

Enhancing Competence in Graduates Through a Transition to Practice Program in Neurological Surgery

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Residency training in the United States has undergone a striking change with the advent of the 80-hour workweek in 2003 (Figure 1). Surgical disciplines have been especially affected because of the acuity of patient illness and the need for time-intensive, hands-on procedural training. Neurosurgical training has also been affected, and many in the neurosurgery establishment believe that this reduction in hours has had a negative effect on training. In particular, the traditional chief residency has suffered. The dictum of the American Board of Neurological Surgery requires that as senior-most, or chief, resident, “the trainee shall have major or primary responsibility for patient management, as well as administrative responsibilities, as designated and deemed appropriate by the program director.” In the last decade, because of rules requiring immediate availability of faculty for all surgical cases, changing patient expectations at academic centers, and oppressive malpractice environments, this period of training has changed. Chief residents are no longer easily able to embrace this comprehensive and primary responsibility for patient care. Similarly, other aspects of training, including administrative responsibilities, billing practices, and coding education, have been left lacking. To address these changes, the University of Florida has adopted a transition to practice (TTP) program. This program allows residents a 6- to 12-month period as a heavily mentored junior faculty member with independent operative, clinic, and on-call time. We reviewed the experience of the 8 residents who have completed this program since 2005.

MATERIALS AND METHODS

Objectives for the TTP program were set out at the initiation of the program in 2005. These objectives are listed in Figure 2. To determine whether these objectives had been met, anonymous surveys were sent to each TTP graduate. Concurrently, surveys were sent to current residents, faculty, and support staff. The survey is shown in Figure 3. For the TTP graduates, surveys were followed by telephone interviews for

Rule Description

- 1) 80 hrs per wk averaged over a 4-wk period
- 2) Every 7 days, a 24-hour period completely free of clinical responsibilities
- 3) In-house call no more than every 3rd night (4-wk average)
- 4) In-house call no more than 24 hrs (+ 6 additional hrs for continuity of care) per shift
- 5) Min of 10-hrs between daily duty periods and after in-house call
- 6) No new patients after 24 hrs of continuous duty
- 7) Vacation does not count as “days off”
- 8) Home call counts toward the 80 hrs if the resident comes to the hospital

FIGURE 1. The Accreditation Council for Graduate Medical Education (ACGME) work-hour rule, effective July 1, 2003.

a narrative and descriptive comments about the program. Data were collected on satisfaction with specific aspects of the program, as well as overall satisfaction. Data were also collected on number of operative cases performed by each graduate during the TTP training period and complication rates for these procedures, as defined by class 1 surgical site infection rates, observed vs expected mortality, and return to the operating room within the same surgical stay.

RESULTS

All responses were rated from 1 (strongly disagree) to 5 (strongly agree). Responses ranged from 5.0 for “Overall I am very satisfied with the TTP program” to 3.13 for “The TTP prepared me for the business aspects of my practice.” Case volume for all graduates was 1776, with a range of 125 to 417 and a median of 213. The surgical case numbers per

- 1) Perform common Neurosurgical procedures with minimal or no assistance
- 2) Enter practice as competent neurosurgeons
- 3) Successfully manage and run an outpatient clinic
- 4) Add to the participant’s fund of knowledge regarding neurosurgical patient management
- 5) Handle a large patient volume
- 6) Handle the business aspects of practice
- 7) Master CPT coding
- 8) Function as a member/leader of a healthcare team
- 9) Use resources of the healthcare team in patient management
- 10) Critically analyze patient complications
- 11) Base practice on evidence based medicine principles

FIGURE 2. Transition to practice (TTP) program objectives.

