CAST PROGRAM REQUIREMENTS AND CURRICULUM FOR
FELLOWSHIP EDUCATION IN NEUROTRAUMA

INTRODUCTION

Eligibility
Fellowship programs that exist within the structure of an ACGME-accredited residency in neurological surgery may apply for accreditation through the Committee on Accreditation of Subspecialty Training (CAST).

Definition and Scope of the Subspecialty
The specialty of Neurotrauma is defined by expertise in the care of patients with traumatic injuries of the nervous system. The goal of this care is to preserve the life and maximize the functional outcome of these patients. The aim of CAST Neurotrauma Fellowship is to provide training in the management of the full spectrum of traumatic injuries to the brain, spine, and peripheral nervous system. Neurotrauma specialists, or neurotraumatologists, demonstrate expertise in the clinical care of neurotrauma patients, beginning with pre-hospital acute care and lasting through the post-acute setting. This includes patient triage, diagnostic testing, surgical and non-surgical management, clinical follow up and rehabilitation. Neurotraumatologists work as a part of multi-disciplinary teams that include other neurosurgeons, surgery traumatologists, intensivists, neurologists, and rehabilitation physicians, as well as advanced practice providers, nurses, therapists, pharmacists, and social workers. Neurotraumatologists must exhibit excellent communications skills that are essential for interacting with other medical professionals and patients and families to deliver the highest level of coordinated care. Finally, in order to provide compassionate, equitable and ethical care, Neurotraumatologists must demonstrate skills and expertise to guide patients and families through end-of-life decisions.

In addition to these core skills, neurotraumatologists may have also expertise in neurocritical care as it relates to neurotrauma because of the relationship of the injured nervous system to other organ systems in the critical care setting; outpatient care such as injury prevention, concussion, and neuro-rehabilitation; and laboratory and translational research.

This is accomplished by:
- Minimizing the sequelae of primary injuries
- Preventing and treating secondary injuries and complications
- Recognizing the interactions between the nervous system and other organ systems
- Facilitating an optimal healing environment for the patient in the hospital and post-discharge

Duration of Training and Prerequisites

Post-graduate fellowships:
- Prior to beginning a CAST-accredited neurological surgery subspecialty fellowship, each fellow candidate will have satisfactorily completed an ACGME-accredited residency training program in neurological surgery
Enfolded fellowships:

- If a candidate is pursuing an enfolded CAST-accredited fellowship during their residency, that fellowship training should occur at the appropriate senior level of residency allowable; the term "senior resident level" is defined by the ABNS to occur after the successful completion of the Chief Resident year.
- Prior to beginning fellowship, the resident participant must already have a broad exposure to the full spectrum of neurosurgery with sufficient senior level clinical experience to warrant a focused experience to build upon his/her already acquired skills; It is anticipated that any fellow should already have both the technical expertise and intellectual maturity to understand and apply the material available in subspecialty training (Milestone Level 4).
- The "senior resident level" requirement for participation in all enfolded CAST-accredited fellowships (other than neurocritical care and endovascular neurosurgery) will be after the completion of Chief Resident year, ideally during PGY7 and not before PGY6.
- All new and renewal CAST-accredited fellowship applications approved during the coming year and thereafter will be obligated to comply with these guidelines and adhere to the new annual updates of the fellowship program along with specific training details for each graduating fellow completing that program.
- It is anticipated that the standard length of fellowships will be twelve (12) months; a six-month fellowship would be the exception; Since all fellowship applications will be reviewed formally, an application at variance from the 12-month standard must provide convincing evidence of an ability to satisfy the educational attainment defined by the CAST.

Broad Description of the Objectives/Goals of Education in the Fellowship

- The fellowship training must provide broad educational experience in Neurotrauma which will complement training achieved in the neurosurgery residency to promote further acquisition of knowledge and skills in the subspecialty.
- The usual fellowship will be 12 months (minimum of 6 months) and fellowship training will be spent in a clinical Neurotrauma program, with experience under the direction of specified clinical faculty; This period of time must provide the trainee with an organized, comprehensive, supervised, full-time educational experience in the field of neurotrauma; This should include comprehensive patient care, diagnostic modalities, the performance of surgical procedures, and the integration of non-operative and surgical therapies into clinical patient management (See, Appendix: Fellowship Curriculum).
- Each fellowship should provide broad exposure to clinical evaluation and appropriate patient selection for operative and non-operative management in both the inpatient and outpatient settings.
- Each fellow should actively participate in the operative and non-operative management of a wide range of neurotrauma pathologies including the TBI spectrum from concussion through severe TBI, spinal cord injury, osseous spinal column injuries, and polytrauma with neurological injury; Progressive responsibility in patient management should be provided.
- Clinical, anatomic, and neuroscience research constitute an integral component of the educational experience and time should be protected for the successful completion of research projects; A full-time experience in research will require an extension of the fellowship beyond the 12 months of clinical training.
Core Neurotrauma Curriculum

