THE HOUSE INSTITUTE FOUNDATION

Neurotology Training & Examination Curriculum

Neurotology training includes a knowledge of otology as defined in the basic Otolaryngology-Head and Neck Surgery Scope of Knowledge, in addition to the areas of diseases, disorders, and procedures specific to neurotology. This document describes the curriculum for neurotology training and examination.

Basic Science of Head and Neck Structures:

- Detailed knowledge of embryology, anatomy, physiology, histology and pathology of: Ear/temporal bone.
- Skull base.
- Petrous apex, greater and lesser wing of the sphenoid bone, foramen rotundum, foramen ovale, foramen spinosum, internal auditory canal, jugular foramen, Meckel's Cave, superior orbital fissure, inferior orbital fissure, infratemporal fossa. Detailed anatomy of the Cranial Nerves, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII.
- Vascular anatomy of the brainstem, cerebellum, pons and temporal lobe, including: Inferior petrosal sinus, superior petrosal sinus, cavernous sinus, AICA, PICA, vein of Labbe. Anatomy of brainstem, cerebellum, temporal lobe, 4th ventricle, forament of Luschka.
- Other nerve system structures related to the head and neck.

Neurophysiology (peripheral and central) of:

- Central auditory pathways.
- Central vestibular pathways.
- Vestibulo-ocular reflex, characteristics of central and vestibular nystagmu

General knowledge of embryology, anatomy, physiology, histology & pathology of:

- Skin, integument, muscles (incisions and flaps).
- Temporalis muscle flap, sternocleidomastoid muscle flap, free flaps for closure of skullbase and dural defects.

Genetics/molecular genetics:

- Neurofibromatosis.
- Familial paraganglioma.
- Familial meningioma.

Diagnostic & Assessment Procedures

Proper historical interview, technique, indications, limitations, and normal pathological findings of:

- Vestibular function testing, video vestibular oculography, vestibular ocular reflex, rotational chair, platform posturography, head shake test, visual acuity. Facial nerve testing (e.g., electroneurography, electromyography).
- Physical exam (e.g., cranial nerve, cerebellar, sensory, motor, posture, gait, VOR, oculomotor, electrophysiologic testing).

Indications, limitations, and normal and pathological findings of:

- Imaging studies (e.g., computed tomography, magnetic resonance imaging with and without contrast, magnetic resonance angiography, nuclear medicine, angiography, interventional radiology, carotid artery balloon occlusion testing with SPECT scanning, PET scanning of the temporal bone, skull base and intracranial anatomy).

Diseases, Disorders and Conditions

Etiology, diagnostic criteria, historical features, differential diagnosis, prognosis,- medical/surgical management, common and unusual complications, and impact on all spheres of functioning:

- Congenital (e.g., inner ear disorders, skull base tumors such as teratoma, congenital cholesteatoma (epidermoid) of petrous bone and skull base).
- Genetic (e.g., neurofibromatosis type 2, familiar paraganglioma, familiar meningioma).
- Infectious (e.g., Bell's Palsy, petrositis, osteomyelitis or osteitis of skull base, neurosyphilis).
- Inflammatory (e.g., cholesterol granuloma of petrous apex).
- Idiopathic (e.g., spontaneous CSF leak into temporal bone).
- Vascular (e.g., hemifacial spasm, tic douloureaux, neurovascular compression syndromes, arteriovenous malformations and dural AVMs, Wallenberg Syndrome, internal carotid artery abnormalities).
- Neurologic disorders (e.g., multiple sclerosis, cerebral vascular accident syndromes, seizure disorders, migraines).
- Neoplastic (e.g., squamous cell carcinoma of skull base, adenoid cystic carcinoma involving the temporal bone, acoustic neuroma, meningioma, glomus tumor of skull base, cranial nerve schwannoma (including V, VII, IX, X, XI, XII), clivus chordoma, aneurysmal bone cyst, hemangioma, chondroma, sarcoma, chondrosarcoma, rhabdomyosarcoma).
- Trauma (e.g., temporal bone trauma involving facial paralysis, CSF fistula, and/or encephalocele, arteriovenous malformation) latrogenic (e.g., facial nerve paralysis, labyrinthine fistual). Metabolic (e.g. DI (Diabetes Incipitus), SIADH (Syndrome of Inappropriate Diuretic Hormone).

