

Tehran University of Medical Sciences
Department of Anesthesiology, Critical Care, and Pain Management

Pain Fellowship Curriculum

The Pain Fellowship of Tehran University of Medical Sciences integrates several areas of pain medicine including, interventional pain management, chronic pain rehabilitation, cancer pain, and palliative care, acute pain, pediatric chronic pain, neurology, psychiatry, and clinical research. The fellowship is a collaboration between three of the main teaching centers at Imam Khomeini Hospital Complex (IKHC), Shariati General Hospital, and Amir Aalam Hospital.

The IKHC is the main center for pain fellowship training and accommodates the main office of the pain department. The center has an ever-increasing patient volume and increased the complexity of cases. The center is equipped with two fluoroscopy suites, ultrasound suites, examination rooms, a recovery area, and the multimedia Teaching Conference Hall. The center has a well-equipped pain operating room, which is exclusive to the center.

Shariati General Hospital and Amir Aalam Hospital accommodate an ever-increasing patient volume and face an increased complexity of cases. These centers are also equipped with fluoroscopy suites, ultrasound suites, examination rooms, recovery rooms, and multimedia teaching conference areas.

The fellowship offers three positions for an 18-month appointment. All three positions are filled with those who completed anesthesiology residency. Exceptional candidates from other disciplines may be considered in the future. All positions will be filled through a written exam and interview.

Faculty members are recognized experts in pain medicine and regional anesthesia. They all have subspecialty training in pain management (accredited pain fellowship training). The faculty is active in training, research, and clinical pain management.

Education

Introduction

Pain and its management is a very important issue for the patients and their relatives, physicians, and nurses. Pain is considered the fifth vital sign and its evaluation (and management) is required for hospital accreditation.

The science of pain and its management has come to the forefront of medicine. Developments in basic and clinical pain research have increased drastically within the last ten years. The subspecialty has attracted talented basic researchers. Clinicians are interested in pain medicine because it is rewarding and because of the opportunities it provides in terms of scholarly productivity for academicians and employment for those interested in private practice.

Pain medicine is challenging because of its multidisciplinary nature. It combines pharmacological, interventional, as well as psychological and physical medicine modalities. As such, it offers respect for the pain practitioner from other specialists once mastery of this subspecialty is obtained

Goals and Learning Objectives

Goals and learning Objectives for this pain fellowship program are:

Gain proficiency in understanding the underlying mechanisms of the different pain syndromes

This program has weekly conference meetings. During these weekly meetings, the most important aspects of pain management will be discussed and reviewed. The topics will be reviewed through the lectures. The fellow will learn the pathways and the neurochemistry involved in pain propagation and transmission. The fellow will learn the mechanisms of the different types of pain and the management thereof. These include pain syndromes such as acute pain, back pain, neuropathic pain, myofascial syndromes, headache, cancer pain, etc.

Gain proficiency in the management of acute pain

The fellow will learn to manage acute postoperative pain, post-dural puncture headache and chest trauma (i.e., complex rib fractures/flail chest). Epidural opioid and local anesthetic infusions, peripheral nerve blocks and catheterization and intravenous patient-controlled analgesia (PCA) are utilized in postoperative pain management while epidural or intercostal nerve blocks are employed in chest trauma.

The fellow will be involved in the assessment and treatment of inpatients with benign and cancer-related pain disorders (other than postoperative pain) while covering inpatient consultation service. Responsibilities to the consultation service are assigned on a rotating basis amongst all fellows. The fellow will document at least 15 new patients assessed in this setting.

Gain proficiency in treating cancer pain and palliative care patients

The fellow will learn the etiologies of cancer pain and gain exposure in the medical and interventional management of patients with cancer pain.

The fellow will have longitudinal clinical exposure to patients with cancer pain and will have longitudinal palliative medicine experiences.

The fellow will be exposed to multidisciplinary and interventional approaches to treating patients with cancer pain and patients with terminal diseases while focusing on outpatient clinics, inpatient consultation service, and outside rotations.

The fellow will document experience with a minimum of 80 longitudinal cancer pain patients and 10 palliative care patients during the year.

Gain proficiency in managing chronic non-cancer pain

Low back pain, myofascial pain syndrome, headache, pelvic pain and neuropathic pain (post-herpetic neuralgia, CRPS, etc.) are examples of chronic benign pain. The fellow will be exposed to the pharmacologic, interventional, as well as the nonmedical (psychological and rehabilitation approaches) treatments of these syndromes.

The fellow will have a longitudinal clinical experience with patients with chronic benign pain syndromes during their outpatient clinic experiences and will document a minimum of 70 different patients per week over the training period.

