Basic Standards for
Fellowship Training in
Otolaryngic Allergy

American Osteopathic Association
and
American Osteopathic Colleges of Ophthalmology
and Otolaryngology Head and Neck Surgery
Basic Standards for Fellowship Training
In Otolaryngic Allergy

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I - INTRODUCTION

These are the Basic Standards for Fellowship Training in Otolaryngic Allergy as established by the American Osteopathic Colleges of Ophthalmology and Otolaryngology Head and Neck Surgery (AOCOO-HNS) and approved by the American Osteopathic Association (AOA). These standards are designed to provide the osteopathic fellow with advanced and concentrated training in otolaryngic allergy and to prepare the fellow for examination for certification in Otolaryngic Allergy by American Osteopathic Boards of Ophthalmology and Otolaryngology-Head and Neck Surgery (AOBOO-HNS).

II - MISSION

The mission of the Osteopathic Otolaryngic Allergy training program is to provide fellows with comprehensive structured cognitive and clinical education that will enable them to become competent, proficient and professional osteopathic otolaryngic allergists.

III – EDUCATIONAL PROGRAM GOALS

The goals of the Osteopathic Otolaryngic Allergy program are to train fellows to become proficient in the following core competencies:

A. Medical Knowledge: A thorough knowledge of the complex differential diagnoses and treatment options for the patient with Otolaryngic Allergy and the ability to integrate the applicable sciences with clinical experiences.

B. Patient Care: The ability to rapidly evaluate, initiate and provide treatment for patients with acute and chronic Otolaryngic Allergy in both the inpatient and outpatient settings as well as promote health maintenance and disease prevention.

IV – INSTITUTIONAL REQUIREMENTS

4.1 There must be a minimum volume of two hundred and fifty (250) otolaryngic allergy procedures per year for each fellow in training.

4.2 The institution's department/section of Otolaryngic Allergy shall have at least one (1) physician who currently holds a Certificate of Added Qualifications in Otolaryngic Allergy from the AOA through the American Osteopathic Board of Ophthalmology and Otolaryngology-Head and Neck Surgery (AOBOO-HNS).

4.3 The program must maintain a list of learning objectives to indicate learning expectations at yearly training levels and provide it to the fellows annually.

4.4 The program must maintain a written curriculum and provide it to the fellows annually.

4.5 The institution must provide a supervised ambulatory site for continuity of care training. Institutional clinics or Otolaryngic Allergist's offices may be used.

4.6 The institution/program must maintain a file for each fellow containing, at minimum:
   1. Ambulatory logs;
   2. Procedure logs;
   3. Monthly rotation evaluation forms;
   4. Quarterly program director evaluations;
   5. Semiannual ambulatory evaluations;

4.7 The program must be represented each year at the annual AOCOO-HNS Program Directors Work Shop and annual College sponsored Faculty Development Course.
4.8 The institution must provide an otolaryngic allergy laboratory.

V - PROGRAM REQUIREMENTS AND CONTENT

A. Program Requirements

5.1 The training program in Otolaryngic Allergy must be completed utilizing one of the following options.

a. One (1) year of uninterrupted studies with participation in a minimum of 250 documented cases; or

b. Two (2) years of interrupted studies and training in Otolaryngic Allergy with participation in a minimum of 500 documented cases including academic experience equivalent to at least (1) year of formal concentrated study; or

c. Three (3) years of interrupted studies and training in Otolaryngic Allergy with participation in a minimum of 750 documented cases including academic experience equivalent to at least one (1) year of formal concentrated study.

B. Transfers and Advanced Standing

5.1 The program must receive documentation from previous program director confirming that the fellow has achieved a specific level of training, and receive an endorsement from the new program director recommending advanced standing for a specific block of time.

5.2 The program is required to provide verification of residency education for fellows who may leave the program prior to completion of their education.

5.3 Requests for advanced standing and time allotted for such requests shall be considered on a case-by-case basis. The AOCOO-HNS Council of Medical Education shall review all applications and make recommendations. Advanced standing credit is applicable only for training received at the institution immediately prior to the program to which the fellow is requesting transfer.

C. Program Content

5.1 Medical Knowledge

a. Fellows must participate in structured Otolaryngic Allergy educational activities throughout their training program.

b. Each fellow must attend a minimum of one hundred (100) credit hours of AOCOO-HNS sponsored/approved courses, thirty (30) of which must be from an otolaryngic allergy basic course (AAOA/AOCOO-HNS) and seventy (70) hours of advanced courses.

c. By the completion of the Otolaryngic Allergy fellowship program, each fellow must have training and experience so the resident has the ability to:

1. Take an allergy history and assess the likelihood of allergy
2. Understand basic pathophysiology of inhalant allergy
3. Diagnose allergy using either skin endpoint titration or an in-vitro specific IgE testing
4. Manage allergy symptoms using avoidance, pharmacology and immunotherapy
5. Initiate, escalate, and adjust inhalant allergy immunotherapy.
6. Understand safety precautions and management of emergencies.
7. Understand pathophysiology of food allergy.
8. Understand pathophysiology of chemical allergy.
9. Understand nutritional needs of allergy patients.
10. Recognize most common presentations of allergy.
11. Formulate diagnostic plans.
12. Interpret diagnostic allergy tests.
13. Initiate therapy.

5.2 Patient Care

a. The fellow must have training and experience in comprehensive histories and physicals, including structural examinations, with emphasis on the immunologic and related systems.

b. The fellow must have training and experience in the Diagnosis, Pathophysiology, and Treatment of Inhalant Allergy, food and fungal hypersensitivity. Application of skin wheals, mix vials, and the making of five-fold serial dilutions, as well as how to interpret skin endpoints, perform dosage calculations, and plan treatment vials.

c. The fellow must have training and experience in the pathophysiology Evaluation, and Treatment of Food Allergy and Chemical Sensitivity, Principles of Clinical Nutrition, Supplementary Allergy Treatment Techniques, such as the use of Histamine and Heparin, and Evaluation and Management of Difficult Clinical Problems such as Urticaria, Drug Allergy, Inner Ear Allergy, and Immunodeficiency.

d. The fellow must have training and experience with state-of-the-art advances and emerging technology that may be needed in future practice settings.

D. Ambulatory Clinic

5.1 The fellow’s continuity clinic training must be under the supervision of an Otolaryngic Allergy specialist.

5.2 There must be participation between the supervisor and the fellow including, at minimum, evidence that all cases are discussed.

5.3 The fellow must be exposed to the medical diagnoses found in a general Otolaryngic Allergy practice.

5.4 The fellow must be taught to apply the concepts of disease prevention and health maintenance.

5.5 Specific ambulatory clinic logs must be maintained and contain, at minimum: patient identification; diagnosis and the activity and/or procedures performed on each visit.

5.6 The fellow must develop a continuity panel of patients in the ambulatory clinic.

5.7 An opportunity must exist for the fellow to participate in the ongoing care of his/her clinic patients.

VI – PROGRAM DIRECTOR AND FACULTY

A. Program Director

6.1 The program director must be certified in Otolaryngic Allergy by the AOA through the American Osteopathic Boards of Ophthalmology and Otolaryngology-Head and Neck Surgery.

6.2 The program director must have a minimum of three (3) years of clinical experience in Otolaryngic Allergy following certification by the AOA or request special consideration by the AOCOO-HNS Council of Medical Education;
The program director must be an active member of the AOCOO-HNS.

The program director's authority in directing the residency training program must be defined in the program documents of the institution.

The program director must comply with procedures and requests of the Council on Medical Education.

The program director must have compensated dedicated time to administer the training program.

The program director must complete an annual report for each fellow and review it with the fellow. Final reports must be submitted within 30 days of training completion. Delinquent annual reports will not be reviewed until a delinquency fee is paid as determined by the AOCOO-HNS administrative policies.

The program director must attend the annual AOCOO-HNS Program Director Workshop, held during the ACA, at a minimum of once every other year. In the intervening years, the program director must assign a designee who is actively involved in the training program, to attend the workshop in his or her place.

The program director must attend the annual AOCOO-HNS-sponsored Faculty Development Course as follows: the program director must attend two (2) out of three (3) programs and assign other faculty involved in the training program to attend one (1) out of five (5) annual faculty development programs.

The program director must notify the AOCOO - HNS of the fellow’s entry into the training program and the names of all fellows in the program by submitting a fellow list annually on a form furnished by AOCOO - HNS.

The program director must maintain an e-mail address and provide it to the AOCOO – HNS.

B. Faculty

Faculty must make available non-clinical time to provide instruction to fellows.

VII – FELLOW REQUIREMENTS

The fellow must have satisfactorily completed an AOA approved residency in otolaryngology.

The fellow must be members of the AOCOO-HNS.

The fellow must submit an annual resident report to the AOCOO-HNS within thirty (30) days of completion of each training year. The annual report consists of: the segregated totals (Logs), the program directors report, the professional paper, and verification of required courses. Delinquent annual reports will not be reviewed until a delinquency fee is paid as determined by the AOCOO-HNS ’s administrative policies.

The fellow must attend a minimum of 70 percent of all meetings as directed by the program director.

The fellow must maintain certification in advanced cardiac life support throughout the residency.

The fellow must attend the AOCOO-HNS Annual Clinical Assembly or another AOCOO-HNS continuing education program once during the training program.

The fellow must maintain a current e-mail address and provide it to the AOCOO - HNS upon entering the program.

VIII – EVALUATION
8.1 The faculty and fellows must evaluate the program and curriculum annually to ensure that it is consistent with the current goals of the program and further address, at minimum: pass rates on the AOBOO-HNS certification examination; fellow retention rates in the program; percent of graduates completing the program using one of the required plans; placement of graduates and professional accomplishments of graduates.

8.2 The ambulatory clinic director must complete semiannual written evaluations of the fellow’s performance.

8.3 All evaluations must be signed by the person completing the evaluation, the program director and the fellow.

8.4 The program director or a designee must meet with the fellow semiannually to review and document the fellow’s progress.

8.5 At the end of each training year, the program director, with faculty input, must determine whether each fellow has the necessary qualifications to progress to the next training year or be considered training/program complete.

8.6 Fellows’ identities in faculty evaluations must remain confidential.

8.7 Program Director and Faculty performance must be reviewed on an annual basis.

8.8 Information provided by fellows must be included as part of the assessment of faculty performance.

8.9 The program must have a remediation policy for fellows who are performing at an unsatisfactory level.

8.10 All newly approved residency training programs will be given a maximum of thirty six (36) months continuing approval following the first inspection which occurs twelve (12) months after the first fellow begins the program.

8.11 At the end of each training year, the program director and the fellow must complete and send an Annual Report to the AOOCO-HNS within thirty (30) days of completion of each training year. The annual report consists of: the segregated totals (Logs), the program directors report. Delinquent annual reports will not be reviewed until a delinquency fee is paid as determined by the AOOCO-HNS’s administrative policies.
Basic Standards for
Residency Training in
Otolaryngology / Facial Plastic Surgery

American Osteopathic Association
and
American Osteopathic Colleges of Ophthalmology
and Otolaryngology Head and Neck Surgery

BOT Oct 2015, Effective 7/2016
## Basic Standards for Residency Training
### In Otolaryngology / Facial Plastic Surgery

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I - INTRODUCTION

These are the Basic Standards for Residency Training in Otolaryngology / Facial Plastic Surgery as established by the American Osteopathic Colleges of Ophthalmology and Otolaryngology Head and Neck Surgery (AOCOO-HNS) and approved by the American Osteopathic Association (AOA). These standards are designed to provide the osteopathic resident with advanced and concentrated training in otolaryngology / facial plastic surgery and to prepare the resident for examination for certification in Otolaryngology / Facial Plastic Surgery by American Osteopathic Boards of Ophthalmology and Otolaryngology-Head and Neck Surgery (AOBOO-HNS).

II- MISSION

The mission of the osteopathic otolaryngology / facial plastic surgery training program is to provide residents with comprehensive structured cognitive and clinical education that will enable them to become competent, proficient and professional osteopathic otolaryngologists/facial plastic surgeons.

III – EDUCATIONAL PROGRAM GOALS

The goals of the osteopathic Otolaryngology/Facial Plastic Surgery program are to train residents to become proficient in the following core competencies:

A. Osteopathic Philosophy and Osteopathic Manipulative Medicine: Integration and application of osteopathic principles into the diagnosis and management of patient clinical presentations.

B. Medical Knowledge: A thorough knowledge of the complex differential diagnoses and treatment options for the patient with otolaryngic disease and the ability to integrate the applicable sciences with clinical experiences.

C. Patient Care: The ability to rapidly evaluate, initiate and provide treatment for patients with acute and chronic otolaryngic conditions in both the inpatient and outpatient settings as well as promote health maintenance and disease prevention.

D. Interpersonal and Communication Skills: Use of clear, sensitive and respectful communication with patients, patients’ families and members of the health care team.

E. Professionalism: Adherence to principles of ethical conduct and integrity in dealing with patients, patients’ families and members of the health care team.

F. Practice-Based Learning and Improvement: Commitment to lifelong learning and scholarly pursuit in Otolaryngology/Facial Plastic Surgery for the betterment of patient care.

G. Systems-Based Practice: Skills to lead health-care teams in the delivery of quality patient care using all available resources.

IV – INSTITUTIONAL REQUIREMENTS

4.1 There must be a minimum volume of one hundred (100) major otolaryngology surgical cases per year for each resident in training that consist of head and neck, intra-nasal and sinus, broncho-esophagology, and otologic procedures, combined with seventy-five (75) major facial plastic surgery cases per year for each resident in training.

4.2 The institution's department/section of Otolaryngology/Facial Plastic Surgery shall have at least one (1) physician certified in Otolaryngology/Facial Plastic Surgery by the AOA and a second physician certified in Otolaryngology/Facial Plastic Surgery by the AOA or the American Board of Otolaryngology.

4.3 The program must maintain a list of learning objectives to indicate learning expectations at yearly training levels and provide it to the residents annually.
4.4 The program must maintain a written curriculum and provide it to the residents annually. Sample curriculum is available at www.aocoohns.org.

4.5 The institution/program must maintain a file for each resident containing, at minimum:
   1. Ambulatory logs;
   2. Procedure logs;
   3. Monthly rotation evaluation forms;
   4. Quarterly program director evaluations;
   5. Semiannual ambulatory evaluations;
   6. Semi-annual reviews
   7. In-service exam scores

4.6 The institution must provide the time and resources for each resident to attend the Annual Clinical Assembly or another educational program sponsored by the AOCOO-HNS at least once during their residency.

4.7 The institution must arrange for each resident to take the annual in-service exam.

4.8 The program must be represented each year at the annual AOCOO-HNS Program Directors Work Shop and annual College sponsored Faculty Development Course.

4.9 The institution must provide access to a temporal bone lab facility, staffed, and organized to provide quality otolaryngology training.

4.10 The institution must provide access to post-graduate courses in allergy, facial plastic surgery, head and neck surgery, laser surgery, and temporal bone surgery when clinical and didactic material is not available at the base institution.

V - PROGRAM REQUIREMENTS AND CONTENT

A. Program Requirements

5.1 The residency training program in Otolaryngology/Facial Plastic Surgery must be sixty (60) months in duration.

B. Transfers and Advanced Standing

5.1 The program must receive documentation from previous program director confirming that the resident has achieved a specific level of training, and receive an endorsement from the new program director recommending advanced standing for a specific block of time.

5.2 The program is required to provide verification of residency education for residents who may leave the program prior to completion of their education.

5.3 Requests for advanced standing and time allotted for such requests shall be considered on a case-by-case basis. The AOCOO-HNS Council of Medical Education shall review all applications and make recommendations. Advanced standing credit is applicable only for training received at the institution immediately prior to the program to which the resident is requesting transfer.

C. Program Content

5.1 Osteopathic Philosophy & Manipulative Medicine
   a. Training in osteopathic principles and practice must be provided in both structured educational activities and clinical formats.
b. Residents must complete an OPP/OMM curriculum.

5.2 Medical Knowledge
a. The formal structure of educational activities must include monthly journal clubs.
b. The formal structure of educational activities must include structured faculty didactic participation.
c. Attendance at required educational activities must be documented.
d. Residents must participate in the Otolaryngology/Facial Plastic Surgery structured educational activities throughout their training program, including during the OGME-1 Year.
e. Each resident must participate in Otolaryngology/Facial Plastic Surgery board review, either in the form of an ongoing program, or by the program sponsoring the resident’s attendance at an Otolaryngology/Facial Plastic Surgery board review course.
f. By the completion of the Otolaryngology/Facial Plastic Surgery residency program, each resident must have completed an formal basic science course (at minimum 100 hours) and demonstrate competency in the basic sciences, medical and surgical knowledge in the following areas:
   Morphology, physiology, pharmacology, pathology, microbiology biochemistry, genetics, and immunology relevant to the head and neck; the upper respiratory and upper alimentary systems; the communication sciences, including knowledge of audiology and speech-language pathology; the chemical senses and allergy, endocrinology, and neurology as they relate to the head and neck; and voice sciences as they relate to laryngology.

5.3 Patient Care
a. The resident must have training and experience in comprehensive histories and physicals, including structural examinations, with emphasis on the head and neck and related systems.
b. The resident must have training and experience in the following surgical procedures:
c. The resident must have training and experience in the interpretation, indications, contraindications and complications of audiologic, vestibular, and vocal function testing; biopsy and fine needle aspiration techniques; and other clinical and laboratory procedures related to the diagnosis of diseases and disorders of the upper airway and digestive tract and the head and neck.
d. The resident must have training and experience in the management of congenital, degenerative, idiopathic, infectious, inflammatory, toxic, allergic, immunologic, vascular, metabolic, endocrine, neoplastic, foreign body and traumatic states; airway management, resuscitation, local/regional anesthesia, sedation; universal precaution techniques to include, at minimum: indications; contraindications; complications; limitations and evidence of competent performance.
e. The resident must have training and experience in operative intervention, and preoperative and postoperative care of the following major categories:
   1. General otolaryngology, including pediatric otolaryngology, rhinology, bronchoesophagology and laryngology;
2. Head and neck oncologic surgery;
3. Facial plastic and reconstructive surgery of the head and neck;
4. Otology and neurotology.

f. The resident must have training and experience to competently perform habilitation and rehabilitation techniques and procedures, in the areas of respiration, deglutition, chemoreception, balance, speech, as well as auditory measures such as hearing aids and implantable devices.
g. The resident must have training and experience to diagnose and apply therapeutic techniques involving endoscopy of the upper airway and digestive tract, including rhinoscopy, laryngoscopy, esophagoscopy, and bronchoscopy, as well as the associated application of stroboscopes, lasers, mechanical debriders, computer-assisted guidance devices, and nerve integrity monitors.
h. The resident must have training and experience in therapeutic radiology and the interpretation of x-rays, CT scan, MRI and other imaging modalities of the head and neck and thorax including: temporal bone skull, nose, paranasal sinuses, salivary glands, thyroid gland, larynx, neck, lungs, and esophagus.
i. The resident must have training and experience with state-of-the-art advances and emerging technology in otolaryngology and head-and-neck surgery;

5.4 Interpersonal and Communication Skills

a. The resident must have training in communication skills with patients, patient families and other members of the health care team, including patients with barriers to communication, such as sensory impairments, dementia, language and cultural differences.

5.5 Professionalism

a. The resident must have training in health care disparities.

5.6 Practice-Based Learning and Improvement

a. The resident must have training in teaching skills.
b. The resident must have training in the use of electronic health records.
c. The resident must have learning activities and participation in quality improvement processes.
d. The resident must have learning activities in medical research throughout the program including, at minimum: research types and methodology; biostatistics; health services research and interpretation of medical literature.
e. The resident must complete scholarly projects as required by the AOCOO-HNS and approved by the program director.

5.7 Systems-Based Practice

a. The resident must have training in practice management.
b. The resident must have training in health policy and administration.

D. Surgical Experience

5.1 Residents must have major technical and patient care responsibilities in surgery (including laser surgery). Each resident must perform as primary surgeon at least the following required number of operative procedures prior to graduation:
a. Head and neck: 25 major per year  
b. Otology: 20 major per year  
c. Plastic and reconstructive: 35 major per year  
d. Endoscopic sinus surgery: 25 major per year  
e. Congenital anomalies: 3 major per year  
f. Laser pertaining to all categories: 10 per year

5.2 The program director is responsible for verifying the surgical experiences of each resident, to include the number of cases in each category where the resident has served as the primary surgeon or the assistant surgeon (surgical logs).

5.3 Equivalent distribution of categories and procedures among the residents must be demonstrated. Significantly unequal experience in volume and/or complexity of cases managed by the residents will be considered serious noncompliance with these requirements.

E. Program Rotational Requirements

5.1 The first year of Osteopathic graduate medical education (OGME-1) training must contain the following required elements:
   a. 4 months hospital-based general surgery;  
   b. 1 month medical pediatrics;  
   c. 1 month anesthesia;  
   d. 1 month intensive care unit;  
   e. 1 month emergency room;  
   f. 1 month surgical subspecialty (neurological, vascular, maxillofacial, plastic, cardiovascular, general);  
   g. 1 month medical subspecialty (pulmonary, neurology, family medicine, gastroenterology, dermatology, internal medicine, ophthalmology);  
   h. 2 months Elective (from surgical subspecialty or medical subspecialty lists above).

5.2 During OGME-2-OGME-5 training years the resident must have the following rotations:
   a. Otology  
   b. Rhinology  
   c. Laryngology  
   d. Head and Neck  
   e. Facial Plastic surgery  
   f. Pediatric Otolaryngology  
   g. Otolaryngic Allergy

VI – PROGRAM DIRECTOR AND FACULTY

A. Program Director

6.1 The program director must be certified in Otolaryngology/Facial Plastic Surgery by the AOA through the American Osteopathic Boards of Ophthalmology and Otolaryngology-Head and Neck Surgery.
6.2 The program director must have a minimum of three (3) years of clinical experience in Otolaryngology/Facial Plastic Surgery following certification by the AOA or request special consideration by the AOCOO-HNS Council of Medical Education;

6.3 The program director must be in active clinical practice in Otolaryngology/Facial Plastic Surgery.

6.4 The program director must be an active member of the AOCOO-HNS.

6.5 The program director's authority in directing the residency training program must be defined in the program documents of the institution.

6.6 The program director must comply with procedures and requests of the Council on Medical Education.

6.7 The program director must have compensated dedicated time to administer the training program.

6.8 The program director must submit an annual report for each resident to the AOCOO-HNS and review it with the resident. Annual Reports must be submitted within 30 days of training completion.

6.9 The program director must attend the annual AOCOO-HNS Program Director Workshop, held during the Annual Clinical Assembly (ACA), at a minimum of once every other year. In the intervening years, the program director must assign a designee who is actively involved in the training program, to attend the workshop in his or her place.

6.10 The program director must attend the annual AOCOO-HNS-sponsored Faculty Development Course as follows: the program director must attend two (2) out of three (3) programs and assign other faculty involved in the training program to attend one (1) out of five (5) annual faculty development programs.

6.11 The program director must notify the AOCOO-HNS of the resident's entry into the training program and the names of all residents in the program by submitting a resident list annually on a form furnished by AOCOO-HNS.

6.12 The program director must maintain an e-mail address and provide it to the AOCOO-HNS.

6.13 The program director must arrange for the residents to take the in-service examination on an annual basis and to provide, each year, the test results to the AOCOO-HNS Council of Medical Education.

6.14 The program director must review the results of the annual in-service examination with each resident by the end of the training year.

6.15 The program director has the responsibility and authority to promote a resident.

6.16 The program director has the responsibility to designate the resident as training complete.

B. Faculty

6.1 Faculty must maintain current certification or be board eligible by the AOA or appropriate allopathic board agency.

6.2 Faculty must make available non-clinical time to provide instruction to residents. Faculty must participate in the academic educational programs such as formal lectures, case conferences, journal clubs, book clubs, and board review.

VII – RESIDENT REQUIREMENTS

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7.1 The residents must be members of the AOCCO-HNS.

7.2 The resident must maintain and accurately complete records of their educational activities in the required surgical log format.

7.3 Surgical logs must be recorded from surgery performed at the base and affiliate sites, and must be reviewed and verified semi-annually by the program director.

7.4 The surgical logs must document the fulfillment of the requirements of the program, describing the scope, volume, and variety and progressive responsibility of the resident.

7.5 The residents must submit the year-end annual surgical log to the program director within thirty (30) days of completion of each training year.

7.6 The curriculum must advance residents’ knowledge of the basic principles of research through scholarly activity. Scholarly activity is required of all residents during their training. Scholarly activity entails contribution to knowledge that is available to the discipline of otolaryngology/facial plastic surgery or its subspecialty areas. To be recognized as scholarly the project must be shared with peers and subject to peer review. Each resident is required to obtain 3 points by the completion of their fourth year of training. Projects with their point values are to be approved by the program director in advance of completion and submitted on the program director’s annual report (see appendix ii for project and point recommendations). The sponsoring institution and program should allocate adequate educational resources to facilitate resident’s involvement in scholarly activity.

7.7 The residents must attend a minimum of 70 percent of all meetings as directed by the program director.

7.8 The residents must participate in hospital committee meetings as directed by the program director.

7.9 The residents must participate each year in the annual Resident In-Service Examination.

7.10 The residents must maintain certification in advanced cardiac life support throughout the residency.

7.11 The residents must attend the AOCCO-HNS Annual Clinical Assembly or another AOCCO-HNS continuing education program once during the training program.

7.12 The resident must maintain a current e-mail address and provide it to the AOCCO-HNS upon entering the program.

7.13 The resident must complete a suitable home study course approved by the program director during the OGME-2, OGME-3, and OGME-4 training years. Documentation of the entire home study course is required by the end of the OGME-4 year of training. The residents must review the home study course in a group fashion, and to review it twice during the training program.

VIII – EVALUATION

8.1 The faculty and residents must evaluate the program and curriculum annually to ensure that it is consistent with the current goals of the program and further address, at minimum: aggregate performance on the annual Resident In-Service Examination; pass rates on the AOBOO-HNS certification examination; resident retention rates in the program; percent of graduates completing the program in 60 months; placement of graduates and professional accomplishments of graduates.
8.2 All evaluations must be signed by the person completing the evaluation, the program director and the resident.

8.3 The program director or a designee must meet with the resident semiannually to review and document the resident’s progress.

8.4 At the end of each training year, the program director, with faculty input, must determine whether each resident has the necessary qualifications to progress to the next training year or be considered training/program complete.

8.5 Residents’ identities in faculty evaluations must remain confidential.

8.6 Program Directors and Faculty performance must be reviewed on an annual basis.

8.7 Information provided by residents must be included as part of the assessment of faculty performance.

8.8 The program must have a remediation policy for residents who are performing at an unsatisfactory level.

8.9 All newly approved residency training programs will be given a maximum of thirty six (36) months continuing approval following the first inspection which occurs twelve (12) months after the first resident begins the program.
APPENDIX ONE: ACCREDITATION

The Council of Medical Education (C.O.M.E.) of the American Osteopathic Colleges Of Ophthalmology And Otolaryngology-Head And Neck Surgery (AOCOO-HNS) is the body which recommends its residency programs for accreditation to the American Osteopathic Association (AOA). The C.O.M.E. has the responsibility of maintaining the standards of training by which all otolaryngology/facial plastic surgery residency training programs can be measured. Accredited institutions and programs agree to, and must meet or exceed the standards set forth in the AOA basic documents and the AOCOO-HNS otolaryngology/facial plastic surgery basic standards for postdoctoral training throughout their entire period of accreditation.

The residency program director is the central figure in the accreditation process. A program director must commit to compliance with the basic standards for residency training in ophthalmology. He/she is responsible for amassing and submitting the required data to the C.O.M.E. the accuracy and veracity of this information is critical to the accreditation process. The C.O.M.E. retains the authority to recommend to the AOA acceptance or denial of accreditation, call for a focused site visit, or place a program on probation if the standards are not being met.

Residency training programs demonstrate compliance with the basic standards and on-going quality improvement through the following:

1. self-study evaluation of the program using appropriate crosswalk, and conducted by faculty, residents, and sponsoring institution and OPTI.
2. Delineation of findings and recommendations from this self-study for self-improvement.
3. Submission to the C.O.M.E. reports of on-site evaluations, mid-cycle reviews, annual reports and any other requested information in a timely manner and meeting all published deadlines.
APPENDIX TWO: SCHOLARLY ACTIVITY POINT RECOMMENDATIONS

- 3 points for a published article in a peer review journal
- 2 points for an unpublished article requiring irb approval
- 2 points for presenting a workshop at a national meeting
- 1 point for presenting a lecture at a national meeting
- 1 point for presenting a poster at a national meeting
- 1 point for a non-published paper conforming to the paper requirements
- 1 point for completion of a course in statistics, writing skills, editorial courses or research skills course
APPENDIX THREE: PAPER REQUIREMENTS

In order for a non-published paper to conform to the current paper requirements it must meet the following list of requirements.

- Abstract must be well written, include key words and define the scope of the paper.
- The general structure of the paper must include:
  - 1500 words or more (excluding the bibliography)
  - Correct use of language
  - Correct punctuation
  - Proper footnoting
  - Appropriate use of charts, graphs, figures, tables or photographs
  - Type-written or computer formatted
  - Adheres to recommended format for type of paper chosen
  - Bibliography properly written and annotated
  - Appropriate contact made with IRB if applicable
- Originality of content must be demonstrated in the following:
  - Introduction and abstract
  - Clearly defined objectives of the paper
  - Literature review and references appropriate in scope and number for paper's subject
  - Accurate reporting of case findings including the collected data.
  - Discussion demonstrates critical comment, reflects an interpretation of data, cross-references literature, shows mastery of subject and demonstrates direction for reader
  - Results for data collection appropriately analyzed and clearly articulated.
  - Paper presents good evidence for conclusions drawn
  - Conclusion concise, clear and relevant
  - Paper offers new paradigm or shows new direction for reader (i.e., was this an important study? Is there a take-home message?)
American Osteopathic College of Otolaryngology– Head and Neck Surgery

Otolaryngology/Facial Plastic Surgery

Resident Curriculum
2016-17 Academic Year Final Edition
Des Peres Hospital

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Program Director

Edition Date: 1 April, 2016
Preface to 2016 Edition

This 2016 edition to the Otolaryngology/Facial Plastics Resident Curriculum emphasizes the principles adopted by the American Osteopathic Association related to General and Core Competency requirements for Osteopathic Graduate Medical Education or OGME. The mission of residency training in Otolaryngology/Facial Plastics Surgery is to produce an Osteopathic Physician, skilled in the specialty of Otolaryngology/Facial plastic surgery and who can provide compassionate, quality care, continue lifelong learning, display integrity, and professionalism. Training shall be accomplished through meeting or exceeding educational goals and objectives as outlined not only in the Standards for Program Approval but through a structured, written curriculum for the program that may include the following competencies in:

- Medical Knowledge
- Osteopathic philosophy and osteopathic manipulative medicine
- Patient care
- Interpersonal and communication skills
- Professionalism
- Practice-based learning and improvement
- Systems-based practice
Section 1

Section 1.1

Otolaryngology/ Facial Plastics Surgery Resident Curriculum Goals

A. Seven Core Competencies of the Osteopathic Profession:

Upon completion of the residency program, residents are required to attain and demonstrate competencies in the seven areas described to a level expected of a new practitioner or journeyman level practitioner. The residency program is required to define specific knowledge, skills, and attitudes required and provide educational experiences as needed in order for its residents to demonstrate competency in medical knowledge and Osteopathic Manipulative Medicine.

B. Guidelines for Resident Education:

The Otolaryngology/Facial Plastics Surgery Curriculum has integrated units, so that resident objectives related to patient care are presented with, or immediately adjacent to, related Otolaryngology/Facial Plastics Surgery content.

Section 1.2

A. Program Design

The program director and faculty must prepare and implement written educational goals for the program.

1. All educational components of a residency program should be related to program goals and specialty content with documentation of multiple measures to assess the resident’s performance. The program structure will be assessed by the COME and AOA as part of the regular review process.

2. The program must have a comprehensive, well organized, and effective curriculum, including:
   a. The cyclical presentation of core specialty knowledge supplemented by the addition of current information.
   b. Indication of what competencies are needed to progress through each year of training.
educational settings such as clinics, classrooms, operating rooms, bedsides, and laboratories, employing accepted educational principles.

3. To fulfill requirements of the basic standards or enhance training, the program director may arrange for required rotations with affiliated training sites.

   a. A program seeking to fulfill its requirements through affiliations with other AOA or ACGME institutions shall sign formal affiliation agreements with these training sites. Affiliation agreements shall be signed by representatives of both the base institution and the affiliate training sites, and shall be maintained on file with the DME at the base institution. Affiliations shall be consistent with the guidelines of the AOA.

   b. Residents on rotation to affiliated training sites shall remain under contract to the base institution. Resident training logs shall reflect training and service to the affiliated training site and shall be included in the resident records at the base institution. Written evaluation of the resident’s performance at the affiliated training site must be submitted by the on-site faculty to the program director at the base institution.

   c. The parent institution or organization may arrange for up to a total of six (6) consecutive months of training outside of the institution.

   d. In no case shall the maximum aggregate time on outside rotations be more than one-third the length of the program.

B. Specialty Content

The broad scope of the specialty of Otolaryngology - Head and Neck Surgery requires that the program provide surgical and medical education in the following areas:

1. Osteopathic Management of Otolaryngic diseases with the ability to demonstrate knowledge of:

   a. Basic concepts of structure-function relationships and the body’s inherent healing ability.
b. How to design a management plan that promotes the body’s ability to regulate itself toward health.

c. Osteopathic manipulative treatment based on the musculoskeletal system’s impact on circulation to and from all tissues, the autonomic nervous system and the promotion of lymphatic circulation and its role in reducing swelling and inflammation and stimulation of the immune system.

d. Medical and surgical intervention combined with patient education and appropriate musculoskeletal treatment.

2. Morphology, physiology, pharmacology, pathology, microbiology, biochemistry, genetics, and immunology relevant to the head and neck; the upper respiratory and upper alimentary systems; the communication sciences, including knowledge of audiology and speech-language pathology; the chemical senses and allergy, endocrinology, and neurology as they relate to the head and neck; and voice sciences as they relate to laryngology.

3. Diagnosis and diagnostic methods: audiolingual and vestibular assessments, techniques in voice assessment, electrophysiological techniques, and other related laboratory procedures for diagnosing diseases and disorders of the ears, the upper respiratory and upper alimentary systems, and the head and neck.

4. Therapeutic and diagnostic radiology: the interpretation of medical imaging techniques relevant to the head and neck and the thorax, including studies of the temporal bone, skull, nose, paranasal sinuses, salivary and thyroid glands, larynx, neck, lungs, and esophagus.

5. Diagnostic evaluation and management of congenital anomalies, allergy, trauma, and diseases affecting the regions and systems mentioned above.

6. Management of congenital, inflammatory, endocrine, neoplastic, degenerative, and traumatic states, including operative intervention and preoperative and postoperative care of the following major categories:

   a. General otolaryngology
   b. Head and neck surgery
   c. Plastic and reconstructive surgery
   d. Otology
7. Habilitation and rehabilitation techniques and procedures including respiration, deglutition, chemoreception, balance, speech, and hearing

8. Diagnostic and therapeutic techniques involving the application and utilization of lasers and flexible and rigid perioral endoscopy.

C. Clinical Components

The volume and variety of clinical otolaryngic problems in children and adults must be sufficient to afford each resident a graduated supervised experience with the entire spectrum of otolaryngic diseases so that the resident may develop diagnostic, therapeutic, and manual skills and judgment as to their appropriate use.

During the course of training residents should be responsible for the care of a panel of outpatients who represent a broad range of otolaryngic diseases. There must be appropriate faculty supervision of the residents in all outpatient visits. Appropriate faculty supervision occurs when the faculty is readily available to the resident(s) for consultation or assistance.

1. Outpatient experience

   a. There must be a well-organized and well-supervised outpatient service. This service must operate in relation to an inpatient service used in the program. Residents must have the opportunity to see patients, establish provisional diagnoses, and initiate preliminary treatment plans. An opportunity for follow-up care must be provided so that the results of surgical care may be evaluated by the responsible residents. These activities must be carried out under appropriate faculty supervision.

   b. If residents participate in preoperative and postoperative care in a private office, the program director must ensure that the resident functions with an appropriate degree of responsibility with adequate supervision. Experience should be provided in office practice procedures and management.

   c. Residents must have experience in the emergency care of critically ill and injured patients with otolaryngology-head and neck conditions.

