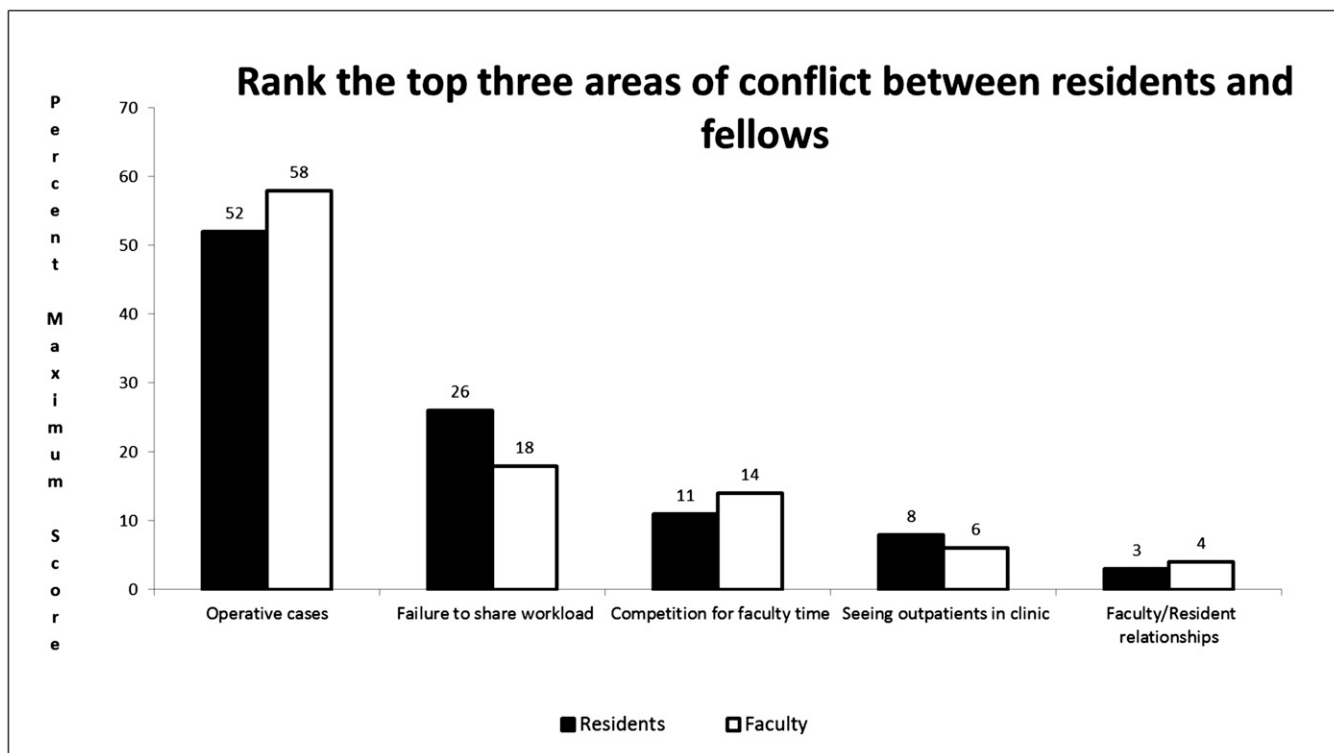


Fig. 2

Graph showing the responses of residents and faculty to the request to rank the top three areas of conflict between residents and fellows.

by the presence of a fellow and approximately 23% of faculty felt similarly (Fig. 4). Individual comments by both residents and faculty highlighted the phenomenon of fellows “stealing” operative cases from residents as an underlying problem.