1. Default Section

1. Please indicate your level of agreement with the following statements:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The TTP program prepared me to perform common neurosurgical procedures with minimal or no assistance.	<input type="radio"/>				
The TTP program prepared me to enter practice as a neurosurgeon.	<input type="radio"/>				
The TTP year added to my fund of knowledge regarding neurosurgery patient management.	<input type="radio"/>				
The TTP program prepared me to run a clinic.	<input type="radio"/>				
The TTP program prepared me to handle a large patient volume.	<input type="radio"/>				
The TTP program prepared me to handle the business aspects of my practice.	<input type="radio"/>				
The TTP program helped me to master CPT coding of my cases.	<input type="radio"/>				
The TTP program helped me to function effectively as a member of a health care team.	<input type="radio"/>				
The TTP program helped me to use other resources in the health care system in the management of their patients.	<input type="radio"/>				
The TTP program helped me to carefully analyze my patient complications.	<input type="radio"/>				
The TTP program helped me to develop the ability to base my practice on evidence based principles.	<input type="radio"/>				
Overall, I am very satisfied with the Transition to Practice	<input type="radio"/>				

FIGURE 3. The survey.

graduate are shown in Table 1, and the breakdown of surgical cases by procedure is given in Table 2. This variety of cases is in keeping with standard practice for most US neurosurgeons, with some tailoring of cases for the specific subspecialty

interest for each TTP. Complications (Table 3) included 15 surgical site infections, 24 returns to the operating room within 48 hours, and 94 deaths. Observed vs expected mortality for all cases was 1.02. These rates were similar to the rates for the

TABLE 1. Surgical Case Numbers Per Graduate of the Transition to Practice Program

Graduate	Cases, n
1	243
2	150
3	146
4	241
5	269
6	125
7	185
8	417
Total	1776

TABLE 2. Breakdown of Surgical Cases by Procedure

Cranial Procedures, n	Spinal Procedures, n
Vascular, 335	Disk/spondylosis, 458
Tumor, 194	Tumor, 29
Functional, 14	Trauma, 190
Trauma, 90	Dysraphism, 1
Reconstructive, 17	Spasticity/pain, 3
Cerebrospinal fluid shunting, 213	Vertebral reconstruction, 12
Extracranial/intracranial, 6	Peripheral nerve, 39
Other, 82	Other, 93
Total, 951	Total, 825

remainder of the department as a whole during the period of time under investigation.

DISCUSSION

Residency training in neurosurgery has been changed dramatically by the restrictions of the 80-hour workweek.¹⁻⁴ Although this change has allowed improved lifestyle for

residents,⁵ the impact on patient safety and resident education remains unknown for most specialties.⁵⁻¹³ Many leaders in neurosurgical education are skeptical about the changes engendered by the work-hour changes.³ Jagannathan et al⁴ performed a survey of neurosurgical program directors and chief residents. Of the respondents, 96% believed that the 80-hour workweek compromised resident surgical experience and education. Similarly, 96% of program directors and 78% of chief residents believed that the work-hour limitations compromised patient care. This confirmed prior work surveying residents only 2 years after the duty-hour changes had gone into effect.¹ Educational achievement in neurosurgical residents has also been adversely affected by the changes.^{4,14} Further pressures within Congress and organized medicine are threatening to limit residents to even fewer hours per week, further decreasing educational experience and access.

To overcome these limitations of current training, new educational models are being explored. The University of Florida Department of Neurosurgery developed the TTP program to allow a new approach to address the aforementioned limitations. TTP provides a heavily mentored experience as a junior faculty member. Residents are able to practice and bill independently. All operative cases are mentored by a faculty member, and that faculty member is then available for backup in the operating room. The resident is also able to take faculty-level call, again with backup. Day-to-day aspects of a regular practice are maintained, including billing and coding, an independent clinic, operative and clinic dictations, and supervision of other residents. All operative cases are reviewed at a biweekly conference attended by the faculty and residents. This allows reflection on decision making and judgment involved in the preoperative, intraoperative, and postoperative care of these patients.

Our results indicate that the TTP program offers an excellent opportunity for residents to experience independent practice with mentoring and backup available. The availability of backup, having primary responsibility for patient management, and making medical decisions independently

TABLE 3. Complications Experience by Transition to Practice Program Participants

Discharges, n	Deaths, n	Death Rate, %	Mortality, Observed/Expected	Surgical Site Infection, n	NSG Return to the Operating Room Within 48 h, n
179	13	7	NA	NA	8
286	20	7	0.94	5	7
123	9	7	1.01	4	0
151	10	7	1.10	1	6
75	6	8	1.05	0	0
97	2	2	0.46	1	0
257	24	9	1.19	4	2
95	10	11	1.56	0	1
Total = 1263	94		Mean = 1.02	15	24

have all been shown to be very important in the development of physician confidence.¹⁵ Residents were able to develop operative skills, self-confidence, continuity of care with primary responsibility for patients, and the ability to manage complex patients with increasing autonomy. Our data show that staff and trainees believed that all of these goals were successfully met. Furthermore, the year is flexible and allows up to 6 months of subspecialty training tailored to each graduate's career goals.