2. Surgical Experience

   a. Residents must perform and assist at a sufficient number of operative procedures to become skilled as comprehensive
otolaryngology/facial plastic surgeons. That is, each resident must have major technical and patient care responsibilities in surgery (including laser surgery).

b. The program director is responsible for documenting the surgical experiences of each resident, to include the number of cases in each category where the resident has served as the primary surgeon or the assistant surgeon. This documentation must be provided to the COME and individual resident logs must be available at the time of the site visit.

c. While not all residents are expected to have operative experience in all surgical specialty procedures, the surgical procedures performed by the residents must be sufficient in number and variety to provide education in the entire scope of the specialty. There must be adequate distribution and sufficient complexity within the principal categories of the specialty.

d. Generally equivalent and adequate distribution of categories and procedures among the residents must be demonstrated. Significantly unequal experience in volume and/or complexity of cases managed by the residents will be considered serious noncompliance with these requirements.

3. Systemic Disease Consultation Experience

Each resident should receive experience in providing inpatient and outpatient consultation during the course of his/her education.

D. Resident Duty Hours and the Working Environment

Providing residents with a sound academic and clinical education must be carefully planned and balanced with concerns for patient safety and resident well being. Each program must ensure that the learning objectives of the program are not compromised by excessive reliance on residents to fulfill service obligations. Didactic and clinical education must have priority in the allotment of residents' time and energies. Duty hour assignments must recognize that faculty and residents collectively have responsibility for the safety and welfare of patients.

1. Supervision of Residents

The residency is an educational experience and must be designed by the institution to offer structured and supervised exposure in order to promote learning rather than service. An opportunity must exist for
residents to be supervised and evaluated throughout their training with availability of teaching staff scheduled within the program. During daytime hours, residents will be responsible to attending physicians for assignment and assignment of responsibility.

2. Work Hours must comply with AOA policy

3. Moonlighting Policy

Any professional clinical activity (moonlighting) performed outside of the official residency program can only be conducted with the permission of the program administration (DME/Program Director). A written request by the resident must be approved or disapproved by the Program Director and DME and be filed in the institution’s resident file. All approved hours are included in the total allowed work hours under AOA policy and are monitored by the institution’s graduate medical education committee. This policy must be published in the institution’s house staff manual. Failure to report and receive approval by the program may be grounds for terminating a resident’s contract.

E. Progressive Responsibilities

The program must provide the residents with experience in direct and progressively responsible patient management as they advance through the educational program. This education must culminate in sufficient independent responsibility for clinical decision making to reflect that the graduating resident has developed sound clinical judgment and possesses the ability to formulate and carry out appropriate management plans.

F. Research and Scholarly Activities

1. Graduate medical education must take place in an environment of inquiry and scholarship in which residents participate in the development of new knowledge, learn to evaluate research findings, and develop habits of inquiry as a continuing professional responsibility. Research offers an important opportunity for the application of the basic sciences to clinical problems and is an important part of the preparation of the resident for a lifetime of self-education after the completion of formal residency education.

2. The educational program should provide access to a structured research experience for the residents, sufficient to result in an understanding of the basic principles of study
design, performance, analysis, and reporting. The research experience may be clinical or basic in nature and should reflect careful advice by and planning with the faculty. Facilities and protected time for research by the residents should be provided, with guidance and supervision by qualified faculty.

3. The responsibility for establishing and maintaining an environment of inquiry and scholarship rests with the faculty. While not all members of the faculty must be investigators, the faculty as a whole must demonstrate broad involvement in scholarly activity. This activity should include:

a. Participation of the faculty in clinical discussions, rounds, and conferences in a manner that promotes a spirit of inquiry and scholarship. Scholarship implies an in-depth understanding of basic mechanisms of normal and abnormal states and the application of current knowledge to practice.

b. Participation in journal clubs and research conferences.

c. Participation in regional or national professional and scientific societies, particularly through presentations at the organizations' meetings and publication in their journals.

d. Participation in research, particularly in projects that are funded following peer review and/or result in publications or presentations at regional and national scientific meetings.

e. Offering of guidance and technical support (e.g., research design, statistical analysis) for residents involved in research.

f. Provision of support for resident participation in scholarly activities.

G. Conferences

1. Basic Science

The resident must complete a minimum of 100 hours of basic science studies relating to Otolaryngology / Facial Plastic surgery and
presented in a structured format. Resident attendance must be monitored, education must be evaluated, and content must be integrated into the educational program. The basic science education should meet the following requirements:

a. Basic science education should include instruction in anatomy, biochemistry, cell biology, embryology, immunology, molecular genetics, pathology, pharmacology, physiology, and other basic sciences related to the head and neck.

b. Sufficient funding for instruction in the basic sciences should be available.

c. Resident instruction in anatomy should include study and dissection of cadaver anatomic specimens, including the temporal bone, with appropriate lectures and other formal sessions.

d. Resident instruction in pathology should include formal instruction in correlative pathology in which gross and microscopic pathology relating to the head and neck area are included. The resident should study and discuss with the pathology service tissues removed at operations and autopsy material. It is desirable to have residents rotate in the Department of Pathology.

2. Clinical Conferences

Clinical conferences must be held regularly and should be attended by all residents and faculty. Grand rounds, mortality and morbidity conferences, tumor conferences, and conferences on other pertinent topics must be included in the educational program. Interdisciplinary conferences are encouraged.
Section 2
MEDICAL KNOWLEDGE –
OTOLARYNGOLOGY/FACIAL PLASTICS SURGERY

Section 2.1

Otolaryngology/Facial Plastics Medical Knowledge

Unit 2.1 Otology:

Unit Objectives:

Demonstrate knowledge of anatomy, physiology, and pathophysiology of otologic disease pertinent to general otolaryngology.

Demonstrate the ability to manage clinically and surgically patients with otologic diseases.

2.1.1 Otology – Hearing:

Competency-Based Knowledge Objectives:

1. Basic Science:

A. Demonstrate an understanding of basic anatomical and physiological mechanisms of the ear, auditory pathway and vestibular system.
B. Describe the embryology of the external, middle and inner ear.
C. Describe the chronologic development of the auditory system.
D. Demonstrate comprehension of neurophysiology of the ear related to hearing.
E. Explain from memory the microscopic anatomy of the cochlea and eighth cranial nerve.
F. Describe concepts related to measurement of sound and hearing.

1. Instrumentation.
2. Physical and psycho-acoustic measures.
3. Masking.
4. Pure tone audiometery.
5. Speech audiometry.

G. Demonstrate comprehension of theories of otoacoustic emissions.
H. Demonstrate comprehension of theories of Brainstem Evoked Responses including sites of waveform generators.
I. List the normal developmental milestones for hearing and speech in the pediatric population.

2. **Clinical**:

   A. Recognize clinical correlates of common audiometric patterns.
   B. Demonstrate knowledge in the use of amplification and aural rehabilitation to include hearing aids, assistive listening devices.
   C. Discuss the classification, causes and treatment of Tinnitus.
   D. Describe a standard test battery for new born hearing screening and diagnosis of hearing impairment.
   E. Categorize and describe the patterns of cochlear dysplasia.
   F. List all risk factors for congenital sensor neural hearing loss. List from memory common congenital syndromes that are associated with hearing loss.
   G. Describe the symptoms and natural history of sudden idiopathic sensorineural hearing loss.
   H. Outline the treatment options for sudden idiopathic Sensorineural hearing loss.
   I. Summarize the causes and treatments of fluctuating sensorineural hearing loss.
   J. List indications for cochlear implantation.
   K. Describe mechanisms of hearing loss after temporal bone trauma.

3. **Surgical**:

   A. Compare and contrast materials and types of middle ear implants.
   B. Describe indications for middle ear reconstruction versus amplification.
   C. Discuss management of postoperative complications related to middle ear reconstruction.

**Competency-Based Performance Objectives**:

1. **Clinical**:

   A. Demonstrate proper technique for hearing assessment with tuning forks:

      1. Weber and Rinne.

   B. Demonstrate ability to perform tympanometry.
   C. Demonstrate ability to perform comprehensive audiometry on normal hearing individuals.
   D. Interpret auditory evoked potential test results and their application in auditory function.
2. Surgical:

A. Perform ossicular chain reconstruction on cadaver and live patients.
B. Demonstrate surgical approach for Cochlear implantation on cadaveric specimens.
2.1.2

Otology - Acute Inflammatory Disease of the Ear:

Competency-Based Knowledge Objectives:

1. **Basic Science:**
   
   A. Identify the anatomy and explain the physiology of the external and middle ear.
   
   B. Describe the microbiologic and pathologic basis of acute infections of the external and middle ear.
   
   C. Discuss the pathophysiology of the acute inflammatory diseases as they affect the auricle, external canal, middle ear and mastoid.
   
   D. Discuss the pathophysiology of the acute inflammatory diseases of the auricle, external canal, middle ear and mastoid on auditory function.
   
   E. Describe effect of classes of pharmacologic agents on Acute inflammatory diseases of the auricle, external canal, middle ear and mastoid.
   
   F. Describe treatment through pharmacologic agents of acute Otitis Externa.
   
   G. Describe appropriate surgical intervention for acute inflammatory diseases of the auricle, external canal, middle ear and mastoid.

2. **Clinical:**

   A. Summarize the pathological findings in the focused history and physical examination of a patient with Acute Otitis Media or Externa.
   
   B. Discuss the changes found in audiometric evaluation and interpret results in patients with acute inflammatory pathology.
   
   C. Describe the pathophysiology of intracranial and extracranial complications.

3. **Surgical:**

   A. List indications for medical and surgical treatment options.
   
   B. Describe the risk and complications of all surgical interventions used to treat Acute Otitis Media.
   
   C. Explain peri-surgical management of patients with surgical Acute Otologic disease.
**Competency-Based Performance Objectives:**

1. **Clinical:**
   
   A. Demonstrate ability to diagnose Acute Inflammatory Otologic disease based on synthesis of data from a focused history and physical exam and audiometric testing.
   
   B. Discuss the changes found in audiometric evaluation and interpret results in patients with acute inflammatory pathology.
   
   C. Demonstrate proper selection of pharmacologic agents based on unique patient situations.
   
   D. Demonstrate awareness associated and list conditions of impending complications in the success or failure of treatment related to acute otologic disease through the recognition of:
      
      a. Intratemporal.
      b. Extratemporal.
      c. Intracranial.

   E. List conditions associated with the success and failure of medical treatment of acute otologic disease.
   
   F. Demonstrate ability to manage acute Otitis Externa.

2. **Surgical:**

   A. Ability to clean and debride the external auditory canal for a patient with acute external otitis.
   
   B. Demonstrate ability to perform drainage and ventilation for all forms of acute inflammation of the middle ear.
   
   C. Perform appropriate skills related to drainage of acute mastoid abscess on anatomical specimens.
   
   D. Perform simple mastoidectomy, from start to finish without error, on appropriately identified patient.
2.1.3

Otology - Chronic Inflammatory Disease of the Ear:

Competency-Based Knowledge Objectives:

1. Basic Science:
   A. Identify the anatomy of the temporal bone.
   B. Describe the physiology of the mastoid and pathophysiology in chronic inflammatory disease states.
   C. Explain from memory theories of how Cholesteatomas form including common routes of spread.
   D. Explain the electrophysiologic principals and indications for intra-operative facial nerve monitoring.

2. Clinical:
   A. Summarize the pathological findings in the focused history and physical examination of a patient with Chronic Otitis Media.
   B. Describe the medical management of a patient with Chronic Otitis Media with and without Cholesteatoma.
   C. Describe the pathophysiology and management of complications that may develop from Chronic Otitis Media and Cholesteatomas.
   D. Explain indications for temporal bone imaging and pathologic changes that suggest Chronic Otitis Media.

3. Surgical:
   A. List indications for medical and surgical treatment of Chronic Otitis Media.
   B. Describe the risk and complications of all surgical interventions used to treat Chronic Otitis Media.
   C. Explain peri-surgical management of patients with Chronic Otologic disease.
   D. Describe post-op management and minor complications after surgical treatment of Chronic Otitis Media.
   E. Explain technical and physiologic differences of canal wall up verses canal wall down mastoid surgery.
   F. Categorize tympanoplasty by various standards of classification systems.
**Competency-Based Performance Objectives:**

1. **Clinical:**
   
   A. Demonstrate ability to diagnose Chronic Inflammatory Otologic disease based on synthesis of data from a focused history and physical exam, audiometric testing, and ancillary test results.
   
   B. Demonstrate skills used for oto-microscopic examination of Chronic Otitis media with Cholesteatoma.
   
   C. Demonstrate proper selection of pharmacologic agents based on unique patient situations.
   
   D. Demonstrate awareness of and vigilance for signs of impending complications of Chronic Otologic Disease.
   
   E. List conditions associated with the success and failure of medical treatment of Chronic Otologic Disease.

2. **Surgical:**

   A. Perform simple tympanoplasty, from start to finish without error, on appropriately identified patient.
   
   B. Perform appropriate skills related to Chronic Middle Ear and Mastoid disease including removal of Cholesteatoma on anatomical specimens.
   
   C. Perform canal wall up and canal wall down mastoidectomy, from start to finish without error, on appropriately identified patient.
   
   D. Demonstrate proper application use and monitoring of intra-operative facial nerve monitor.
2.1.4

Otology - Neurotology

Unit Objectives:

Demonstrate knowledge of anatomy, physiology, and pathophysiology of neurotologic disease pertinent of general otolaryngology.

Demonstrate the ability to manage clinically and surgically patients with neurotologic diseases.

Competency-Based Knowledge Objectives:

1. Clinical:
   A. Outline the clinical evaluation of a patient with suspected neurotologic disease.
   B. Summarize the pathological findings in the focused history and physical examination of a patient with neurotologic disease:
      1. Acoustic neuroma.
      2. Glomus tumors.
      3. Temporal bone malignancy.
   C. Discuss the changes found in audiometric evaluation and interpret results in patients with neurotologic disease.
   D. Demonstrate knowledge of radiographic anatomy of the temporal bone, adjacent skull base structures, and the cerebello-pontine angle using CT and MRI.
   E. Identify pathology of the temporal bone in radiographic studies.
   F. Discuss nonsurgical options to the treatment of patients with neurotologic diseases:
      1. Clinical observation.
      2. Gamma knife.
      3. Chemotherapy.

2. Surgical:
   A. Demonstrate knowledge of surgical anatomy for the temporal bone and anatomical relationships of vital structures of the internal auditory canal, skull base and cochlea.
   B. Summarize the indications and considerations for surgical removal of acoustic neuromas.
   C. Describe the perioperative management of patients undergoing major neurotologic procedures.
D. Outline the procedural steps in a posterior fossa approach to the internal auditory canal.
E. Outline the procedural steps in a temporal bone resection.

**Competency-Based Performance Objectives:**

1. **Clinical:**
   A. Perform an advanced history and physical exam specific to the neurotologic patient including a focused neurological examination.

2. **Surgical:**
   A. Perform a transmastoid labyrinthectomy in the temporal bone lab without complications.
   B. Perform a Translabyrinthine and transcochlear approach to the internal auditory canal in the temporal bone lab.
   C. Perform a middle cranial fossa approach to the internal auditory canal in the temporal bone lab.
2.1.5

**Otology - Vertigo:**

**Unit Objectives:**

Demonstrate knowledge of anatomy, physiology, and pathophysiology of Otology related to Vertigo.

Demonstrate ability to manage clinically and surgically patients with Vertigo.

**Competency-Based Knowledge Objectives:**

1. **Basic Science:**
   
   A. Identify the anatomy and explain the neurophysiology of the vestibular system.
   
   B. Describe the pathology and pathophysiology of Vestibular Disorders.
   
   C. Describe the effect of pharmacologic agents and toxic conditions on vestibular function.

2. **Clinical:**
   
   A. Summarize essential components of a focused history and physical examination of Vestibular function.
   
   B. Discuss components of ENG testing and interpret results of pathologic function.
   
   C. Describe from memory clinical findings of central vs. peripheral origin of vertigo.
   
   D. Summarize the natural history of common disorders causing dysfunction of the labyrinth, that include:
      
      2. Labyrinthitis.
      3. Vestibular neuronitis.
      5. Vascular loop syndrome.
   
   E. Explain the principles of Vestibular rehabilitation and indications to consider this therapy.
   
   F. Demonstrate the Canalith repositioning maneuver and appropriate indications for use.
   
   G. Outline a medical treatment plan for patients with labyrinthitis and vestibular neuronitis.
H. Summarize current concepts of the pathophysiology of Meniere’s syndrome.
I. Outline the medical treatment options you would recommend for patients diagnosed with Meniere’s syndrome.
J. Describe medical treatment options for patients with migraine-associated vertigo.

3. **Surgical:**

   A. Describe indications for surgical intervention in vertiginous patients with pathologies other than Meniere’s syndrome.
   B. Be able to compare indications and results of destructive and nondestructive surgical treatments for Meniere’s syndrome.
   C. Explain peri-surgical management of patients with surgical vestibular disorders.
   D. Summarize the operative and postoperative complications associated with surgical procedures for vestibular disorders.

**Competency-Based Performance Objectives:**

1. **Clinical:**

   A. Perform and record a focused history and physical examination of the Vestibular system.
   B. Perform and document a Canalith repositioning maneuver.
   C. Diagnose the etiology of dizziness including vertigo.
   D. Manage a patient with new onset of vertigo.
   E. Evaluate a patient with vestibular disorder for serologic and metabolic etiologies.
   F. Appropriately inform and discuss with a patient the expected outcomes with various treatment options for vestibular disorders.
   G. Identify changes on MRI that would suggest a diagnosis of vascular loop syndrome.

2. **Surgical:**

   A. Demonstrate ability to describe and perform appropriate skills related to peripheral vertigo through the use of anatomical specimens.
   B. Endolymphatic sac decompression.
   C. Labyrinthectomy that includes:
      1. Repair of oval and round window fistula.
      2. Vestibular nerve section.
   D. Demonstrate ability to describe and perform appropriate skills related to middle ear infusion of aminoglycosides and steroids using anatomical specimens.
2.1.6

**Otology - Facial Nerve:**

**Unit Objectives:**

Demonstrate knowledge of anatomy, physiology, and pathophysiology of neuro-otologic disease pertinent of the facial nerve.

Demonstrate the ability to manage clinically and surgically patients with facial nerve disorders.

**Competency-Based Knowledge Objectives:**

1. **Basic Science:**
   A. Identifies the anatomy and explain the physiology of the facial nerve.
   B. Describe pathology, pathophysiology, of facial nerve disorders.
   C. Describe pharmacologic agents, metabolic, and toxic conditions affecting facial nerve function.

2. **Clinical:**
   A. Summarize essential components of a focused history and physical examination of facial nerve.
   B. Compare modalities that test the electrophysiologic functioning of the facial nerve.
      1. EnoG.
   C. Describe from memory House-Brackmann or AAO-HNS Facial Nerve Function grading scale.
   D. Compare classifications of temporal bone fractures and effects related to facial nerve injury.
   E. Compare and contrast signs of benign and malignant neoplasms of the facial nerve.

3. **Surgical:**
   A. Describe indications for facial nerve decompression.
   B. Be able to compare results to determine surgical vs. medical management of diseased facial nerve.
   C. Explain peri-surgical management of patients with surgical facial nerve disorders.
D. Demonstrate knowledge of facial nerve reanimation procedures through verbal and/or written examination.

**Competency-Based Performance Objectives:**

1. **Clinical:**
   
   A. Perform and record a focused history and physical examination of the facial nerve.
      
      1. Assess level of weakness using House-Brackmann or AAO-HNS Facial Nerve Function grading scale.
   
   B. Perform and document a maximal stimulation test of the facial nerve.
   C. Diagnose etiology of facial nerve paralysis.
   D. Manage a patient with acute idiopathic facial nerve paralysis.
   E. Evaluate a patient with facial nerve disorder for serologic and metabolic etiologies.
   F. Appropriately interpret imaging studies of the temporal bone for facial nerve pathology.
   G. Appropriately inform and discuss with patient the probability of favorable outcome with various treatment options for facial nerve disorders.

2. **Surgical:**

   A. Demonstrate the ability to perform appropriate skills related to facial nerve decompression through the use of anatomical specimens.
   B. Demonstrate the ability to perform appropriate skills related to repair of idiopathic facial nerve injury including grafting.
   C. Demonstrate the ability to perform appropriate skills related to facial nerve monitoring (Nerve Integrity Monitor).
   D. Demonstrate the ability to use appropriate surgical skills related to facial nerve reanimation and perform skills on appropriate anatomical specimen.
2.2

Rhinology

Unit Objectives:

Demonstrate knowledge of anatomy, physiology, and pathophysiology of the Rhinogeoal Structure.

Demonstrate ability to manage patients both clinically and surgically with Rhinogeoal diseases and disorders.

2.2.1

General Rhinology

Competency-Based Knowledge Objectives:

1. Basic Science:

   A. Describe from memory the anatomy and physiology of the nose, paranasal sinuses and orbits.
   B. Describe from memory the physiology of the nose and paranasal sinuses related to both respiration and olfaction.
   C. Describe the blood supply and innervations of the nose, paranasal sinuses and orbits.

   1. Describe the neurophysiologic pathways of olfaction.
   2. Describe the embryologic development of the nose and paranasal sinuses.

2. Clinical:

   A. List the essential components of a complete focused exam of the nose and paranasal sinuses.
   B. List indications to perform an extended exam of the nose with nasal endoscopes.
   C. Describe signs and symptoms or anterior and posterior epistaxis.

   1. Describe the clinical use of pharmacologic agents and their effects on the nasal mucosa that include:

      a. Decongestants.
      b. Antihistamines.
      c. Topical anesthetics.
d. Topical steroids.

D. Describe the nasal cycle and conditions that will cause dysfunction.
E. Discuss the diagnosis and causes of nasal obstruction that includes:

1. Anatomic.
2. Physiologic.
3. Foreign bodies.

F. Outline the microbiology and treatment of local nasal infections including:

1. Bacterial infections.
2. Granulomatous.
3. Fungal.

3. **Surgical:**

A. List the potential complications from use of cautery in the nose and describe the management options for each.
B. Outline treatment for septal perforation.
C. Describe all materials used for anterior and posterior nasal packing that includes:

1. Discussion of the pros and cons for each material.
2. Discussion of prevention and management of complications from anterior and posterior nasal packing.

D. Explain all the steps of septoplasty and submucosal resection in detail.
E. List all potential complications from septal surgery and describe their management.
F. Summarize methods to reduce the inferior turbinates and discuss the advantages of each of the following:
   a. Cautery.
   b. Submucosal resection.
   c. Partial resection.

G. Outline options for repair of nasal valve collapse including the steps of the following procedures:

1. Open approaches.
2. Closed approaches.
H. Describe the procedures and indications for maxillary artery ligation.
I. Summarize the procedure septoplasty / dermatoplasty and perioperative management.
J. Summarize the procedure for excision of rhinophyma.

**Competency-Based Performance Objectives:**

1. **Clinical:**
   
   A. Perform a focused history and physical exam of the nose and paranasal sinuses.
   B. Demonstrate proficiency in the use of nasal endoscopes in the office setting.
   C. Properly assess olfaction by simple and comprehensive methods.

   1. Treat a patient with anosmia.

3. **Surgical:**
   
   A. Perform simple nasal cautery for control of anterior epistaxis.
   B. Perform both anterior and posterior nasal packing using a variety of packing materials.
   C. Perform septoplasty or submucus resection on 5 live patients without assistance.
   D. Demonstrate proficiency in removing nasal foreign bodies.
   E. Reduce a concha bullosa with endoscopic technique.
   F. Perform turbinate reduction using at least 3 different methods.
   G. Perform maxillary artery ligation by endoscopic and transantral approach on cadaveric specimens.
2.2.2

Inflammatory Rhinology:

Unit Objectives

Demonstrate knowledge of anatomy, physiology, and pathophysiology of Rhinologic Inflammatory disease.

Demonstrate the ability to manage clinically and surgically patients with Rhinologic Inflammatory disorders.

Competency-Based Knowledge Objectives:

1. Basic Science:
   A. Diagram the acute inflammatory response including all biochemical mediators and their effect on the target organs.
   B. Present a review of pharmacological agents used to suppress the acute inflammatory response:
      1. Antihistamines.
      2. Steroids.
      3. Leukotriene inhibitors.

2. Clinical:
   A. Describe the causes and pathophysiology of acute Rhinitis:
      1. Viral.
      2. Bacterial.
      3. Invasive fungal.
   B. Describe the causes and pathophysiology of chronic Rhinitis:
      1. Allergic.
      2. NARES.
      3. Hormonal.
      4. Vasomotor.
      5. Bacterial.
      7. Rhinitis medicamentosa.
      8. Rhinitis of pregnancy.
C. Discuss the precipitating causes and pathophysiology of acute bacterial rhinosinusitis, chronic sinusitis and sinonasal polyposis.
D. List the micro-organisms responsible for acute bacterial rhinosinusitis and chronic sinusitis with appropriate discussion of antibiotic resistance.
E. Discuss empiric choice of antibiotics for the treatment of acute bacterial rhinosinusitis and chronic sinusitis.
F. List medicines used in conjunction with antibiotic therapy in the treatment of acute bacterial rhinosinusitis, chronic sinusitis and sinonasal polyposis.
G. Discuss the use of CT scanning in the diagnosis of acute bacterial rhinosinusitis, chronic sinusitis and sinonasal polyposis.
H. Describe the complications of sinusitis including mechanism and treatment options:
   1. Local:
      a. Osteomyelitis.
      b. Mucocele.
   2. Orbital:
      a. Cellulitis.
      b. Abscess.
      1. Reproduce in writing chandlers classification of orbital complications from sinusitis.
      c. Cavernous sinus thrombosis.
   3. Intracranial:
      a. Meningitis.
      b. Subdural abscess.
      c. Brain abscess.

b. List the infectious organisms and treatment considerations for local nasal infections such as bacterial granulomatous fungal.

1. Surgical:
   A. Describe and discuss theory of functional sinus surgery.
   B. List the indications for functional endoscopic sinus surgery.
   C. Discuss the perioperative management of patients undergoing functional endoscopic sinus surgery.
   D. Summarize modifications in endoscopic surgical technique and theory in treating pediatric sinusitis.
   E. Explain the role of adenoidectomy in treatment of pediatric sinusitis.
F. List indications for external approach to sinus surgery and outline the main steps for each procedure:

1. Caldwell-Luc antrostomy.
2. External ethmoidectomy.
3. Frontal trephine.
4. Osteoplastic flap with or without fat obliteration.

G. Outline the steps to perform lateral canthotomy and inferior cantholysis in management of orbital complications of sinus surgery.

H. Describe the principles and components of image guided sinus surgery.

I. List indications for the use of image guided assistance in sinus surgery.

J. Summarize principles and risks of endoscopic sinus surgery for treatment of nasal polyps.

Competency-Based Performance Objectives:

1. **Clinical:**
   
   A. Perform a focused history and physical exam on patients with acute sinusitis, chronic sinusitis and nasal polyps.
   B. Perform a nasal smear.
   C. Perform postoperative care for 3 patients after endoscopic sinus surgery.
   D. Review 10 CT scans of the paranasal sinuses and correctly diagnose a variety of pathology.

2. **Surgical:**
   
   A. Perform bilateral sphenoethmoidectomy on patients with and without image guided assistance.
   B. Perform endoscopic intranasal polypectomy on patient.
   C. Perform Caldwell-Luc antrostomies on patients.
2.2.3

Rhinologic Congenital Disorders:

Unit Objectives:

Demonstrate knowledge of anatomy, physiology, and pathophysiology of Rhinologic Congenital disorders.

Demonstrate the ability to manage clinically and surgically patients with Rhinologic Congenital disorders.

Competency-Based Knowledge Objectives:

1. Basic Science:
   A. Summarize the embryological development of the nose and paranasal sinuses.

2. Clinical:
   A. Describe causes of nasolacrimal duct obstruction in the newborn.
   B. Describe signs and symptoms of unilateral and bilateral choanal atresia.
   C. List congenital anomalies associated with choanal atresia:
      1. Charge association.
   D. Describe techniques for diagnosis of choanal atresia:
      1. Transnasal catheter.
      2. Imaging.
   E. List a differential diagnosis of a congenital nasal mass.
      1. Nasal dermoid.
      2. Gliomas.
      3. Encephaloceles.
      4. Cysts:
         a. Rathke's pouch.
         b. Globulomaxillary.
         c. Thornwaldt's.
   F. Describe imaging techniques appropriate for diagnosis of congenital nasal masses and the expected findings for each pathology.
3. **Surgical:**

   A. Summarize procedures for dacrocytostorhinostomy.
   B. Outline the approaches and steps in each procedure for correction of choanal atresia:
      1. Transnasal.
      2. Transpalatal.
   C. Describe the essential considerations in the surgical excision of congenital nasal masses.

**Competency-Based Performance Objectives:**

1. **Clinical:**
   A. Perform a focused history and physical exam on patients with congenital anomalies of the nose.
   B. Review and correctly interpret imaging of patients with congenital nasal anomalies.

2. **Surgical:**
   A. Pass a transnasal catheter on an infant to diagnose choanal atresia.
   B. Participate in the surgical planning and correction of a patient with choanal atresia.
   C. Participate in the surgical planning and correction of a patient with a congenital nasal mass.
2.2.4

Neoplastic Rhinology:

Unit Objectives:

Demonstrate knowledge of anatomy, physiology, and pathophysiology of Neoplastic Rhinology.

Demonstrate the ability to manage clinically and surgically patients with Neoplastic Rhinology.

Competency-Based Knowledge Objectives:

1. Basic Science:
   A. Describe the pathologic characteristics of benign and malignant neoplasms of the nose and paranasal sinuses:
      1. Nasal polyps.
      2. Papillomas.
      3. Inverting Papilloma.
      4. Squamous Cell Carcinoma.

2. Clinical:
   A. Summarize the differences in clinical presentation of patients with Papillomas versus nasal polyps.
   B. List the essential steps in the evaluation of a patient with a nasal mass.
   C. Review and describe pathological changes seen on imaging studies of patients with nasal masses.
   D. Describe nonsurgical treatment options for patients with papillomas of the nose and paranasal sinuses.
   E. List factors from a patient’s history that are associated with development of malignant nasal and paranasal sinus tumors.
   F. Describe from memory the TNM staging for malignant nasal and paranasal sinus tumors.
   G. Describe nonsurgical treatment options for patients with malignant nasal and paranasal sinus tumors.

3. Surgical:
   A. Summarize the essential steps in the following surgical procedures:
      1. Medial maxillectomy.
      2. Resection of nasal septum.
      3. Lateral rhinotomy.
4. Partial and total radical maxillectomy.
5. Partial and total rhinectomy.

B. List the potential complications of surgical procedures for excision of nasal tumors.
C. Describe the perioperative management of patients scheduled for surgical excision of nasal tumors.
D. Discuss the surgical approaches for excision of pituitary tumors.

**Competency-Based Performance Objectives:**

1. **Clinical:**
   A. Perform a focused history and physical examination of a patient with a nasal mass.
   B. Perform a nasal endoscopic examination of a patient with a nasal mass under topical anesthesia.

2. **Surgical:**
   A. Perform a biopsy of a nasal mass using endoscopic or anterior rhinoscopy.
   B. Perform a medial maxillectomy with assistance.
   C. Perform a lateral rhinotomy with assistance.
   D. Assist with planning and performance of a maxillectomy.
2.2.5

Rhinological Trauma:

Unit Objectives:

Demonstrate knowledge of anatomy, physiology, and pathophysiology of a patient with Rhinological Trauma.

Demonstrate the ability to manage clinically and surgically patients with Rhinogical Trauma.

Competency-Based Knowledge Objectives:

1. Clinical:

   A. Describe the appropriate evaluation of a patient after trauma to the nose.
   B. Describe the use of plain film and CT imaging in the evaluation of patients with facial trauma including:

      1. Nasal fractures.
      2. Nasoethmoidal complex fractures.
      3. Frontal sinus fractures.
      4. Maxillary sinus fractures.
      5. Fractures of the anterior skull base.

   C. Summarize techniques used to identify CSF rhinorrhea.

2. Surgical:

   A. Explain the management of septal hematoma, including the procedure for drainage.
   B. Summarize the essential steps in the surgical repair of the following nasal and paranasal sinus fractures.

      1. Reduction of nasal bone fractures - open and closed technique.
      2. Nasoethmoidal complex fractures.
      3. Frontal sinus fractures – anterior and posterior wall.
      4. Maxillary sinus fractures.
      5. Fractures of the anterior skull base.

   D. Describe the perioperative management of patients scheduled for surgical repair of nasal and paranasal sinus fractures.
   E. Describe surgical options for the management of CSF rhinorrhea after nasal trauma.

Competency-Based Performance Objectives:
1. **Clinical:**
   
   A. Perform a focused history and physical examination on a patient with nasal and paranasal sinus trauma.
   B. Correctly identify a variety of nasal and paranasal sinus fractures on plain films or CT scans.

2. **Surgical:**

   A. Perform the closed reduction of a nasal fracture on an appropriately selected patient.
   B. Assist in the planning and surgical repair of the following nasal and paranasal sinus fractures.
      1. Open reduction of nasal bone fractures.
      2. Nasoethmoidal complex fractures.
      4. Maxillary sinus fractures.
2.3

**Laryngology**

**Unit Objectives:**

Demonstrate knowledge of anatomy, physiology, and pathophysiology of the larynx in relation to laryngeal disorders and diseases.

Demonstrate ability to manage clinically and surgically patients who exhibit laryngeal disorders and diseases.

2.3.1

**Laryngology – Voice**

**Unit Objectives:**

Demonstrate knowledge of anatomy, physiology, and pathophysiology of the larynx in relation to voice disorders and diseases.

Demonstrate ability to manage clinically and surgically patients who exhibit appropriate voice disorders and diseases.

**Competency-Based Knowledge Objectives:**

1. **Basic Science:**

   A. Describe the measurements of sound, pitch and intensity, especially as it relates to voice.
   B. Describe the anatomy of the larynx including the following:

      1. Laryngeal cartilages.
      2. Intrinsic muscles.
      3. Extrinsic muscles.
      4. Ligaments.
      5. Nerve supply.

2. **Clinical:**

   A. Discuss the essential anatomic components in the production of voice.
B. List important milestones in the development of speech.
C. Describe the etiologies of hoarseness that include:
   1. Inflammatory.
D. Outline treatment options for patients with hoarseness.
E. Describe symptoms and signs of laryngotracheal reflux.
F. Describe methods to definitively diagnose reflux disease in adults.
G. Outline a progressive approach to the medical treatment of reflux disease affecting the larynx.
H. Explain the effects of damage to the recurrent laryngeal nerve and the superior laryngeal nerve on the clinical position and function of the vocal cords.
I. Outline the evaluation of a patient with unilateral vocal cord paralysis.

3. **Surgical:**
   A. Summarize the essential steps in performing a thyroplasty for unilateral vocal cord paralysis.
   B. List the perioperative and long-term complications of thyroplasty for vocal cord paralysis.

**Competency-Based Performance Objectives:**

1. **Clinical:**
   A. Perform a focused history and physical exam on a patient with hoarseness.
   B. Demonstrate expertise in examination of the larynx using a laryngeal mirror.
   C. Perform a direct nasopharyngoscopy using topical anesthesia in an office setting.

2. **Surgical:**
   A. Perform a thyroplasty for unilateral vocal cord paralysis with the assistance of an attending physician.
2.3.2

**Congenital Laryngology**

**Unit Objectives:**

Demonstrate knowledge of anatomy, physiology, and pathophysiology of the larynx in relation to congenital disorders and diseases.

Demonstrate ability to manage clinically and surgically patients who exhibit appropriate congenital laryngeal disorders and diseases.

**Competency-Based Knowledge Objectives:**

1. **Basic Science:**
   
   A. Summarize the embryologic development of the larynx, including anatomy and physiology, in writing.
   
   B. Demonstrate an understanding of the common congenital laryngeal diseases and disorders.

2. **Clinical:**

   A. Discuss the presenting symptoms of patients with congenital lesions in the larynx including:

   1. Atresia.
   2. Web.
   3. Laryngomalacia.
   4. Subglottic hemangiomas.
   5. Vocal cord paralysis.
   6. Subglottic stenosis.