The training program must enable the trainee to acquire an advanced body of knowledge and level of skill in the management of neurotrauma patients with competency to assume primary responsibility for care of these patients in the hospital and outpatient setting. This advanced body of knowledge and level of skill must include the mastery of:

- Critical Care of the neurotrauma patient
- Treatment of polytrauma with neurological injury
- Treatment of the TBI spectrum, from concussion to coma
- Treatment of spinal cord injury
- Treatment of osseous spinal column injuries
- Injury prevention and rehabilitation strategies
- Experience with palliative care as it relates to neurotrauma
- Follow-up and management of post-acute neurotrauma care
- Organizational and administrative aspects of a neurotrauma program

INSTITUTIONAL ORGANIZATION

The Sponsoring Program and Institution

- The sponsoring neurosurgical residency program and its affiliated institutions must provide sufficient breadth and depth of neurotrauma cases to sustain fellowship training; The sponsoring institution should be identified as a regional referral resource for patients with complex neurotrauma injuries; Additionally, there must be faculty, financial resources, research, and laboratory facilities to meet the educational needs of the fellowship trainee and to enable the program to comply with the requirements of accreditation
- Recognizing the interdisciplinary nature of comprehensive care for patients with neurotrauma conditions, it is required that within the institution(s) of the fellowship there shall exist clinical facilities and faculty in trauma surgery, neurocritical care, and neuroradiology, including interventional capabilities
- Support for the fellowship program by the sponsoring department/division of neurosurgery must be demonstrated in writing by the program chair at the time of application for, or renewal of, accreditation

Participating Institutions

- Participating institutions shall be limited to those necessary for a complete fellowship experience
- In most instances the neurotrauma fellowship will occur at a single institution; Depending on local circumstances, training may be spent at additional institutions that provide special resources for training; Each of these institutions must be located within reasonably close proximity for interactions with the teaching programs of the sponsoring program
- The primary teaching staff must be members of the faculty of the sponsoring program

Appointment of Fellows

In general, only one fellowship position per training program will be allowed at any one time. Accreditation of additional positions will be considered by the Committee on Accreditation of
Subspecialty Training. In determining the merit of additional fellowships, the Committee will consider:

- The presence of a faculty of national stature in neurotrauma
- The quality of the educational program
- The quality of clinical care
- The total number and spectrum of cases
- The quality of clinical and research programs
- Facilities
- The quality of alumni fellows trained by the program
- The impact of fellows on the clinical and educational experience of the neurosurgical residents within the sponsoring program
- A high rate of fellowship attrition from a program may adversely affect the fellowship accreditation status

FACULTY QUALIFICATIONS AND RESPONSIBILITIES

Fellowship Director Qualifications

- The fellowship director must be appointed by and be responsible to the chair of the sponsoring neurologic surgery residency program
- The fellowship director shall be a neurologic surgeon who possesses special expertise in the evaluation as well as surgical and medical management of neurotrauma patients and whose practice is concentrated in the area of neurotrauma
- The fellowship director should be certified by the American Board of Neurological Surgery or possess equivalent qualifications as judged by the Resident Review Committee (RRC) for Neurological Surgery.

Responsibilities of the Fellowship Director

The fellowship director must assume responsibility for the training program and devote sufficient time to the educational program including the following:

- Preparation of a written curriculum outlining the educational goals of the program with respect to knowledge, skills, and other attributes to be attained during the fellowship; This statement must be distributed to the fellow and members of the teaching staff and be available for review
- Selection of fellows in accordance with institutional and departmental/division policies
- Selection and supervision of the teaching staff and other program personnel at the institution(s) participating in the program
- The supervision of the fellow through explicit written directives relative to responsibilities for in-patient care as well as supervisory lines of organization; These guidelines must be communicated to all members of the program faculty; Fellows must be provided with prompt, reliable systems for communication and interaction with supervisory physicians
- Regular evaluation of the fellow’s knowledge, skills, and overall performance, professional growth, including the development of professional deportment every 6 months.
- Advance fellows to positions of increasing responsibility on the basis of satisfactory progression in patient management, scholarship, and professional growth
- Maintain a permanent record of evaluations of each fellow and have it accessible to the fellow and other authorized personnel
• Provide a written final evaluation for the fellow on completion of the program; This evaluation must include a review of the fellow’s performance during the final period of training and verification of the fellow’s demonstrated professional abilities and competence for independent practice; This final evaluation should be part of the fellow’s permanent record maintained by the institution
• Implement all procedures, as established by the sponsoring institution, regarding academic discipline and complaints or grievances pertinent to fellowship trainees
• Monitor fellow’s stress, including mental or emotional conditions affecting performance or learning, and drug or alcohol-related abuse; Fellowship directors and teaching staff should be sensitive to the need for timely provision of confidential counseling and psychological support services to the fellow; Training situations that consistently produce undesirable stress on the fellow must be evaluated and modified
• Prepare accurate statistical and narrative descriptions of the program as required by the CAST
• Notify CAST regarding major programmatic changes