The “competition” for surgical cases, whereby both the resident and fellow wish to be the primary surgeon, is undoubtedly the most common potential conflict when incorporating

fellows into the learning environment of a residency training program. The involvement of a fellow may vary and, in some instances, the fellow may want to be involved in all cases regardless of complexity. In other situations, complex or rarer cases may default to the fellow as the primary surgeon, eliminating that opportunity for the resident. Ultimately, the coexistence of residents and fellows on the same teaching service would most

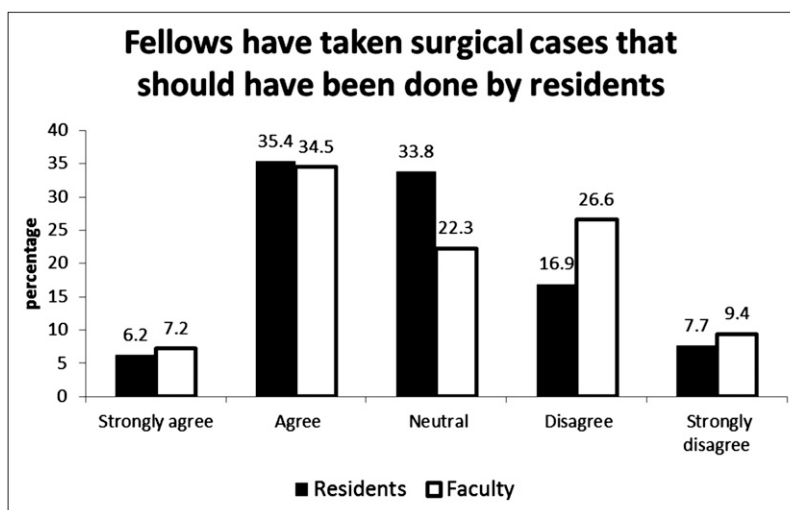


Fig. 3

Graph showing the level of agreement of residents and faculty to the statement “Fellows have taken surgical cases that should have been done by residents.”

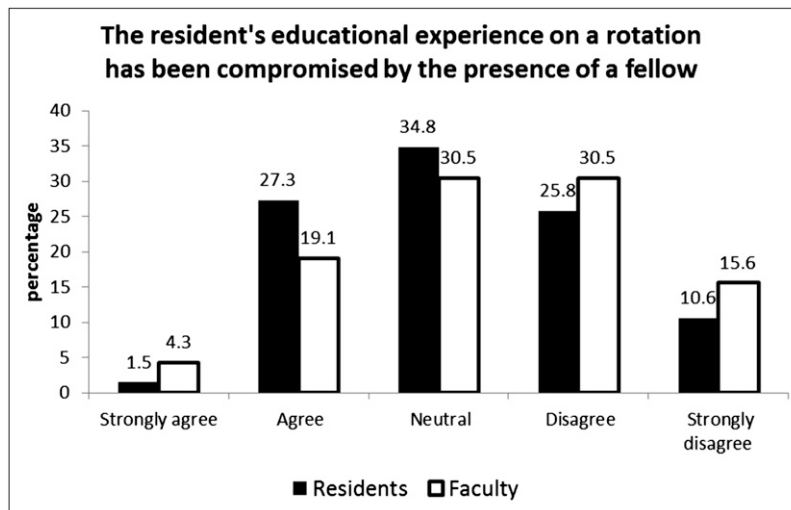


Fig. 4

Graph showing the responses of residents and faculty to the statement "The resident's educational experience on a rotation has been compromised by the presence of a fellow."

likely, if not obligatorily, diminish the number of times that either the resident or the fellow might take the role of primary surgeon during an operation, a situation that could effectively translate into fewer times as primary surgeon for both.

#### Case Allocation

Residents reported that case allocation generally occurred either by the decision of the attending physician (19%) or by a system in which fellows perform the more difficult cases and residents perform the easier ones (21%). Other methods included giving the fellow priority in 16% of programs and the resident priority in 3% of programs. Residents generally agreed that cases should be allocated either by the decision of the attending physician (17%) or in a manner that distributes cases based on degree of difficulty (35%). An additional 12% felt that

fellows should get priority, but 13% felt that the resident should get priority. Faculty members tended to agree that cases should be allocated by the decision of the attending physician (17%) or degree of difficulty (35%). On the other hand, only 1% of faculty felt that the fellows should get priority and 11% felt that the residents should get priority. Given that only 1% of program directors, department chairs, and fellowship directors supported giving priority to fellows, whereas residents reported that this occurs in 16% of programs, the results suggest that prioritization of fellows over residents may also occur at the level of the individual attending physician.