   B. Recite from memory, the classification of laryngeal atresias.
   C. Describe the appropriate evaluation of a neonate with symptoms of laryngeal atresia.
   D. Describe the epidemiology and etiology of laryngomalacia.
   E. Outline the natural history of subglottic hemangiomas.
   F. Describe the medical and surgical treatment options in a neonate with a symptomatic subglottic hemangioma that include:

   1. Steroids.
   2. Laser.
   3. Tracheostomy.
G. Summarize the etiology of subglottic stenosis in the neonate.

   2. Acquired.

3. **Surgical:**

   A. Describe the surgical treatment options and procedural details for patients with laryngeal webs.
   B. Summarize the surgical options and procedural details for treatment of laryngomalacia, that include:

       1. Supraglottoplasty.
       2. Tracheostomy.

   B. Be able to discuss the unique challenges that are associated with tracheostomy on a neonate with upper airway obstruction.
   C. Summarize the essential steps in laryngotracheal reconstruction procedure.
   D. Summarize the essential steps in an Anterior cricoid split procedure.
   E. Describe the operative and postoperative complications of open laryngeal surgery for a neonate.

**Competency-Based Performance Objectives:**

1. **Clinical:**

   A. Perform a focused history and physical examination on a neonate with presenting symptoms of inspiratory or biphasic stridor.
   B. Assist in the perioperative management of a neonate scheduled for open laryngeal surgery.
   C. Perform the postoperative care and patient education associated with pediatric tracheostomy.

2. **Surgical:**

   A. Perform laryngoscopy and bronchoscopy in the operating room setting to evaluate laryngeal pathology in a neonate.
2.3.3

Neoplastic Laryngology

Unit Objectives:

Demonstrate knowledge of anatomy, physiology, and pathophysiology of the larynx in relation to neoplastic repair.

Demonstrate ability to manage clinically and surgically patients who are in need and have undergone neoplastic laryngeal procedures.

Competency-Based Knowledge Objectives:

1. Basic Science:

   A. Demonstrate an understanding of the basic anatomical and physiological structures of the larynx.
   B. Demonstrate an understanding of the common laryngeal diseases and procedures that would require neoplastic intervention.

2. Clinical:

   A. Summarize the presenting symptoms and evaluation of patients with benign lesions of the larynx.

      1. Nodules.
      2. Polyps.
      3. Papilloma.
      4. Granulomas.
      5. Saccular cysts.

   B. Describe the pathologic changes noted on CT imaging in patients with saccular cysts and laryngoceles.
   C. Describe the differences in presentation and treatment for internal and external laryngocele.
   D. List adjuvant treatment options such as interferon for patients with laryngeal papillomas.
   E. Outline the role of speech therapy and indications for referral after endoscopic removal of laryngeal lesions.
   F. Describe the epidemiologic factors related to malignancies of the larynx.
   G. Summarize the pathology of common malignancies of the larynx including common routes of spread including:

      1. Squamous cell.
      2. Verrucous squamous cell.
3. Fibrosarcoma.
4. Lymphoma.

H. Describe the evaluation, including imaging, of patients with suspected malignant laryngeal lesions.
I. Write from memory the TNM staging classification of carcinomas of the larynx based on anatomical sites.
J. Outline a standard evaluation for metastatic, metachronous and synchronis lesions in a patient diagnosed with laryngeal malignancy.
K. Summarize medical treatment options for laryngeal malignancies including chemotherapy and radiation therapy.
L. Outline options for voice rehabilitation after total laryngectomy.

3. **Surgical:**

A. Discuss the perioperative management including the operative and postoperative complications of patients scheduled for laryngoscopy and endoscopic excision of laryngeal lesions.
B. Outline the essential steps to endoscopically remove benign lesions of the larynx with and without the use of laser.
C. Outline the essential steps in the surgical excision of a laryngocele.
D. Summarize considerations in choosing partial versus total laryngectomy in the treatment of laryngeal malignancies.
E. Outline the essential steps in performing a total laryngectomy.
F. Outline the essential steps in performing a partial laryngectomy.
G. Discuss the perioperative management including the operative and postoperative complications of patients scheduled for partial and total laryngectomy.

**Competency-Based Performance Objectives:**

1. **Clinical:**

A. Perform a focused history and physical examination of a patient with benign and malignant laryngeal lesions of the larynx.
B. Demonstrate proficiency in the use of a laryngeal mirror for examination of the larynx.
C. Correctly evaluate multiple patients using a nasopharyngoscope.
D. Demonstrate the ability to manage the postoperative care of a patient after laryngeal surgery.
2. **Surgical:**

A. Perform a direct micro laryngoscopy for both diagnosis and excision of laryngeal lesions.
B. Assist in the planning and surgery of a patient scheduled for total laryngectomy.
C. Assist in the planning and surgery of a patient scheduled for partial laryngectomy.
D. Perform a tracheoesophageal puncture for voice restoration after laryngectomy.
2.3.4

Laryngeal - Trauma

Unit Objectives:

Demonstrate knowledge of anatomy, physiology and pathophysiology of laryngeal trauma.

Demonstrate ability to manage clinically and surgically patients with laryngeal trauma.

Competency-Based Knowledge Objectives:

1. **Basic Science:**

2. **Clinical:**

   A. Describe common mechanisms of injury to the larynx in blunt and high-speed motor vehicle trauma.
   B. Summarize options for management of the airway in patients who have sustained blunt or penetrating trauma to the larynx.
   C. Describe diagnostic techniques, including endoscopy and imaging, in patients subjected to laryngeal trauma.
   D. List the anticipated pathologic findings during endoscopic examination of the larynx after blunt trauma and explain their significance.
   E. Outline a medical treatment plan for a patient with nonsurgical trauma to the larynx.
   F. List signs and presenting symptoms of children and adults with airway foreign bodies.
   G. Describe imaging techniques appropriate for diagnosing foreign body in the airway.

3. **Surgical:**

   A. List the indications for surgical exploration of the larynx after trauma.
   B. Summarize the principles of surgical exploration of the larynx after trauma.
   C. Describe the indications and techniques for stenting of the larynx after surgical repair of traumatic injuries.
D. Describe advantages of rigid and flexible bronchoscopy in the treatment of airway foreign bodies.
E. Summarize strategies for removing sharp foreign bodies, such as a safety pin, from the airway.

Competency-Based Performance Objectives:

1. **Clinical:**
   A. Perform a focused history and physical exam on a real or simulated patient with potential laryngeal trauma.

2. **Surgical:**
   A. Perform 5 tracheostomies in appropriately selected patients.
2.4

Head and Neck Surgery

Unit Objectives:

Demonstrate knowledge of anatomy, physiology, and pathophysiology of the Head and Neck.

Demonstrate ability to manage patients clinically and surgically with Head and Neck diseases and disorders. This should include; congenital disorders, neoplastic disorders, malignancies, inflammatory diseases and trauma.

2.4.1

Head and Neck - Benign Neoplasms

Competency-Based Knowledge Objectives:

1. **Basic Science:**
   A. Discuss the histology of the salivary glands.
   B. Discuss the histology of the thyroid gland.

2. **Clinical:**
   A. Describe the natural history of the following benign neck masses.
      1. Soft Tissues:
         a. Lipoma.
         b. Epidermal cysts.
         c. Benign skin tumors.
         d. Keloids.
      2. Salivary glands:
         a. Pleomorphic adenoma.
         b. Adenolymphoma (Warthins tumor).
         c. Oncocytoma.
      3. Thyroid Gland:
a. Adenoma.

4. Glomus Tumors:
   a. Glomus Vagalae.
   b. Carotid body tumors.

5. Osseous
   a. Odontogenic Cysts.
   b. Ameloblastoma.
   c. Odontoma.
   d. Mandibular Osteoma.
   e. Exostoses.
   f. Fibrous Dysplasia.

B. Describe the abnormal history and physical findings for each of the benign neck masses.
C. Summarize the evaluation, including imaging studies, needed to diagnose a benign neck mass.
D. Discuss the medical treatment options for each benign neck mass.
E. List and describe benign neck masses that have potential for malignant transformation.

3. Surgical:

A. Describe and diagram various skin rotation flaps used in closure of defects after excision of skin tumors.
B. Summarize the essential steps of a thyroidectomy procedure.
C. Describe important landmarks for identifying the recurrent laryngeal nerve during thyroidectomy.
D. Outline the procedure for autotransplantation of parathyroid tissue.
E. Summarize the essential steps in the surgical treatment of various glomus tumors.
F. Summarize the essential steps in the surgical treatment of various benign osseous masses.
G. Describe important landmarks for identifying the facial nerve during parotidectomy.
H. Discuss the intraoperative and postoperative complications for the following procedures including their management.

1. Superficial Parotidectomy.
2. Thyroidectomy.
3. Excision of carotid body tumor.
4. Excision of Odontogenic cyst.
**Competency-Based Performance Objectives:**

1. **Clinical:**
   
   A. Perform a history and physical exam on multiple patients with neck masses of various etiologies.
   B. Demonstrate ability to identify pathologic changes on imaging studies for neck masses.

2. **Surgical:**
   
   A. Demonstrate proficiency at biopsy of skin lesions using a variety of techniques.
   B. Perform excision of skin lesions of the head and neck requiring closure by multiple techniques including rotational flaps.
   C. Perform an excision of the Submandibular gland.
   D. Perform a superficial Parotidectomy.
   E. Perform a total Thyroidectomy.
2.4.2

Head and Neck - Malignant Neoplasms

Competency-Based Knowledge Objectives:

1. **Clinical**:

   A. Describe the epidemiology and natural history of the following malignant tumors arising in the head and neck.

   1. Squamous cell carcinoma.
   2. Lymphoma.
   3. Mucoepidermoid carcinoma.
   4. Adenoid cystic carcinoma.
   5. Adenocarcinoma.
   6. Malignant mixed cell carcinoma.
   7. Papillary thyroid carcinoma.
   8. Follicular thyroid carcinoma.
   9. Hurthle cell thyroid carcinoma.
   10. Medullary thyroid carcinoma.
   11. Anaplastic Carcinoma.

   B. Summarize in writing the staging of malignancies of the head and neck by site of origin.

   C. Describe from memory the staging of the neck in cancers originating from the head and neck.

   D. Describe the common routes of spread and appropriate metastatic evaluation for each malignant neoplasm in the head and neck.

   E. Summarize the common chemotherapeutic agents and basic principals of their use in treating head and neck malignancies.

   F. Summarize the basic principles of radiation therapy in treating head and neck malignancies.

   G. Summarize the use of radioiodine ablation in the treatment of thyroid malignancies.

   H. Outline the treatment options for nasopharyngeal carcinoma.

2. **Surgical**:

   A. Discuss the advantages and disadvantages of fine needle aspiration in evaluation of neck masses.

   B. Outline the essential steps in performing a deep lobe Parotidectomy.

   C. List the indications for segmental resection of the facial nerve during Parotidectomy.

   D. Outline the intraoperative and postoperative complications of Parotidectomy.
E. Outline techniques for repairing the facial nerve after resecting a segment of nerve.
F. Outline the essential steps in performing a Thyroidectomy.
G. Outline the intraoperative and postoperative complications of Thyroidectomy.
H. Outline the essential steps in performing a partial pharyngectomy in treatment of head and neck malignancies.
I. Outline the intraoperative and postoperative complications of pharyngectomy.
J. Outline the essential steps in performing a partial glossectomy in treatment of head and neck malignancies.
K. Outline the intraoperative and postoperative complications of partial glossectomy.
L. Discuss indications for speech therapy evaluation after partial pharyngectomy and partial glossectomy.
M. Summarize indications to perform a neck dissection as part of treatment for head and neck malignancies.
N. Describe the classification of neck dissections and describe the differences.
O. Outline the intraoperative and postoperative complications of neck dissection.
P. Summarize the management options in the nutritional therapy of a patient after a major head and neck resection.

Competency-Based Performance Objectives:

1. **Clinical:**
   
   A. Perform a focused history and physical exam on patients being evaluated for head and neck malignancies.
   B. Demonstrate proficiency in managing the pre and postoperative care of patients treated surgically for major head and neck malignancies.
   C. Perform the nutritional management of a patient after head and neck resection.
   D. Correctly manage the thyroid hormone replacement of a patient after Thyroidectomy.

2. **Surgical:**
   
   A. Demonstrate ability to correctly perform a direct micro laryngoscopy for the diagnosis and treatment planning of a patient with a head and neck malignancy.
   B. Demonstrate ability to correctly perform a bronchoscopy for the diagnosis and treatment planning of a patient with a head and neck malignancy.
C. Demonstrate ability to correctly perform an esophagoscopy for the diagnosis and treatment planning of a patient with a head and neck malignancy.

D. Demonstrate ability to correctly perform both radical and conservative neck dissections in patients with a head and neck malignancy.

E. Assist in the planning and surgery of a patient scheduled for Parotidectomy.

F. Assist in the planning and surgery of a patient scheduled for Thyroidectomy.

G. Assist in the planning and surgery of a patient scheduled for partial pharyngectomy.

H. Assist in the planning and surgery of a patient scheduled for partial glossectomy.
2.4.3

Head and Neck - Congenital

Competency-Based Knowledge Objectives:

1. **Basic Science:**
   
   A. Describe the embryology of the neck including all structures associated with branchial clefts, pouches and the thyroid gland.

2. **Clinical:**
   
   A. Describe the natural history of the following congenital neck masses:
      
      1. Thyroglossal duct cysts.
      2. Branchial cleft anomalies.
      3. Ranula.
      5. Thymoma.
      6. Cystic Hygroma.
      7. Dermoid Cysts.
      8. Teratoma.

   C. List the expected history and physical findings associated with congenital neck masses.

   D. Summarize the evaluation of congenital neck masses including appropriate imaging studies.

   E. Discuss the medical management of congenital masses that arise in the neck.

3. **Surgical:**
   
   A. List indications for surgical interventions for congenital neck masses.
   B. Discuss the potential for intraoperative and postoperative complications from surgical excision of congenital neck masses.
   C. Diagram the anatomic course of all types of branchial cleft fistulas.
   D. Outline the essential steps in surgical excision of branchial cleft anomalies.
   E. Describe the Sis-trunk procedure.
   F. Summarize the essential steps in surgical excision of a Cystic Hygroma.
   G. Describe the different type of ranulas.
   H. Summarize the essential steps in the surgical excision of a Ranula.
Competency-Based Performance Objectives:

1. **Clinical:**
   A. Perform a focused history and physical exam on a patient with a congenital neck mass.
   B. Demonstrate the ability to manage the postoperative care of patients after removal of a congenital neck mass.

2. **Surgical:**
   A. Perform an excision of a branchial cleft cyst.
   B. Perform a Sis-trunk procedure.
2.4.4

HEAD AND NECK: INFLAMMATORY DISEASE

Competency – Based Knowledge Objectives:

1. **Basic Science:**

   A. Describe the anatomic location of the following fasciae
      1. Superficial fascia.
      2. Superficial layer deep fascia (SLDF).
      3. Middle layer deep fascia (MLDF).
      4. Deep layer deep fascia (DLDF).
      5. Alar fascia (AF).
      6. Prevertebral fascia (PF).
      7. Buccal pharyngeal fascia (BF).

   B. Describe the anatomic boundaries for the following spaces.
      1. Superficial space (space no. 1 of Grodinsky and Holyoke).
      3. Anterior visceral (pretracheal or previsceral) space.
      4. Posterior visceral retropharyngeal, retrovisceral, or retroesophageal (space) [posterior part of space no. 3 of Grodinsky and Holyoke].
      5. Danger space (space no. 4 of Grodinsky and Holyoke).
      6. Prevertebral space (space no. 5 of Grodinsky and Holyoke).
      7. Visceral vascular space.

2. **Clinical:**

   A. Summarize the course of unopposed infection in the following stages.
      1. Cellulitis stage.
      2. Abscess stage.

   B. Outline the principles of inflammatory response associated with chronic inflammatory disease.

   C. Describe the progression of acute infection involving the following structures:
      1. Palatine tonsil, peritonsillar abscess.
         a. Viral.
         b. Bacterial.
         c. Sialolithiasis.
      3. Epiglottis.
      4. Skin/subcutaneous glands.
E. Describe the clinical symptoms and pathophysiology of acute bacterial infection involving each of the neck spaces.

F. Describe clinical diseases caused by granulomas of the following structures:
   1. Lymph nodes / lymphatic structures of the neck.
   2. Larynx.

G. Summarize the clinical symptoms and pathophysiology of Ludwig’s angina.

H. Summarize the clinical symptoms and pathophysiology of Sjogren’s disease.

I. Describe the diagnoses related to laryngopharyngeal reflux in the head and neck.

J. Describe decision-making and choices in selecting antibiotics for bacterial infections involving:
   1. Skin.
   3. Tonsil.
   4. Peritonsillar abscess.
   5. Neck space abscess.

3. **Surgical:**

   A. Outline the decision process leading to Incision and Drainage of the below.
      1. Neck space.
      2. Parotid gland.
      3. Ludwig’s angina.

   B. List the indications for tonsillectomy.
   C. List the indications for major salivary gland resection.
   D. List the indications for supraglottitis intervention including intubation and tracheotomy.
   E. List indications for Ludwig’s angina intervention including intubation and tracheotomy and dental extraction.

**Competency – Based Performance Objectives:**

1. **Clinical:**
   
   A. Participate in the diagnosis and management of cellulites or abscess of the following structures.
1. Skin.
4. Tonsils.
5. Paratonsillar cellulitis/abscess.
7. Ludwig’s angina

B. Participate in the diagnosis and management of chronic inflammatory / granuloma’s disease of the head and neck.
C. Demonstrate ability to manage laryngopharyngeal reflux – related disease.

2. **Surgical:**

A. Demonstrate ability to perform Incision and Drainage of the following.
   1. Skin – related abscess.
   2. Neck space abscess.

B. Assist in performing a dental extraction.
2.4.5

HEAD AND NECK: TRAUMA – ADULT AND PEDIATRIC

Competency – Based Knowledge Objectives:

1. **Basic Science:**
   A. Describe anatomic features and components of the facial bones, mandible, cervical spine, larynx and esophagus.
   B. Describe the neural / vascular supply of the facial bones, mandible, cervical spine, larynx and esophagus.

2. **Clinical:**
   A. Outline the of the spinal injured patient
      1. Describe the “ABC” Approach to the trauma patient.
      2. List and discuss the indications for radiologic procedures and studies of the trauma patient.
      3. Outline the management of the trauma patient with C-spine injury including techniques for stabilization.
   B. Outline the principles of airway management in the trauma patient.
      1. Discuss techniques and procedures for evaluating the airway.
      2. Outline all the available techniques to procure an airway in a trauma patient
   C. Summarize the management of penetration neck wounds.
      1. Describe the factors of significance in deciding whether surgical exploration is elective or required in a trauma patient with a penetrating neck wound.
      2. Describe the physiologic difference between high velocity and low velocity projectile injury to the neck.
   D. Outline the principles in management of a trauma patient with vascular injuries to the neck.
      1. Describe the significance of vascular injuries related to mortality.
      2. Describe the anatomy and associated consideration for exploration in Zones I, II and III.
   E. Outline the principle in management of Orbital injuries
      3. Describe the evaluation of the orbit and periorbital tissues.
      4. Describe the evaluation of the lacrimal duct.
      5. Describe the indications and technique for testing visual acuity.
   F. Summarize the management of Orbital Blowout fractures.
      1. List the categorization of orbital blowout fractures.
      2. Describe the preoperative functional evaluation of patients with blowout fractures.
   G. Summarize the management of panfacial fractures
1. List the three zones of the face.
2. Describe the LeForte classification system for maxillary fractures.
3. Outline special considerations in airway management in patients with panfacial trauma.
4. List expected physical exam findings of patients with various LeForte fractures.

H. Outline the principles in the management of patients with mandibular fractures.
1. List areas of weakness in the normal mandible anatomy.
2. Discuss factors effecting the direction of fracture lines in mandibular trauma.
3. Describe favorable and unfavorable fractures of the mandible.
4. Describe the physical exam and the expected findings of patients with a traumatized mandible.
5. List the possible post operative complications associated with mandibular fractures.

3. **Surgical:**

A. Outline the principles of airway management in the trauma patient.
   1. Describe the available techniques for achieving orotracheal intubation.
   2. Describe the technique for insertion of an esophageal obturator airway.
   3. List the essential steps in performing the following surgical airway techniques.
       a. Trans-tracheal ventilation
       b. Cricothyrotomy
       c. Emergency Tracheotomy

B. Summarize the surgical techniques for exploration of the neck in patients with penetrating neck wounds.

C. Outline techniques and surgical approaches to each of the three vascular zones of the neck

D. Outline the principles in the surgical management of Orbital injuries.
   1. Describe the key points in the repair of upper and lower lid injuries.
   2. Describe the key points in the repair of the medial canthal ligament.
   3. Describe the key points in repair of the injured lacrimal duct.
   4. Describe the key points in the surgical repair of orbital floor fractures.

E. Summarize the surgical management of laryngeal fractures.
   1. Outline the essential steps of surgical exploration and repair of laryngeal fractures.
   2. Outline the essential steps of surgical management of esophageal injuries associated with laryngeal fractures.

F. Discuss the surgical management of panfacial fractures.
   1. Describe the priority for fixation of intraoral and extraoral fractures.
   2. Outline the essential steps in repair of LeForte I, II and III fractures
H. Outline the principles in the surgical management of patients with mandibular fractures.
   1. List the essential steps in the closed reduction of a mandibular fracture.
   2. List the essential steps in the open reduction of mandibular fractures using wire, plates and lag screws.
   3. Describe techniques for fixation of a mandibular fracture by both internal and external approaches.

**Competency – Based Performance Objectives:**

1. **Clinical:**
   A. Perform a focused history and physical examination on multiple trauma patients including the following.
      1. Orbital fractures
      2. Laryngeal fractures
      3. mandibular fractures
      4. panfacial fractures
      5. evaluation of the airway
      6. penetrating neck wounds
   B. Correctly identify head and neck trauma on radiographic studies.
   C. Identify and discuss the common causes and treatments of potential intraoperative and postoperative complications in the trauma patient.
   D. Correctly manage the postoperative course of a trauma patient.

2. **Surgical:**
   A. Perform orotracheal intubation for an elective surgery or if possible for a traumatized patient
   B. Participate in the planning and surgery of patients with the following traumas.
      1. Penetrating neck wounds.
      2. Vascular injuries of the neck.
      3. Laryngeal fracture.
      4. Periorbital injuries.
      5. Lacrimal duct injuries.
      6. Orbital blow out fractures.
      7. Patients with multiple facial fractures.
      8. Trimalar fractures.
2.4.6
HEAD AND NECK : ESOPHAGEAL DISORDERS

Competency-Based Knowledge Objectives:

1. **Basic Science:**
   A. Diagram the embryologic development of the esophagus.
   B. Outling the anatomy and neural / vascular supply of the esophagus.

2. **Clinical:**
   A. Describe the four phases of swallowing.
   B. Describe the anatomy and physiology of the esophageal sphincters.
   C. Describe the pathophysiology and medical treatment options for each of the following esophageal disorders.
      1. GERD.
      2. Laryngopharyngeal Reflux.
      3. Cryophasyungeal dysfunction.
      4. Diverticular disease
      5. Esophageal webs and rings.
      6. Diffuse esophageal spasm.
      7. Esophagitis.
      8. Achalasia.
   D. Summarize the treatment options of benign and malignant tumors of the esophagus.
   E. Outline the indications, technique and likely results of diagnostic studies used for esophageal disorders.
      1. Rigid and Flexible eirect esophagoscopy
      2. Barium esophagram
      3. Modified barium esophagoscopy
      4. CT Scan

2. **Surgical:**
   A. Describe techniques gor obtaining biopsies of the esophagus using rigid and flexible esophagoscopes.
   B. Outline techniques used to control hemorrhage resulting from esophageal biopsy.
   C. Summarize the procedure for removal of esophageal tumors benign and malignant.
   D. Summarize options for reconstruction of esophageal defects after resection of tumors.
**Competency-Based Performance Objectives:**

1. **Clinical:**
   A. Perform a focused history and physical exam identifying key points significant for the diagnosis of esophageal disorders.
   B. Correctly review and interpret diagnostic studies of the esophagus.
   C. Review histiologic exam and correctly identify esophageal tumors.

2. **Surgical:**
   A. Demonstrate ability to perform rigid and flexible esophagoscopy
   B. Demonstrate ability to perform biopsy of esophageal lesions.
   C. Participate in the planning and surgery of a patient with an esophageal tumor.
2.5

Facial Plastic and Reconstructive Surgery:

2.5.1
Facial Plastic and Reconstructive Surgery - General

Unit Objectives:

Demonstrate an understanding of the nature and principles of correction and reconstruction of congenital and acquired defects of the face, head, and neck.

Demonstrate the ability to manage the treatment of acute, chronic, and neoplastic defects not requiring complex reconstruction.

Competency-Based Knowledge and Objectives:

1. Basic Science:

A. Discuss and compare skin and connective tissue according to:

   1. Anatomy.
   2. Normal Physiology and Biochemistry.
   3. Pathophysiology of benign and malignant skin disorders.
   4. Unique pathophysiology of connective tissue disorders.

B. Categorize the pathophysiology of thermal, chemical, and electrical burns, including the consideration of:

   1. Systemic pathophysiology.
   2. Local pathophysiology.
   3. Cardiac depression.
   4. Pulmonary compromise.

C. Summarize the pathologic features of a patient with congenital or acquired deformity.

2. Clinical:

A. Outline the components of a comprehensive focused history and physical examination pertinent to the evaluation and correction of congenital or acquired defects under the realm of facial plastic and reconstructive surgery.
B. Explain the basic technique for surgical repair of superficial incisions and lacerations of the face, head, and neck to include the following considerations:

1. Skin.
2. Subcutaneous tissue.
3. Superficial muscle and fascia.
4. Dressings.
5. Suturing and knot tying.

C. Summarize the evaluation of patients with skin cancers and develop a treatment plan according to the following criteria:

1. Location of the lesion.
2. Size of the primary lesion.

D. Outline appropriate diagnostic studies needed to supplement the physical examination when developing a treatment plan for:

1. Facial fractures.
2. Congenital structural anomalies of the head and neck.

E. Summarize the pathologic features in the focused history and physical examination of a patient with congenital or acquired deformity in the following categories:

1. Normal anatomy.
2. Common congenital anomalies.
3. Evolution of neoplastic disease.

F. Explain the assessment of facial skeletal trauma according to the following systems:

1. LeFort I, II, and III classification of maxillary fractures.
3. Zygomatic, orbit, orbital blowout fractures and mandibular fractures.
4. Disruption classification.

G. Describe the "classical" chemical agents causing burns; list their antidotes.

H. Define the tumor, node, and metastases (TNM) classification system as used for neoplasms of skin, soft tissue, and head and neck.
I. Discuss the epidemiology, risk factors, treatment, and prevention of cutaneous malignancies in the patient, including:

1. Skin cancer rates (basal cell carcinoma [BCC], squamous cell carcinoma[SCC]).
2. Average age of onset for BCC/SCC.
3. Etiology of BCC/SCC.
4. Usual modes of treatment for BCC/SCC (Mohs Technique, radiation, chemotherapy).
5. Prevention using medications (isotretinoin, beta-carotene).

J. Summarize the evaluation of patients with head and neck cancer, and develop a treatment plan according to the following criteria:

2. Location of the lesion.
3. Size of the primary lesion.

K. Discuss the reconstructive ladder (including skin grafts, local flaps, and regional and free microvascular flaps) in the definitive management of traumatic or excised wounds.

L. Assess burns in regards to extent and severity

M. Describe considerations of fluid management of severely burned patient.

N. Demonstrate knowledge of relaxed skin tension lines of the face and neck by diagramming incisional cuts to various facial lines.

3. **Surgical:**

A. Describe the physiology of various techniques of skin and composite tissue transplantation with particular regard to component tissue circulation:

1. Skin grafts (split vs. full thickness).
2. Bone (cartilage grafts).
3. Composite grafts.
4. Skin flaps.
5. Muscle flaps.
8. Random-Pattern Flaps.

B. Summarize the available options of implants to reconstruct the orbital floor.

C. Summarize the available options of implants for facial augmentation.
D. Demonstrate knowledge of various implant and plating techniques with respect that includes:

1. Size.
2. Material makeup.

E. Discuss the surgical treatment of:

2. Surgical repair of facial trauma, soft tissue, and bony defects.
3. Resection and reconstruction of the simple, soft tissue defects following resection of neoplasms of the head and neck.
4. Resection of skin and soft tissue neoplasms requiring complex reconstruction.
5. Reconstruction of congenital craniofacial defects.

F. Explain treatment options for the comprehensive care of the patient with burns of the head and neck, including:

1. Excision of burn.
2. Homografting.
3. Xenografting.
4. Autografting.
5. Tissue engineering and prefabrication.

G. Summarize currently accepted surgical techniques for treating the following:

6. Correction of congenital lesions of the head/neck.
7. Craniofacial anomalies, including cleft lip and palate.
8. Reconstruction and ablative head and neck surgery.
9. Aesthetic rejuvenation of the face.

H. Explain the methods for performing incisional and excisional biopsies of the oral cavity.

I. Describe the physiology of local and general anesthetics in these categories:

1. Narcotics.
2. Sedatives.
3. Analgesics.
**Competency-Based Performance Objectives:**

1. **Clinical:**

   A. Complete a comprehensive physical examination and clinical data history, including pertinent diagnostic laboratory and radiographic findings.
   
   B. Evaluate and treat simple and intermediate abrasions and burns of the face.
   
   C. Provide treatment plans for superficial incised and lacerated wounds of the head and neck.
   
   D. Summarize functions affecting wound healing in repair of simple lacerations or surgical wounds.
   
   E. Participate in the perioperative evaluation and management of congenital or acquired defects.
   
   F. Apply and remove dressings of the head and neck, including:
      
      1. Occlusive.
      2. Non-occlusive.
      3. Wet to dry.
      4. Casts.
      5. Alginate.
      6. Colloidal.

2. **Surgical:**

   A. Debride and suture major non-facial wounds and burns.
   
   B. Participate in the acute and resuscitation, evaluation, and initial treatment of a burn patient.
   
   C. Harvest and apply split-thickness skin grafts.
   
   D. Perform simple, localized skin flaps for wound coverage.
   
   E. Under the direction of a plastic surgeon, assist in the planning and performance of reconstructive operations that include:
      
      1. Mandibular defects.
      2. Defects of the facial skeleton.
      3. Raise muscle and skin flaps.

   F. Reconstruct defects with random flaps, composite flaps, and grafts.
   
   G. Act as first assistant and attending-supervised surgeon for major resectional and reconstructive surgery of the head and neck.
   
   H. Participate in assessment and repair for the following:
      
      1. Complex soft tissue injury.
      2. Fractures requiring operative and non-operative reduction.
I. Perform simple incisional and excisional biopsies on the skin and subcutaneous tissues.
J. Apply surgical plates to stabilize various facial fractures in cadaveric and/or appropriately identified patients.
2.6

**Pediatrics Otorhinolaryngology:**

**Unit Objectives:**

Demonstrate knowledge of anatomy, physiology, and pathophysiology of pediatric disease.

Demonstrate the ability to manage clinically and surgically pediatric patients with diseases.

**2.6.1**

**General Pediatric Otolaryngology:**

**Unit Objectives:**

Demonstrate knowledge of anatomy, physiology, and pathophysiology of general pediatric Otolaryngologic diseases.

Demonstrate the ability to manage clinically and surgically pediatric patients with general Otolaryngologic diseases.

**Competency-Based Knowledge Objectives:**

1. **Basic Science:**

   A. Describe the anatomy of the pharynx, including:

   1. Waldeyer’s ring.
   2. Tubal tonsils of Gerlach.
   3. Arterial and venous supply.
   4. Lymphatic drainage.

   B. Describe the anatomy of the hard and soft palate.
   C. Outline the embryology of the palate and oral cavity.

2. **Clinical:**

   A. Outline the pathogens of acute and chronic adenotonsillitis

   1. Viral.
   2. Bacterial.
B. Describe the diagnosis and treatment options for patients with acute and chronic tonsillitis.

C. List the potential complications of acute tonsillitis:

1. Acute airway compromise.
2. Peritonsillar abscess.
3. Parapharyngeal and retropharyngeal abscess.
4. Rheumatic fever.
5. Glomerulonephritis.
7. Scarlet fever.

D. Describe the diagnosis and treatment of obstructive adenotonsillar hypertrophy.

E. Describe the signs, symptoms and clinical relevance of a submucous cleft palate.

F. Summarize the diagnosis and treatment options of anykyloglossia.

G. Define the defects in the following palatal clefts:

1. Unilateral and bilateral median.
2. Complete or incomplete.
3. Primary or secondary.

H. Outline the feeding options for a newborn with cleft palate.

I. Summarize the complications associated with cleft palate and their etiologies:

1. Otologic:
   a. Eustachian tube dysfunction.

2. Speech:
   a. Velopharyngeal insufficiency.

3. **Surgical:**

   A. List the indications for adenotonsillitis.
   B. Describe the perioperative care of patients scheduled for adenotonsillectomy.
   C. Summarize the essential steps and differences and differences in technique for adenotonsillectomy performed by the following methods:

   1. Cold.
   2. Hot.
   3. Laser.
   4. Harmonic scalpel.
5. Subcapsular ablation.

D. Outline the treatment options for a child with cleft lip:
   1. Millard repair.
   2. Bardach.
   3. Salyer.
   4. Randall-graham.

E. Outline the treatment options for a child with cleft palate:
   1. V-Y pushback.
   2. Two flap palatoplasty.
   3. Rour flap palatoplasty.
   4. Rurlow palatoplasty (Z-plasty).

**Competency-Based Performance Objectives:**

1. **Clinical:**
   A. Perform a focused history and physical exam and correctly diagnose acute and chronic adenotonsillitis.
   B. Perform a focused history and physical exam and correctly diagnose obstructive adenotonsillar hypertrophy.
   C. Participate in the clinic evaluation and treatment of children with cleft lip and palate.

2. **Surgical:**
   A. Perform adenotonsillectomy using a variety of techniques.
   B. Perform an incision and drainage of a peritonsillar abscess.
   C. Perform a frenulectomy.
   D. Assist in the planning and surgical repair of a child with cleft lip and palate.
2.6.2

Pediatric Head and Neck

Unit Objectives:

Demonstrate knowledge of anatomy, physiology, and pathophysiology of pediatric head and neck diseases.

Demonstrate the ability to manage clinically and surgically pediatric patients with pediatric specific head and neck diseases.

Competency-Based Knowledge Objectives:

1. Basic Science:
   A. Describe the embryologic development of the neck and larynx.

2. Clinical:
   A. Airway:
      1. Explain the difference between stridor and stertor and the clinical significance of each.
      2. Describe the classification of laryngomalacia.
      4. Outline the signs, symptoms, bacteriology and treatment options for the following laryngeal infections:
         a. Laryngo-tracheal bronchitis (croup).
         b. Epiglottitis.
         c. Bronchitis.
      5. Describe the pathononomic signs of epiglottitis and laryngo-tracheal bronchitis on plain film neck xrays in the pediatric patient.
   
   B. Describe the defect and embryologic etiology of laryngeal clefts in a newborn.
   C. Describe the etiologic factors and clinical evaluation of a child with suspected tracheo-esophageal fistula.
   D. Describe the etiology and diagnosis of laryngeal stenosis in an infant.
   E. Demonstrate the pathological findings on imaging studies of patients with laryngeal stenosis, laryngeal clefts and laryngeal webs.
F. Outline the management and indications for surgical intervention in an infant with laryngeal stenosis.

G. Describe the etiology and diagnosis of pediatric head and neck malignancies.
   1. Lymphoma.
   2. Rhabdomyosarcoma.
   3. Neuroblastoma.
   4. Malignant teratoma.

H. Outline the treatment options for children with head and neck malignancy.
   1. Lymphoma.
   2. Rhabdomyosarcoma.
   3. Neuroblastoma.
   4. Malignant teratoma.