Pharmacology

Neurotoxicity

Principles of medication use, route of administration, mechanisms of action, indications/contraindications, proper usage, interaction effections and limitations of:

- Antibiotics.
- Antihistamines.
- Vestibular suppressants.
- Anti-inflammatories (steroids and nonsteroids).
- Antiemetics.
- Pain medications (e.g., analgesics, sedatives, hypnotics, psychotropics).
- Anti-neoplastic agents.
- Antiviral agents.
- Anticonvulsants.
- Central muscle relaxants.

Basic Concepts Associated with Surgery:

- Preoperative care (e.g., antiembolism measures for prolonged procedures, catecholamine and secreting tumors, blood transfusion).

- Anesthesia (e.g., neuroanesthesia, phenobarbital coma, hypocarbia, diuresis).
- Intraoperative monitoring (e.g., cranial nerves VII, VIII {BSER, EAP}, IX, X, XI, XII).
- Cerebrospinal fluid management (e.g., intraoperative and postoperative lumbar drains).
- Flaps (e.g., regional muscle flaps, myocutaneous, free tissue transfer).
- Management of complications (e.g., cerebrospinal fluid leak, dural repair, subdural hematoma, epidural hematoma, intracranial hemorrhage, hydrocephalus, stroke, intraoperative or postoperative seizure, hearing loss, dysequilibrium, oscillopsia, headache, cranial nerve paralysis, meningitis, diplopia, vertigo, steroid psychosis).
- Basic techniques (e.g., harvest of nerve graft from neck or sural nerve, intracranial and intratemporal neural anastomoses, decompression of cranial nerve, ultrasonic aspiration,focused radiation therapy.
- Postoperative care (e.g., neurointensive care, neuronursing care, DI (Diabetes Incipitus).
- SIADH (Syndrome of Inappropriate Diuretic Hormone).
- Multidisciplinary planning (e.g., neuroradiology, interventional radiology, neuroanesthesiology, neurology, neurosurgery).
- Stereotactic radiosurgery for skull base neoplasms.

Specific Surgical Procedures

Indications, contraindications, risks/benefits, and complications of:

- Middle cranial fossa approach (e.g., facial nerve decompression, vestibular nerve section, acoustic tumor excision, repair of spontaneous, traumatic, or iatrogenic CSF leak and/or encephalocele, drainage of petrous apex abscess, vestibular neurectomy, repair superior semicircular canal dehiscence).
- Excision petrous apex tumors.
- Translabyrinthine approach (e.g., facial nerve decompression and repair, vestibular nerve section, acoustic tumor excision and other CPA lesions, repair of CSF leak and/or encephalocele, meningioma, vestibular neurectomy).
- Transcochlear approach (e.g., acoustic tumor excision, other cranial nerve tumors, drainage of petrous apex abscess, drainage of cholesterol granuloma, meningioma).
- Retrosigmoid/suboccipital approach (e.g., acoustic tumor and other CPA lesions, vestibular nerve section, vascular decompress V, VII, VIII, meningioma).
- Infratemporal fossa approach (e.g., glomus jugulare, neuroma IX, X, XI, XII, meningioma).
- Lateral skull base approach (e.g., clivus chordoma, petroclival meningioma, parasellar tumors, neuroma cranial nerve V, cavernous sinus lesions, chondrosarcoma).
- Cochlear implant/brainstem auditory implant.
- Total and lateral temporal bone resection.
- Labyrinthectomy.
- Endolymphatic sac surgery.
- Subtotal petrosectomy
- Posterior lateral craniotomy.

Habilitation/Rehabilitation Approaches

Basic Otolaryngology – Head and Neck Training as well as neurotology trainin should include the following:

- Swallowing rehabilitation.
- Rehabilitation of the paralyzed face.
- Vestibular compensation and rehabilitation methods.