#### Workload

Approximately 26% of residents described failure on the part of fellows to share workload as a major source of conflict. Some

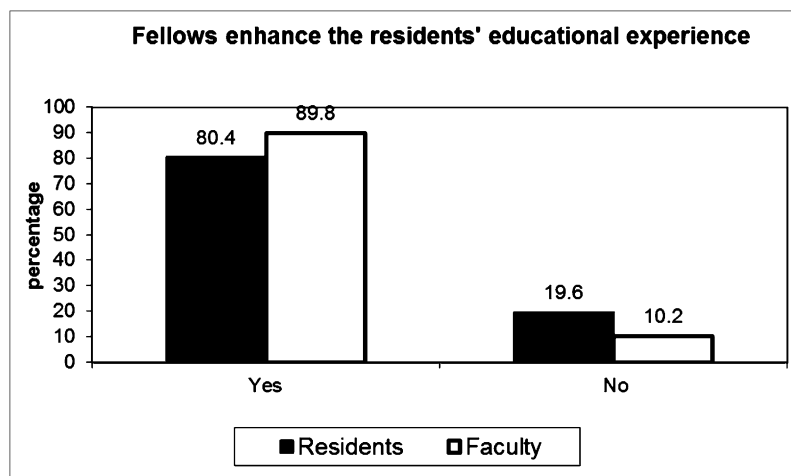


Fig. 5

Graph showing the percentage of residents and faculty who answered "yes" or "no" to the statement "Fellows enhance the residents' educational experience."

specifically stressed the need for fellows to share in the burden of responsibility for floor work, especially as it pertains to operative cases performed without resident participation.

### *Conflict by Subspecialty*

The degree of perceived conflict between fellows and residents varied by orthopaedic subspecialty. Sports ranked first as an area of resident concern, followed by spine, trauma, and hand. Faculty agreed that sports medicine was the greatest area of conflict, and they sequentially ranked adult reconstruction, spine, and hand as the most problematic subspecialty areas.

### *The Role of Leadership in Conflict Resolution*

Faculty members reported that conflicts between fellows and residents are generally adjudicated by the attending physician in charge (50%) and less frequently by the fellowship director (18%) or residency director (16%). Ideally, however, they expressed the view that fellowship or residency directors (50%) may be better positioned to manage such conflict in lieu of the attending physicians involved (36%). In contrast, most residents felt that such conflict should be managed by the attending physician (60%) rather than by the fellowship or program directors (33%). Ultimately, 83% of faculty members claimed their program is taking active steps to manage potential conflict and 72% of residents agreed.

### *Positive Contributions*

Of the residents surveyed, approximately 80% affirmed that fellows enhanced their educational experience (Fig. 5), and 58% went so far as to say that fellows had contributed to their education in a way that faculty had not. Faculty confirmed this sentiment, with approximately 90% agreeing that fellows enhance the resident experience (Fig. 5). Individual comments highlighted that fellows often provide a more hands-on experience for residents when they directly supervise operative procedures and thereby act as junior attending physicians rather than first assistants. Furthermore, 91% of residents planned to pursue a fellowship after graduation and fellows were cited as a source of career advice.

### **Discussion**

Over the past century, surgical training has evolved from an apprenticeship model to the formal structured requirements of modern day. Paralleling the increased complexity of clinical practice has been the increasing specialization that has taken place across surgical disciplines, which has further shaped the educational landscape. Contemporary residents not only compete with each other for instruction and resources in their program but often with a substantial number of fellows in virtually all orthopaedic subspecialties.