3. **Surgical:**

   A. Describe the perioperative management of a neonate requiring laryngotracheal surgery.
   B. Summarize the essential steps and potential intraoperative complications in the following procedures:
      1. Cricoid split.
      2. Epiglottplasty.
      3. Laryngotracheal reconstruction.

   C. Demonstrate understanding of the risks and complications of major laryngeal and head and neck surgery in the pediatric patients.

**Competency-Based Performance Objectives:**

1. **Clinical:**

   A. Perform a focused history and physical exam on a pediatric patient presenting with stridor.
   B. Correctly interpret the imaging studies of patients with symptoms of upper airway disease including epiglottis.
   C. Manage the postoperative care of a pediatric patient after a major head and neck procedure.
2. **Surgical:**

   A. Perform a tracheostomy on a pediatric patient.
   B. Assist in the planning and performance of major neck surgery on pediatric patients.
   C. Perform a direct micro laryngoscopy on a pediatric patient with vocal cord pathology.
   D. Assist in the planning and performance of therapeutic and diagnostic bronchoscopy in a pediatric patient.
2.6.3

Pediatric Laryngology:

See Under Head and Neck : Laryngology 2.3
Section 3

3.0

Osteopathic Philosophy and Manipulative Medicine

These knowledge and performance activities are designed to assist the resident in preparing for post-residency. This unit is presented to assist the resident in his/her transition to private practice. This curriculum is intended to provide the trainee with a developmental approach to Otolaryngologic/Facial Plastics OMM from basic to the journeyman level.

3.1

Osteopathic Principles and Practices:

Unit Objective:

After completion of an approved program in Otolaryngology/Facial Plastics Surgery, the resident will be able to integrate Osteopathic Principles and Techniques into his/her private practice.

Competency-Based Knowledge Objectives:

1. Junior Level:

   A. Define and Explain the basic precepts of Osteopathy through:

      1. The body as an integrated whole.
      2. The body's structure and function that cannot be separated.
      3. Disease processes that can only be present if structural dysfunction is present on:

         a. Macroscopic level.
         b. Microscopic level.
         c. Biochemical level

   B. Disease processes that can be treated by normalizing the body's structure and allowing normal function to proceed.

   C. Proper application of Osteopathic Manipulative Medicine along with Surgery and Medical therapies can restore normal body structure and function.
D. List and Explain how Osteopathic Principles relating to structure correlate the following regional disease states:

1. Otologic disease.
2. Rhinological disease.
4. Laryngological disease.
5. Head and Neck Cancer.

E. List and Explain basic Osteopathic patient treatment plans and their rationale:

1. General full-body treatment algorithms.
2. Region specific algorithms.

F. Explain how the basic Osteopathic patient treatment plans above work in conjunction with Medical and Surgical therapies

2. **Senior Level**:

A. Define and Discuss the hypothesized physiology underlying the five basic treatment modalities:

1. HVLA (High Velocity- Low Amplitude Techniques)
3. Cranial Concept and techniques.
4. Direct and Indirect Myofascial- Ligamentous, Articular Release techniques.
5. Counterstrain techniques.

B. List the general indications and contraindications for each of the above treatment modalities.

C. Formulate and Document an Osteopathic treatment plan for the following specific disease states:

1. Acute and Chronic Otitis media.
2. Acute and Chronic Rhinosinusitis.
3. Allergic Upper Airways Disease.
5. Peripheral Vestibulopathy.
6. Acute and Chronic Adenotonsillitis.
7. Acute and Chronic Sialadentitis.
8. Acute and Chronic Laryngitis.
10. Torticollis.
11. Thyroiditis.
12. Laryngopharyngeal Reflux.
15. TMJ Syndrome.

D. Formulate and Document an Osteopathic treatment plan for the following pre and post-surgical states:

1. Tympanoplasty, mastoidectomy and/or middle ear surgery.
2. Endoscopic Sinus Surgery and/or Septoplasty.
3. Adenotonsillectomy.
4. Parotidectomy.
5. Submandibular Sialadenectomy.
6. ORIF Facial Bone Fractures.
7. Laryngeal/ Phonosurgery.
8. Thyroidectomy.
10. Thyroglossal Duct Excision.
11. Laryngectomy.

**Competency-Based Performance Objectives:**

1. **Junior Level:**

   A. Perform and Document a basic general-body osteopathic evaluation in the following positions:
   
   1. Supine.
   2. Standing.
   3. Seated.

   B. Perform the following Basic Osteopathic Techniques, from start to finish without error:

   1. Compression of the 4th Cranial Ventricle (CV-4 by any method).
   5. Sinus Direct Effleurage.
   6. Release of the Transverse Diaphragms using Indirect Technique.
   7. Pelvic diaphragm.
   8. Thoraco-abdominal diaphragm.
   10. Tentorium cerebelli.
   11. Lymphatic Pump (any technique).
2. **Senior Level:**

A. Perform and Document a specific Osteopathic Evaluation of the following sites:

1. Temporal Bones.
2. Facial Bones and Orbits.
3. Cranial Rhythmic Impulse (CRI) and Skull Base.
4. OA and AA Joints.
5. C3-7 levels.

B. Perform the following Osteopathic Techniques, from start to finish without error:

1. Eustachian Tube indirect release under general anesthesia.
2. Spheno-basilar decompression (any method).
3. Indirect release of facial bone strains.
4. OA and AA HVLA and Muscle Energy techniques.
5. TMJ Muscle Energy and Indirect techniques.
7. First rib techniques (any method).
8. Rib Raising technique.
9. Hyoid and Laryngeal direct and indirect techniques.
10. Lumbo-sacral decompression (any method).
Section 4

CLINICAL RESEARCH/EPIDEMIOLOGY/EVIDENCE-BASED MEDICINE

It is expected that residents will acquire knowledge and basic understanding of clinical research methodology in order to improve practice-based care. Although it is not expected the resident will know all of the following, it should be noted that residents should use Section 4 as a guide in order to better understand clinical research methods as it relates to patient care.

4.1

RESEARCH AND BIOSTATISTICAL METHODS:

UNIT OBJECTIVES:

Demonstrate an understanding of research principles and their application to the practice of Otolaryngology/Facial Plastics.

Demonstrate knowledge about the use and application of study designs and statistical methods.

Demonstrate knowledge of the role of clinical databases in clinical research and patient care.

Demonstrate knowledge of the principles underlying evidence-based surgery.

Demonstrate the ability to critically evaluate the information provided by drug companies and medical instrument and equipment manufacturers.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. **Basic Knowledge:**

   A. Differentiate between the following study designs:

      1. Descriptive or case-series.
      2. Case control (retrospective).
      3. Cross-sectional (prevalence).
      4. Cohort (prospective/incidence).
      5. Clinical trial.
6. Sequential (repeated measures).
7. Crossover.

B. Discuss the following concepts related to study design:

1. Internal versus external validity (generalizability).
2. Major threats to internal and external validity.
3. Randomization, random selection, random assignment.
4. Inclusion versus exclusion criteria.
6. Number needed to treat.
7. “Intention to Treat” principle.

C. Explain the differences between the following scales of measurement:

1. Nominal.
2. Ordinal.
3. Interval.

D. Distinguish between the following techniques/methods for exploring and presenting data:

1. Frequency distribution.
2. Bar chart.
3. Contingency table.
5. Frequency polygon.

E. Distinguish between the following statistics used to summarize or describe data:

1. Mean, mode, and median.
2. Range, standard deviation.
3. Percentile, interquartile range.
4. Proportion, ratio, rate.

F. Interpret the following vital statistics rates:

2. Prevalence, incidence.
3. Adjusted rates.

G. Distinguish between the following measures of relationship between two variables:
1. Pearson correlation coefficient.
2. Coefficient of determination.
3. Spearman rank correlation.
4. Relative risk, odds ratio.

**H.** Interpret the following terms and concepts related to drawing inferences from research data:

4. Hypothesis testing, null and alternative (research) hypothesis.
5. Parametric versus nonparametric tests.
6. Confidence intervals, confidence limits.
7. One-tailed versus two-tailed tests.
8. Level of significance, alpha level, P value.
9. Type I error, type II error, power.

**I.** Identify the following tests of significance and concepts related to the comparison of means:

1. Independent and paired *t*-test (parametric tests).
2. One-way analysis of variance (ANOVA).
3. Two-way ANOVA.
4. Repeated measures ANOVA.
5. Statistical interaction.
6. Planned comparisons.

**J.** Identify the following tests of significance and concepts related to the comparison of proportions:

2. Chi-square test.
3. Sample size and strength of association in the interpretation of the chi-square statistic.
4. Fisher's Exact Test.

**K.** Identify the following tests of significance and concepts related to investigating the relationship between two or more variables:

1. *t*-test for testing the significance of the correlation.
2. Fisher's *Z* transformation.
3. Confidence intervals for the relative risk and odds ratio.
4. Simple and multiple linear regression.
5. Standard error of estimate.
6. Confidence bands for a regression line.
7. Comparing two regression lines.

L. Identify the following concepts related to the analysis of survival data:

1. Actuarial or life table analysis versus Kaplan-Meier.
2. Comparing two survival curves using the Gehan or generalized Wilcoxon test, the log rank test, and the Mantel-Haenszel chi-square test.
3. Censored observations.

M. Interpret the following concepts related to evaluating diagnostic tests and procedures:

2. Predictive value of a positive or negative test.
3. Index of suspicion or prior probability.
4. Likelihood ratio method.

N. Discuss the following procedures, principles, and concepts related to the ethics of medical research:

1. The Declaration of Helsinki (see Troidl reference).
2. Informed consent.
3. Institutional review boards and animal use review committees.
4. Ethical use of animals in research.
5. Confidentially and anonymity concerns.
6. Truth and accuracy in the publication of research results.

O. Explain the following procedures and concepts related to clinical databases:

1. Role of clinical databases in clinical research and outcomes research.
2. Database terminology such as field, record, query, report generation, ASCII file, computer file, and merging.
3. Data coding, data entry, and data verification.
4. Use of standardized databases such as hospital tumor registries or state trauma registries.
5. Database development.

P. Discuss the following principles, methods, and concepts related to evidence-based otolaryngology surgery:

1. Basic skills needed to critically evaluate the published evidence:
   a. Defining the clinical question.
b. Translating the question into searchable keywords.
c. Conducting the search.
d. Selecting the best articles.

2. Users’ guides for selecting and evaluating articles about therapy, diagnosis, harm, and prognosis.

3. Selection and evaluation of integrative articles such as review articles, meta-analyses, practice guidelines, and decision analyses.

4. Use of administrative databases to link patient outcomes to costs related to producing these outcomes.

5. Use of patient-reported outcome measures as another method for evaluating the success of surgical treatments.

COMPETENCY-BASED PERFORMANCE OBJECTIVES

1. **Performance-Based:**

   A. Critically evaluate the published evidence for a surgical therapy using a computer search engine such as MEDLINE, using the users’ guide for evaluating therapy articles, and summarizing your findings in writing, to include your recommendation for surgical practice.
   
   B. Write a summary of the literature review, including a synthesis of the major findings and a recommendation for surgical practice.
   
   C. Develop and implement a computer-based clinical database using a software package such as EXCEL, ACCESS, SPSS, SAS, FileMaker, or other commercially available software.
   
   D. Identify and prepare a case study suitable for presentation or publication.
   
   E. Design and conduct a surgical research study, utilizing the following activities:

      1. Select/search for a researchable project, involving an attending or other clinician-mentor.
      2. Search and review the literature.
      3. Formulate hypotheses.
      4. Identify key variables (both predictor and outcome), decide on the optimal level of measurement, create operational definitions, and assess reliability.
      5. Develop a research design.
      6. Identify population and study sample.
      7. Develop sample selection procedures.
      8. Select or develop measures.
      9. Develop study protocol and prepare institutional review board (IRB) proposal.
      10. Collect and analyze data.
      11. Interpret results.
12. Identify various journal formats and related instructions to authors.
13. Review techniques for optimal presentation of papers and posters, including related media.
14. Convert paper into an appropriate presentation.
15. Deliver the presentation.
4.2

**CLINICAL EPIDEMIOLOGY:**

**UNIT OBJECTIVE:**

Demonstrate competency in clinical epidemiology through knowledge and performance-based measurable outcomes related to Otolaryngology/Facial Plastics Surgery.

4.2.1

**CLINICAL EPIDEMIOLOGY:**

**UNIT OBJECTIVE:**

Demonstrate understanding of the principles of clinical epidemiology and their application to the practice of Otolaryngology/Facial Plastics Surgery.

**COMPETENCY-BASED KNOWLEDGE OBJECTIVES:**

1. **Basic Knowledge:**

   A. Explain the discipline of clinical epidemiology to include the study of groups of people and the background evidence needed for clinical decisions in patient care.

   B. List the clinical events of primary interest in clinical epidemiology, including: death, disease, disability, discomfort, and dissatisfaction.

   C. Distinguish mass screening from case finding.

   D. Discuss the following criteria used to determine for which diseases people should be screened:

      1. Sensitivity.
      2. Specificity.
      3. Positive predictive value; negative predictive value.
      4. Number of false positives.
      5. Test factors (e.g., simplicity, cost, safety, patient acceptability).

   E. For a given disease/condition, compare the advantages and disadvantages of applying multiple diagnostic tests all at once versus consecutively.

   F. Discuss clinical decision analysis, including:

      1. Defining the problem, alternative actions, and possible outcomes.
      2. Developing a decision tree to assign probabilities for each outcome.
3. Assigning a value or utility for each outcome.

G. Differentiate risk factors from prognostic factors for a given disease/condition (e.g., for acute myocardial infarction, older age and male gender are both risk factors and prognostic factors, whereas hypertension is a risk factor but hypotension is a prognostic factor).

H. Discuss the following five rates commonly used to predict prognosis:

1. Five-year survival.
2. Remission.
3. Case-fatality.
4. Recurrence.
5. Response.

I. Identify locations of potential bias in randomized, controlled clinical trials, including:

1. Patient selection.
2. Patient allocation to study groups.
3. Patient compliance.
4. Definition of outcomes.
5. Generalizability of results.

J. Distinguish between clinical significance and statistical significance.

K. Analyze the following situations in which a physician's personal experience is insufficient to establish a relationship between a disease and its cause. Personal experience is insufficient when:

1. The disease is common.
2. The disease has multiple causes.
3. The disease has a low incidence.
4. The disease has a long latency period.

L. For non-experimental studies, define the following criteria for determining cause and effect:

1. Temporality.
2. Strength of the measure of association.
4. Consistency of results.
5. Biological plausibility.
COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. **Performance-Based:**
   
   A.  Recognize and appropriately apply a specific screening test in a case finding situation.
   
   B.  Apply clinical decision analysis to the treatment of a given patient with a given disease.
   
   C.  Estimate risk of disease development for a given patient given a history of exposure to specific risk factors.
   
   D.  Decide whether a given association is one of cause and effect.
4.3

EVIDENCED-BASED MEDICINE/OUTCOMES RESEARCH:

Unit Objectives:

Appropriately understand, recognize and apply skills and methods related to outcomes research methodology.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. **Basic Knowledge:**

   A. Explain the traditional negative clinical outcomes for a given surgical procedure, including death, disease, disability, and complications.

   B. Discuss the modern clinical outcomes for a given surgical procedure, including discomfort, dissatisfaction, quality of life, and cost-effectiveness.

   C. Identify the most frequently occurring negative outcome(s) of a given surgical procedure, (e.g., thrombosis following arterial venous prosthetic shunt formation).

   D. Compare the following different ways of measuring outcomes for a given surgical procedure:

      1. Chart reviews.
      2. Clinical evaluations.
      3. Questionnaires.

   D. Discuss each of the following steps in conducting prospective outcomes research:

      1. Hypothesis formation.
      2. Computerized literature search.
      3. Selection of a study design.
      4. Estimation of sample size.
      5. Specification of inclusion and exclusion criteria.
      6. Allocation of patients to groups.
      7. Evaluating outcome(s).
      8. Analyzing data.

   E. Provide examples of potentially confounding patient variables, including age, sex, race, income, education, occupation, religion, marital status, residence, nationality, disease stage, co-morbidities, and complications.
F. Provide examples of potentially confounding treatment variables, including extent of surgery, timing of surgery, anesthetic technique, postsurgical nursing care, drug therapy, chemotherapy, radiotherapy, physical therapy, and nutritional therapy.

G. Describe the following common problems in collecting useful outcomes data:
   1. Inadequate sample size.
   2. Inaccurate characterization of patient population.
   3. Inappropriate comparison group.
   4. Uncontrolled patient variables.
   5. Uncontrolled treatment variables.
   6. Patient noncompliance.

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. **Performance-Based:**
   A. Demonstrate the ability to review the research, clinical and surgical literature critically.
   B. Design a clinical outcomes research study using the AOCOOHNS guidelines as outlined in the Basic Standards Document.
### Section 5

#### 5.1

**Common Procedures**

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**Caseload to Minimal Competency**

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<th>Type of Case</th>
<th>Minimal # of Cases</th>
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<td>General</td>
<td>Adenotonsillectomy</td>
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<td>Cervical Node Biopsy</td>
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<td>Mastoidectomy</td>
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MEDICAL STUDENTS AND ROTATING RESIDENTS CURRICULUM

Otolaryngology-Head and Neck Surgery

This Core Curriculum Syllabus was modified from that developed by Donald T. Donovan, M.D., and the faculty of the Bobby R. Alford Department of Otolaryngology-Head and Neck Surgery as a guide to otolaryngology for medical students (http://www.bcm.edu/oto/studs/toc.html). The information contained within this syllabus is not a substitute for professional medical advice, and there are no guaranties or warranties, expressed or implied, with respect to the accuracy of this material.

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8. Inner Ear Disease: Hearing Loss
9. Inner Ear Disease: Vertigo
10. Facial Paralysis
11. Nose and Paranasal Sinuses, Olfaction and Taste
12. Inflammatory Disorders of the Pharynx
13. Salivary Gland Disorders
14. Disorders of Speech and Swallowing
15. Head and Neck Tumors
Recommended Reading

General texts for medical students:


More detailed textbooks to assist students in patient evaluation and prepare for operating room cases:


Major journals to seek specifically for articles regarding selected topics:

1. *Archives of Otolaryngology-Head and Neck Surgery* (American Medical Association)

2. *Laryngoscope* (The Triological Foundation)

4. *Head & Neck Surgery* (John Wiley & Sons)

Chapter 1 – Learning Objectives

1. Students should be able to perform a basic head and neck exam [see below: Chapter 4 - Examination of the Head and Neck] with equipment available to a primary care practitioner (flashlight, tongue blade, otoscope).

2. It is not expected that students will become proficient with a mirror exam. However, if at all possible they should have an opportunity to observe, but not perform, a fiberoptic exam of the larynx.

3. Students should be acquainted with the risk factors for head and neck cancer [see below: Chapter 15 - Head and Neck Tumors – Risk Factors, etc.] and know the early signs that would precipitate a referral to an otolaryngologist-head and neck surgeon. If possible, they should have an opportunity to see some examples of head and neck cancers, especially of the oral cavity.

4. Students should be familiar with an ear exam including tympanometry and have an opportunity to compare an exam performed with the otoscope and an exam using binocular microscope.

5. Although exposure to the operating room is not emphasized, it would be very useful for students to observe common procedures like PE tubes and tonsillectomy. It would also be ideal if students become familiar with tracheostomy tubes.

6. Students should be familiar with typical clinical presentation, key physical findings, initial treatment, and referral indications for common otolaryngological diseases listed below:

(Students may receive didactic lectures as part of the surgery core covering allergic rhinitis, sinusitis, AOM, SOM, OE, epistaxis, facial fractures, hearing loss, dizziness, and swallowing disorders.)

- Acute otitis media
- Serous otitis media
- External otitis
- Ruptured eardrum (acute)
- Cerumen impaction
- Presbyacusis
- Tinnitus
- Vertigo
- Epistaxis

- Deviated nasal septum
- Tonsillitis
- Allergic rhinitis
- Sinusitis
- Epiglottitis
- GE reflux
- TMJ arthritis
- Neck mass (acute, child)
- Neck mass (acute, adult)
Chapter 2 – Introduction to Otolaryngology – Head and Neck Surgery

Otolaryngology is a regional specialty, involving both medical and surgical management of problems in the head and neck. The American Board of Otolaryngology was formed in 1924 and is the second oldest surgical specialty in this country.

The term otorhinolaryngology is derived from the Greek words for ear, nose and larynx, and the abbreviated term "ENT" has been commonly used for many years. This appellation does not fully reflect the scope of a discipline which is concerned with disorders of the face, the ears, the oral cavity and pharynx, the upper respiratory tract, the neck, and even certain intracranial tumors. For this reason, "Head and Neck Surgery" was added to the official title.

Prior to the advent of sulfa drugs and penicillin, the otolaryngologist spent the bulk of his time treating suppurative conditions. Progress in surgery for deafness and disorders of the upper aerodigestive tract was limited by the high risk and grave consequences of secondary infections. The use of antibiotics greatly improved the safety and success rate of reconstructive surgery in these inherently contaminated spaces. Since the 1950's, significant advances have been made in the ability to restore function and aesthetic appearance to head and neck structures.

Post-graduate training in otolaryngology consists of five or six years of residency, sometimes followed by one or two years of fellowship. The first year or two are spent in general surgery, with the remaining residency time devoted to otolaryngology. Basic training includes otology, rhinology, laryngology, bronchoesophagology, head and neck oncology, facial plastic surgery, and allergy. Fellowship training can provide additional experience in one of the subspecialty areas.

Teaching of otolaryngology at the medical student level has two primary goals. The first is to ensure that all medical school graduates have a firm grasp of basic principles related to the specialty: the recognition and treatment of common disorders of the head and neck, the initial management of head and neck emergencies, and indications for specialist referral. Physicians engaged in primary care encounter a large number of head and neck problems. The second goal is to provide sufficient exposure to the specialty to assist in informed career planning. The basic two-week rotation through this service includes didactic lectures to provide essential factual information, and clinical assignments to provide practical experience.
This syllabus is intended to be a study guide, outlining information with which we feel all medical graduates should be familiar. For a more thorough discussion of selected topics, please refer to the reading list [see above].
Chapter 3 – Review of Anatomy

The anatomy of the head and neck can be divided into the following sections:

I. Temporal Bone.
II. Ear.
III. Nose.
IV. Paranasal Sinuses.
V. Oral Cavity.
VI. Pharynx.
VII. Larynx.
VIII. Salivary Glands.
IX. The Neck.

Temporal Bone and Ear

Temporal Bone
The temporal bone contains the sensory organs of hearing and balance, and structurally contributes to the cranial vault. The temporal bone consists of five parts: the squamous, the mastoid, the tympanic, zygomatic and petrous segment. It contains portions of the carotid artery and jugular venous drainage system, and is intimately related to the dura of the middle and posterior fossa. Anteriorly, it articulates with the condyle of the mandible. Posteriorly, and superiorly, the mastoid air cell system communicates with the middle ear. The facial nerve passes through the temporal bone en route to the muscles of facial expression.

Ear
Both functionally and anatomically, it can be divided into three parts.
A. External Ear - that portion external to the tympanic membrane. It serves chiefly to protect the tympanic membrane, but also collects and directs sound waves and plays a role in sound localization. The skin of the external ear normally migrates laterally from the umbo of the malleus in the tympanic membrane to the external auditory meatus (at a rate of 2-3 mm per day). This is a unique and essential mechanism for maintaining patency of the canal.

- **The Auricle** - elastic cartilage covered with closely adherent skin. The configuration is intricate, and extremely difficult to duplicate.

- **External Auditory Canal**
  - **Lateral Portion** - cartilaginous with thick, loosely applied skin containing ceruminous and sebaceous glands.
  - **Medial Portion** - very thin skin directly over bone, no skin appendages. Curves anteriorly and medially in adults, which may obscure the anterior tympanic membrane. It comprises two-thirds of the total canal in adults, less in infants and children.
B. The Middle Ear - This is an air-containing space which communicates with the nasopharynx via the eustachian tube. It is normally sealed laterally by the tympanic membrane. Its function is to transmit and amplify sound waves from tympanic membrane to the stapes footplate converting energy from air medium to a fluid medium of the membranous labyrinth. The relationship of the three ossicles is depicted below.

- **The tympanic membrane** is an ovoid, three-layered structure consisting of squamous epithelium laterally, respiratory mucosa medially, and an intervening fibrous layer. It normally has a conical shape, with the apex maintained medially by the support of the malleus. The fibrous layer thickens laterally to form the annulus, an incomplete ring which is attached to surrounding bone. Superior to the lateral process of the malleus, this ring is deficient, and this area is known as the pars flaccida. The majority of the drum is composed of the pars tensa.
• **Ossicles** - three small bones which are involved in sound conduction. From lateral to medial, these are the malleus, the incus, and the stapes. The handle and lateral process of the malleus is attached to the tympanic membrane and can be easily seen on physical exam. The long process of the incus can often be seen through the posterior superior quadrant of the membrane. The stapes is attached to a foot plate which is in direct contact with the fluid of the inner ear. (See diagrams 1 and 3).

• **Spaces** - the middle ear cleft is wider than the tympanic membrane, and is conventionally divided into spaces in reference to the annulus.
  
  o **Epitympanum** - superior to the tympanic membrane. Contains the body of the incus and the head of the malleus. Communicates with the mastoid via the aditus.

  o **Mesotympanum** - on a level with the ear drum. The oval and round windows, located posterosuperiorly on the medial wall, communicate with the inner ear. The long process of the incus projects into the posterior quadrant to articulate with the stapes which sits in the oval window. The facial nerve, usually covered by a bony canal, crosses the posterior superior quadrant superior to the stapes, then courses inferiorly between the middle ear and mastoid air cells.

  o **Protympanum** - in this anterior recess of the middle ear, the eustachian tube exits to communicate with the nasopharynx. This tube runs in close proximity to the carotid artery.
Hypotympanum - the jugular bulb curves through the hypotympanum. It is usually covered by bone, but may be dehiscent and extend into the middle ear space.

C. Inner Ear - consists of a fluid-filled labyrinth which functions to convert mechanical energy into neural impulses. The bony labyrinth is subdivided into smaller compartments by the membranous labyrinth. Fluid surrounding the membranous labyrinth is called perilymph; fluid within is called endolymph. There are three main divisions of the bony labyrinth.

- **Vestibule** - just medial to the oval window, and contains the utricle and the saccule, two organs of balance. The vestibule is an antechamber, leading to both the cochlear and the semicircular canal.

- **The Cochlea** - a snail-shaped chamber anterior to the vestibule. It bulges into the middle ear and its bony covering is the promontory. The cochlea also communicates with the middle ear via the round window. In this organ, sound waves are converted into neural impulses with elaborate coding.

- **The Semicircular Canals** - three in number; project posteriorly from the vestibule. These organs detect angular acceleration. They consist of a superior (anterior), posterior and lateral (horizontal) canals.

The nerve fibers from the labyrinth make up the auditory nerve which consists of a cochlear nerve and a superior and inferior vestibular with both afferent and efferent fibers from the respective sensory end organs. This nerve enters the cranial cavity via the internal auditory canal.

Nose and Paranasal Sinuses

The Nose

The nose is the air conditioner of the body, responsible for warming and saturating inspired air, removing bacteria and particulate debris, as well as conserving heat and moisture from expired air. Nasal breathing is important for optimal pulmonary function. It is also a prominent cosmetic feature of the face.
A. External Nose - the anterior, caudal portion of the nose is cartilaginous, while posteriorly and superiorly it is bony.

- Framework
  - Cartilages: greater alar (lower lateral), septal, lateral nasal (upper lateral), lesser alar, sesamoid.
  - Bones: Nasal, maxillary, frontal
- Musculature: Nasalis, depressor septi, procerus, dilator naris.
- Blood supply
  - External carotid
    - External maxillary: lateral nasal, angular, alar, septal, external nasal.
  - Internal carotid: Ophthalmic, which gives rise to anterior ethmoid, posterior ethmoid, and dorsal nasal vessels.

Lymphatics: facial artery, submandibular, parotid nodal drainage.
- Nerve supply
  - Sensory trigeminal
    - Ophthalmic division: Nasociliary, external nasal, infratrochlear.
    - Maxillary division: infraorbital
  - Motor facial: Buccal, zygomatic branches

B. Internal Nose:

- Floor - the floor of the nose is formed by the hard palate. The nasal cavity extends as far back as the soft palate, where the posterior choanae opens into the nasopharynx. Roof - the roof of the nose is adjacent to the anterior cranial fossa. The cribriform plate contains numerous tiny perforations which transmit sensory fibers to the olfactory bulbs. The sensation of smell is limited in man to a very small area of mucosa in the superior recesses of the nose. Posteriorly, the roof slants downward as the anterior wall of the sphenoid sinus.
- Lateral Walls - the turbinates, three or sometimes four bony shelves covered by erectile mucosa, project from the lateral wall of the nose. These processes serve to increase the interior surface area of the nose to facilitate heat and water exchange. They constantly engorge or shrink to accommodate changing physiologic requirements. They are also the chief structures involved in pathologic obstruction. A series of spaces are created by the overhanging edge of these turbinates.
- **Inferior Meatus** - inferior to the inferior turbinate. Contains orifice of nasolacrimal duct. **Middle Meatus** - inferior to the middle turbinate. Contains semilunar hiatus, with openings of the maxillary, frontal, and anterior ethmoidal sinuses. **Superior Meatus** - drains posterior ethmoid cells.

- **Spheno-ethmoid recess** - orifice of sphenoid sinus.

**Blood Supply**

- Anterior ethmoid - to roof and anterior superior portion of septum and lateral wall. Sphenopalatine - to lateral wall of nose Nasopalatine - supplies roof, septum, and floor Lateral nasal - supplies lateral nasal wall anteriorly. Descending palatine - supplies the lateral nasal wall posteriorly. Pharyngeal - supplies roof posteriorly Posterior ethmoid - supplies septum and lateral nasal wall superiorly

- Septal - supplies septum inferiorly and floor

**Nerve supply**

- Medial internal nasal - to septum, anterosuperiorly Lateral internal nasal - to lateral wall, anterosuperiorly External nasal - to skin of back of nose Posterior superior nasal - supplies septum and lateral wall posteroinferiorly, to middle turbinate Posterior inferior nasal - to floor and inferior turbinate Pharyngeal - to choana Anterior superior alveolar - to inferior meatus

- Infraorbital - to vestibule

**Lymphatics:** drained by

- Facial venous drainage Retropharyngeal Superior deep cervical

- Submandibular

**Paranasal Sinuses** These are air-filled, mucosal-lined cavities which develop in facial and cranial bones. The spaces communicate with the nasal airway. Their function is unknown but has been subject to a great deal of speculation. They could serve to decrease the weight of the skull or to function as resonators for the voice. In lower animals with a more acute sense of smell, the sinuses are largely lined by olfactory epithelium. Sinuses may have originally developed to increase the available surface area for the sense of smell. Therefore, in humans, with olfaction limited to a much smaller area, sinuses may be vestigial anachronisms. Though their function is obscure, their medical significance is not. Sinuses frequently become infected due to obstruction of normal drainage, and negative pressure in a sinus can cause headache. Neoplasms which arise in the sinuses can be occult for quite a long time, so that they are usually very advanced at the time of diagnosis. There are four groups of sinuses:

- **A. Frontal** - Paired, in frontal bone. Posterior wall is adjacent to anterior cranial fossa. Usually asymmetrical, occasionally absent.

C. Ethmoid - Numerous cells in superior and lateral walls of nose, and in medial walls of orbits.

D. Sphenoid - Paired, in sphenoid bone. Sella turcica projects into this space.

Oral Cavity and Pharynx

Oral Cavity

Designed for articulation in speech and mastication of food, the oral cavity also functions as an alternate airway.

A. Boundaries

- **Anterior** - the lips
- **Posterior** - the anterior tonsillar pillars
- **Roof** - hard and soft palate
- **Floor** - mucosa overlying sublingual and submandibular glands.

- **Walls** - buccal mucosa

B. Contents

- **Alveolar processes and teeth**
- **Anterior tongue to circumvallate papilla**
- **Orifice of parotid gland** (Stenson's duct) in buccal mucosa opposite upper second molars
- **Orifice of submandibular duct** (Wharton's duct) in anterior floor of mouth

- **Orifices of sublingual glands**

Pharynx

A. Nasopharynx - extends from posterior choanae of the nose to the soft palate. Related posteriorly to the base of the skull. Contains adenoid tissue and the orifices of the eustachian tubes. This area is not accessible to direct inspection and must be examined by mirrors or optical instruments.

B. Oropharynx - that portion which is visible via the mouth. Extends from soft palate superiorly to vallecula inferiorly. Posterior and lateral walls are formed by the superior and middle pharyngeal constrictors.

C. The Palatine Tonsils are lymphoid aggregates between the mucosal folds created by the palatoglossus and palatopharyngeus muscles. They are covered by stratified squamous epithelium, which continues down into deep crypts. Tonsils vary widely in size and may be sessile or pedunculated.

D. Hypopharynx - is the portion of the pharynx that lies inferior to the tip of epiglottis. The posterior and lateral walls are formed by middle and inferior pharyngeal constrictors. It extends inferiorly to the cricopharyngeus, where the pharynx empties into the cervical esophagus. Anteriorly, it extends from the valleculae and contains the
epiglottis and the larynx. Lateral to the larynx are the pyriform sinuses, two mucosal pouches whose medial borders are the lateral walls of the larynx. The posterior aspect of the hypopharynx contains the posterior pharyngeal wall and post cricoid mucosa.

The Larynx

The larynx is a valve separating the trachea from the upper aerodigestive tract. It is primarily thought of as an organ of communication—the "voice box"—but it is also an important regulator of respiration, and is necessary for an effective cough or valsala maneuver, and prevents aspiration during swallowing.

A. Skeleton

- **Hyoid Bone** - attachment to epiglottis and strap muscles.
- **Thyroid Cartilage** - anterior attachment of vocal folds. Posterior articulation with cricoid cartilage.
- **Cricoid Cartilage** - complete ring. Articulates with thyroid and arytenoid cartilages.
- **Arytenoids** - two cartilages which glide along the posterior cricoid and attach to posterior ends of vocal folds.

Articulated Elements

- **Cricoid cartilage**
- **Hyoid bone**
- **Epiglottis**
- **Comanulate cartilage**
- **Arytenoid cartilage**
- **Thyroid cartilage**
- **Cricoid cartilage**

B. Divisions

- **Supraglottis** - usually covered with respiratory epithelium containing mucous glands.
  - **Epiglottis** - leaf-shaped mucosal-covered cartilage, which projects over larynx.
  - **Aryepiglottic folds** - extend from the lateral epiglottis to the arytenoids.
  - **False vocal cords** - mucosal folds superior to the true glottis. Separated from true vocal folds by the ventricle.
Ventricle - mucosal-lined sac, variable in size which separates the supraglottis from the glottis.

- **Glottis** - the true vocal folds attach to the thyroid cartilage at the anterior commissure. The posterior commissure is mobile, as the vocal folds attach to the arytenoids. Motion of the arytenoids effects abduction or adduction of the larynx. The bulk of the vocal fold is made up of muscle covered by mucosa. The free edge is characterized by stratified squamous epithelium. The vocal folds abduct for inspiration and adduct for phonation, cough, and valsala.

- **Subglottis** - below the vocal folds, extending to the inferior border of the cricoid cartilage.

C. Innervation - branches of the vagus nerve.

- **Superior Laryngeal Nerve** - sensation of the glottis and supraglottis. Motor fibers to the cricothyroid muscle, which tenses the vocal folds. This nerve leaves the vagus high in the neck.

- **Recurrent Laryngeal Nerve** - sensation of the subglottis, and motor fibers to intrinsic muscles of the larynx. This nerve branches from the vagus in the mediastinum, then turns back up into the neck. On the right, it travels inferior to the subclavian artery and on the left, the aorta.

Salivary Glands

A. Parotid Gland

- Located on side of face, anterior to mastoid tip and external auditory canal, inferior to zygomatic arch, and superior to the lower border of the angle of the mandible. Anteriorly, it overlaps the masseter muscle.
- Stenson's duct enters oral cavity through buccal mucosa opposite upper second molar.

- Parasympathetic secretory afferents to the parotid leave the inferior salivary nucleus with the glossopharyngeal nerve and travel via Jacobson's plexus in the middle ear to synapse in the otic ganglion. Post-synaptic fibers are distributed to the parotid by the auriculotemporal nerve.