Other Teaching Faculty Qualifications and Number

• All clinical faculty members who are neurologic surgeons shall be certified by, or be in the certification process of, the American Board of Neurological Surgery or possess equivalent qualifications as judged by the RRC for Neurological Surgery
• All members of the teaching staff must demonstrate a strong interest in the education of fellows, sound clinical and teaching abilities, support the goals and objectives of the fellowship, a commitment to their own continuing medical education, and participation in scholarly activities
• If multiple institutions are approved for participation in the fellowship program, a member of the teaching staff at each participating institution must be specifically designated to assume responsibility for the day-to-day activities of the fellowship at that institution with overall coordination by the fellowship director
• The faculty must have regular, documented meetings to review the fellowship training, the financial and administrative support of the fellowship, the volume and variety of patients available for educational purposes, the performance of members of the teaching staff, and the quality of fellowship supervision

Other Personnel

Fellowships must be provided with the additional professional, technical, and clerical personnel needed to support the administration and educational conduct of the fellowship.

LOGISTICS OF TRAINING

The Educational Program

• All educational components of the fellowship should be related to the specified goals and must not interfere with the training opportunities of residents who are members of the sponsoring neurosurgical residency program
• The fellowship program and/or structure must be reviewed for re-accreditation by the Committee on Subspecialty Training of the Society of Neurological Surgeons in synchrony with the RRC review of the sponsoring residency program; Failure of the fellowship program to reapply for review within six months of residency programmatic review will constitute cause for withdrawal of accreditation by CAST.
Clinical Components

- A minimum of 12 months of fellowship training must be spent in clinical activities in neurotrauma. (A shorter 6-month fellowship can be applied for).
- The responsibility or independence given to fellows in patient care must be dependent upon the fellow’s demonstrated knowledge, manual skill, experience in the complexity of the patient’s illness, as well as the perceived risks of the surgical management.
- A portion of the fellowship experience should be allocated to training in an outpatient clinic or office setting which provides preoperative, perioperative and postoperative continuity of patient care.

OTHER COMPONENTS

- The fellowship program should provide opportunities for the fellow to engage in research relative to the subspecialty
- The fellow should actively participate in scholarly activities and should contribute to the education of neurosurgery residents and medical students
- The fellowship program should have regular dedicated teaching conferences with participation of the fellow, the associated faculty, and residents of the sponsoring program; Participation of other affiliated disciplines should be encouraged

FELLOWSHIP POLICIES

Supervision

- All patient care services must be supervised by appropriately qualified faculty in accordance with institutional guidelines
- The fellow who has completed an accredited neurosurgery residency program may function independently as a junior staff neurosurgeon consistent with institutional and departmental/division policies
- The fellowship director must ensure direct and documented supervision of the fellow at all times by attending physicians with appropriate experience for the severity and complexity of the patient’s condition; The fellowship trainee must be provided with rapid, reliable systems for communication with supervisors

Maintenance of Case Logs

- The fellowship program director must maintain accurate case logs of the annual neurotrauma case volume within the institution and the subspecialty experience attained by the graduating chief resident throughout their training, as well as that of the fellow
- The fellow must maintain an accurate prospective case log of his/her operative cases throughout the fellowship which documents all operative cases and their level of responsibility for the case (assistant versus primary surgeon)

Evaluations

- There shall be written evaluations and constructive discussions of the fellow by the faculty relative to performance and accomplishments of stated goals; These evaluations must occur at a minimum of two times per year and maintained in a permanent file
- The fellow shall provide an evaluation of the faculty and fellowship program; This may be submitted either to the fellowship or program director at completion of the fellowship training; The evaluation
should be maintained in a permanent file for review by the CAST if requested

**Duty Hours and Conditions of Work**

Duty hours and work conditions for subspecialty fellows must be consistent with ACGME institutional and program requirements for residency training in neurological surgery

**Procedural requirements**

Demonstrate competency with all procedures listed below, and have completed the minimum number specified during the fellowship.

- Critical care management of TBI (minimum 25)
- Critical care management of SCI (minimum 10)
- Surgical management of TBI (minimum 25)
- Surgical management of traumatic cervical injuries, with or without neurological deficits (minimum 10)
- Surgical management of traumatic thoracolumbar injuries, with or without neurological deficits (minimum 10)
- Clinical care of acute concussion/mild TBI (GCS 13-15) (minimum 50)

**MAINTENANCE OF FELLOWSHIP ACCREDITATION**

Fellowship accreditation is valid for five (5) years in the manner described in the successful application. At each successive five-year interval thereafter, the program will be required to file a renewal application to maintain accreditation status. Each year, the program will be required to provide an annual report to CAST. Although the fellowship is accredited for five years, factors that may impact ongoing accreditation include any adverse actions of the Neurological Surgery Review Committee (RC) relative to the parent residency training program, changes in fellowship leadership, failure to maintain a satisfactory volume of cases, major changes in the fellowship faculty, and failure to complete required annual reports. CAST should be notified immediately of any changes that occur.