Resident physicians are, understandably, both concerned about and protective of their clinical and surgical experiences. The presence of additional trainees such as fellows poses unique issues in the balance of surgical education. The interaction between residents and fellows, not only with each other but also with attending physicians, can play a critical role in the

formative experiences of surgeons-in-training. A successful and peaceful interplay between residents and fellows can potentially maximize each of their respective experiences; however, poor communication, territorial behavior toward cases, and competition for the time of the attending physician undermine the experiences of the trainees and the teachers.

It should be noted that our data represent survey responses to our questionnaire. These responses are inherently perceptions of the participating residents and faculty rather than hard data. While this means that our conclusions will be interpretations of these perceptions, we believe that certain salient points do arise when examining the impact of fellowships on residency training programs.

### *Education*

From a practical point of view, modern orthopaedic surgery increasingly necessitates fellowship training due to subspecialization of the field. Invariably, adding additional trainees at any level to an existing residency program has educational implications. Educational resources—ranging from volume of operative cases to faculty time—may be limited. Thus, as the number of fellows increases, a foreseeable “tipping point” looms wherein the number of trainees outpaces educational opportunities. Furthermore, given that fellows have a higher level of training, an implicit interest in a specific subspecialty, and a propensity to spend longer periods of time on a service, the education of a fellow may insidiously become prioritized over that of a resident. The literature from other subspecialties confirms that there is often a discrepancy in the way faculty and residents perceive the impact of fellows, wherein faculty tend to view fellows more positively while residents express concern over lost educational opportunities. The inherent difficulty in defining the tipping point is that it is often identified after it has already been reached and conflict has become evident. From a purely numerical standpoint, operative volume in a residency program may not be high enough to sustain a fellowship if it would require residents and fellows to double-scrub on basic cases. From a cultural standpoint, adding fellowships must afford fellows a valuable educational experience but must not significantly compromise a program’s traditional focus on resident education. When the culture of a residency program tolerates the metamorphosis of resident surgical training into extended periods of observership, the tipping point has been reached.

One educational philosophy that may maximize the experience of the resident (or fellow) is “one teacher, one learner, one patient.” This form of functional learning is easiest to employ in a mentorship or preceptorship curriculum, or if there is adequate volume in the practice to allow one-on-one interaction for the residents and the fellows with the attending staff. While there are obviously many different models of education and curricula, conflict between residents and fellows may tend to arise when the ratio of residents and fellows to teachers and patients becomes larger.

Unquestionably, however, fellows also have the potential for positive contributions toward resident education, especially as it pertains to their unique position as peer educators. Fellows

may serve as sources of information in various subspecialties, lead didactic sessions, facilitate research, and expose residents to treatment methods used at other institutions. Cultivating this relationship necessitates clear guidelines on the part of department chairpersons, program directors, and service chiefs. Ultimately, the goals of a fellowship need to be explicitly defined. These should focus on learning the general approach of the faculty to subspecialty patient care, research, teaching, writing, and preparing presentations. In essence, fellowships ought to build on past experiences rather than rectify deficits in prior residency training.

### **Operative Procedures**

Much of the perceived conflict between fellows and residents stems from competition for operative cases. Residents frequently express concern about fellows “stealing” cases that would have otherwise been performed by residents, although residents also concede that complex cases requiring additional training may be appropriately designated as “fellow level.” Faculty should play a central role in case allocation, with an eye toward both the degree of difficulty inherent in a day’s cases as well as equity of time spent operating if both a resident and fellow are scrubbed. Realistically, the more senior the trainee, the more subtleties that can be appreciated by watching, and this should be taken into account when choosing between a resident and fellow to participate in a case. Furthermore, the designation of fellow-level cases need not be static, and efforts should be made to encourage resident participation in increasingly complex cases through the course of a rotation.