- Facial nerve passes through this gland.

**B. Submandibular Gland**

- Beneath floor of the mouth, inferior to mylohyoid muscles and superior to digastric muscle.

- Marginal mandibular branch of the facial nerve travels in the fascia on the lateral surface of this gland.

- Parasympathetic secretory afferents to the submandibular gland arise from the superior salivatory nucleus, and leave the brainstem in the facial nerve. They exit the facial nerve at the geniculate ganglion and travel via the chorda tympani to the lingual nerve. Fibers synapse in the submandibular ganglion, and post-synaptic fibers then enter the gland.

- The lingual and hypoglossal nerves lie deep to this gland.

- Wharton's duct enters the floor of the mouth near the lingual frenula.

**C. Sublingual Glands** - located below the mucous membrane of the floor of the mouth, adjacent to mandible and mylohyoid muscle. Ten to twelve small caliber ducts drain the gland, some emptying into the submandibular duct, and others draining directly into the floor of the mouth.

**D. Minor Salivary Glands** - small collections of salivary gland tissues are scattered throughout the oral mucosa, and can also be seen in the pharynx, supraglottis, nose and sinuses.

**The Neck**

The neck contains important communications between the head and the body, including air and food passages, major blood vessels and nerves, and the spinal cord. Many vital structures are compressed into a narrow area which is engineered for maximal mobility to permit variation in head position relative to body.

**A. Skeleton** - primarily composed of the vertebral column. Anteriorly, the hyoid bone, and laryngeal and tracheal cartilages support the aerodigestive spaces. These are suspended from the mandible and base of skull by a system of muscles and ligaments.

**B. Muscles** - anteriorly, strap muscles connect the respiratory skeleton and sternum. There are also muscular attachments from the hyoid to the tongue, mandible, and
styloid. The digastric muscle passes forward from the mastoid, attaches to the hyoid, then ascends to the anterior mandible. The sternocleidomastoid (SCM) divides the neck into anterior and posterior triangles. The posterior triangle is largely muscular. The anterior triangle which contains most of the vital structures, can be divided into smaller triangles by muscles.

The anterior and posterior bellies of the digastric form the submandibular triangle. The submental triangle is in the midline, between the anterior bellies. The vascular or carotid triangle is inferior to the digastric and hyoid.

The omohyoid is a small muscle, running at roughly 90 degrees to the SCM, from the hyoid to the scapula.

**C. Nerves** - the neck contains major branches of cranial nerves, as well as cervical roots.

- **Cranial Nerves**
  - VII - the marginal mandibular branch dips down into the neck in the fascia overlying the submandibular gland. In addition to the muscles of facial expression, branches of VII innervate the platysma, the stylohyoid and the posterior belly of the digastric.
  - X - the vagus nerve exits the jugular foramen and travels inferiorly in the carotid sheath. It carries the parasympathetic fibers of the thoracic cavity and much of the GI tract, as well as laryngeal and pharyngeal sensory and motor branches.
  - The Spinal Accessory Nerve (XI) - supplies the trapezius and sternocleidomastoid muscles. It exits the jugular foramen, then runs posteriorly.
  - The Hypoglossal Nerve (XII) - supplies the muscles of the tongue. The nerve exits the skull through its own canal, runs downward in the carotid sheath, then curves forward superficially to the carotid at the level of the occipital artery to reach the tongue.

- **Cervical Nerves**
  - Cervical plexus - anterior roots of C1-4
    - Ansa cervicalis - to strap muscles (some travel with XII)
    - Branches to phrenic nerve
    - Sensory
  - Phrenic nerve - C3-5
  - Brachial Plexus C5-T1
o **Posterior rami** - to posterior muscles and skin

o **Cervical sympathetic chain** - travels in carotid sheath

### D. Major Vascular Structures

- **Carotid Artery** - bifurcates into:
  - Internal (intracranial) - no branches in the neck
  - External (extracranial) - branches:
    - Superior thyroid
    - Ascending pharyngeal
    - Lingual
    - Facial
    - Occipital
    - Post-auricular
    - Superficial temporal
    - Internal maxillary
  - Thyrocervical trunk
    - Suprascapular
    - Transverse cervical
    - Inferior thyroid
  - Vertebral artery
  - Internal jugular vein (within carotid sheath)
  - External jugular vein

### E. Visceral Column
- Pharynx, larynx, trachea, and esophagus.

### F. Thyroid Gland

- Developmentally derived from pharyngeal floor
- Located anterior and lateral to the trachea
- Closely related to recurrent laryngeal nerve and parathyroid glands
- Blood supply
o Arterial
  - Superior thyroid artery (branch of external carotid)
  - Inferior thyroid artery (branch of thyrocervical trunk)
  - Thyroid "ima" artery (variable)

o Venous
  - Superior thyroid vein
  - Middle thyroid vein
  - Inferior thyroid vein

G. Parathyroid Glands
- Four glands: two on each side
- Derived from branchial pouches III and IV: Superior parathyroid glands from pouch IV and inferior parathyroid gland from pouch III.
- Glands usually related to posterior surface of thyroid gland, but may be found as inferior as mediastinum

H. Anatomic triangles (superimposed on superficial neck anatomy):

The neck can be divided into two major triangles, with multiple smaller triangles:
A. Anterior triangle - bordered by the anterior border of the SCM, midline of the neck, and the mandible

- **muscular triangle**--formed by the midline, superior belly of the omohyoid, and SCM
- **carotid triangle**--formed by the superior belly of the omohyoid, SCM, and posterior belly of the digastric
- **submental triangle**--formed by the anterior belly of the digastric, hyoid, and midline
- **submandibular triangle**--formed by the mandible, posterior belly of the digastric, and anterior belly of the digastric

B. Posterior triangle - bordered by the posterior border of the SCM, trapezius, and clavicle

- **supraclavicular triangle**--formed by the inferior belly of the omohyoid, clavicle, and SCM
- **occipital triangle**--formed by inferior belly of the omohyoid, trapezius, and SCM

I. Lymphatic drainage: major head and neck lymph node groups.

The lymph nodes of the neck can be divided into six levels within the defined anatomic triangles. These groups and the areas that they drain are particularly important when locating and working up a "neck mass" or possible malignancy. The groups and
drainage areas are as follows:

- **I--Submental and submandibular nodes**
- **II--Upper jugulodigastric group**
- **III--Middle jugular nodes** draining the naso- and oropharynx, oral cavity, hypopharynx, larynx.
- **IV--Inferior jugular nodes** draining the hypopharynx, subglottic larynx, thyroid, and esophagus.
- **V-- Posterior triangle group**
- **VI--Anterior compartment group**

**Individual Lymph Nodes in the Head and Neck:**
Chapter 4 – Examination of the Head and Neck

The head and neck exam involves observation of all surface features and careful palpation. In addition, many interior surfaces must be inspected, which makes adequate illumination essential. A hand-held light is commonly used by most physicians to examine the mouth, but head mirrors or head lights provide much brighter light and free both hands for the examination. The otoscope is the basic instrument used to evaluate the ear.

Several techniques are used by otolaryngologists to better assess the ears, nose, and throat. The binocular operating microscope provides an enlarged three-dimensional view of the ear canal and tympanic membrane, which is vastly superior to the monocular image obtained with the hand-held otoscope. The microscope also permits the bimanual removal of wax and foreign bodies. It may also be used to visualize the nasal septum, nasal cavity, oral cavity or skin lesions. Indirect mirror exam permits examination of the larynx, hypopharynx, and nasopharynx. Fiberoptic and telescopic instruments are also useful.

Many structures are not accessible to direct examination, such as the sinuses, portions of the pharynx, and the middle and inner ear. The condition of these can often be inferred from a combination of a careful history and the physical examination of adjacent, more visible areas. For example, acute sinusitis can be diagnosed on the basis of characteristic history, the observation of purulence draining into the nose, and often, tenderness over the affected spaces. The inflamed sinus mucosa cannot be viewed directly. X-rays or CT scans may demonstrate opacification of the sinuses, but in the absence of the patient history, accurate diagnosis cannot be made.

The Ear

External Auricle: Congenital deformity such as microtia and accessory tragus can be associated with middle ear, inner ear, and renal malformations. Assess patency of external auditory meatus. Look for preauricular pits which may indicate sinus tracts.

Otoscopy: The canal should be thoroughly cleaned, and the largest speculum which will comfortably fit should be used. The external ear canal is normally curved, which limits the visibility of the eardrum and medial canal. Gentle traction on the auricle will move the cartilaginous canal and afford a better view. In adults, the auricle should be pulled superiorly, laterally, and inferiorly. In infants, the bony canal has not yet developed, and the auricle should be pulled inferiorly.
The external canal may be swollen due to external otitis or filled with cerumen or debris. Subcutaneous bony masses (exostoses or osteomas) may project into the lumen. Note the condition of the skin and any lesions (from the external ear to the tympanic membrane). The anterior canal wall commonly obscures the anterior portion of the ear drum. The tympanic membrane is normally pearly gray, shiny, translucent and concave. Changes in the appearance of this structure may indicate pathology in the middle ear, mastoid, or eustachian tube. White patches, called tympanosclerosis, can frequently be seen and provide evidence of prior infection. A dull, blue ear drum indicates hemotympanum. A red bulging tympanic membrane indicates acute bacterial otitis media. A dull, retracted, amber drum is seen in serous otitis. If a perforation is present, then the middle ear mucosa may be viewed directly. Healed perforations are often more transparent than the surrounding drum and may be mistaken for actual holes.

Pneumatic otoscopy refers to examining the tympanic membrane via an airtight speculum and observing movements with the gentle insufflation of air. Mobility may be limited by scarring, middle ear effusion, or perforation.

Eustachian tube function may be assessed by watching the ear drum as the patient swallows with the nose pinched off (Toynbee maneuver) and then swallows with the nose unobstructed. The first step normally causes the ear drum to retract, while the second step releases it.

Tuning forks can be used to grossly assess hearing, but more importantly, to differentiate between conductive and sensorineural hearing loss. A tuning fork placed in the center of the skull will normally be perceived in the midline (Weber). With a conductive hearing loss, the sound will appear to be on the side of the bad ear. If there is a sensorineural loss, the sound will be perceived in the better ear. The Rinne test compares air conduction hearing (tuning fork tines in the air just outside external auditory canal) to bone conduction hearing (base of tuning fork over mastoid process or in contact with the mastoid bone). In conductive hearing loss, bone conduction is more sensitive than air conduction (negative Rinne).

A proper, complete assessment of hearing requires audiometry. This is indicated in any patient with chronic hearing loss, or with acute loss that cannot be explained by canal occlusion or middle ear infection. It is also an integral part of the evaluation of the patient with vertigo.

Unilateral hearing loss due to serous otitis in an adult may be the presenting symptom of cancer of the nasopharynx, due to occlusion of the eustachian tube. All such patients should have a thorough nasopharyngeal exam, and careful palpation of the neck to detect possible metastasis from an occult tumor.
Complete evaluation of the ear includes assessment of the facial nerve and vestibular function.

The Nose

The nose is a very narrow space, and it is impossible to completely examine the inner surface in the intact patient. Anterior rhinoscopy with a bivalve speculum usually discloses the anterior ends of the inferior turbinates and the septum. Topical vasoconstriction permits a somewhat more thorough examination. Nasal patency may be compromised by swollen turbinates, septal deviation, or intranasal masses, such as tumors, or nasal polyps. A perforation of the nasal septum can cause symptoms such as a whistling noise during breathing, sense of nasal obstruction, recurrent epistaxis, and excessive crusting of the nose.

The sense of smell is rarely tested due to the difficulty in objectively quantifying responses, but by presenting common odors (lemon, coffee, vanilla) one can assess the patient’s ability to detect an odor or identify it. Ammonia fumes will stimulate trigeminal endings (CN V), and thus produce a response in the absence of any olfaction; thus it is useful for distinguishing true anosmics from malingerers.

The Mouth

An adequate light and tongue blade are necessary for examining the mouth. The blade should be used to systematically expose all teeth and mucosal surfaces, including those recesses inferior and posterior to the tongue, and the gingivobuccal sulci. Dentures should always be removed to permit a complete examination. The parotid duct orifice can be seen on the buccal mucosa opposite the upper second molar, and massage of the gland should express clear fluid. The submandibular and sublingual glands empty into the floor of the mouth. Complete examination of the mouth includes bimanual palpation of the tongue and the floor of the mouth to detect possible tumors or salivary stones.

The Pharynx

The posterior wall of the oropharynx can be visualized easily via the mouth, by depressing the tongue. Inspection of the hypopharynx, larynx, and nasopharynx requires use of indirect mirror exam. Mirrors should be pre-warmed to minimize fogging. To examine the nasopharynx, use a small mirror. The patient should be instructed to open his mouth as widely as possible, RELAX his tongue, and try to breathe via the nose. The posterior tongue blade is depressed as much as possible to provide a space for the mirror above the tongue and posterior to the soft palate. Concentrating on nasal breathing causes the soft palate to relax and drop, providing a view of the nasopharynx. Only a small portion of the nasopharynx can be visualized in
the mirror at once; therefore, it must be moved about to show the posterior choanae of
the nose, the posterior nasopharyngeal wall, and the eustachian tube orifices.

The hypopharynx and larynx is examined with a large mirror. The patient is asked to
lean forward slightly from the hips, with back straight and neck slightly extended (sniff
position). The tongue is protruded as far as possible, and the examiner grasps the tip
with a gauze sponge. Gentle anterior traction is applied. The patient must voluntarily
relax and protrude his tongue, or else excessive traction (which may be painful!) may
be required. The mirror is placed against the soft palate and used to push it posteriorly.
The mirror is rotated as necessary for visualization of the base of the tongue,
valleculae, posterior and lateral pharyngeal walls, pyriform sinus openings, and larynx.
At rest, the epiglottis normally overhangs and obscures the glottis. If the patient tries to
produce a high pitched "Eeeee", the epiglottis usually lifts sufficiently to expose the
cords. Vocal fold mobility should be assessed by asking the patient to alternately
phonate, and inspire deeply. The glottis opens with inspiration and closes for
phonation.

In patients with a hyperactive gag reflex or extremely overhanging epiglottis, mirror
exam may not be feasible and a fiberoptic nasopharyngoscope may be inserted via the
nose. A right-angle telescope is useful for close-up inspection, strobolaryngoscopy,
and for photography.

**The Paranasal Sinuses**

Since direct visualization is difficult, one must rely on indirect physical assessment and
radiology. Purulent drainage from the sinuses may be noted in the nose. Tenderness
may be elicited by tapping over the frontal or maxillary sinuses or applying pressure
under the supraorbital rim or near the medial canthi. The frontal and maxillary sinuses
can be transilluminated by placing a bright light under the supraorbital rim and inside
the mouth in a dark room. This method is not commonly used due to the availability
and greater reliability of sinus x-rays and CT scans of the paranasal sinuses. In
addition, the availability of fiberoptically illuminated endoscopes now allows better
direct visual assessment of the middle meatus and maxillary sinuses.

**The Salivary Glands**

The parotid and submandibular glands should be inspected and palpated to detect
enlargement, masses, and/or tenderness. The intraoral openings for the salivary ducts
of the parotid (Stenson’s), submandibular (Wharton’s), and sublingual glands should be
observed.

**The Neck**
The normal neck is supple, with the hyoid, larynx and trachea easily palpable in the midline. A complete examination should include external observation for symmetry and possible masses by thorough palpation of all tissue and auscultation. The thyroid gland and trachea should be thoroughly palpated. The exact position, size, mobility, consistency, tenderness, and overlying skin changes or erythema of any mass should be carefully noted, along with any relationship to the thyroid, carotid, or airway. A neck mass may be an inflammatory lymph node, an aneurysm, a thyroid mass, a dermoid, a branchial cleft cyst, or a thyroglossal duct cyst. It may also be a metastasis from cancer in the head, neck or lung, or occasionally gastrointestinal tract. With the exception of supraclavicular nodes, the neck is an uncommon site of metastasis from below the diaphragm.
Chapter 5 – Audiology

Accurate assessment of hearing (audiometry) is vital to the diagnostic evaluation of patients with suspected otologic disorders for the determination of the underlying process, as well as in the planning of rehabilitation of hearing loss. Originally, audiometry was limited to the psychophysical measurement of the sensation of hearing; thus, patient cooperation was essential. However, other tests have been developed over the years which permit more objective assessment of hearing even in infants, small children, malingerers, and hysterics.

I. Human Hearing

Most humans hear sounds in the range of 20 to 20,000 Hz. Sensitivity varies as a function of frequency, with sounds in the middle frequencies being heard best. The ability to hear higher frequencies declines with age.

For a discussion of the causes of hearing loss, see the section on diseases of the middle ear, or diseases of the inner ear.

II. Basic Audiometry

Adequate testing requires an audiometer (device for presenting sounds to the patient at precisely controlled intensity), a sound-proof environment, a competent audiologist, and a cooperative patient. The standard testing battery includes Pure Tone Audiometry, Speech Audiometry, and Immittance Audiometry.

A. Pure Tone Audiogram: This is a graphic plot of the patient's thresholds of auditory sensitivity for pure tone (sine wave) stimuli. Threshold hearing levels are indicated for each frequency tested. By convention, normal hearing levels are shown at top of the graph; a decrease in hearing sensitivity is indicated by larger values of hearing level. Hearing level is plotted on a logarithmic decibel scale. Sounds are tested with presentation by air conduction (earphones) as well as bone conduction (skull vibrator). An air bone gap indicates a conductive component of hearing loss. A decrease in threshold sensitivity by bone conduction reflects a sensory or neural loss.

The format for recording audiometric findings is shown in the legend below:
Air conduction thresholds are represented by a circle or “x”, and bone conduction by arrow heads. A triangle or square indicates air conduction thresholds with masking (noise presented to the opposite ear to minimize the chance of responses due to crossover of sound), and brackets represent bone conduction thresholds with masking.

This sample audiogram indicates normal hearing in the right ear, and a conductive loss on the left.
0 dB - 20 dB ....... normal hearing
20 dB - 40 dB ...... mild hearing loss
40 dB - 55 dB ...... moderate hearing loss
55 dB - 70 dB ...... moderately severe hearing loss
70 dB - 90 dB ...... severe hearing loss
>90 dB .............. profound hearing loss
The second audiogram demonstrates a sensorineural loss in the right, and a mixed loss on the left.

B. Speech Audiometry: These tests utilize spoken words and sentences rather than pure tones. Tests are designed to assess sensitivity (threshold) or understanding (intelligibility).
• Threshold - the level at which the patient can correctly repeat 50% of test materials—phoneme-balanced words (PB), synthetic sentences, etc.

• Intelligibility - by convention, the percentage of words or sentences a patient can correctly repeat when presented at supra-threshold levels.
  
  o Provides information about hearing handicap. Problem maybe worse than indicated by pure tone average (PTA) for the speech frequencies.
  
  o Useful to determine candidacy for hearing aid.
  
  o Very poor results, out of proportion to PTA, suggests probable retrocochlear cause of hearing loss.

C. Immittance Audiometry: These hearing tests utilize the electroacoustic immittance bridge, as shown in this schematic diagram below. This device is designed to quantify the impedance (resistance to movement) of the conductive mechanism of the ear by bouncing a probe tone off the tympanic membrane and measuring the proportion of reflected sound.

Maximal reflection of sound occurs when the mechanism is very stiff, while a compliant system transmits more sound and reflects less. There are two principal applications of this device.

• Tympanometry: A tympanogram is a graphic representation of the relationship of external auditory canal air pressure to impedance; the latter is usually reported in terms of tone of its derivatives, compliance in arbitrary units. Pressure in the external auditory canal is varied from -200 daPa* through +200daPa while monitoring impedance. Impedance is lowest (maximal compliance) when pressure in the canal equals pressure
in the middle ear. Ears can be classified into three basic groups on the basis of the configuration of the tympanogram.

- **Type A.** The peak compliance occurs at or near atmospheric pressure indicating normal pressure in the middle ear. There are three subgroups.
  
  - A - normal shape reflects a normal mechanism
  
  - AD - A deep curve with a tall peak indicates an abnormally compliant middle ear, as seen in ossicular dislocation or erosion, or loss of elastic fibers in the tympanic membrane.
  
  - AS - A shallow curve indicates a stiff system, as in otosclerosis.

- **Type B** - No sharp peak, with little or no variation in impedance over a wide range, usually secondary to non-compressible fluid in the middle ear (otitis media), tympanic membrane perforation or obstructing cerumen.

- **Type C** - Peak compliance is significantly below zero, indicating negative pressure (sub-atmospheric) in the middle ear space. This finding is often indicative eustachian tube dysfunction.

*daPa = deciPascal = mm H2O

One system of tympanogram classification.

\[
\text{A} = \text{normal} \\
\text{As} = \text{stiffened tympano-ossicular system; Ad} = \text{disarticulation} \\
\text{B} = \text{Middle ear effusion, tympanic membrane perforation or impacted cerumen} \\
\text{C} = \text{negative middle ear pressure.}
\]

- **Acoustic Reflex measures (AR):** Contraction of the stapedius muscle occurs with loud sounds, producing a measurable change in compliance. Abnormalities of hearing may be suspected by the following results:
  
  - Elevated threshold - indicates cochlear sensitivity loss or VIII nerve disorder
  
  - Absent reflex
- Abnormal middle ear system
- Severe sensitivity loss
- VIII nerve lesion
- Ipsilateral VII nerve lesion
- Some otherwise "normal" ears
  - Threshold low in proportion to sensitivity level ("recruitment")- seen in cochlear loss
  - Abnormal "shape" of reflex.

III. DIAGNOSTIC AUDIOMETRY

A battery of tests intended to determine the site of lesion inpatients with otologic or neurotologic disorders. The constellation of tests varies according to the available test battery and provisional diagnosis.

A. Immittance audiometry (see above)

B. PI-PB functions - Speech discrimination is plotted as a function of sound intensity. Normally, discrimination improves with intensity up to a maximal level, then plateaus. In VIII nerve disorders, discrimination often declines dramatically as intensity increases above the level yielding maximum performances.

<table>
<thead>
<tr>
<th>PI-PB Function</th>
<th>RIGHT EAR</th>
<th>LEFT EAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAL P1 - PB</td>
<td><img src="image1" alt="" /></td>
<td><img src="image2" alt="" /></td>
</tr>
<tr>
<td>ROLLOVER</td>
<td><img src="image3" alt="" /></td>
<td><img src="image4" alt="" /></td>
</tr>
</tbody>
</table>

C. Bekesy Audiometry: This test has significant historical interest in development of assessment of hearing. However, today it is used predominately only in industrial and military hearing screening situations. Patient traces his own auditory threshold by means of a self-recording audiometer. Tracings are obtained for pulsed as well as continuous tones. The relationship between the two categories can be categorized into diagnostic patterns.
• Type I: interwoven - normal or cochlear
• Type II: slight separation, especially in high frequencies - cochlear
• Type III: initially interwoven, but continuous sensation falls off dramatically at higher frequencies - VIII nerve lesion
• Type IV: continuous tracing at markedly lower level than that for pulsed signal - usually associated with VIII nerve lesion
• Type V: sensitivity lower for intermittent tone - malingering

D. Tone decay tests: Abnormal adaptation to a continuous tone is seen in retro-cochlear lesions.

E. Stenger Test: Performed to detect malingering of unilateral loss. If sound is presented to both ears, patient will deny hearing in the ear with the feigned loss. If sound is presented to the good ear at a suprathreshold level, simultaneous to a louder sound in the questionable ear, a malingerer will localize the sound to his "bad" ear, and therefore deny hearing anything at all.

F. ABR - evoked auditory brainstem responses: Scalp electrodes measure electrical activity in response to sound clicks. The response is quite small in relation to other ongoing brain activity, but by presenting a large number of clicks and averaging the responses by computer, unrelated events can be canceled out.

• This is useful for documenting hearing in uncooperative or unresponsive patients. The disadvantage is that it tests mainly the 1,000-4,000 Hertz frequency range of hearing and is a poor indicator of the overall auditory function.
• Abnormal ABR is seen in VIII n or brainstem lesions.

Normal Auditory Brainstem Response

![Normal Auditory Brainstem Response Diagram]

Wave I: Action potential, auditory nerve
Wave II: Cochlear nucleus
Wave III: Superior olive  
Wave IV, V: Inferior colliculus  
Wave VI, VII: Unclear

G. ECOG (electrocochleography): Electrical activity is measured from the promontory, and responses to a large number of clicks are averaged. These will be abnormal in eighth cranial nerve lesions and certain cochlear disorders.
Chapter 6 – Otolaryngologic Emergencies

Emergencies in Otolaryngology-Head and Neck Surgery

Many otolaryngological problems can be handled electively; however, there are emergencies, especially those associated with airway obstruction and facial trauma, for which proper initial assessment and management are crucial in preserving life and minimizing disabling or disfiguring sequelae. In this section, these emergencies are divided into the following categories:

I. Airway Obstruction

II. Inspired or Ingested Foreign Bodies

III. Sore Throat or Difficulty Swallowing

IV. Epistaxis [see Chapter 11 – Nose and Paranasal Sinuses]

V. Ear Complaints [see Chapter 7 – Common Diseases of the External & Middle Ear]

VI. Head and Neck Infections

VII. Laryngeal and Tracheal Trauma

VIII. Facial Trauma

Epistaxis and ear complaints are covered in more detail in other sections.

I. Emergencies in Otolaryngology-Head and Neck Surgery: Airway Obstruction

Airway obstruction will be covered separately in the (A.) adult, (B.) child, (C.) newborn or infant. Although the etiologies and treatment of airway obstruction may vary between different age groups, some common principles of evaluation and treatment are worth emphasizing. First, try to anticipate airway problems before the patient's airway becomes completely obstructed and mobilize support quickly. After assessing the patient's potential for airway compromise, look for a cause. The patient will often require multiple endoscopy (laryngoscopy, bronchoscopy and esophagoscopy), which in addition to helping identify an etiology may also help establish an airway. Then the airway may be secured by either intubation or tracheotomy.

A. Adult with Airway Obstruction

History

- Precipitating event
Aspiration

Trauma

Allergic reaction

Systemic illness

- Time course
- Previous intubation or neck trauma

**Physical Examination**

- Total obstruction - without any air movement, aphonic, no choking or coughing
- Stridor
  - Inspiratory - glottic or supraglottic
  - Expiratory - subglottic or intrathoracic
  - Biphasic - subglottic or tracheal; severe higher or lower obstruction may also be biaphasic
- Suprasternal or intercostal retractions
- Fatigue with decrease in stridor may herald impending decompensation
- Cyanosis
  - Mirror or fiberoptic exam of hypopharynx

**Ancillary Studies**

- Soft tissue lateral of neck
- Chest x-ray
- Tomograms, xeroradiograms
- CT scan

**Endoscopy**

- Direct laryngoscopy, rigid bronchoscopy and esophagoscopy
  - May simultaneously establish airway

**Etiology**

- Traumatic
  - Laryngeal or tracheal fracture
• Oropharyngeal laceration
• Edema from injury to head and neck
• Subglottic stenosis or granulation tissue secondary to intubation

• Infectious
  • Epiglottitis (more supraglottitis in adult)
  • Peritonsillar abscess
    - Signs & Symptoms: sore throat, fever, "hot potato" voice, drooling, bulging tonsil
    - Treatment: aspiration vs I&D vs tonsillectomy (noninvolved side tends to bleed more than usual)

• Deep neck abscess
• Parapharyngeal space
• Prevertebral space
• Submental space - Ludwig's angina

• Mechanical
  • Foreign body
  • Blood
  • Vomitus

• Neoplastic
  • Tumors occluding airway
  • Tumors eroding into major vessels with massive blood loss into airway

• Allergic

**Treatment**

• Oropharyngeal obstruction
  • Heimlich maneuver for total obstruction (aphonic, no choking or coughing)
  • Remove blood, vomitus, etc.
  • Extend head (if you are sure there is no cervical spine injury) and apply anterior traction to mandible, and/or tongue as needed
- Oro or nasopharyngeal airway
  - If unsuccessful, proceed to intubation or tracheotomy

- Laryngotracheal obstruction
  - Conservative: close observation, steroids, racemic epinephrine, oxygen, humidification
  - Intubation: Often difficult in severe airway or facial trauma due to distortion and bleeding. Contraindicated in laryngeal or tracheal fracture.
  - Standard tracheotomy - Indicated in any patient with upper airway obstruction who cannot be safely or successfully intubated.
    - Technique
      1. Horizontal skin incision
      2. Separate strap muscles in midline
      3. If necessary, mobilize or divide thyroid
      4. Visualize tracheal rings, **identify level**
      5. Incise trachea under direct visualization. Do not incise first tracheal or cricoid ring
      6. Create inferiorly based tracheal flap
      7. Put traction suture through tip of flap
      8. Insert tube under direct visualization
      9. Confirm proper placement of tube by inspection and auscultation
      10. Prevent early dislodgement because reinsertion even with traction suture can be difficult
      11. May change after 2 to 3 days when tract formed
Cricothyroidotomy - Indicated in emergency situation when standard tracheotomy not feasible or advisable

1. Incision through skin and cricothyroid membrane
2. Insert tube or stent incision open
3. Requires PRECISE surface identification of anatomy. If landmarks ambiguous, proceed with standard tracheotomy or needles.
4. Contraindicated in laryngeal or tracheal trauma or infection and in young children.
5. Conversion to standard tracheotomy if prolonged airway support is needed

Large bore needles inserted percutaneously into trachea. Not procedure of choice, but can be life saving as a temporizing measure.

B. Child with Airway Obstruction

History
- Stridor - inspiratory, expiratory, biaphasic
- Fever
- Difficulty swallowing
- Foreign body
- Trauma, including prior intubation

Physical Examination
- Supraclavicular/intercostal retractions, cyanosis
- Positional changes
Epiglottitis - breathing is better sitting up

Ancillary Studies

- Soft tissue lateral of neck
- Chest x-ray
- Airway management overrides importance of x-rays

Endoscopy

- Direct laryngoscopy, rigid bronchoscopy and esophagoscopy
  - Bronchoscope sizes: 6 months to 3 years - 4 mm; 3 to 12 years - 5 mm; over 12 years - 6 mm
- May be needed to establish airway

Etiology

- Congenital
  - May have both a congenital and an acquired problem
- Infectious
  - Epiglottitis
    - Febrile, toxic appearing child who prefers sitting up and cannot swallow his own saliva
    - Inspiratory stridor
    - Tonsils okay
    - Blood cultures - H. influenza
    - To OR to make diagnosis, intubate
  - Acute tonsillitis
    - R/O mono, possibility even in children
  - Peritonsillar abscess
    - May have to take child to OR to drain or perform tonsillectomy, but intubation can be treacherous so have a good anesthesiologist and a trach set available
  - Laryngotracheal bronchitis (croup)
    - Concentric narrowing of airway
- monitor closely; may need to intubate
  - Papillomata
    - More common in young children, but all ages affected
    - DNA virus - Human papilloma virus subtypes HPV 6 & 11
    - Palliation - CO2 laser
    - Many spontaneously regress, but in a small percentage of patients papillomas recur for many years
  - Viral Respiratory Infection
    - In a child with some airway obstruction, any additional airway compromise such as the edema resulting from a URI may lead to frank airway distress
  - Mechanical
    - Foreign body
      - ALWAYS SUSPECT IN CHILD WITH RAPID ONSET OF AIRWAY PROBLEMS
        - Do not turn child upside down
        - Rigid bronchoscopy with removal of foreign body is the treatment of choice
        - Rarely may need to perform tracheostomy or thoracotomy to remove
  - Traumatic
    - Prior intubation - subglottic stenosis
    - Laryngeal or tracheal fracture
  - Neoplastic
    - Submucosal mass effect
      - Rhabdomyosarcoma
        - Tonsillar masses
      - Neurofibroma
        - Macroglossia
        - Supraglottic mass
• **Allergic**

**Treatment**

• Conservative: close observation, steroids, racemic epinephrine, oxygen, humidification

• Intubation: tube about the size of the patient's little finger, prevent movement of the tube after intubation

• Tracheotomy: 1 to 1.5 years - size 1; 1.5 to 4 years - size 1 or 2; 4 to 7 years - size 2 or 3; 7 to 12 years - size 3 or 4; over 12 years - size 5 to 8

**C. Newborn with Airway Obstruction**

**History**

• **Stridor**
  
  o Inspiratory - glottic or supraglottic
  
  o Expiratory and biaphasic - subglottic

  o Present from birth - laryngomalacia, unilateral vocal cord paralysis, webs, cysts and vascular rings

  o Later - bilateral vocal cord paralysis and others

• **Atypical cry**

  o Muffled - supraglottic obstruction

  o High-pitched, weak - webs and vocal cord paralysis

  o Croupy - subglottic stenosis

• **Feeding difficulty**

  o Laryngotracehioesophageal clefts, neurogenic dysfunction and laryngeal webs

  o Can lead to aspiration induced pneumonia

  o Choanal atresia - infants are obligate nasal breathers

• **Failure to thrive**

**Physical Examination**

• Supraclavical/intercostal retractions, cyanosis

• Positional changes
• Laryngomalacia - worse with supine vs prone

Other anomalies - Assess for presence of:

• Cranial anomalies
• Pectus excavatum
• Cardiopulmonary anomalies
• Imperforate anus

Ancillary Studies

• Cervical X-rays - lateral and AP
• Barium swallow - cinefluoroscopic studies

Endoscopy

• Direct laryngoscopy, rigid bronchoscopy and esophagoscopy
• Bronchoscope sizes - less than 5 pounds - 3 mm; average newborn to 6 months - 3.5 mm

Congenital Etiologies

• Laryngomalacia
  
  • Most common
  
  • May be associated with pectus excavatum, retrognathia or subglottic stenosis
  
  • Inspiratory stridor, severe in supine position, usually present from birth
  
  • Endoscopy - flexible or rigid
    
    • Long narrow epiglottis with floppy aryepiglottic folds
    
    • Venturi effect - airway narrows from oropharynx to trachea, as airway becomes smaller air moves more rapidly creating negative pressure which causes loose aryepiglottic folds and arytenoids to collapse first which narrows airway more causing floppy epiglottis to fold blocking the airway
  
  • Treatment rarely required, outgrown in 18 months

• Vocal cord paralysis
  
  • Second most common
Unilateral more frequent than bilateral with unilateral left more common than right
  - Left associated with cardiovascular or pulmonary defect
  - Right usually solitary finding

Unilateral symptoms can be minimal

Bilateral abductor paralysis causes severe inspiratory and expiratory stridor

Endoscopy - flexible or rigid (place tip of laryngoscope in vallecula to avoid distortion of endolarynx)

Treatment unilaterally generally not required, movement may return within three to six months

Bilateral abductor paralysis requires a trach and in event of no return of function, additional surgery

- Congenital subglottic stenosis
  - Third most common
  - White male infants most commonly affected
  - Associated abnormalities include cleft palate, imperforate anus and tracheoesophageal fistula
  - Greatest obstruction usually 2 to 3 mm below vocal cords, involves either abnormally shaped or small cricoid cartilage or redundant submucosal fibrous tissue
  - Biaphasic stridor, cyanosis and barking cough suggest croup or laryngotracheal bronchitis, but subglottic stenosis follows a more protracted course
  - Treatment - gentle dilation, CO2 laser with or without stenting, for mild stenosis. Cricoid split and laryngotracheoplasty with costal cartilage or hyoid bone interposition may be required in more severe stenosis.

- Laryngeal webs and atresias
  - Incomplete epithelial breakdown during the 10th week of embryogenesis
  - Most common location between cords, but can be in supraglottic or subglottic spaces
  - Treatment - CO2 laser lysis, occasionally more extensive procedures required
Atresias - rare, trach at delivery is imperative

- Laryngotracheoesophageal clefts and fistulas
  - Tracheal atresia with TE fistula is not compatible with sustained life

- Laryngeal cysts (fluid) and laryngoceles (air)

- Tracheomalacia
  - Rare, usually associated with other anomalies like vascular rings
  - Wide, flat arch not as strong as more circular one

- Hemangioma
  - Worse when infant cries
  - Treatment - CO2

- Vascular rings

- Choanal atresia
  - A newborn is an obligate nasal breather capable of exchanging air through his nose while he feeds
  - Can be mimicked by mucosal swelling from viral respiratory infection or nasal decongestant drops

- Laryngeal cysts/neoplasms

- Macroglossia
  - Relative macroglossia because of underdevelopment of the mandible in patients with the Pierre Robin Syndrome

**Treatment**

- Varies with etiology - Intubation, rigid bronchoscopy or tracheotomy may be indicated depending on the nature of the problem

**II. Emergencies in Otolaryngology-Head and Neck Surgery: Inspired or Ingested Foreign Bodies**

Symptoms are related to the site of the foreign body and its composition.