Interpret and become familiar with basic neuro-imaging, identify significant findings, including MR and CT of the spine and brain and/or MRI studies drawn from the examples within the following areas: brain, cervical, thoracic, and lumbar spine when assessing patients with chronic pain.

Gain proficiency in interventional fluoroscopy assisted blocks

At our pain center, there are fluoroscopy suites with dedicated fluoroscopy machines where interventional blocks are performed. There is a recovery room adjacent to the fluoroscopy rooms where the patients recover after their procedure(s). Fellows will be exposed to interventional procedures such as discography and intradiscal techniques, radiofrequency ablation (pulsed and thermal), intra-articular injections, vertebral augmentation, spinal cord stimulators, and neuraxial opiate trials and long-term management.

Almost all interventional blocks will be performed in our centers and on occasion, permanent implants (spinal cord stimulators, peripheral nerve stimulators, peripheral nerve and/or field stimulators and intrathecal opiate infusion pumps, battery replacements, epidural ports), and vertebral augmentation are performed in our pain centers. Fellows will actively participate in these surgeries under the direct supervision of pain medicine attending and will also participate in the perioperative management of these patients (wound checks, suture removal, pump refills, pump and stimulator reprogramming, management complications, etc.)

A trend of progressive improvement in manual skills during the conduct of interventional procedures will be maintained by the fellow, with decreasing direct attending “rescue” during injection procedures.

Gain exposure to the multidisciplinary treatments of pain

The fellow will rotate in different centers for rehabilitation, neurology and psychology exposure. Fellows will rotate through the Hospice and Palliative Care Service at IKHC for management of cancer pain and palliative medicine experience. In addition, other specialists (psychologists, physical therapists, neurosurgeons, spine surgeons, neuroradiologists, urologists) are invited to give lectures to the service and will participate in multidisciplinary conferences and lectures.

Gain exposure to research design and statistical analyses and exposure to publications

The fellowship program has weekly journal club meetings where research design and statistical analyses are discussed and analysis of classic or pertinent pain medicine papers are evaluated and discussed. These journal club meetings will be led by a pain medicine attending with active participation by the multidisciplinary pain medicine fellows.

The Department of Anesthesiology has weekly journal club meetings where research design and statistical analyses are discussed in the context of anesthesiology practice. There is a monthly common journal club meeting between the department of anesthesiology and pain fellowship program, which is dedicated to acute pain management. All fellows and residents within the department, as well as pain attendings, attend these events.

Research seminar presentations are conducted throughout the year wherein an attending presents their research project(s). Depending on their participation, fellows may be invited as co-authors of case reports, review articles, original articles, or book chapters written by the faculty.

There is a research requirement for all pain fellows. Each fellow will be assigned a faculty mentor to guide and assist the fellow in a research project and assist in submitting an abstract, case report, case series, to a regional or national pain meeting.

Gain exposure to teaching, administrative aspects, and systems-based practices of pain management

The fellow will present formal and informal lectures to the residents and medical students rotating through the service. Depending on their expertise and enthusiasm, the fellow will have the opportunity to present cases and lectures to the department, including Department Grand Rounds.

Each fellow will present one morbidity/mortality case discussion to the section of pain medicine during the academic year. A post-conference self-evaluation will be completed by each fellow.

Administrative responsibilities including fellow call schedules will be rotated among all multidisciplinary pain medicine fellows.

Clinical Responsibilities

The fellow is expected to participate in the clinical activities of the section. These include making rounds on the postoperative pain patients, seeing inpatient consults, performing neuraxial and peripheral nerve blocks, seeing patients in the outpatient pain clinic and performing interventional procedures therein.

- The fellow is expected to demonstrate improvement in manual skills with less need for attending the procedure "rescue" as training progresses.

- The fellow is expected to demonstrate improved accuracy in assessing the history and physical examination findings as training progresses, as validated by supervising attendings who directly observe the fellow's history taking and examination skills.
- The fellow is expected to be involved in the research activities of the division.
- The fellow is expected to supervise residents and medical students rotating through the service.
- The fellows have no operating room call responsibilities.
- The fellows will rotate in taking out-of-hospital calls to answer questions, pages, etc. related to the management of inpatient consults, patients on epidural opioid infusions and continuous peripheral nerve blocks, as well as pain clinic patients. The fellows will cooperatively create and manage a pain call schedule amongst themselves, in conjunction with the APNs on the Acute Pain Service.
- The fellows will see emergency consults such as post-dural puncture headache in the emergency room, acute vasospasm conducive to sympathetic blockade or patients with impending ventilatory failure secondary to fractured ribs. These emergency consults are rare. The fellow will communicate with the covering pain attending and discuss/plan management of these patients.