As with any new educational program or change, we intend to use the data gathered from our survey to improve the program. Future directions for improvement include formal mentoring, expanding the curriculum on billing and coding, and improving scholarly output during the TTP experience.

In conclusion, the TTP program has proven successful in preparing graduates to embark on a career in independent practice as confident, well-educated, and well-prepared practitioners.

Disclosure

The authors have no personal financial or institutional interest in any of the drugs, materials, or devices described in this article.

REFERENCES

1. Cohen-Gadol AA, Piegras DG, Krishnamurthy S, Fessler RD. Resident duty hours reform: results of a national survey of the program directors and residents in neurosurgery training programs. *Neurosurgery*. 2005; 56(2):398-403.
2. Friedman WA. Resident duty hours in American neurosurgery. *Neurosurgery*. 2004;54(4):925-931.
3. Grady MS, Batjer HH, Dacey RG. Resident duty hour regulation and patient safety: establishing a balance between concerns about resident fatigue and adequate training in neurosurgery. *J Neurosurg*. 2009;110(5): 828-836.
4. Jagannathan J, Vates GE, Pouratian N, et al. Impact of the Accreditation Council for Graduate Medical Education work-hour regulations on neurosurgical resident education and productivity. *J Neurosurg*. 2009; 110(5):820-827.
5. Basu CB, Chen LM, Hollier LH Jr, Shenaq SM. The effect of the Accreditation Council for Graduate Medical Education Duty Hours Policy on plastic surgery resident education and patient care: an outcomes study. *Plast Reconstr Surg*. 2004;114(7):1878-1886.
6. Bland KI, Stoll DA, Richardson JD, Britt LD; Members of the Residency Review Committee-Surgery. Brief communication of the Residency Review Committee-Surgery (RRC-S) on residents' surgical volume in general surgery. *Am J Surg*. 2005;190(3):345-350.
7. Brunworth JD, Sindwani R. Impact of duty hour restrictions on otolaryngology training: divergent resident and faculty perspectives. *Laryngoscope*. 2006;116(7):1127-1130.
8. Carlin AM, Gasevic E, Shepard AD: Effect of the 80-hour work week on resident operative experience in general surgery. *Am J Surg*. 2007;193(3): 326-329.
9. Feanny MA, Scott BG, Mattox KL, Hirshberg A. Impact of the 80-hour work week on resident emergency operative experience. *Am J Surg*. 2005; 190(6):947-949.
10. Hutter MM, Kellogg KC, Ferguson CM, Abbott WM, Warshaw AL. The impact of the 80-hour resident workweek on surgical residents and attending surgeons. *Ann Surg*. 2006;243(6):864-871.
11. Kairys JC, McGuire K, Crawford AG, Yeo CJ. Cumulative operative experience is decreasing during general surgery residency: a worrisome trend for surgical trainees? *J Am Coll Surg*. 2008;206(5):804-811.
12. Petersen LA, Brennan TA, O'Neil AC, Cook EF, Lee TH. Does housestaff discontinuity of care increase the risk for preventable adverse events? *Ann Intern Med*. 1994;121(11):866-872.
13. Swide CE, Kirsch JR. Duty hours restriction and their effect on resident education and academic departments: the American perspective. *Curr Opin Anaesthesiol*. 2007;20(6):580-584.
14. Lister J, Friedman, WA. An unexpected observation of board scores since implementation of common duty hours. *ACGME Bull*. 2009;4-6.
15. Binenbaum G, Musick DW, Ross HM. The development of physician confidence during surgical and medical internship. *Am J Surg*. 2007; 193(1):79-85.