**A. Laryngeal or Supraglottic Foreign Bodies**

Presentation - Sudden total or near total obstruction, usually during eating. Also known as "cafe coronary." Very common cause of death.
• Heimlich maneuver (sudden, vigorous abdominal compression) has been
  recommended to dislodge objects from the larynx; however, this technique may
  convert a partial airway obstruction to a total occlusion; therefore, use this ONLY
  in the setting of TOTAL OBSTRUCTION.

• Removal by direct laryngoscopy may be feasible in partial laryngeal obstruction,
  but only when equipment for emergency laryngoscopy or bronchoscopy are
  immediately at hand.

• Tracheotomy is the most reliable treatment. Cricothyroidotomy may be
  performed with any available sharp object.

B. Tracheal or Bronchial Foreign Bodies

Presentation - Choking episode, usually followed by asymptomatic interval. Late
  symptoms and signs are related to air trapping distal to object(s).

  • Unilateral expiratory wheeze
  • Recurrent infections in one lobe
  • Air trapping

Diagnosis - Characteristic history and physical is suggestive and requires
  bronchoscopic evaluation. X-ray may demonstrate air trapping, localized infection, or in
  chronic cases, bronchiectasis. Foreign body seen only if it is radiopaque

Treatment - Rigid bronchoscopy. Removal of tracheal or bronchial foreign body is an
  extremely hazardous procedure, particularly in children; therefore, an optimal situation
  is imperative in regard to anesthesia, equipment, nursing staff. The worst objects are
  ones like pinto beans that can swell or ones like nuts and crayons that can fragment
  into smaller pieces with attempts to remove them.

C. Pharyngeal Foreign Bodies

Presentation - Sensation of something "sticking" in throat, typically following fish meal.

Diagnosis - Must be differentiated from superficial mucosal abrasion, which presents
  identically.

  • Soft tissue lateral x-ray - rarely helpful.
  • Direct oral and mirror pharyngeal exam. Typical site of fish bone is in base of
    tongue or tonsil. Fish bone may be mistaken for a strand of saliva.

Treatment

  • Perform oral removal as out patient - if object visible and easily accessible.
  • Endoscopy - if object visible but not accessible or if no foreign body seen and
    symptoms persist beyond 4-5 days.
D. Esophageal Foreign Bodies

Presentation - Sensation of something "sticking" after swallowing. This may result in severe dysphagia with inability to swallow even saliva.

Diagnosis

- Mirror exam to rule out pharyngeal foreign body
- Plain films - for radio opaque foreign bodies, such as coins
- Barium swallow - Barium "burger", marshmallow, or barium soaked pledgets

Treatment

- For mild symptoms and nonhazardous objects, watchful waiting. Many foreign bodies pass spontaneously, and mild symptoms may be secondary to local trauma, rather than an actual foreign body. Those foreign bodies that fail to pass into the stomach are usually trapped in the cervical portion of the esophagus below the cricopharyngeus muscle. If the foreign body reaches the stomach, it will, in most cases, pass completely through the remainder of the gastrointestinal tract.
- For severe or persistent symptoms, or hazardous objects, rigid esophagoscopy. A meat bolus lodged in the esophagus can sometimes be pushed into the stomach or removed endoscopically, but do not use a meat tenderizer because it may injure the esophagus.
- Follow carefully for possible perforation and mediastinitis.
- After initial resolution, rule out underlying cause of impaction, such as stricture or tumor

III. Emergencies in Otolaryngology-Head and Neck Surgery: Sore Throat or Difficulty Swallowing

Many patients go to an emergency room complaining of a sore throat or difficulty swallowing and not all have major problems such as an obstructed airway or an inspired or ingested foreign body; however, each patient should be examined carefully.

History

Sore throat

- Duration
- Associated complaints
  - Fever
  - Neck nodes
o Oral lesions
o Hoarseness
- Systemic infection, immunodeficiency
- History of smoking or chewing tobacco

**Difficulty Swallowing** - above questions plus the following:
- Type
  o Large bolus to liquids - intrinsic or extrinsic obstruction
  o Liquids only - neurologic involvement
- Aspiration or nasal regurgitation
- Odynophagia
- Referred otalgia
- Vomiting
- History of foreign body or caustic ingestion
- Weight loss
- Reflux
- History of neck or chest surgery

**Physical examination**
A. Good light source important
B. Anesthetize palate, pharynx and base of tongue if necessary
C. Bimanual palpation of floor of mouth, base of tongue
D. Indirect mirror exam and/or flexible nasopharyngoscopy
E. Assess
  - Dental hygiene
  - Tongue mobility
  - Palatal competence
F. Look for
  - Drooling
  - Presence of lip or oral lesions
  - Pooling of secretions in pyriform sinuses
• Hidden neoplasms on palate, tonsillar fossa, base of tongue, epiglottis, pyriform sinus and postcricoid region

Ancillary Studies
A. Barium swallow with cine-esophagram
B. Chest x-ray
C. CT scan
D. Endoscopy and biopsy

Treatment
A. Correct dehydration, especially important in children
B. Caustic ingestion
   • Do not induce vomiting
   • Do not perform a gastric lavage
   • Do not order a barium swallow
   • Early, aggressive endoscopy and resection of nonviable tissue

IV. Emergencies in Otolaryngology-Head and Neck Surgery: Ear Complaints [see Chapter 7 – Common Diseases of the External and Middle Ear]

V. Emergencies in Otolaryngology-Head and Neck Surgery: Head and Neck Infections

Treat head and neck infections immediately and aggressively!

*Infection can spread to orbit, brain and mediastinum.*

• Extension to orbit from ethmoid sinuses can lead to blindness; time course especially rapid in children
• Ear and sinus infections can spread directly and indirectly to brain; in addition infections in central area of face can extend into cavernous sinus
• Extension in neck along fascial planes can result in mediastinitis; expansion can lead to airway compression
• Infection can spread rapidly due to delayed treatment, virulent pathogen or impaired immune competence or combination of above
  • With virulent pathogen like fungus in mucormycosis, blindness and death can occur
  • With strep and staph in necrotizing fasciitis extensive tissue necrosis probable

Treatment
• With neck abscesses, control airway before I&D
• I&D, remove necrotic tissue
• Culture - aerobic, anaerobic, AFB, fungal, special stains
• Use appropriate antibiotic or antifungal agents
• Control associated problems like diabetes mellitus.

VI. Emergencies in Otolaryngology-Head and Neck Surgery: Laryngeal and Tracheal Injuries

A. General considerations - The respiratory skeleton is suspended from the base of the skull and mandible by the pharynx and strap muscles. Because of its mobility, resilience and relatively shielded anatomy, it usually escapes serious injuries; however, direct anterior blows, strangulation, and penetrating missiles can cause significant damage. Early diagnosis is the key to successful management. Unfortunately, these injuries are often overlooked initially in the multiply injured patient. Prompt diagnosis requires a vigilant approach.

B. Types of injuries
• Laryngeal fracture
• Tracheal fracture
• Penetrating injuries
• Arytenoid dislocation
• Cricotracheal separation
• Recurrent laryngeal nerve paralysis

C. Diagnosis
• Symptoms
  o Pain
  o Hoarseness
  o Obstruction (can develop rapidly even if asymptomatic for several hours after the injury)
  o Hemoptysis
• Signs
  o Ecchymosis
  o Subcutaneous emphysema
Loss of surface landmarks
- Saliva or air exiting neck wound
- Crepitus of larynx or trachea
- Indirect laryngoscopy to search for lacerations and/or deformity
- X-rays
  - Neck (soft tissue)
  - Chest
  - CT scan

D. Treatment
- Maintain airway. Oral or nasal intubation is contraindicated. If intervention is required, proceed with tracheotomy. Try to avoid high tracheotomy in the presence of laryngeal injury.
- Endoscopy evaluation is safe only after tracheotomy. Look for possible associated injuries of the esophagus or bronchi.
- OPEN reduction of fractures and careful suturing of lacerations is imperative, as soon as possible after injury.

E. Late Complications: hoarseness, aspiration, and obstruction.

VII. Emergencies in Otolaryngology-Head and Neck Surgery: Facial Fractures

A. General Considerations
- Look for other fractures like skull and/or cervical spine fractures
- Test function of cranial nerves
- Indications for reduction
  - Functional impairment
  - Cosmetic deformity
- Timing - As soon as is practical, but in general, delay of one week is not harmful. Delay may be necessary due to:
  - Edema or ecchymosis, which obscures skeletal deformity
  - Instability of patient due to other injuries

B. Nose
• **Anatomy**
  - Skin very closely related to skeleton
  - Two-thirds cartilaginous, one-third bony
  - Shock absorbing structure
  - Bony bridge extremely strong

• **Types of Fracture**
  - Lateral - most common
  - Depressed - due to dorsal blow
  - Nasofrontal ethmoidal - unusual and severe, involving displacement of nasal and frontal bones into the ethmoid area

• **Diagnosis**
  - Primarily physical exam
    - Pain and tenderness
    - Epistaxis
    - Nasal obstruction
    - Ecchymosis
    - Deformity - may be difficult to assess secondary to swelling or bleeding
  - X-rays usually not helpful
  - Look for septal hematoma

• **Treatment**
  - Control bleeding and minimize swelling with ice and elevation
  - **DRAIN SEPTAL HEMATOMA IF PRESENT** - Failure to diagnose and treat can lead to severe deformity
  - Prophylactic antibiotics
  - Swelling usually prohibits early evaluation and reduction. Advise head elevation to facilitate resolution.
  - Reduce within 5-7 days by closed or open manipulation. Indications for reduction are functional (obstruction) and/or cosmetic.
o Simple fractures - splint one week
o Nasofrontal ethmoidal
  ▪ External fixation by lead plates or acrylic bar
  ▪ Internal fixation with rigid fixation plates
  ▪ May need to repair medial canthal ligament or lacrimal sac apparatus

C. Orbit

- Anatomy: The orbit is a bony pyramid with the optic foramen at its apex
  o Floor of orbit is the roof of maxillary sinus
  o Medial wall - Lamina papyracea of ethmoid bone
  o Lateral wall Zygoma and sphenoid bone (greater wing)
  o Superior wall - Frontal bone - floor of frontal sinus and anterior fossa
- Types of Fractures
  o Orbital floor blow-out fracture

Orbital Fracture

"Blow Out"

- Orbital rim
- Trimalar (tripod fracture, avulsion of lateral wall)

**Malar Fracture**

- Zygomatic arch

**Zygomatic Fracture**

- Diagnosis
  - Clinical
  - "Black eye" - periorbital ecchymosis and edema
  - Cheek depression - may be difficult to detect due to swelling, indicates involvement of zygoma
• Orbital rim step-off
• Infraorbital hypesthesia
• Diplopia or entrapment of inferior oblique muscle, due to defect in orbital floor
• Enophthalmos - orbital floor defect
• Trismus - zygomatic arch impinging on coronoid process of mandible

• X-rays
  • Water's view - orbital rim, maxillary sinus
  • Submental vertex to visualize zygomatic arch
  • Frontal (Caldwell) and lateral sometimes helpful
  • CT scan - coronal cuts helpful in identifying orbital floor fracture

• Treatment
  • Indications
    ▪ Functional deficit - trismus or ocular symptoms
    ▪ Cosmetic defect - wait for swelling to subside prior to reduction
  • Reduction - usually requires open exploration and manipulation
    ▪ Blow-out fracture - replace orbital contents and restore floor. May use permanent or absorbable alloplastic implant or autogenous bone graft
    ▪ Orbital rim - same, plus repair rim
    ▪ Trimalar - explore floor if indicated. Fixation by interosseous wiring, external pin, rigid fixation plate or sinus packing
    ▪ Isolated zygomatic arch fracture - Gilles or intraoral reduction.

D. Mandible

• Anatomy
  • Condyle - articulates with skull
  • Coronoid process - under zygomatic arch
  • Angle and ramus - protected by masseter
  • Body - tooth-bearing portion
Illustration demonstrating frequency of fractures by anatomical area:

- **Diagnosis**
  - Clinical
    - Swelling and tenderness
    - Trismus
    - Malocclusion
    - Palpable step-off
    - Intraoral lacerations
    - Mental nerve hypesthesia
  - X-rays

- **Treatment**
  - Goals of treatment
    - Restore occlusion
    - Avoid nonunion by immobilizing fracture(s) and preventing infection
  - Fixation
    - Interdental wiring
    - Interosseous wiring or plates
    - Intraoral splints
    - External Pins

- Important considerations
  - Condyle is the growth center for the mandible. Therefore, injury here in childhood can cause significant deformity.
  - Interdental wiring is potentially hazardous in the non-alert patient. Wire cutters should be kept at the bedside when the patient is recovering from anesthesia, and used to open jaws immediately in case of vomiting or airway problem. Never rely on nasotracheal intubation to reestablish an airway in the presence of intermaxillary fixation.

E. Le Fort Fractures (Mid Face Fractures) - Result from severe frontal blows. Frequently associated with intracranial damage, CSF leak.

- Types of fractures
  - Le Fort I - tooth bearing portion separated from upper maxilla
  - Le Fort II - fracture across orbital floor and nasal bridge (pyramidal fracture)
  - Le Fort III - fracture across frontozygomatic suture line, entire orbit and nasal bridge (craniofacial separation)

  - Combinations common

- Diagnosis
  - "Dishpan Face"
  - Mobile maxilla
• X-rays - CT scan most helpful axial and coronal cuts

Treatment
• Postpone until patient neurologically stable and swelling resolved, usually 7 to 10 days
• Rigid fixation plates or IMF and wire upper teeth to next higher stable point
• Splint for palate split

F. Frontal Sinus Fractures

Anatomy
• Anterior table - part of forehead and supraorbital rim
• Posterior table - anterior wall of anterior cranial fossa
• Inferiorly, the nasofrontal duct drains the sinus into the nose

Diagnosis
• Clinical
  ▪ Pain
  ▪ Swelling
  ▪ Ecchymosis
  ▪ Epistaxis or CSF rhinorrhea
  ▪ Associated nasal or skull fractures
• X-rays
  ▪ Caldwell and lateral skull views
  ▪ Tomograms, CT scan - essential for evaluation of nasofrontal ostia

Treatment
• Indications
  ▪ Posterior table fracture
  ▪ Nasofrontal ostia injury
  ▪ Cosmetic defect from displaced anterior table depression
Frontal sinus obliteration
- Exploration of frontal sinus via osteoplastic flap
- Examine and repair dura if necessary
- Remove all mucosa from the sinus
- Fill the sinus with fat to prevent communication with nose and reepithelialization

G. Basilar Skull Fractures
- Diagnosis
  - Conductive and/or sensorineural hearing loss
  - VII paresis or paralysis
  - Hemotympanum
  - CSF otorrhea
- Treatment
  - Observation in NICU
  - Emergency decompression of VII nerve if nerve was noted to be out immediately after injury
  - Reserve surgery for persistent CSF otorrhea; allow adequate time for CSF flow to stop on its own
  - Repair disrupted ossicular chain later

Facial Lacerations - General Considerations
- Find all lacerations including those "hiding" in scalp
- Test function of cranial nerves
- Note areas of hypesthesia or anesthesia before using local anesthetic
• Clean wounds thoroughly
• Do not discard any tissue initially
• Restore lips, lids and eyebrows precisely
• Stent injured lacrimal duct
• Repair lacerated nerves accurately in OR
• Establish hemostasis
• Minimize wound tension
• Provide for wound drainage
• Administer tetanus prophylaxis
Chapter 7 – Common Diseases of the External and Middle Ear

The External Ear

A. Infection

- **External Otitis ("Swimmer's Ear")**
  - Symptoms: pruritus, otalgia varying from sense of fullness to throbbing pain, hearing loss.
  - Signs: Edema and erythema of canal skin, tenderness of tragus, foul-smelling secretions, possible periauricular cellulitis.
  - Treatment: Clean EAC; Topical otic neosporin-polymyxin B (or colistin)-hydrocortisone for gram negative bacilli (most commonly *Pseudomonas aeruginosa*) for 10 days; impregnated wick for severe edema; adequate analgesic.
  - Preventive Measures for Recurrent Otitis Externa: Ethyl alcohol drops (70%) or acetic acid - nonaqueous solutions (2%) after swimming or bathing. Avoid self-instrumentation.

- **Necrotizing External Otitis (Malignant External Otitis)**
  - Symptoms & Signs: Progressive pain and drainage from the EAC. Granulation tissue often present. *Pseudomonas aeruginosa* invasion of soft tissue, cartilage and bone. Occasional facial nerve palsy.
  - Treatment: Radical surgical debridement with combination semi-synthetic penicillin and aminoglycoside for 4-6 weeks. Significant mortality in diabetics who acquire disease.

- **Perichondritis**
  - Symptoms: Pain and warmth of the pinna following trauma or infection.
  - Signs: Erythema, induration, and possible fluctuance of part or all of the auricle.
  - Treatment: Most common organism: *Pseudomonas aeruginosa*. Betadine or boric acid wet-to-dry dressings to open wound. If perichondritis progresses to chondritis with abscess, then incision, drainage, and debridement of non-viable cartilage is necessary.
  - Obtain cultures.

- **Otomycosis**
Symptoms: Itching or mild otalgia. Secondary bacterial infection may produce intense pain.

Signs: *Aspergilla nigrans* produces a grayish membrane with hyphae visible under microscope. Erythema of underlying epithelium.

Treatment: Clean EAC. Topical cresyl acetate or 1% gentian violet and/or boric or acetic acid and alcohol drops.

- **Bullous Myringitis**
  
  Symptom: otalgia.
  
  Signs: Hemorrhagic blebs on TM and adjacent canal.
  

- **Herpes Zoster Oticus (Ramsey Hunt Syndrome)**
  
  Symptoms: Otalgia, malaise, headache, possible dizziness.
  
  Signs: Vesicular eruption of distal canal and concha. Occasional 7th CN paralysis.
  
  Treatment: Analgesics. Middle cranial fossa decompression of facial nerve if progressive degeneration.

**B. Allergy**

- **Contact Dermatitis**
  
  Symptoms: Burning, itching, pain
  
  Signs: Variable. Range from erythema to hyperpigmentation of skin. Fissures with weeping.
  
  Agents incriminated: Shampoos, hair sprays, perfumes, ear plugs, and earrings. Most common: Nickel allergy to earrings.
  
  Treatment: Remove allergen. Topical corticosteroids.

- **Eczema**
  
  Symptoms and signs: Itching, scaling, and fissuring: More aggressive forms will present with weeping, crustig, and secondary bacterial infections.
  
  Predisposing factors: Seborrheic dermatitis, atopic dermatitis, psoriasis, and other skin conditions.
  
  Treatment: Topical steroid lotions and creams.
C. Trauma

- Hematoma of Auricle
  - Etiology: Blunt trauma results in accumulation of blood between perichondrium and cartilage.
  - Differential Diagnosis: Perichondritis, cellulitis, and relapsing polychondritis.
  - Treatment: Repeated aspiration under sterile conditions and mastoid pressure dressings.
  - Complication: Organization and calcification of clot with necrosis of underlying cartilage leads to “cauliflower ear”.

- Laceration of Auricle
  - Complicated: Same principles. Contaminated or extensive wounds may require staging with use of grafts or reconstructive flaps.
  - Avulsion, Treatment: Amputated parts should be cleaned and placed in iced physiologic saline until reconstruction. Anticoagulants and prophylactic antibiotics may improve success.

- Burns
  - Treatment similar to general burn management except:
    - Prophylactic antibiotics are indicated to prevent suppurative perichondritis; and,
    - Stenting of a burned meatus necessary to prevent stenosis.

- Lacerations of External Canal
  - Injury predisposed to stenosis. Canal should be carefully examined, cleaned, and debrided under microscope. Skin of meatus should be reapproximated and denuded areas covered with split thickness skin graft supported in place with rosette of antibiotic impregnated gauze and packing.

- Foreign Bodies of EAC
  - Insects. Immobilize with topical 2% lidocaine or ether and remove with gentle irrigation or alligator forceps under direct vision.
  - Materials: All shapes and sizes in all age groups! Key to successful removal is use of proper instruments: microscope, alligator forceps, right-
angle hook, suction, and local anesthesia. Young children often require
general anesthesia to remove impacted objects without further injury.
Topical otic antibiotics if localized reaction to foreign body.

D. Cysts and Tumors

• Cysts
  o Pilar (Sebaceous) cysts arise in hair follicles. Present as discrete, mobile
    masses frequently with overlying orifice. May become secondarily
    infected. Treatment is complete excision.
  o Epidermal cysts derived from layer of epithelium. Filled with keratin
    debris. Treatment consists of complete excisional biopsy.
  o Preauricular cyst and fistula
    ▪ Results from faulty fusion of mesodermal hillocks that form the
      auricle. Fistula opening located in front of the incisura. Recurrent
      infection can be troublesome. After injection of methylene blue into
      the fistulous tract, the tract and cyst are excised.

• Benign Lesions
  o Keloids
    ▪ Predisposition among Blacks. Hypertrophy of connective tissue in
      traumatized areas. Most common area: ear lobe secondary to ear
      piercing. Treatment is complete excision followed with injections of
      cortisone.
  o Exostosis
    ▪ Periosteal outgrowths in the osseous canal of cold-water
      swimmers. On rare occasion will cause a conductive hearing loss
      or impact cerumen. In those cases, surgical removal is indicated.

• Malignant Lesions
  o Precancerous: Actinic Keratosis
    ▪ Flat, scaling lesions on the sun-exposed regions of face, neck, and
      hands. Tend to occur in those with fair complexion. May give rise
      to squamous cell carcinoma. Treatment with topical 5-fluorouracil
      or liquid nitrogen is very effective.
  o Basal Cell Epithelioma
    ▪ Classically presents as discrete nodule with smooth, raised edges
      and central crater. Superficial telangiectasias occur on edges.
      Locally invasive. Poor control may result in invasion of EAC,
middle ear, TMJ, or parotid. Treatment of choice is wide surgical excision or Mohs chemosurgery. Invasion of EAC requires en bloc resection of the canal.

- Squamous Cell Carcinoma
  - Most commonly presented as raised, ulcerated lesions on helix. Preferred treatment is wide surgical excision or Mohs chemosurgery. Pre- or postoperative radiation therapy is reserved for advanced lesions. Invasion of EAC or temporal bone requires temporal bone resection. Nodal metastasis occurs in extensive lesions. Parotidectomy and radical neck dissection performed to control clinically evident metastasis.

The Middle Ear

The symptoms of middle ear pathology are limited to otalgia, tinnitus, and hearing loss. When proper otologic examination fails to reveal the etiology of otalgia, one should think of referred pain. Sensation to the ear is provided by cranial nerves V, VII, IX, X, and the C1-2 plexus; hence, diseases elsewhere in the head and neck may refer pain to the ear. A useful mnemonic is the "10 T's of otalgia":

1. TMJ
2. Tonsils
3. Throat
4. Tube (Eustachian)
5. Teeth
6. Tongue
7. Tics (Glossopharyngeal)
8. Trachea
9. Thyroid
10. Tendons

A. Inflammation and Infection

- Serous otitis media (otitis media with effusion) refers to the accumulation of non-purulent middle ear fluid due primarily to eustachian tube dysfunction and secondarily to metaplasia of mucosa.
  - Etiologies
• Nasopharyngeal obstruction: adenoid hypertrophy, neoplasia, iatrogenic.

• Intratubal obstruction: URI, allergy, sinusitis.

• Middle ear obstruction: chronic otitis media, cholesteatoma, tumor.

• Failure of physiological opening: cleft palate, submucous cleft, some neurological disorders.

• Other Contributing Factors: Metaplasia due to recurrent or chronic infection, hypothyroidism, diabetes mellitus, immune deficiency syndromes, connective tissue disorders.

  o Symptoms: Mild otalgia, stuffiness, autophony, hearing loss.

  o Signs: Retracted, discolored TM. Diminished TM mobility.

  o Medical Treatment:
    • Treat nasal congestion or drainage.
    • Treat concurrent infections - adenoids, middle ear, sinuses, pharynx.
    • Antibiotics for OME.
    • Control allergies.
    • Valsalva maneuvers for insufflation.
    • Politzerization.

  o Sequelae of Persistent SOM:
    • Conductive hearing loss (10-30 dB).
    • Recurrent suppurative otitis media.
    • Impaired auditory processing with impaired socialization and delayed speech and language development in young children.
    • Ossicular erosion, tympanosclerosis, cholesteatoma formation.

  o Surgical Treatment of SOM:
    • Pressure equalization tubes. Recent studies have demonstrated that adenopectomy may provide additional benefit but there is still some controversy regarding this

  o When to Recommend Tubes:
    • SOM for more than 3 months.
• Three-four episodes OM/year in an ear with chronic or recurrent SOM.
• Hearing handicap.

• Acute Suppurative Otitis Media
  Refers to an acute exudative middle ear disease secondary to bacteria.
  o Clinical Stages of Acute Suppurative Otitis Media
    • Hyperemia
    • Exudation
    • Suppuration
    • Resolution
    • Coalescence
  o Complications:
    • Acute surgical mastoiditis
    • Facial nerve paralysis
    • Acute labyrinthitis
    • Sigmoid sinus thrombophlebitis
    • CNS infection
  o Pathogens:
    • Infants: gram negative enteric bacilli
    • Under age 5: pneumococcus, H. influenza, streptococci
    • Over age 5: pneumococcus, H. influenza (less prevalent), streptococci
  o Drugs of Choice
    • According to appropriate cultures
    • Amoxicillin (30-40 mg/kg/d) in 3 doses-every 8 hours
    • Cefaclor (20-40 mg/kg/d) in 3 doses-every 8 hours
    • Trimethoprim (6-12 mg/kg/d) and Sulfamethoxazole (30-60 mg/kg/d) in 2 doses q 12 hrs
- Erythromycin (50 mg/kg/d) and Sulfisoxazole (150 mg/kg/d) in 4 doses-q 6 hrs

- Chronic Suppurative Otitis Media
  COM refers to a permanent tympanic membrane perforation with associated middle ear and mastoid disease. Intermittent or continuous otorrhea usually exists.
  - Types of Perforations:
    - Central
    - Marginal
    - Attic - usually association with cholesteatoma
    - Perforations are often accompanied by purulent drainage and otic polyps
  - Evaluation:
    - Pure tone and speech audiology
    - Mastoid films
  - Treatment:
    - Clean under microscope
    - Topical otic antibiotics
    - Treatment of predisposing conditions: smoking, allergy, chronic sinusitis, chronic tonsillitis, uncontrolled diabetes mellitus, etc.
    - Surgery
  - Goals of Surgery (Tympanomastoidectomy)
    - Eradicate infection
    - Restore hearing
    - Close middle ear cleft

- Tympanosclerosis
  Submucosal hyaline degeneration in the tympanic membrane and middle ear mucosa. Extensive involvement of the TM and ossicles may result in conductive hearing loss. On rare occasion middle ear surgery is advised to restore hearing. Medical therapy and PE tubes do not prevent progression of disease.

B. Cholesteatoma
• Definition: A confined epithelial sac which expands by collection of desquamated cells and debris

• Classifications:
  o **Congenital**: Very rare. Cholesteatoma results from entrapment of an epithelial cell rest within the temporal bone during embryological differentiation of the temporal bone. No TM perforation. Usually presents as pearly white mass behind intact TM or as facial weakness.
  o **Primary acquired**: Perforation or retraction pocket in the pars flaccida. Different theories of pathogenesis
  o **Secondary acquired**: Marginal pars tensa perforation allows squamous epithelium to migrate inward

• Complications: Erosion of ossicles, sensorineural hearing loss, labyrinthitis, facial nerve paralysis, meningitis, brain abscess, sigmoid sinus thrombophlebitis, petrous apicitis, neck abscess (Bezold's)

C. Trauma

• Tympanic Membrane Perforations
  o **Etiology**
    Sudden alteration of air pressure in the EAC: Compression (slap, hit, skiing), blast, instrumentation (Q-tip), burn, skull fracture, or lightning
  o **Danger signs**:
    CSF otorrhea implies basilar skull fracture. Vertigo, nausea and vomiting, nystagmus, may be due to oval or round window fistula, labyrinthine or brain concussion.
  o **Management**:
    - Baseline audiograms
    - Keep ear dry
    - Antibiotics if infection develops. Labyrinthine fistulae may require exploration and repair to preserve hearing
  o **Prognosis**:
    - 90% heal spontaneously, and
    - 10% require tympanoplasty

• Temporal Bone Fractures (see section on Paralysis of the Facial Nerve)

• Barotrauma
Definition: Refers to injury to the ear following a pressure change in the middle ear compartment. Failure of middle ear ventilation leads to negative pressure relative to the outside environment.

Pathogenesis: TM and mucosa retract toward middle ear space and cause pain. Vacuum results in a change in capillary permeability with transudate and possibly bleeding. Eustachian tube "lock" occurs during airplane or diving descent.

Treatment: Decongestant/antihistamines, Valsalva and insufflation, chew gum and swallow frequently. If no response, myringotomy. Should take prophylactic measures when flying or diving.

• Perilymph Fistula

Vigorous coughing or straining, sneezing, or nose blowing can result in rupture of the round window or subluxation of the footplate. Leakage of perilymph causes dizziness and hearing loss. Initial management is bed rest. If no improvement or if deterioration, surgical exploration is indicated.

D. Tumors

• Glomus Tumors
  Glomus tumors (nonchromaffin paragangliomas) are the most common "benign" neoplasms of the ear. Are malignant by location, as continued slow growth results in erosion and involvement of surrounding structures

  Symptoms and signs: Hallmark is unilateral pulsatile tinnitus synchronous with pulse rate. Progressive hearing loss and otalgia. Cranial nerve involvement VII - XII.

  Physical exam reveals a bluish mass behind the tympanic membrane. Brown's sign: Increased EAC pressure with a pneumatic otoscope leads to blanching of mass

  Diagnosis confirmed with arteriography or jugular venogram. Extent of disease evaluated with polytomography and high-resolution CT scanning

  Differential diagnosis: Venous hum, high jugular bulb, carotid aneurysm, A-V malformation, and idiopathic hemotympanum

  Treatment: Surgical removal ranges from transcanal tympanotomy to base of skull resection. Radiotherapy is recommended for tumors extending beyond the boundaries manageable by surgery, for post-operative recurrences, and for non-surgical patients

• Malignant Neoplasia
Squamous cell carcinoma is the most common middle ear malignancy. Symptoms include aural discharge, bleeding, pain, decreased hearing, and otic polyps. Can resemble COM! Treatment is temporal bone resection vs palliative radiation depending on extent of disease.

E. Congenital Disorders

- Otospongiosis (Otosclerosis)
  - Definition: A primary bone dyscrasia affecting 4-8% of Caucasian and 1% of Black temporal bones. Involvement of oval window results in footplate fixation and persistent conductive hearing loss (1% Caucasians). Involvement of cochlear endosteum can produce sensorineural hearing loss through release of "toxins" during bone metabolism.
  - Pathogenesis: Autosomal dominant gene with variable penetrance. Role of sodium fluoride in preventing expression of dyscrasia under investigation.
  - Symptoms: Hearing loss, tinnitus, dizziness.
  - Signs: Usually normal examination. Schwartze's sign: red discoloration under drum due to active focus on promontory. Weber lateralizes to involved ear.
  - Treatment:
    - Medical: Hearing aid. Sodium fluoride 20-30 mg/d with calcium and vitamin D supplementation for sensorineural component.
    - Surgical: Stapedectomy successful in more than 90% of cases.

- Lop Ears
  - Increased angulation of auricle due to a poorly developed antihelix or large concha.
  - Dominant inheritance with variable penetrance.
  - Amenable to surgical correction, preferably before child enters school.

- Microtia
  - Atresia of auricle and/or external canal. Variable in degree.
  - Associated anomalies: preauricular appendages, facial nerve anomalies, hypoplasia of mandible or maxilla.
  - Signs: Absence of meatus or external canal ends in blind sac. Conductive hearing loss.
- Treatment: Cosmetic reconstruction of auricle at 4-6 years of age. Preferential seating in classroom for unilateral involvement. Hearing aids for bilateral involvement as soon as possible. Surgical reconstruction of external canal, tympanic membrane, ossicular chain often deferred until patient can give own consent--earlier in selected cases.
Chapter 8 – Inner Ear Disease: Hearing Loss

Hearing Loss

Hearing is the transduction of sound (mechanical energy) into neural impulses and the interpretation of those impulses by the central nervous system. Hearing loss can result from a defect at any level in this system. The proper management of patients with hearing loss requires an understanding of the normal mechanisms.

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I. Nature of Sound: Vibration of Air

- **Loudness** is determined by the **amplitude** of pressure changes in the alternating compression and rarefaction of air, and expressed in units called decibels (dB).

- **Pitch** is determined by the **frequency** of cycles of vibration and is expressed in cycles per second or Hertz (Hz).

II. Conversion of Sound into Neural Energy

- The external ear shelters the eardrum and plays a role in localization of sound.

- The middle ear transmits the vibration of air into vibrations of the fluid in the inner ear. The difference in **impedance** (resistance to vibration) of air and water causes much sound energy to be reflected from an air-fluid interface. The middle ear compensates for this impedance mismatch.
  - Transmission of sound
    - Eardrum (tympanic membrane, or TM) vibrates in response to
sound

- Malleus, embedded in the TM, transmits vibrations to incus and stapes.
- Stapes, in the oval window, transmits vibrations to fluid investibula.

- Impedance mismatch compensation
  - Area of eardrum is 10 times that of oval window
  - Mechanical advantage of 2 to 1 due to leverage of ossicles.

Middle ear transformer system. Note in the diagram above that the handle of the malleus (1) compared to the long process of the incus (2) adds an advantage of 3-to-1, allowing a gain in sound energy of only 2.5 decibels. However, the area ratio of the tympanic membrane footplate is much greater. The effective ratio is 14:1 and corresponds to a 23-decibel gain.

- The inner ear transduces sound waves of inner ear fluid into afferent impulses in the auditory nerve by stimulation of the hair cells in the cochlea.

Anatomy of cochlea:

Physiology:
• Motion of stapes sets perilymphatic fluid in vestibule into motion.
• Vibrations travel through Reissner's membrane to endolymphatic fluid, and produce a traveling wave in the basilar membrane.
• As fluid is non-compressible, there must be another mobile wall to permit vibration. Round window serves this function.

Hair cells transform mechanical energy to electrical energy.
• Intensity coding: Perceived "loudness" is a function of the number of auditory nerve fibers firing and their discharge rate
• Frequency coding:
• Place coding - hair cells at maximal displacement of basilar membrane are maximally stimulated.
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Volley coding - hair cells fire at same frequency as sound

Telephone place coding - currently most popular theory: Low-frequency sounds are volley coded; high-frequency, place coded; and at mid-frequency, both mechanisms are operative.

Impulses transmitted to brain via acoustic nerve with projections to both sides

Central perception and interpretation.

III. Evaluation of Hearing Loss

- History

  - Age of patient
  - Severity of loss
  - Duration
  - Onset - rapid vs. gradual (sudden hearing loss is an emergency), constant vs. fluctuating.
  - Precipitating or exacerbating factors: trauma, noise, drugs, prenatal infection, etc.
o Associated symptoms: Vertigo, tinnitus, pain or fullness in the ear, headache

o Family history

- Physical - emphasize the following:
  - Otologic exam
    - Systematic otoscopy
    - Tuning forks to grossly assess hearing and to differentiate conductive vs. sensorineural
  - Exam of nasopharynx
  - Neurologic exam
  - Inspection, palpation, and auscultation of neck
  - Look for associated anomalies

- Tests
  - Basic audiogram - all patients
  - Diagnostic audio, ENG, internal auditory canal, x-rays, and/or CT scan if vertigo present or neural lesion suspected
  - Electrocochleography if Meniere's suspected
  - Appropriate blood tests. All patients with sensorineural hearing loss should have VDRL and FTA-ABS.