Scheduled Teaching Sessions - Educational Responsibilities

Lectures are given to the fellows and residents rotating through the program two days a week, Monday and Tuesday. The schedule of lectures is made monthly. The lectures are given either by an attending covering the clinic for the day, by one of the fellows, by one of the residents rotating on the service, or by an invited visiting lecturer.

The lectures given by the pain fellows are expected to be in-depth and sophisticated than that given by the residents rotating on the service. These lectures should be based on the latest original studies or reviews that have been recently published.

Lectures and presentations will be submitted by the fellow in PowerPoint format to the Program Director or his designee. These will be uploaded after the presentation is made and will be integrated into each fellow's Educational Portfolio.

There are multidisciplinary lectures and conferences offered throughout the academic year, including monthly Interdisciplinary Spine Conferences and bimonthly Neurosurgery/Pain Conferences.

Fellows will be relieved of clinic duties to attend lectures and participate in multidisciplinary conferences unless there are extenuating circumstances.

The fellows will present classical and contemporary articles during journal club meetings and the specific journal article to be presented is selected by the fellow and pain attending faculty.

Required Reading List

Required Reading List/Materials Provided

A. A schedule of lectures for the fellows and residents is made every month and is distributed to the fellows. The schedule is given to the fellow at the end of the last month. The topics that are covered throughout the year include, but are not limited to, the following topics of pain assessment and treatment:

1. Pathways of pain
2. Postoperative pain
3. Physical/neurological examination of the pain patient
4. Electromyography and nerve conduction studies
5. Radiology of the spine
6. Low back pain: nerve root irritation and radiculopathies, facet arthropathies, discogenic pain, sacroiliac joint arthropathy, piriformis syndrome
7. Cancer pain
8. Hospice/end of life care issues
9. Myofascial pain syndromes
10. Complex regional pain syndrome (CRPS)
11. Herpes zoster and post-herpetic neuralgia
12. Neuropathic pain
13. Pelvic pain/urogenital pain
14. Obstetric pain/pain syndromes during pregnancy
15. Pain in special populations: elderly, addicted, and impaired
16. Headache
17. Major opioids
18. Minor opioids
19. Addiction, pseudoaddiction, dependence, tolerance
20. Nonsteroidal anti-inflammatory drugs/COX-2 inhibitors
21. Antidepressants
22. Membrane stabilizers/anticonvulsants
23. Local anesthetics

24. Pharmacology for the interventional physician (steroids and radioopaque dyes)
25. Neuraxial opioid and local anesthetic infusions
26. Patient-controlled analgesia: intravenous and epidural
27. Neuraxial drug delivery systems for chronic pain syndromes
28. Epidural steroid injections
29. Facet joint injections
30. Facet nerve blocks/rhizotomy (RF)
31. Thermal and pulsed RF
32. Discography
33. Intradiscal procedures (e.g., annuloplasty, biacuplasty)
34. Percutaneous disc decompression procedures
35. Vertebral augmentations (e.g., vertebroplasty, kyphoplasty)
36. Spinal cord stimulator trials, permanent implantations
37. Modalities for multidisciplinary pain management
38. Functional and disability assessment
39. Pain practice management

B. The fellows are expected to read the following books:

Benzon HT, Raja S, Molloy RE, Liu SS, Fishman SM. *Essentials of Pain Medicine and Regional Anesthesia*, 3rd ed. Philadelphia: Elsevier-Churchill Livingstone, 2011.

Benzon HT, Rathmell J, Wu et al. *Practical Management of Pain*, 5thed. Philadelphia: Elsevier-Churchill Livingstone, 2015

Rathmell, J. *Atlas of Image-Guided Intervention in Regional Anesthesia and Pain Medicine*. Philadelphia: Lippincott, Wilkins and Williams, 2011

Fenton DS, Czervionke LF. *Image-Guided Spine Intervention*. Philadelphia: Elsevier-Churchill Livingstone, 2002.

A book on spine imaging e.g., Renfrew DL. *Atlas of Spine Imaging*. Philadelphia: Elsevier-Churchill Livingstone, 2002.

A book on physiatry e.g., Braddom, *Physical Medicine and Rehabilitation*, 2015

In addition, an extensive collection of recommended pain medicine textbooks is kept in the pain office, which fellows have access to at any time. Computer access for journals, reference articles,

and other texts are available to fellows at any time on site or from a remote location. All fellows have access to the TUMS virtual library in the Learning Center at the IKHC location.

Rotations

The basic goal of the rotation is for the fellow to be exposed to the interdisciplinary evaluation and management of acute, chronic, and cancer-related pain, and to procedures related to the treatment of these patients.

