



# CAST PROGRAM REQUIREMENTS AND CURRICULUM FOR FELLOWSHIP EDUCATION IN NEUROTRAUMA

## INTRODUCTION

- Eligibility
  - Fellowship programs which exist within the structure of an ACGME accredited residency in neurological surgery may apply for accreditation through the Committee on Accreditation of Subspecialty Training of The Society of Neurological Surgeons (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 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 also have 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/TIMING OF TRAINING

- Post-graduate (post-residency) fellowships:
  - Prior to beginning a CAST accredited neurological surgery subspecialty fellowship, each fellow candidate must have satisfactorily completed an ACGME or a foreign equivalent accredited residency training program.
  - The length of the fellowship will be twelve (12) months.
  - A CAST accredited program may not offer a fellowship position to a potential fellow until that fellow has completed their PGY3 year.
  - If the subspecialty is part of the match, it is required that programs and fellows participate according to that match's guidelines.
- Enfolded Fellowships:
  - The length of the fellowship is twelve (12) months.
  - A CAST-accredited program may not offer a fellowship position to a potential fellow until that resident has completed their PGY3 year.
  - If a candidate is pursuing an enfolded CAST-accredited fellowship during their residency, that fellowship training must occur following the Chief Resident year (as a PGY7 if the Chief year was completed as a PGY6).
  - It is expected that all ACGME case requirements will have been met during the preceding Chief year. Prior to beginning the fellowship, the resident candidate 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 expected that fellow candidates already have both technical expertise and intellectual maturity to understand and apply the material available in subspecialty training (Milestone Level 4).
  - If the subspecialty is part of the match, it is required that programs and fellows participate according to that match's guidelines.
- Broad Description of the Objectives/Goals of Education in the Fellowship
  - The fellowship training must provide broad educational experience in Neurotrauma that will complement training achieved in the neurosurgery residency to promote further acquisition of knowledge and skills in the subspecialty.
  - Fellowship training will occur through a clinical Neurotrauma program, under the direction of specified clinical faculty. The 12-month curriculum must provide the trainee with an organized, comprehensive, supervised, full-time educational experience in the field of neurotrauma. This should include comprehensive patient care, education about diagnostic modalities, performance of surgical procedures, and integration of non-operative and surgical therapies into clinical patient management.

- The 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 be an active participant 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, peripheral nerve injury, and polytrauma with neurological injury; Progressive responsibility in patient management should be provided.
  - Clinical, anatomic, and neuroscience research constitutes an integral component of the educational experience; time should be protected for the successful completion of research projects.
- 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
      - Treatment of peripheral nerve injury
      - 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
      - Principles of performance improvement and patient safety
      - Trauma system design and relationship to public health
      - Best practices in injury prevention
      - Research methodology and outcomes measures in neurotrauma

## **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. Those sites must be within 50 miles of the primary site.
- The primary teaching staff must be members of the faculty of the sponsoring program.
- Only one CAST approved fellowship for each subspecialty per training program will be allowed at any one time.

- Appointment of Fellows

- In general, only one fellowship position per fellowship training program will be allowed at any time; however, requests for additional positions will be considered by CAST on a case-by-case basis. In determining the merit of additional fellowship positions, 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 institutional cases.
    - There should be 2X the institutional cases for an increase from one to two fellows, 3X for three fellows, etc.
  - The quality of clinical and research programs.
  - The quality of fellows trained by the program.
    - The program should have graduated one fellow meeting case minimums for an increase to be approved
  - The impact of fellows on the clinical and educational experience of the neurosurgical residents within the sponsoring program.
  - Selection of candidates for the fellowship position must be concordant with the criteria established by the sponsoring program. The fellowship director must adhere to the criteria for fellowship eligibility specified in this document. Appropriate candidates for fellowship position are senior level trainees in or graduates of ACGME accredited (or its equivalent as approved by the SNS CAST) neurosurgical training programs.
  - A high rate of fellow attrition from a program may adversely affect the fellowship accreditation status.

## FACULTY QUALIFICATIONS AND RESPONSIBILITIES

- Fellowship Program Director (FPD) Qualifications
  - 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
    - 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, overall performance, and professional development.
  - The fellowship director, with participation of members of the teaching staff, shall:
    - 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 CAST
    - Notify CAST regarding major programmatic changes

- Other Teaching Faculty Qualifications and Number
  - All clinical faculty members who are neurological surgeons shall be certified by, or be in the certification process of, the American Board of Neurological Surgery or possess equivalent qualifications as determined by CAST.
  - The primary teaching staff should be based at the sponsoring institution or its additional institutions at which the fellow will rotate.
  - All members of the teaching staff must demonstrate a strong interest in the education of fellows, sound clinical and teaching abilities, support of 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 (Site Director) 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.
- Non-physician faculty and other clinical personnel
  - This should include all additional and necessary professional, technical, and clerical personnel to support the program. This includes specially trained nurses and technicians who are skilled in radiological equipment, critical care instrumentation, respiratory function, and laboratory medicine.
    - Fellowship Program Coordinator/Administrator
      - A Fellowship Program Coordinator (FPC)/Administrator must be identified to support the administration and educational conduct of the fellowship. The FPC assists the program director in keeping fellow and institutional case logs, educational programming, evaluation documentation, and supports the program and fellow's(s) day-to-day activities. The FPC is a key member of the leadership team and is critical to the success and accreditation of the program.
      - It is understood that an FPC/Administrator may support more than one CAST-accredited fellowship program. However, to have sufficient time dedicated to the administrative activities necessary to support the program and its participating fellows effectively, it is recommended FPC support should be aligned with effort detailed in the table below.

Number of approved fellow positions across all CAST fellowships within	Minimum FTE Recommendation
1 – 3 fellows	30%
4 – 7 fellows	40%
8 or more fellows	50%

## 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 Advanced 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
  - Training must be spent engaged in clinical activities of neurotrauma.
  - The responsibility or independence given to fellows in patient care must be dependent upon the fellow's demonstrated knowledge, manual skill, and experience in the complexity of the patient's illness, as well as the perceived risks of 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 fellow must actively participate in scholarly activities and should contribute to the education of neurosurgery residents and medical students.
  - The fellowship program should provide opportunities for the fellow to engage in research related to the subspecialty.
  - Each fellow must have at least one academic contribution as first author in one of the following:
    - peer-reviewed paper
    - book chapter
    - presentation at a major meeting which will need to be detailed in the annual report

## 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 be 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 for those individuals who are in the last year of residency. Those outside of residency are not restricted with respect to work hours but may be subject to regulations imposed by the sponsoring institution's program in Neurological Surgery

## PROCEDURAL REQUIREMENTS

A graduating fellow should demonstrate competency with all procedures listed below and have completed the minimum number specified during the 12- month fellowship period:

- **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)**
- **Follow-up and management of post-acute neurotrauma care (minimum 50)**

## MAINTENANCE OF FELLOWSHIP ACCREDITATION

- Each year, the FPD for every accredited CAST fellowship program is required to submit an annual report. CAST will offer continued accreditation based upon review and approval of the annual report. For each annual report, the following must be included:
  - Demographic/contact information for fellowship sites and leadership
  - Full faculty list
  - Detailed block diagram and fellow schedule
  - Institutional case numbers for academic year in review
  - Fellow case numbers for academic year (when applicable)
  - Attestation letter from the fellowship program director
  - Support letter from Chair of department
- Factors that may impact accreditation renewal include:
  - 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
  - Failure to provide adequate administrative support
  - Failure to complete required annual reports completely and accurately.