IV. Differential Diagnosis

- External ear:
  - Cerumen impaction
    - One of commonest causes of sudden hearing loss
    - Treat by removing wax
  - External otitis - inflammation and swelling of canal skin
  - Tumors of external canal
  - Congenital aural atresia

- Middle ear - some further discussion in chapter on external and middle ear
disorders
  o Otitis media
    ▪ Acute - infectious or serous
    ▪ Chronic - serous
    ▪ Must always rule out possibility of nasopharyngeal carcinoma
  o Tympanic membrane perforation or cholesteatoma
  o Normal tympanic membrane with conductive hearing loss - suspect ossicular abnormality: otosclerosis, ossicular dislocation, etc.
  • Sensorineural hearing loss - often associated with poor discrimination out of proportion to degree of pure tone sensitivity loss - this is due to distortion of sound by cochlea or nerve
    o Congenital
      ▪ Hereditary
        ▪ Isolated sensorineural hearing loss
          ▪ Normal inner ear
          ▪ Abnormal inner ear (Scheibe, Mondini-Michelle, etc.)
        ▪ Hearing loss with associated anomalies
      ▪ Acquired
        ▪ Prenatal infection, especially syphilis, rubella, CMV
        ▪ Prenatal drugs
        ▪ Birth trauma
        ▪ Developmental anomaly
      ▪ Hereditary but delayed onset
        ▪ Dominant or recessive
        ▪ Numerous syndromes, some with associated anomalies (example: Waardenburg's syndrome with white forelock, hypertelorism, etc.)
    o Acquired
- Noise induced - very common
  - Due to single blast or repeated or prolonged exposure to loud noise (hunting, rock music)
  - Affects high frequencies first (4 kHz); often progressive
  - Frequently associated with tinnitus
  - No known treatment. Counsel patient to avoid noise in future
  - PREVENTION is key to reducing incidence
- Presbycusis - hearing loss of old age
  - Not universal, etiology not known
  - Central interpretation deficit complicates peripheral sensitivity loss
  - No known cure
  - Amplification can help, but hearing aids must be carefully fitted; Cochlear distortion and central processing may preclude us
- Head trauma - temporal bone fracture, labyrinthine concussion, central damage
- Meniere's disease or syndrome
  - Fluctuating hearing loss
  - Characteristically associated with bouts of vertigo
  - Anatomically correlated with endolymphatic hydrops
  - Electrocochleograph (ECOG) frequently shows elevated summating potential
  - In active phase, glycerol may improve hearing
- Treatment
  - Medical: low-salt diet, diuretics, avoidance of caffeine, anti-vertigo medication, psychological support
  - Surgical: for selected patients with progressive disease
• Luetic hearing loss (syphilis)
  • Usually a fluctuating hearing loss - may mimic Meniere's
  • Treponemas may remain in endolymph after eradicated from other sites in the body.
  • Treatment - steroids and antibiotics (penicillin)

• Ototoxic drugs
  • Reversible: aspirin - associated with tinnitus
  • Permanent: aminoglycosides, anti-neoplastic drugs, etc.
  • Treat by prevention:
    • Careful monitoring of blood levels of toxic drugs
    • Monitor hearing and vestibular function

• Oval or round window rupture
  • Sudden onset of hearing loss, usually fluctuating, often accompanied by vertigo. Definitive diagnosis can only be made by surgical exploration.
  • Usually associated with sudden pressure change: flying, Valsalva, scuba diving, sneeze, etc.; but may be idiopathic
  • Treatment - initially, bed rest for suspected patients. If no recovery, explore and repair leak if found

• Idiopathic sudden sensorineural hearing loss
  • Sudden hearing loss with no apparent cause
  • Etiology obscure, could be viral, autoimmune, vascular, or allergic, to name a few suspected causes
  • Diagnostic evaluation - should be extensive to rule out other causes
  • Treatment - many therapies suggested - few are statistically proven except for bed rest and possibly 95% O2:5% CO2 inhalation and steroid therapies. Patient is usually admitted to the hospital for treatment.

• Acoustic nerve tumor
Uncommon tumor. Usually arises in vestibular nerve and is schwannoma, or less often, neurilemmoma

Usually present with hearing loss. Progression of vestibular nerve involvement is so slow that it is not noticed by patient.

Characteristic audiometric results with abnormal acoustic reflex, poor discrimination, and/or abnormal ABR.

X-rays or CT show flaring of IAC in large tumors. Small tumors are seen with air contrast CT

Treatment - surgical excision

Infections
  - Viral infection
  - Bacterial infection - labyrinthitis, meningitis, etc.

Otosclerosis
  - Sensorineural hearing loss often seen in association with otosclerosis of foot plate, but occurrence of pure sensorineural hearing loss is controversial
  - Treatment with fluoride may be helpful

Surgical trauma
  - Central hearing loss - normal basic tone audiogram and impedance, impaired understanding and processing

V. Significance of Hearing Loss

- Acquired in adulthood
  - Social and occupational handicap
  - Loss of monitoring of environmental warning sounds
  - Loss of pleasure of music, etc.

- Congenital
  - Severe language development handicap
  - Early recognition, prompt amplification, and/or special early management vital for normal development. Therefore, high risk infants should be screened.
• Acquired in childhood
  o Can cause language delay or learning problems
  o Audiometric evaluation is mandatory in all children with speech delay and/or learning problems
  o Frequent screening of school children is advised.
Dizziness is a common complaint and too often the symptom is attributed to an "inner ear problem." Numerous cochleovestibular, neurologic, cardiovascular, metabolic, ocular, and systemic diseases are capable of eliciting the sensation of dizziness; the ear, however, is responsible for only 50-60 percent of the known causes of dizziness.

I. ANATOMY AND PHYSIOLOGY OF THE LABYRINTH

- The semicircular canals
  - Anatomy: the semicircular canals (lateral, posterior, and superior) lie at right angles to one another and are encased within the otic capsule of the temporal bone.

Each canal contains perilymph which bathes the membranous ducts within the canal. Each canal has an ampulla or a widening of the canal at the point it communicates with the vestibula. The crista ampullaris is located in each respective ampulla. The crista contains specialized neuroepithelium with hair cells imbedded in a gelatinous material to form the cupula.
Physiology: the cupula extends into the ampulla to detect rotational movement of the endolymph.
The maculae of the utricle and saccule

- Anatomy: the utricle and saccule are located in the bony vestibula. The endolymph contained within the utricle and saccule is continuous with the cochlear duct and the membranous duct of the semicircular canals. Both the saccule and utricle have maculae which contain hair cells embedded in a gelatinous material covered with calcium carbonate crystals (otoconia).

- Physiology: the maculae are responsive to the effect of gravity and linear movement.
• Posture and movement
  o The labyrinth acts as a bilateral frequency modulator. Acceleration, deceleration, or rotational movement of the head leads to excitation of one system and inhibition of the opposite. Sensory output is relayed to the vestibular nuclei and pathways for central interpretation.
  o The manifestation of disease: in order to maintain posture and move through the environment in an orderly and safe fashion, appropriate information from three sensory modalities is important: the visual axis, proprioception in the joints and muscles, and the labyrinths. This input is integrated in the brain stem and cerebellum to adjust posture and motor activity and to maintain orientation. A failure in sensory input, poor integration in the central nervous system, or diseased support systems (cardiovascular and metabolic), can provoke the feeling of disorientation or dizziness. The interdependence of so many organ systems accounts for the large differential diagnosis of dizziness.

II. DIFFERENTIAL DIAGNOSIS OF DIZZINESS:
The cochleovestibular system
• Infection
  o Acute otitis media
  o Chronic otitis media
  o Serous otitis media
  o Bacterial labyrinthitis
  o Viral labyrinthitis
  o Vestibular neuronitis
  o Syphilis
  o Herpes zoster oticus
• Trauma
  o Perilymph fistula
  o Temporal bone fracture
  o Labyrinthine concussion
  o Iatrogenic injury
  o Barotrauma
• Cervical vertigo

• Tumor
  o Cholesteatoma
  o Acoustic neurinoma
  o Glomus tumors
  o Primary or metastatic carcinoma

• Vascular
  o Infarction of labyrinthine artery
  o Intralabyrinthine hemorrhage

• Degenerative
  o Benign positional vertigo (cupulolithiasis)
  o Aging

• Developmental
  o Congenital anomalies of the inner ear

• Idiopathic
  o Meniere’s disease (Endolymphatic hydrops)
  o Bell’s palsy

• Disorders of bone metabolism
  o Otospongiosis
  o Osteopetrosis

• Ototoxins
  o Aminoglycosides
  o Salicylates
  o Alcohol
  o Loop diuretics: ethacrynic acid and furosemide
  o Heavy metals: mercury, gold, lead, arsenic drugs
  o Antineoplastics: nitrogen mustard, bleomycin, cis-platinum
Nervous system

- Infection
  - Meningitis
  - Encephalitis
  - Brain abscess
- Demyelinating disorders
  - Multiple sclerosis
  - Other demyelinating processes
- Tumor
  - Cerebellopontine angle tumors
  - Benign and malignant neoplasia
  - Metastatic carcinoma
- Developmental
  - Malformations of the base of skull
- Peripheral neuropathy
  - Diabetes mellitus
  - Ethanol
  - Pellagra
  - Tabes dorsalis
- Vascular
  - Hyperventilation
  - Vertebrobasilar insufficiency
  - Migraine variants
  - Brain stem infarction or hemorrhage
  - Cerebellar infarction or hemorrhage
  - Vascular loop syndrome
- Seizure disorders
Temporal lobe
  - Petit mal
Cardiovascular system
  - Circulatory
    - Hypovolemia
    - Anemia
    - Polycythemia
    - Orthostatic hypotension
    - Hypotension
  - Cardiac
    - Arrhythmias
    - Valvular disease: AS/AI
    - Stokes-Adams attacks
  - Great vessels
    - Subclavian steal
    - Hypersensitive carotid sinus reflex

Other Systems
  - Ocular/Oculomotor
    - Changes in refraction
    - Cataracts
    - Glaucoma
    - EOM neuropathy
    - Muscle imbalance
  - Endocrine or metabolic
    - Diabetes mellitus
    - Hyperlipidemia
    - Hyperthyroidism
III. THE EVALUATION OF DIZZINESS

• History

o Characterizing exactly what the patient means by "dizzy" is the most important step in the evaluation.

o Vertigo is an illusion of movement and is specific for a lesion in the inner ear, vestibular nuclei, or vestibular pathways. Momentary vertigo associated with rapid head movements typifies benign paroxysmal positional vertigo. Vertigo lasting for several hours tends to occur with inner ear disorders. Persistent vertigo of greater than three weeks' duration is due to a problem within the central nervous system!

o Imbalance or incoordination connotes disease in the cerebellum, brain stem, or vestibulospinal tracts.

o Light-headedness or the feeling of faintness, although often benign, can implicate a problem in any of the systems listed in the differential diagnosis.

o Peripheral vestibular disorders do not produce a loss of consciousness! Loss of consciousness associated with dizziness is most frequently due to vertebrobasilar insufficiency, cardiac arrhythmias, or seizures.

• Examination
o Resting pulse and blood pressure should be measured in the supine and standing positions to document presence or absence of orthostatic hypotension.

o Complete head and neck exam
  - **Otologic inspection** is necessary to rule out disease of the external and middle ear.
  - The Weber and Rinne test are used to document sensorineural or conductive hearing losses.
  - A fistula test is performed with a pneumatic otoscope in order to ascertain the presence or absence of a perilymph fistula.
  - The patient is examined for the presence of spontaneous gaze and positional nystagmus.
  - Nasopharyngoscopy and indirect laryngoscopy are considered a part of the neurotologic examination.
  - Cranial nerve assessment is essential.
  - Vestibular and cerebellar assessment is made through rapid repetitive motion, past pointing, Romberg, tandem walk, and cold water caloric testing.

o Auscultation of the precordium and the neck is necessary to detect carotid bruits, AV malformations, and valvular heart disease.

**IV. LABORATORY STUDIES**

- Cochleovestibular
  - Standard audiometry
    - Pure tone studies
    - Speech studies
    - Recruitment
    - Tone decay
  - Impedance audiometry
    - Tympanometry
    - Acoustic reflex
  - Auditory brainstem evoked response
- Electronystagmography
  - Oculomotor testing
  - Bithermal calorics

- Positional tests
- Rotary testing
Generation of the vestibular (slow) phase of different kinds of nystagmus. The thickness of the lines connecting the semicircular canal to the eye muscles is proportional to the intensity of nervous discharge along the nerve pathways.

- Roentgenographic views of the internal auditory canal: plain or polytomography
- CT scanning
  - Contrast
  - High resolution
  - Air-contrast
- Arteriography
- Nervous system
  - Lumbar puncture/CSF studies
  - EEG
  - CT scanning with contrast
  - NMR scanning
  - Arteriography
- Cardiovascular system
  - CXR
  - EKG
  - Holter monitor
o Stress testing
o Carotid doppler
o Echocardiogram
o Arteriography

• Other systems
  o CBC with differential
  o Fasting blood glucose
  o Five-hour glucose tolerance test
  o Lipid profile
  o Thyroid function studies
  o Rheumatoid factor and antinuclear antibody
  o RPR, VDRL, or FTA-ABS
  o Psychiatric testing

V. COMMON CAUSES OF DIZZINESS

• Cochleovestibular system
  o Benign paroxysmal positional vertigo.
    ▪ Symptoms: a 15-30 second episode of vertigo induced by position change
    ▪ Signs: the positional nystagmus may be observed by purposefully inducing the position change and observing the eyes. Nystagmus tends to be toward the involved ear and exhibits latency and fatiguability.
    ▪ Laboratory: ENG documents the presence of positional nystagmus.
    ▪ Treatment: reassurance and vestibular exercises. Singular nerve section for the recalcitrant and disabled patient.
  o Meniere's disease (See previous section on Hearing Loss).
  o Viral labyrinthitis
    ▪ Symptoms: acute onset of vertigo usually associated with nausea and vomiting
Hearing loss may or may not be present.

Signs: unilateral hearing loss, spontaneous nystagmus with the slow component toward the involved ear. Pass pointing and falling to the side of the lesion in the acute stages.

Laboratory: audiograms may show sensorineural hearing loss. ENG reveals nystagmus and often a caloric weakness.

Treatment: the condition is self-limited and the most effective therapy includes rest and sedation. Meclizine or diazepam often beneficial.

Vestibular neuritis

Symptoms and signs: presentation and physical findings can be identical to those of viral labyrinthitis except that hearing loss is not present.

Laboratory: ENG will show a unilateral weakness in the involved ear.

Treatment: same as for viral labyrinthitis. Vestibular neuronitis can be recurrent. A vestibular nerve section will cure the vertigo and preserve hearing.

Acoustic neurinoma. Patients rarely present with true vertigo secondary to acoustic neurinoma but more frequently complain of unsteadiness, tinnitus, or hearing loss. See previous section on Hearing Loss.

Labyrinthine concussion

Symptoms: vertigo or dizziness with or without hearing loss following severe head injury.

Signs: spontaneous nystagmus with the slow component toward the involved ear may be present along with a sensorineural hearing loss.

Laboratory: a basic audiogram will document the presence of sensorineural hearing loss. The ENG may document the presence of a caloric weakness or a positional nystagmus. Polytomography of the skull base or CT scanning is indicated when skull fractures are suspected.

Treatment includes the use of antivertiginous medications in the initial stages. Labyrinthectomy or vestibular nerve section are indicated for a patient with symptoms persistent beyond six months.
• Otosyphilis. See section on Hearing Loss.

• Cardiovascular
  o Orthostatic hypotension.
    ▪ Symptoms: the patient complains of light-headedness or the sensation of faintness upon sitting upright or standing.
    ▪ Signs include an increased pulse rate or a fall of systolic pressure with the change in position.
    ▪ Laboratory: none.
    ▪ Treatment: reassurance and a change in medication when indicated.
  o Hyperventilation
    ▪ Symptoms: light-headedness, fullness in the throat, perioral paresthesias, chest tightness, anxiety.
    ▪ Physical examination: normal.
    ▪ Laboratory: if the patient is symptomatic, an arterial blood gas may reveal the presence of hypocarbia.
    ▪ Treatment: reassurance along with methods to increase the pCO2 (paper bag).

• Neurological systems
  o Vertebrobasilar insufficiency.
    ▪ Symptoms: these patients can experience true vertigo but this is usually associated with visual disturbances, dysarthria, disorientation, and ataxia.
    ▪ Signs: physical examination may be normal between attacks.
    ▪ Laboratory: CT scan is usually normal. Findings on arteriography can be variable
    ▪ Treatment: ASA, Persantine, anticoagulation in severe cases.
  o "Old age syndrome"
    ▪ Symptoms: complaints of dizziness and disequilibrium with frequent falls in the elderly population.
    ▪ Signs: include orthostatic hypotension, diminished visual acuity, presbycusis, etc.
• Laboratory: findings tend to be nonspecific.
• Treatment: ambulation with assistance and adjustment of any medications implicated in the production of orthostatic hypotension.

Chapter 10 – Facial Paralysis

I. Anatomy of the 7th Cranial Nerve

• Anatomy of the facial nerve and fallopian canal
  o **Intracranial** nerve arises near pons and courses 12mm to porus acusticus.
  o **Meatal portion** (10 mm) is anterior to the superior vestibular nerve and superior to the cochlear nerve.
  o **Intratemporal portion**
    ▪ **Labyrinthine segment** (3-4 mm) passes through narrowest part of the fallopian canal. Common site of pathology: temporal bone fractures and Bell's palsy.
    ▪ **Tympanic segment** runs from geniculate ganglion to pyramidal turn (11 mm).
    ▪ **Mastoid segment** descends 13 mm to exit the stylomastoid foramen.
  o **Extracranial portion**
    ▪ Nerve extends 15-20 mm from stylomastoid foramen to pes anserinus.
    ▪ Variable branching patterns.
  o Clinical comment: The course of the facial nerve through the posterior fossa, temporal bone, and parotid gland renders this cranial nerve vulnerable to many neoplastic, traumatic, and infectious events. Disorders of the nerve provoke some interest in other medical specialties, but because of his background in head and neck anatomy and pathology and skill in temporal bone surgery, the otolaryngologist is most qualified to diagnose and manage paralysis of the facial nerve. Nevertheless, all clinicians should be able to recognize a peripheral paralysis and initiate proper evaluation.

• Anomalous Courses
  o Most common anomaly: dehiscence of facial canal.
• Common sites: oval window and geniculate ganglion.
• Exposed nerve is more susceptible to injury during otologic surgery.
  o Most course anomalies are within temporal bone:
    ▪ Prolapse of nerve against stapes
    ▪ Bifurcation around stapes
    ▪ Deviation across promontory
    ▪ Knuckle at the pyramidal (second) turn
    ▪ Duplication variants
  o Anomalies are more common in malformations of the ear.

II. Pathophysiology of the Facial Nerve
• Mixed Motor-Sensory Nerve
  o **Efferent** fibers from the motor nucleus innervate muscles of facial expression, post-auricular, stylohyoid, posterior digastric, and stapedius muscles.
  o Superior salivary nucleus projects **efferent** (parasympathetic preganglionic) fibers to sphenopalatine ganglion where postganglionic fibers then innervate lacrimal glands and mucinous glands of the nose. Another set of parasympathetic fibers synapse at the submandibular ganglion. Postganglionic fibers connect the submandibular and sublingual glands.
  o **Afferent** fibers convey taste from anterior two-thirds of tongue to nucleus tractus solitarius via lingual nerve, chorda tympani, and nervus intermedius.
  o **Afferent fibers** mediate sensation from posterior external auditory canal, concha, ear lobe, and deep parts of face. Projections unknown.
• Nerve Injury and Regeneration
  o Sunderland classification of nerve injury:
    ▪ **Neuropraxia**: reversible conduction block (1° damage).
    ▪ **Axonotmesis**: loss of structural continuity of axon with intact endoneurial sheath (2° damage).
    ▪ **Neurotmesis**: 3°: loss of continuity of axons and endoneurial sheaths;
4°: loss of continuity of axons, sheaths, funiculus; 
5°: complete loss of nerve continuity.

- **Degeneration**
  - Interruption of the continuity of the axon separates the distal axon from its metabolic source, the neuron or cell body. **Wallerian degeneration** of the distal axon and myelin sheath begins within 24 hours.
  - Macrophages phagocytose degraded myelin and axons.

- **Regeneration**
  - Neuron metabolism leads to increases in mRNA, enzymes, and structural proteins.
  - Axonal stumps swell with axoplasm and proliferation of neurofilaments.
  - Conditions at the site of injury govern the fate and organization of the sprouts.
  - **Simple misdirection**: the entry of one axon into a tubule destined for a muscle other than the one previously innervated. Clinical expression: synkinesis or associated movement.
  - **Complex misdirection**: a single axon through branching innervates tubules to different muscles. Clinical expression: mass movement.
  - Other sequelae of faulty regeneration: tics, spasms, contractures, weakness, and gustatory lacrimation.

### III. Differential Diagnosis of Peripheral Facial Paralysis

- **Extracranial**
  - **Traumatic**
    - Facial lacerations
    - Blunt forces
    - Penetrating wounds
    - Mandible fractures
    - Iatrogenic injuries
    - Newborn paralysis
- Neoplastic
  - Parotid tumors
  - Tumors of the external canal and middle ear
  - Facial nerve neurinomas
  - Metastatic lesions
- Congenital absence of facial musculature
- Intratemporal
  - Traumatic
    - Fractures of petrous pyramid
    - Penetrating injuries
    - Iatrogenic injuries
  - Neoplastic
    - Glomus tumors
    - Cholesteatoma
    - Facial neurinomas
    - Hemangiomas
    - Meningiomas
    - Acoustic neurinomas
    - Squamous cell carcinomas
    - Rhabdomyosarcoma
    - Arachnoidal cysts
    - Metastatic
  - Infectious
    - Herpes zoster oticus
    - Acute otitis media
    - Chronic otitis media
    - Malignant otitis externa
o Idiopathic
  ▪ Bell's palsy
  ▪ Melkersson-Rosenthal syndrome

o Congenital: osteopetroses

- Intracranial
  o Iatrogenic injury
  o Neoplastic
  o Congenital
    ▪ Mobius syndrome
    ▪ Absence of motor units

**IV. Evaluation of Facial Paralysis**

- Examination
  o The presence of a peripheral facial paralysis demands a complete head and neck examination with otoscopy and cranial nerve evaluation.
  o Characteristics of a peripheral paralysis:
    ▪ At rest: less prominent wrinkles on forehead of affected side, eyebrow droop, flattened nasolabial fold, corner of mouth turned down.
    ▪ Unable to wrinkle forehead, raise eyebrow, wrinkle nasolabial fold, purse lips, show teeth, or **completely** close eye.
    ▪ Bell phenomenon: visible vertical rotation of globe on closing affected eye.
  o Characteristics of a central facial paralysis:
    ▪ Because of uncrossed contributions from ipsilateral supranuclear areas, movements of the frontal and upper orbicularis oculi mm. tend to be spared.
    ▪ Facial movement may be present on affected side during emotional expression.
    ▪ Involvement of tongue.
    ▪ Presence of lacrimation and salivation.
• Electrodiagnostic Testing
  Expediency of management of acute paralysis may prevent conversion of minor injury into a more severe form with resulting sequelae.

  o Nerve Excitability Test
    - Technique: Using a stimulating electrode (square pulse of 0.3 msec duration) over the terminal ramifications of the facial nerve, one increases the current (milliamperes) until movement in the appropriate muscle group is just visible. Normal values (unaffected side of face) are compared to the side of paralysis.
    - Interpretation: A difference of 3.5 mamp or more indicates an unfavorable prognosis.

  o Electroneurography (Evoked Electromyography)
    - Technique: Square wave impulses of 0.2 msec duration and 50-100 volt amplitude with a frequency of 1/sec are delivered with a bipolar electrode in front of the tragus while a second bipolar electrode captures the compound action potentials of underlying facial muscles in the nasolabial fold.
    - Interpretation: The difference in amplitude of the potentials of the intact and involved side of the face correlate with the percentage of degenerated motor fibers (denervation).
    - Advantage: Quantitative analysis of amount of degeneration.
    - Disadvantage: Amplitudes are a 24-48 hour delayed representation of actual events occurring at site of lesion.
    - Clinical applications: Facial nerves subjected to traumatic injuries of a magnitude requiring surgical repair undergo 90% degeneration within six days of injury. In cases of Bell's Palsy, a poor prognosis can be anticipated in patients reaching 95% or more degeneration within 14 days of onset of the palsy.

• Topographic Diagnosis - Topographic testing to determine the anatomical level of a peripheral lesion is possible because of the mixed function of the nerve and the branching pattern within the temporal bone.
Tests of clinical value include:

- Petrosal nerve
  - Schirmer test: quantitative evaluation of tear production
    - Interpretation: When unilateral wetness is reduced by more than 30% of the total amount of both eyes after 5 minutes or when bilateral tearing is reduced to less than 25 mm after a 5-minute period, the Schirmer test is considered clinically significant and implies a lesion at or proximal to the geniculate ganglion.

- Stapedius nerve
  - Impedance audiometry can record the presence or absence of stapedius muscle contraction to sound stimuli 70 to 100 dB above hearing threshold.
Interpretation: Absence of the reflex is due to a lesion proximal to stapedius nerve (vertical segment of facial nerve). (Caution: The Schirmer's test can give false negative results.)

Diagnostic Studies

- **Audiometry**
  - Pure tone audiometry records cochlear nerve function.
  - Stapedial reflex is part of topographic testing.
  - Speech discrimination, tone decay, auditory evoked potentials are used to screen for retrocochlear lesions, e.g., tumors of the cerebellopontine angle.

- **X-ray**
  - Computed tomography with and without contrast (radiopaque and air) is preferred for lesions of IAC, posterior fossa, and brain stem. High resolution scans needed for base of skull lesions.
  - MRI is best for soft tissue assessment and tumors of the facial nerve.

V. Management of Facial Paralysis

- **Extracranial Etiologies**
  - Traumatic injuries: lacerations, gunshot wounds, iatrogenic.
    - Most important areas to repair: main trunk, temporofacial and cervicofacial divisions.
    - When immediate repair in contaminated or extensive wounds is not feasible, proximal and distal stumps should be tagged. The transected ends lose response to electrical stimulation within 72 hours. If not properly identified, these endings may become involved in scar tissue. Anastomosis or grafting in such cases may be impossible.
    - Methods of repair: direct end-to-end anastomosis and interpositional grafting. Do not approximate ends under tension!
  - Iatrogenic injury
    - Complication of parotid surgery. Tumors are best managed by the experienced otolaryngologist-head and neck surgeon.
    - Integrity of nerve should be ascertained prior to closure. Immediate repair indicated.
  - Neoplasia
A mass in the parotid associated with facial paralysis is a sign of malignancy. Two most common cell types: adenoid cystic and undifferentiated.

Sacrifice of involved nerve and nerve adjacent to tumor indicated in high-grade malignancies: adenoid cystic, high-grade mucoepidermoid carcinoma, ex-pleomorphic adenoma, etc.

Reconstruction: interpositional grafting and 7-12 cranial nerve crossover.

Intratemporal Etiologies

- Temporal bone fractures
  - Signs: bleeding from the external canal, hemotympanum, step-deformity of the osseous canal, conductive hearing loss (longitudinal fracture), sensorineural hearing loss (transverse fracture), CSF otorrhea, and facial nerve involvement (20% of longitudinal fractures and 50% of transverse fractures).
  - In general, paralysis of immediate onset carries a poor prognosis and paralysis of delayed onset has a more favorable recovery. All paralysis should be followed with electrical testing, as exceptions to the maxim exist. Timely exploration and repair ensure better quality of return of function.
  - Types of pathology: intraneural hematoma, impingement of bone and transection of nerve. Most common site of injury: adjacent to geniculate ganglion.
  - Surgical approaches: Longitudinal fractures are explored through the middle fossa, and mastoid, if necessary. Facial nerve is examined via transmastoid, translabyrinthine approach in transverse fractures.

- Iatrogenic injury
  - Incidence 0.6-3.7%
  - Most common areas: pyramidal turn and the tympanic segment over the oval window.

- Neoplasia
  - The primary tumor of the facial nerve per se is the facial neurinoma. Weakness of the face is the most common symptom. Treatment is surgical removal with grafting of the involved segment of nerve.
Many benign and malignant masses may involve the facial nerve in its course through the temporal bone: glomus tumors, meningiomas, cholesteatomas, squamous cell carcinoma, rhabdomyosarcoma, etc. Surgical removal is necessary in most cases. Radiation therapy may be palliative depending on cell type, size, and location. If the nerve cannot be spared at the time of resection, interpositional grafting is warranted.

- Idiopathic facial palsy (Bell's Palsy)
  - Bell's Palsy is the most common cause of facial paralysis (greater than 50% of cases of acute palsy). Unfortunately, this leads to over-diagnosis of the condition and a false sense of security. Every patient with a facial paralysis needs a complete evaluation. When the diagnosis of Bell's palsy is made (by exclusion), the patient must be followed 6 - 9 months or until recovery of facial movement. Failure of any return of function implies an etiology other than Bell's palsy. Re-evaluation is mandatory in such cases, as the most commonly overlooked diagnosis is one of neoplasia.
  - Etiology is still unknown.
  - Entrapment theory: an inflammatory response leads to compression and ischemia of the nerve in the narrowest part of the fallopian canal, the meatal foramen and labyrinthine segment.
  - Electrical testing follows the degeneration of the motor fibers. Decompression of the nerve is indicated when 90-94% degeneration occurs within 2 weeks of onset.
  - Steroids are indicated early in the course of the disease. The use of acyclovir is under investigation.
  - Surgical decompression is accomplished via the middle fossa by an otologist-neurotologist. Transmastoid decompression is no more efficacious than steroid therapy.

- Infection
  - Acute suppurative otitis media is caused by gram-positive cocci and Hemophilus influenza. Invasion into the facial canal through a dehiscence may evoke an inflammatory response with edema, compression, and ischemia resulting in facial weakness. Treatment includes myringotomy, appropriate antibiotics, and transmastoid decompression if degeneration progresses.
  - Facial paralysis due to chronic otitis media requires tympanomastoidectomy for eradication of infection or cholesteatoma.
- Otalgia, facial weakness and a vesicular eruption on the concha or external canal (sensory distribution of 7th cranial nerve) characterize herpes zoster oticus (Ramsay-Hunt Syndrome). Site of pathology: labyrinthine segment of nerve. Acyclovir is treatment of choice.

- Malignant otitis externa is due to Pseudomonas invasion of soft tissue, cartilage, and bone. Treatment includes debridement of infected tissue, decompression of facial nerve when involved, and six weeks of semi-synthetic penicillin in combination with an aminoglycoside. Cipro may have a role in long-term therapy.

Other Etiologies

- Congenital
  - Mobius syndrome: hypoplasia of 6th and 7th cranial nerve nuclei.
  - Birth trauma: due to forceps compression or compression of side of face against sacrum during labor.
  - Osteopetroses: hereditary bone diseases. May result in bony obliteration of foramina with compression of cranial nerves. Decompression is indicated on rare occasion.

- Intracranial: Most common causes are neoplastic and iatrogenic.

References


Chapter 11 – Nose and Paranasal Sinuses, Olfaction and Taste

Nose and Paranasal Sinuses

The Nose

Exam:

- Open speculum up-and-down to avoid pressure on septum
- Co-axial lighting (head mirror) is ideal, use otoscope in a pinch
- The first turbinate you see is the inferior turbinate
- Red mucosa = inflammation; blue color = irrelevant
- Polyps found above and medial to inferior turbinate polyps in children: think cystic fibrosis
- Airflow is primarily along the nasal floor
- Septal deviations, C-shaped deformities, spurs
- Septal perforations (Wegener’s, midline granuloma previous septal surgery, cocaine abuse?)

Anatomy:

Mucosal Landmarks of the Nasal Cavity

A: Frontal sinus
B: Sphenoid sinus
C: Superior concha (turbinate)
D: Middle concha (turbinate)
E: Inferior concha (turbinate)
F: Auditory tube opening
Everything drains under the middle turbinate except:

- tears - nasolacrical under inferior turbinate
- posterior ethmoids and sphenoid drain more postero-superior

**Embryology:**

- Developmental stages of maxillary and frontal sinuses

**Sinus Films:**

- Of questionable usefulness in patient with obvious symptoms
• Not needed for diagnosis of nasal fracture:
  o "If it looks broken - it is,
  o if it doesn’t - it isn’t,
  o if you're not sure - wait"

• Common radiologic abnormalities:
  o **Air-fluid levels** suggest an acute process
  o **Opacification** = secretions, polyps, etc.
  o (Ethmoids should be slightly darker than orbits)
  o **Thickened mucosa** (check lateral maxillary wall): Suggests chronic inflammation
  o **Maxillary sinus retention cysts**
    ▪ Very frequent finding
    ▪ Harmless unless symptomatic
  o **Frontal sinus mucocele**
    ▪ Nasofrontal duct obstruction (head injury?)
    ▪ Potentially serious problem
    ▪ Look for loss of scalloped edge

• **Standard views:**
  *The goal is to place sinuses close to the film and at an angle that temporal bone shadows are not superimposed*
  • **Water’s** - best for maxillary sinus (Ethmoids and frontals too far from film
• **Caldwell** - best for ethmoids and frontal sinus (Temporal bones overlie maxillary)

• **Lateral** - sphenoid, frontal(?), maxillary (?)
• **Submentovertical** ("bucket-handle") - ethmoids; Fluid in maxillary sinus will also layer out.

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**Acute Sinusitis:**

- **Diagnosis:**
  - Pain from paranasal sinusitis is often referred in a predictable distribution.

- **Symptoms:**
  - Purulent rhinorrhea
  - Pain, increase with palpation/percussion
  - Periorbital edema
  - Sensitive teeth or gums (irritation dental roots)

- **Treatment:**
  - **Antibiotics:**
    - Amoxicillin Erythromycin-sulfisoxazole
    - Cefaclor Trimethoprim-sulfamethoxazole
      - To cover: *Streptococcus pneumonia*
      - *Hemophilus*
      - *Moraxella catarrhalis*
  - **Steam inhalation/humidifier** - Mainly for liquification of secretions
  - **Decongestants:**
- Topical (e.g. Afrin) for short-term
- Systemic
  Pseudoephedrine (e.g. Sudafed, 30-60 mg Q6H)
  Phenylpropanolamine
  Phenylephrine

  - **Antihistamines**: (see allergy section below)
    Most "cold remedies" are a combination of decongestants and sedating antihistamines with the idea that the side effects of jitteriness and sleepiness will cancel each other out.

  - **Nasal irrigation** (The Proetz Maneuver)

**The Proetz Maneuver**

- **Surgical drainage** (rarely used): for pain relief or unresponsive infection. Options for maxillary sinus include:
  - cannulate ostia
  - puncture anterior wall (under lip)
  - puncture nasal wall under turbinate
Chronic Sinusitis:

- **Diagnosis:**
  - Is it really sinusitis? vs. tension or migraine headaches or temporomandibular joint arthritis, etc.
  - Is allergy a component? (see allergy section below)
  - Is it vasomotor rhinitis?
    - Profuse rhinorrhea,
    - Often precipitated by cold air or eating
    - Treatment: ipatromium bromide (Atrovent®)
  - Is it post-nasal drip causing sore throat, hoarseness

- **Treatment, medical:** (see allergy section below)

- **Treatment, surgical:**
  - **Caldwell-Luc:** Approach maxillary sinus via sublabial incision, open anterior bony wall
Caldwell Luc Procedure

Frontal section through the maxillary sinus after a Caldwell-Luc procedure

- **Nasoantral window**: Make communication between maxillary sinus and nasal cavity under the inferior turbinate; this is outside of the normal ciliary flow pattern and they usually close within 1-2 years.

- **Ethmoidectomy**: Break down the partitions between the many air cells; external and intranasal approaches

- **Frontal sinus obliteration**: A bicoronal or brow incision may be used.
Scalp reflected, showing frontal periosteum.

Elevating periosteum to open the frontal sinus cavity.