Rotations during the fellowship include physical medicine and rehabilitation, neuroradiology, neurology, chronic pain clinic, cancer pain or palliative care, and pain rehabilitation.

Rotation schedule

Rotation	Length
Pain Clinic and hospital-based pain consultation services and interventional pain management	12 months
Neurology	2 weeks
Physical medicine and rehabilitation	2 weeks
Neurosurgery	2 weeks
Neuroradiology	2 weeks
Psychology and behavioral medicine	1 month
Regional Anesthesia	1 month
Electromyography (EMG)	2 weeks (elective)
Hospice and palliative care	2 weeks
Research	1 month

Rotation length is subject to change based on the decision of the program director and the need of the fellow.

Rotation descriptions

Core clinical experience

- Pain Clinic:** Pain medicine fellows train under the supervision of the pain clinic faculty. They participate in the evaluation and treatment of patients with a wide variety of pain problems, including cancer pain, spine pain, sympathetically mediated pain, neuropathic pain, visceral pain and myofascial pain. They are expected to completely evaluate their patients and present their findings and treatment plans to pain medicine faculty. Typical treatment plans may include interventional pain procedures, medications, physical therapy, or behavioral modification. Fluoroscopically and ultrasound guided interventional pain procedures are performed in the on-site procedural facility located within the teaching hospitals.

- **Hospital-based pain consultation services.** Fellows will learn how to evaluate postoperative pain patients, manage complications, and most importantly, organize and safely manage a hospital-based pain consultative service. All hospital-based pain service activities are directly supervised by pain medicine faculty. The hospital training experiences are incorporated throughout the 12-month rotation in the pain clinic.

Additional rotations available

- **Neurology:** During this rotation, fellows develop the necessary knowledge, attitudes, and skills required to manage patients with neuropathic pain and headaches.
- **Physical medicine and rehabilitation:** During the two weeks, they gain experience in assessing chronic pain patients using a rehabilitation model. They develop the necessary knowledge, attitudes and skills to initially evaluate and appropriately refer patients for therapy, including development of a rehabilitation plan of care. In addition, they are exposed to physical and occupational therapy treatment sessions for the patients they evaluate and refer for therapy.
- **Neurosurgery:** Fellows gain experience in assessing patients for neurosurgical intervention for spine and limb pain. They are involved in preoperative and postoperative assessment. They also receive education regarding basic surgical skills, such as surgical preparation, sterile technique, skin suturing technique, and postoperative wound assessment and management.
- **Neuroradiology:** During the rotation, fellows develop the knowledge and skills necessary to make appropriate decisions regarding the utilization of available imaging techniques including X-ray, CT and MRI.
- **Psychology and behavioral medicine:** Trainees learn to recognize psychologic symptoms and syndromes and to initiate appropriate treatment and consultation. This knowledge base enables fellows to differentiate between symptoms that are suggestive of a primary psychological disorder from those suggestive of a primary neurological disorder.
- **Electromyography (EMG):** This elective is specifically tailored to trainees who have attained prior competence in EMG and wish to hone their skills prior to departing the fellowship. They perform routine and complex nerve conduction studies (NCS) and needle EMG independently in a supervised setting.
- **Hospice and palliative care:** During this rotation, trainees learn basic concepts of hospice care, including eligibility and certification, cancer pain and symptom management in terminal patients, and ethical issues related to death and dying. Information about palliative sedation, depression and anxiety management is taught during this rotation. They are supervised by faculty specialists in palliative care during this rotation.
- **Research:** They are expected to participate in scholarly activity and clinical research during their training. Education in the fundamentals of clinical research is provided throughout the year by the pain faculty. Trainees work with a mentor on developing a research project of their choosing and are provided dedicated research time every month.

Didactic training

Our pain fellowship curriculum covers all IASP proposed didactics on a weekly basis. Additional educational opportunities include pain journal club on a weekly basis, pain morbidity, and mortality conferences, Grand Rounds, and numerous additional multispecialty conferences.

Proposed Examination Process - Written and/or Oral Examination

Fellows will take at least two written exams during their fellowship program.

Evaluations of the Fellows

The fellows are evaluated by attending staff quarterly. In addition, the fellows will be evaluated by supervising faculty during away rotations at the completion of an individual rotation experience. The fellows will be able to access their evaluations. The program director will meet with each fellow at least twice during the fellowship to review goals and objectives, assess and communicate areas for fellow improvement and to identify any issues or problems with the curriculum, clinical experience, or supervising faculty.

Performance Evaluations and Feedback

The fellows are asked to provide evaluations of the faculty every quarter and the program at the end of their training.