The operating room may also present important opportunities for fellows to teach, especially when working with relatively junior residents. By standing at the crossroads of having recently completed residency and preparing for imminent attending positions, fellows have a unique insight into the challenges of both orthopaedic training and independent practice. This combination of accessibility and skill can be cultivated into a symbiotic learning environment for both the resident and the fellow. Inherent to the role of the fellow as a teacher is the potential to function as a junior attending physician in the operating room rather than as an additional trainee competing for the faculty’s time. In this sense, if both a resident and a fellow are involved in a case, the best way for faculty to teach, paradoxically, may be to facilitate learning by assuming a less active role.

### **Workload**

Accompanying the educational component of orthopaedic training is a service component that is inherent to patient care. Another source of conflict reported between residents and fellows lies in a failure to share this workload. Some residents describe a “double crush” injury, wherein operative cases may be performed by fellows but floor responsibilities are borne by the residents. This has a deleterious impact on the education-to-service ratio of residency training, and fellowships must be structured in a manner that avoids increasing the service component of residency programs while facilitating the edu-

cational component of fellowships. Furthermore, in a modern educational landscape in which the ACGME focuses on both competency-based education and work-hour limits, an inequity of workload has implications for accreditation during RRC review of programs. Among the successful steps taken toward rectifying this problem has been to require trainees who participated in a given procedure, regardless of level of training, to assume full responsibility for inpatient management.

### **Leadership**

Orthopaedic leadership personnel, including department chairpersons, program directors, and service chiefs, play a crucial role in successfully integrating orthopaedic fellowships into residency programs. They are best positioned to construct the systems-based solutions that balance resident and fellow education, including rotation structures, operative case allocation, and workload sharing. Equally important, they can disseminate a cultural commitment to resident education among all faculty members and must continuously work to reaffirm this dedication at the individual attending level. Beyond simply taking steps to avoid conflict, they may also work to capitalize on the beneficial contributions that fellows uniquely offer in a teaching environment. In a broader sense, it is also incumbent on orthopaedic leadership to continue to explore how best to integrate fellowships and residency programs in a manner that is beneficial for all.

We believe it is necessary to change how educators approach fellows and their training. In lieu of a fellow-centered program, we propose the term *program-centered fellowship*. In a program-centered fellowship, the fellow’s role is clearly defined by the program or fellowship director. The fellow is part of the fabric and framework of the residency training program and is expected to fully participate in the program, while the program must accept the fellow as one of its own. In this setting, the rules for sharing work are clearly established. Fellows assist in didactic teaching, thus allowing programs to capitalize on their experience and expertise. Potentially, the fellow may serve as junior faculty member.

### **Conclusion**

The growth of orthopaedic fellowships raises the salient question of how best to integrate fellowship training into existing residency programs in a manner that enhances rather than detracts from resident education. Fellows best contribute to a residency program when they have clear goals and objectives with a defined curriculum, so that they catalyze rather than infringe on resident learning. Residency programs must also be mindful of reaching a tipping point wherein the number of trainees outpaces educational opportunities. Key areas of conflict lie in the distribution of operative cases and sharing of workload, both of which must be actively addressed by department leadership. Given the potential for peer learning, fellows may function best when they act as junior faculty—who directly teach residents and guide them through operative cases—rather than as additional trainees who compete with residents for the faculty’s time.

In light of recent ACGME initiatives focused on competency-based education, it is also crucial for residency programs to strike a balance between service and education. Fellowships should avoid facilitating the education of fellows at the expense of increasing the service responsibilities of residents. While one must concede that the increasingly complex practice of orthopaedic surgery frequently necessitates subspecialty training, fellowships should not be designed to rectify deficits in prior residency training. The concept of a program-centered fellowship implies integration of the fellow into the residency training program with attention to roles and responsibilities as a team player and educator in his or her own right. As our survey respondents suggest, resident-fellow relationships can be synergistic with appropriate commitment and management. ■

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