- **Endoscopic sinus surgery**: Relieve obstruction at the osteomeatal complex, an area where flow from the frontal, maxillary and ethmoid sinuses can be obstructed
- **Septoplasty** (all incisions inside the nose)
- **Polypectomy**: Polyps will usually recur unless followed by medical therapy

**Allergic Rhinitis:**

- **Symptoms**:
  
  o Sneezing (very characteristic symptom for allergies)
  o Itchy ears, eyes, and palate
  o Congested ears
  o Runny nose, nasal congestion
  o Post-nasal drip (sore throat)

- **Pathophysiology**:
  
  o The mechanisms of inflammation are similar whether the etiology is allergic or infectious.

  o Mast cells can be degranulated by:
    
    ▪ Crosslinking of IgE on their surface by an allergen
    ▪ Anaphylatoxins (C3a and C5a) from complement activation
    ▪ Some drugs, e.g. morphine and codeine

- **Treatment**:
Allergen avoidance - mandates a detailed history

- The biggest offenders are dust, pets, pollens, molds

  - Pollens: Is it seasonal? In south Texas, something is pollinating all the time. Need to know the local plants. Don't garden, keep car windows closed. Ragweed season is late August - October

  - Dust: "Does the vacuum cleaner (closets, attic, etc.) bother you. Dust mite feeds on human dander and grows whenever humidity is over 30% (seasonal in north USA). Carpentry is the major problem. Focus on cleaning the bedroom (8 hours sleep in low allergen room helps). Wash bedding every 2 weeks in hot water. Polyester, not foam or feather pillows. Plastic cases on mattresses and pillow to keep dander out. No upholstered chairs, throw rugs, etc. Clear out bookcases and shelves. Blinds are preferable to curtains or drapes. Change air conditioning filters often (in-line electrostatic filters are good, "bug zapper-type" filters release ozone - bad for asthmatics). No feather dusters; damp dust cloth. Face masks during housecleaning. Avoid oscillating or ceiling fans that stir up dust.


- Molds: "Do mildewy carpets bother you?" Cold fronts coming in over rice paddies north of Houston bring spores. Rain may clean air, but growth surges in the humid which follows.

  - Pets: "outside dogs" still "count"

- People are "more allergic" during their allergy season - i.e. they respond more strongly to any of the allergens during times when the nasal mucosa is inflamed and full of mast cells

- It may take 2 years to "acquire" new allergies to local allergen when people move

- Children might outgrow their allergies, adults rarely do and may even develop sensitivity to things which did not bother them in the past

- Skin tests or RAST tests must be correlated with symptoms history. Food allergies should be diagnosed by history and diet challenge in adults

- Anti-histamines - for the sneezing, scratchy throat, itchy eyes. Will have little effect on nasal congestion but may have drying effect.

  - Sedating (available without prescription)
    All cause sedation, some drying, and possible urinary retention. There are several chemical groups; Benadryl is more sedating, for an equivalent amount of "anti-allergy" effect than some of the others. Chlorpheniramine 4 mg PO Q 6 hours is an economical choice. Patients will overcome the sedating side effects with 2-3 week REGULAR use.
- **Non-sedating (prescription only)**
  Astemizole (Hismanal) 1 PO Q AM has a longer half life (blocks cutaneous reactivity to histamine for 3 weeks) than Terfenadine (Seldane) 1 PO BID. Price per day is the same for the two and they are more expensive than over-the-counter sedating antihistamines. Both are pregnancy Category C "no teratogenic effects..but use only if potential benefit outweighs potential risk..". Not approved for use in children under 12 years

- **Topical** - available abroad, U.S. clinical trials underway, shows great promise as nasal spray and eyedrops

  - **Decongestants** - for congestion and rhinorrhea
    Histamine, leukotrienes and prostaglandins are released causing vasodilation, tissue edema, and increased mucus secretion. Anti-histamines will not block leukotriene and prostaglandin effects so that decongestants must be included in therapy.

    - **Topical decongestants**: vasoconstriction; tissue ischemia; release vasodilators; rebound vasodilation; persistent turbinate edema = rhinitis medicamentosa

    - **Systemic** - no rebound congestion
      All are adrenaline-type drugs and can exacerbate hypertension. Pseudoephedrine 30-60 mg PO Q 6 hours is an economical choice. Cause "jitteriness" with excessive use

      - Highly allergic patients should carry and "Epi-pen" and use it promptly

  - **Topical nasal steroids** - "Best allergy medicine going"
    Make the nasal mucosa an inhospitable site for mast cells. Blocks synthesis of both leukotrienes and prostaglandins, prevents influx of neutrophils

    - **Brands**:
      - Beconase and Vancenase = beclomethasone
      - Nasalide = flunisolide (fluorinated, more potent)
      - Decadron Turbinaire = dexamethasone (systemic effects)
      - Aerosol and aqueous preparations = same medicine; AQ more expensive, rarely needed

    - Are topical nasal steroids safe?
      - Systemic absorption is negligible
      - No hypothalamic-pituitary axis suppression except with Decadron
      - No mucosal abnormalities seen on biopsy after years of use
- Approved for children above age of 6
- No evidence of growth suppression in children
  - Place tip just inside nostril and sniff; 2 puffs each nostril BID
- Warn patients:
  - No "instant decongestant"
  - May sting for first week
  - Takes 1-2 weeks for optimum effect
  - Discard when aerosol "sizzles"

- Indications for systemic steroids = nasal polyps 30-40 mg daily 2 weeks
- **Cromolyn**
  - As a single agent, less effective than steroids, but it is a good second drug to combine with steroid sprays. Two puffs each nostril BID or TID. Opticrom were good eyedrops but are off the market
- **Immunotherapy**
  Weekly desensitization therapy to limited # allergens. Mechanism (?) -elevated IgG and suppress IgE antibodies. Can have potentially lethal reactions and should be administered under medical supervision

**Epistaxis**
- Usually located on anterior septum
- Try 15 minutes of pressure. Get hypertension under control
- Topical epinephrine/neosynephrine on pledgets as vasoconstrictor
- Pull pledgets out and look fast for the bleeding site
- Suction away blood and cauterize with silver nitrate
- Try packing nose lightly with Surgicel or gelfoam sponges soaked with topical thrombin
- Vigorous bleeds must be packed with antibiotic ointment-soaked gauze strips. Need good lighting and instruments for an adequate job. Avoid packing patients with coagulopathies who will invariably re-bleed when the pack is removed
- Intranasal balloons (e.g. Epistat) are easier to use but less consistently effective
- Persistent bleeding is then treated with posterior and anterior packs
- Leave packs in three days. Cover with antibiotics to prevent sinusitis
• If packing fails vessels must be ligated. If the responsible vessel cannot be identified then both maxillary artery and ethmoid arteries are ligated

• Blood supply of the lateral nasal wall.

Blood supply of the nasal septum.
Tumors:
- **Juvenile nasoangiofibroma** - epistaxis in boys
- **Nasopharyngeal carcinoma** -
  - early symptoms = serous otitis media, neck metastases
  - Chinese at higher risk
  - EBV genome in undifferentiated carcinoma
    - Squamous cell carcinomas
    - Inverting papillomas (occupational exposure?)

Olfaction
- **Anosmia**
  - Head injury, especially antero-posterior can shear off nerves as they cross the cribiform plate
  - Viral (influenza) infection can kill off nerves
  - Obstruction such as nasal polyps or septal deviation
- **Hyposmia** Advanced age
- **Hyperosmia** Addison’s, pregnancy
- **Cacosmia** Infection (sinus, dental), hysteria
Taste

- Innervation anterior 2/3rds of tongue CN VII
- posterior tongue, pharynx CN IX
- 4 basic tastes - sweet, sour, bitter, and salt
- Altered taste is usually olfactory loss. Ask patient whether they can still taste sweet or salt. Check oral mucosal for lesions and adequacy of salivation. Medications such as sulfa drugs and anti-arthritics can cause altered taste sensations
Chapter 12 – Inflammatory Disorders of the Pharynx

Inflammatory disorders of the pharynx most commonly present as throat or neck pain. Dysphagia, odynophagia, and airway obstruction are other frequent complaints. The pharynx is a dynamic conduit for inspired air and ingested matter, responsible for diverting each into the trachea or esophagus, respectively. This process may be impaired by anything which obstructs or restricts the mobility of the pharynx. The following outline is directed toward a systematic approach to the evaluation of the patient with sore throat, odynophagia or dysphagia.

I. EVALUATION

- Key historical considerations
  - Age of patient
  - Onset and duration
  - History of recent trauma (including possible foreign body)
  - Inflammatory symptoms - fever, pain, malaise, malodorous breath
  - Status of nasal airway: congestion, obstruction, rhinorrhea, purulent discharge, allergic history, snoring
  - Reflux symptoms such as heartburn or water brash
  - Associated ear pain
  - Dysphagia or odynophagia
  - Dyspnea or stridor
  - Other associated symptoms
  - Recent exposure to infectious discharge
  - Cancer risk factors: smoking history, ETOH abuse

- Key considerations of physical examination for patients with throat pain:
  - Ears - The patient's ears need to be examined for primary ear pathology, as acute otitis media and serous otitis media are often preceded by pharyngitis and nasal congestion. Conversely many patients with pharyngeal inflammation or tumor will have referred ear pain in which case otoscopy will be normal.
  - Nose - The nose should be examined for any evidence of obstruction, purulence, or excessive secretions. Mouth breathing leads to drying of
pharyngeal mucosa; this is a very common cause of chronic sore throat. Excessive secretion may cause the patient to clear his throat frequently, which traumatizes the larynx; and infected drainage from sinusitis may cause irritation in the pharynx.

- Pharynx - Examination of the throat for asymmetry, injection, erythema, exudate, swelling, or pooling of secretions. Also, careful inspection and palpation of any ulcerations, lesions, mucosal or submucosal masses.

- Neck - Careful palpation and inspection of the neck for lymphadenopathy, swelling, tenderness, induration or fluctuance. Large, firm, non-tender masses suggest neoplasia, while multiple small nodes are often seen in chronic recurrent infections.

II. DIFFERENTIAL DIAGNOSIS OF THROAT PAIN

- Trauma

  - Ingested foreign bodies may cause acute or chronic throat pain. Fish bones or chicken bones often lodge in the tonsil, the vallecula, pyriform sinuses, while such objects as coins are often wedged in the cricopharyngeal area. A careful history will elicit the probable type of foreign body, and the patient can often help localize the foreign body by indicating the site of the pain.

    ▪ Diagnosis - Careful examination will usually reveal the foreign body if it is still present in the pharynx. Foreign bodies at the level of the cricopharyngeus or upper esophagus may be seen on soft tissue lateral x-ray of the neck. However, many objects are not radiopaque.

    ▪ Treatment - Appropriate treatment involves either office removal, admission for endoscopy under general anesthesia, or reassurance. Patients who have swallowed a sharp object causing irritation may complain of a "foreign body sensation" for 3-5 days after the episode even if the foreign body has passed. If no object is seen on physical or radiologic exam, and the patient is able to swallow, he should be assured that the symptoms will probably subside. If symptoms persist beyond five days, or if there is drooling or inability to swallow liquids, endoscopy is indicated.

  - Chronic exposure to cigarette smoke, especially in conjunction with alcohol intake, can cause intermittent or persistent pharyngeal irritation.

  - Penetrating injuries of the pharynx and mouth may result from assault, or from falling with sharp objects in the mouth (especially pencil injuries in children). These can be complicated by vascular injuries or may lead to parapharyngeal or retropharyngeal abscess. Close observation,
prophylactic antibiotics, and in some cases, arteriography, may be indicated.

- Iatrogenic injury can result from nasogastric tubes or endotracheal intubation
- Patients on anticoagulants may develop pharyngeal hematomas from seemingly insignificant trauma.

- Infection: Most infectious conditions are characterized by acute onset of symptoms. The following list includes some of the more common conditions.

  o **Viral or Bacterial Pharyngitis**
    - Symptoms - This condition affects all ages, and is characterized by diffuse sore throat and other symptoms of upper respiratory infection.
    - Signs - Diffuse erythema and edema of the oral and nasopharyngeal mucosa. Cervical lymph nodes may be slightly enlarged. Viral infection cannot be reliably differentiated from bacterial infection on physical exam.
    - Treatment - In general, supportive care consists of good oral hygiene, hydration, saline gargles, rest, and analgesics such as aspirin or acetaminophen. If bacterial infection is present, antibiotics will hasten resolution and prevent rheumatic complications. Empiric prescription of antibiotics is controversial.

  o **Infectious Mononucleosis (Epstein-Barr Virus)**
    - Symptoms - Primarily affects young adults, who present with non-specific malaise, fatigue, and low-grade fever. They commonly complain of sore throat and tender cervical adenopathy.
    - Signs - Diffuse erythema of the oropharynx and tonsils often mimicking bacterial tonsillitis. The tonsils may appear almost necrotic. Diffuse cervical adenopathy is present bilaterally. CBC and mono spot are useful in diagnosis.
    - Treatment - Treatment of the sore throat in infectious mononucleosis generally consists of the supportive measures as outlined above for any viral pharyngitis. In severe cases adenotonsilles involvement can lead to upper airway obstruction, which may require treatment with steroids and antibiotics. Patients with infectious mononucleosis should also be followed by an internist or family physician to monitor for hepatitis and other complications of mono.
o **Acute Tonsillitis** - The most common organism is beta hemolytic *streptococcus*, but viral organisms can also cause exudative tonsillitis. Other causative organisms include *staphylococcus aureus, streptococcus viridans*, and various hemophilus species.

- **Symptoms** - Rapid onset of throat pain with pain on swallowing associated with fever, often 102° - 103° F with malaise and fatigue being common.

- **Signs** - Swollen erythematous mucosa of the oropharynx and hypopharynx, often with edema of the uvula and soft palate. The tonsils are red, enlarged and covered with an exudate or studded with white follicles. Tender, firm cervical adenopathy is often present.

- **Treatment** - A 10-day course of penicillin is indicated. Erythromycin may be used in patients with a penicillin allergy. In resistant cases clindamycin may be helpful. Supportive measures such as hydration, humidification of inspired air and analgesics.

o **Peritonsillar Abscess (Quinsy)** - This develops by a spread of bacterial tonsillitis to the peritonsillar space which lies between the tonsillar capsule and the superior constrictor muscle.

- **Symptoms** - Progressively increasing pharyngeal pain, often unilateral with radiation to the ear on the affected side, and increasing dysphagia with eventual difficulty in handling secretions and opening the mouth (trismus).

- **Signs** - Unilateral erythema and swelling of the anterior tonsillar pillar and soft palate with deviation of the uvula to the opposite side. Bilateral cervical adenopathy is common. Trismus is often severe and may preclude a complete examination unless a sphenopalatine block is employed.

- **Treatment** -
  
  - Needle aspiration or incision and drainage of the peritonsillar space.
  
  - Antibiotic coverage (penicillin) parenterally followed by p.o. administration for at least ten days.
  
  - Rehydration, analgesics, and good oral hygiene are important adjunctive measures in patient care.
  
  - If the patient has a prior history of tonsillitis the abscess is likely to recur, and tonsillectomy is recommended. Whether this should be done acutely or after an interval of recovery is controversial.
o **Vincent's Angina** - This condition, also termed ulcerative tonsillitis, pseudomembranous angina, and trench mouth, is characterized by acute inflammation and ulceration of the pharyngeal tonsils usually due to a fusiform bacillus.

- Symptoms - Severe throat pain often radiating to the ears.
- Signs - Tonsil is covered by a pseudomembrane (formed by the necrosis of the superficial layer of the mucous membrane and the tonsil). Removal of the pseudomembrane reveals ulceration.
- Treatment - Oral or parenteral penicillin and vigorous oral hygiene

o **Lingual Tonsillitis**

- Symptoms - Pain in the upper throat. Voice is often garbled and odynophagia is a prominent symptom
- Signs - Examination of the posterior tongue with a mirror reveals enlarged lingual tonsils usually with exudate
- Treatment - 10-day course of penicillin and supportive therapy

o **Candidiasis** - (Also known as thrush or moniliasis). A fungal infection most commonly seen in very young, elderly, or immunosuppressed patients. Long-term antibiotic therapy and radiation treatment also predispose patients to candidiasis.

- Symptoms - Oral and pharyngeal pain
- Signs - Diffuse pharyngeal erythema and edema with multiple white patches over the inflamed mucosa. Removal of the whitish material reveals superficially ulcerated mucosa. The diagnosis is made on a KOH prep which reveals budding yeast forms.
- Treatment - Clotrimazole lozenges or Nystatin oral suspension.

(The following entities are commonly associated with respiratory obstruction in addition to sore throat:)

o **Epiglottitis** - An acute inflammatory condition of the supraglottic larynx. This is most common in children aged three to five years but also occurs in adults. The usual organism is *Hemophilus influenzae*. **This condition is an otolaryngologic emergency.**

- Symptoms - *Rapid* onset of sore throat and fever with increasing pain on swallowing. Dysphagia causes salivary pooling and progresses rapidly to difficulty in breathing and airway obstruction. Complete respiratory obstruction can occur within hours of the onset of symptoms.
Signs - The patient usually appears quite ill, often with fever of 102°-104° F and has a characteristic muffled voice. Examination with a tongue blade or indirect laryngoscopy may cause coughing or gagging which can precipitate sudden total airway obstruction, and should only be attempted by an experienced examiner with tracheotomy instruments immediately at hand. Examination reveals excessive secretions with erythema of the pharynx; the epiglottis is edematous and often "cherry" red.

Treatment - Prompt attention is mandatory, and management of the airway is of paramount importance when epiglottitis is diagnosed. The patient should be taken to the operating room for examination and an airway established either by endotracheal intubation or tracheotomy. Once the airway is secured, the larynx can be examined more carefully. Blood cultures are the most reliable means of obtaining a culture of the offending organism. The patient should be promptly started on appropriate antibiotics, (ceftriaxone, cefotaxime, or cefuroxime), humidified air and aggressive respiratory support as indicated.

Croup - Epiglottitis must be differentiated from croup (acute laryngotraechitis). This is a subglottic and tracheobronchial inflammatory process most commonly caused by parainfluenza, respiratory syncytial and other viruses, with circumferential subglottic erythema and edema.

Symptoms - Upper airway obstruction with a barking cough. The disease most commonly occurs in children between six months and two years of age. Viral croup is preceded by an upper respiratory infection with sore throat. "Nocturnal croup" or "spasmodic croup" is an idiopathic, recurrent upper airway obstruction which is usually benign and self-limited.

Signs - A characteristic croupy cough, stridor, hoarse voice and tracheobronchial secretions. The child is most often tachypneic and breathing is labored.

Treatment - Mild to moderate respiratory distress: humidified air and a mist tent, intravenous fluids, steroids, and epinephrine may be sufficient to reverse the acute inflammatory response. In patients with more significant respiratory distress, endotracheal intubation or even tracheotomy may be necessary. If bacterial infection supervenes, repeated bronchoscopy may be required to remove purulence and necrotic debris.

Deep neck infection - To understand deep neck infections, a brief review of the cervical fascia and fascial spaces of the neck will be useful.
Anatomy

- Fascial Layers
  - Superficial cervical fascia beneath the skin and superficial to the platysma muscle of the neck.
  - Deep cervical fascia has three subdivisions:
    - Anterior layer (superficial) - surrounds the sternocleidomastoid, trapezius muscles and strap muscles.
    - Pretracheal (visceral) - envelopes the trachea, larynx and hypopharynx.
    - Prevertebral fascia - runs posterior to the esophagus and great vessels, and ensheathes the prevertebral musculature.

- Fascial spaces -
  - The visceral space - contains the lower pharynx, larynx, trachea and cervical esophagus, thyroid gland and great vessels
  - The prevertebral or retropharyngeal space - between the prevertebral musculature and prevertebral fascia. It is continuous with the mediastinum
  - Carotid sheath
- Submental space
- Submaxillary space
- Sublingual space.

- Neck spaces are interconnected with each other and also communicate with the mediastinum so that infections can spread easily to a variety of areas. Common clinical conditions which can occur in these spaces are retropharyngeal abscess, parapharyngeal abscess, as well as infection of sublingual and submental space including Ludwig's angina.

  o Parapharyngeal space infections
    - Etiology: suppuration of deep cervical lymph nodes, direct contamination by needle sticks or as the result of vascular inflammation such as phlebitis or thrombosis of the deep neck veins. Infections extending into the deep neck structures frequently begin with a bacterial pharyngitis, acute tonsillitis, or dental abscess. It may also follow surgical manipulation of the tonsils or dental extraction.
    - Symptoms - Sore throat, neck pain, dysphagia and swelling.
    - Signs - Patient is frequently toxic with a high fever. Trismus due to splinting of the pterygoid muscles is a prominent symptom. Displacement of the lateral pharyngeal wall without swelling or enlargement of the tonsil is characteristic. Tender swelling of the neck.
    - Treatment - Blood cultures and intravenous antibiotics. If the patient does not respond to this therapy, then incision and drainage through the neck is indicated.

  o Retropharyngeal abscess can occur at any age but most commonly is seen in young children.
    - Etiology - suppuration of the retropharyngeal lymph nodes, injuries to the posterior pharyngeal wall
    - Symptoms - Severe sore throat, difficulty swallowing, possible airway obstruction.
    - Signs - Erythema and edema of the oropharynx, bulging of the posterior pharyngeal wall. A lateral soft tissue xray of the neck demonstrates widening of retropharyngeal space.
    - Treatment - Incision and drainage under general endotracheal anesthesia followed by vigorous oral hygiene and appropriate antibiotic coverage
Ludwig's Angina - An unusual inflammatory condition of the floor of the mouth, with pronounced edema and often abscess formation in the sublingual space. It can lead to fatal airway obstruction.

- Etiology - usually trauma to the floor of the mouth, severe dental caries, tonsillitis, peritonsillitis, or recent dental extraction
- Symptoms - Pain in the floor of mouth and submental area
- Signs - Severe swelling and induration of the floor of the mouth, gums and tongue with displacement of the tongue posteriorly and superiorly, oropharyngeal airway obstruction, and drooling
- Treatment - Intravenous antibiotic (penicillin) following blood cultures, close observation and often tracheostomy. If cellulitis progresses to abscess formation then incision and drainage is indicated.

Neoplasia - Cancer of the upper aerodigestive tract frequently will present as a chronic sore throat. The possibility of cancer must be considered in any patient over the age of 30 who has persistent sore throat, especially with a strong smoking or drinking history. Careful evaluation and attention to other factors and findings as mentioned above may reveal a benign etiology for the persistent throat pain. However, when no other simple explanation can be made, it is important for the physician to rule out the presence of carcinoma. The systematic evaluation for malignancy is covered in a separate section (see chapter on Head and Neck Tumors).

III. TONSILLECTOMY AND ADENOIDECECTOMY - These two procedures are among the most commonly performed operations accounting for nearly 1/2 of all childhood surgical procedures. Although the literature concerning these procedures is vast, most published papers are based on opinion rather than scientific fact. This is due to the difficulties inherent in maintaining a large controlled series. Patients randomized for non-operative management frequently drop out to seek surgery elsewhere. However, most otolaryngologists agree on general guidelines for tonsil and adenoid surgery as presented below.

- Tonsillectomy
  - Indications
    - Strong
      - Cor pulmonale secondary to hypertrophied tonsils
      - Upper airway obstruction
      - Obstructive sleep apnea
- Complications of streptococcal infection, such as rheumatic fever or nephritis
- Dysphagia secondary to hypertrophied tonsils
- Peritonsillar abscess
- Unilateral tonsillar hypertrophy
  - Relative
    - Recurrent tonsillitis, 5-6 episodes/year or 3-4 episodes in successive years
    - Chronic tonsillitis with halitosis or sore throat
    - Tonsillar hypertrophy with speech distortion or snoring
  - Contraindications - abnormal clotting
- Complications
  - Hemorrhage -
    - Early - within 24 hours
    - Late - 7-10 days
  - Dehydration secondary to odynophagia and trismus - low-grade fever
  - Infection of tonsillar bed - high fever
- Adenoidectomy
  - Indications
    - Urgent - severe nasal obstruction
  - Relative
    - Persistent nasal obstruction
    - Chronic or recurrent otitis media
    - Chronic or recurrent adenoiditis
    - Chronic or recurrent sinusitis
  - Contraindications
    - Clotting disorder
- Submucosal cleft palate (bifid uvula, is "red flag")
- Short soft palate

○ Complications
  - Bleeding - rarely serious
  - Infection
  - Velopharyngeal insufficiency with speech defect and or nasal regurgitation
  - Scarring of eustachian tube orifice
Chapter 13 – Salivary Gland Disorders

Salivary Gland Disorders

Inflammatory Diseases

I. Viral - Mumps

- Etiology: Contagious systemic myxovirus. Incubation period of 14 to 21 days.
- Signs and symptoms
  - Prodrome of fever, malaise, and headache may occur
  - Painful swelling of one or both parotid glands with erythema of Stenson’s duct orifice. Ingestion of sour liquids increases pain.
  - Complications may occur due to involvement of other organs
    - Sensorineural deafness
    - Encephalitis
    - Orchitis or oophoritis can lead to sterility
    - Pancreatitis
- Treatment - supportive and symptomatic. No specific treatment currently available.
- Prevention by mumps vaccine

II. Acute Bacterial Infection

- Etiology
  - Stasis - secondary to obstruction, decreased flow or dehydration
  - *Staphylococcus aureus* is the most common pathogen in the parotid. Staph aureus and oral flora are seen in submandibular gland.
- Signs and Symptoms - pain, tenderness and swelling with increased pain on eating. Orifice of duct is red and swollen, and massage of the gland may express pus.
- Treatment
  - Antibiotics
  - Warm compresses
Promote drainage by

- Massage
- Sialogogues
- Dilatation of duct

If condition unresponsive or progressive after above, surgical drainage is indicated.

- In the parotid gland, care must be taken to avoid the facial nerve. A parotidectomy incision is made and skin over the gland is elevated. The gland is drained bluntly by inserting a clamp and spreading in the direction of the nerve.
- In draining the submandibular gland, the marginal mandibular nerve must be avoided.

III. Chronic or Recurrent Infections

- Etiology -
  - Usually related to scarring and inflammation of the duct and/or parenchyma from prior infections
  - May also be due to stones
- Signs and Symptoms - as in acute infection
- Treatment
  - Conservative treatment as for acute infection
  - In refractory disease, surgical excision is indicated

IV. Autoimmune Diseases - Sjogren’s Syndrome

- Etiology - collagen vascular disease
- Signs and Symptoms - keratoconjunctivitis sicca, xerostomia, and a connective tissue disorder, such as rheumatoid arthritis. Enlargement of salivary and lacrimal glands, often with recurrent sialoadenitis
- Diagnosis - biopsy of salivary glands, usually the lower lip, shows lymphoreticular hyperplasia
- Treatment
  - Treat recurrent infection
May develop a superimposed malignancy. Therefore, if a mass appears, surgical excision is needed.

**Degenerative Diseases**

I. **Fatty Infiltration**

II. **Hypertrophy**

- Alcoholism
- Kwashiorkor
- Metabolic diseases

**Obstructive Disease**

I. **Sialolithiasis (Salivary Duct Stones)** - Common in submandibular gland, uncommon in the parotid

- Etiology - Inspirated secretions, ductal debris, and calcium phosphate coalesce, due to inflammation or stasis.
- Signs and symptoms
  - Submandibular stone may be palpable in the floor of the mouth.
  - Partial obstruction causes enlargement and pain on eating, with return to normal as saliva drains.
  - Total obstruction leads to chronic enlargement and often infection.
- Treatment
  - Stones near the orifice may be removed intraorally
  - Deeper stones require excision of the gland

II. **Ductal Stenosis**

- Etiology-Trauma, neoplasm or chronic inflammatory process
- Signs and symptoms-Painful swollen gland-Neoplasm usually palpable
- Treatment-Dilatation or glandular excision

**Cystic Disease**

I. **Ranula** - A sialocele of the floor of the mouth

- Types
- Circumscribed - obstruction and cystic dilatation of sublingual gland or submandibular duct.
- Plunging - extravasation of saliva into tissues of the floor of the mouth. May extend deep into floor of the mouth

- Signs and Symptoms - cystic submucosal mass in the floor of the mouth; may periodically shrink with discharge of contents into mouth
- Treatment
  - Circumscribed cyst may be excised, along with involved gland or glands
  - Plunging ranulas cannot be excised and should be marsupialized

II. Congenital Cysts

Developmental Diseases

I. Agenesis

II. Branchial Cleft Cysts
- First branchial cleft cysts present as cysts or draining sinuses in preauricular area
  - Type I cysts track deep into parotid along EAC
  - Type II cysts track deep into parotid and are intimately involved with facial nerve
- Treatment - surgical excision

Salivary Gland Masses

I. Etiology
- Inflammatory scarring or focal obstruction,
- Inflammatory lymph node enlargement, secondary to cat scratch disease, scalp or external ear infection, etc.
- Metastatic involvement of nodes
- Neoplasm
  - Benign - 75-80% of all parotid tumors are benign
    - Benign mixed tumor
      - 65% of parotid neoplasms
    - Warthin's tumor
- Lymphangioma, hemangioma
  - Malignant - 20% of all parotid tumors are malignant. Submandibular and minor salivary gland tumors have increasing percentage of malignancy, i.e., the smaller the gland, the greater the likelihood of malignancy.
    1. Mucoepidermoid carcinoma
    2. Adenoid cystic carcinoma - associated with high propensity for nerve invasion
    3. Squamous cell carcinoma

II. Diagnosis
- Careful examination of scalp, ear and face for infection or malignant lesion
- Palpation of other lymph nodes
- Persistent salivary gland mass should be assumed to be neoplastic unless proven otherwise
- Minimum biopsy of parotid mass is a superficial parotidectomy
- Submandibular masses require excision of gland
- Minor salivary gland masses require excision with a margin of surrounding normal tissue

III. Treatment - Most salivary gland tumors require surgical excision of involved gland with or without post operative radiotherapy depending on the histology of the tumor and extent of disease. (See section on Head and Neck Tumors for management principles)
Chapter 14 – Disorders of Speech and Swallowing

Speech

- Normal Mechanisms
  - Phonation-the production of sound by the larynx
    - Requirements
      - Approximation of vocal folds
      - Forced expiration (adequate breath support)
      - Passive vibration of free mucosal edge of vocal fold
    - Pitch determined by the fundamental frequency of vocal fold vibration
      - Dependent on vocal fold length and tension
      - Controlled by "pre-phonatory tuning" and auditory feedback
    - Intensity is dependent on subglottic pressure, which is related to:
      - Expiratory flow
      - Glottic aperture area
  - Resonance-the modulation of sound by passage through body tissues. This can be voluntarily modified by movements of the tongue, palate and pharynx, as well as by changing the position and shape of the larynx. It may also be altered by pathology.
  - Articulation-the formation of words is accomplished by voluntary movements of the upper aerodigestive tract (lips, teeth, tongue, palate, etc.) to produce:
    - Unvoiced consonants
    - The "shaping" of phonation into vocalizations

- Speech Disorders
  Speech disorders may result from disruption of phonation (hoarseness), articulation (dysarthria), resonance, or prosody. A speech disorder is a symptom or sign - not a diagnosis. It cannot be properly treated if the etiology is unknown. Further, it can be a manifestation of a serious underlying disorder. Hence a thorough diagnostic evaluation is always indicated for persistent speech disorders.
o Hoarseness—abnormal vocal fold vibration—coarseness or raspiness of the voice. Most commonly, hoarseness is due to either infectious laryngitis or vocal abuse and will resolve with voice rest. However, a patient with hoarseness which persists more than two weeks should be referred for laryngeal exam.

- Structural changes in larynx
  - Laryngitis
    - Diffuse edema of the larynx
    - Etiology: infection, allergy, acute or chronic gastroesophageal reflux, trauma, or vocal abuse.
    - Therapy
      - Voice rest!
      - Specific management of causative factors
  - Reinke's edema
    - Isolated edema of the mucosal edge of the vocal fold
    - Etiology
      - Usually due to hormonal changes (menopause, hypothyroidism, etc.) but may also be seen in allergy, vocal abuse, or secondary to URI
    - Therapy
      - Voice rest, speech therapy, medical management of endocrine problems. If persistent, stripping of vocal fold mucosa may be indicated.
  - Vocal nodules
    - Thickened area on vocal cord, usually bilateral, at junction of anterior and middle thirds.
    - Etiology
      - Analogous to a callus. Develops with vocal abuse.
    - Therapy

- Vocal polyps
  - Sessile or pedunculated, on vocal fold
  - Etiology - most commonly results from traumatic hemorrhage into vocal fold with stretching of mucosa and loss of elasticity.

- Therapy
  - Excision

- Contact granuloma
  - Hyperplasia and granulation of mucosa overlying the vocal process of the arytenoid, seen more commonly in males.
  - Etiology
    - Traumatic irritation (intubation)
    - GE reflux, chronic throat clearing or cough, vocal abuse may also be implicated.
  - Therapy
    - Voice rest, voice therapy, anti-reflux regimen and cough suppression.
    - May need biopsy to rule out cancer or surgical removal.

- Hyperkeratosis
  - White plaques on vocal fold
  - Etiology - smoking, other chemical agents
  - Biopsy to rule out carcinoma, discontinue smoking, stripping of mucosa

- Papillomas
  - Warts on vocal folds. Most often in children. Airway obstruction can be life threatening.
  - Etiology
- Human papilloma virus subtype HPV6, HPV11.
- Relationship with maternal condylomas has been suggested
  - Therapy
    - Surgical removal by cup forceps or CO2 laser. Usually requires multiple repeat excisions because of recurrence.
    - May spontaneously resolve
- Carcinoma of the larynx
  - See section on Head and Neck Cancer. Laryngeal lesion requires direct laryngoscopy and biopsy for diagnosis and staging
  - Etiology - patient almost invariably smokes heavily and may drink
  - Therapy
    - Radiation, surgery, or combination
- Laryngeal paralysis
  - Unilateral vocal fold paralysis
    - Symptoms are determined by position of the cord, which correlates to specific neural lesion.
Chapter 15 – Head and Neck Tumors – Risk Factors, etc.

Introduction

The management of cancers of the head and neck has conventionally been the province of surgeons and radiotherapists. In the past fifteen years, medical oncologists have been increasingly involved in patients with these neoplasms. Multimodality management of head and neck cancer patients is now the modus operandi in most medical centers. Head and neck tumors should not only be the concern of head and neck surgeons, radiotherapists and oncologists, but also all primary care physicians and dentists. Practitioners familiar with these tumors can often recognize the symptoms and signs of early disease. The establishment of a diagnosis of head and neck cancer at an early stage significantly improves the prospect of curative therapy.

Mucosal Tumors

• Incidence and Epidemiology
  
  • Squamous cancers of the upper aerodigestive tract constitute approximately 6% of new cancer cases in men and 2% of women. At all sites, except the salivary glands, there is a significant preponderance of cases in men. Oral and pharyngeal cancer is more common in white males at every site, but the incidence of laryngeal cancer is somewhat higher in black males.

  • The geographic distribution pattern for head and neck cancer shows considerable variation and is site-dependent. For example, cancers of the nasal cavity and paranasal sinuses are slightly more common in the South than in the rest of the United States. Nasopharyngeal cancer is a very common disease in the Chinese, with age-specific incidence rates in males from Kwangtung Province (Cantonese) 40 times that of U.S. Caucasian males.

• Etiology and Pathogenesis
  
  • The overwhelming majority of head and neck cancers have been related to prolonged exposure to environmental factors. While many associations between risk factors and various head and neck cancers are firm, others remain questionable.
    
    ▪ Sunlight - Lip cancer, skin cancer
    
    ▪ Tobacco - Tobacco contains many carcinogens

  • Risk is a function of the degree of exposure and the inherent susceptibility of the site. Tobacco chewing is uncommon in the United States. However, it is common practice in some parts of the world, such
as Ceylon, Bombay, other parts of India and portions of Southeast Asia, which have some of the highest incidence rates in the world of oral and pharyngeal cancer. Oral cavity cancer is the commonest form of cancer in Bombay. A mixture called pan (betel, nut and leaf, lime, catechu, tobacco and other additives) is very popular in India. It is chewed into a quid and buccal mucosa cancer usually develops at the site where the quid is kept and has most frequent contact.

- Further evidence of the importance of type of exposure and site of cancer is the high incidence of cancer of the hard palate in populations that practice reverse smoking, i.e., where the burning end of the cigarette is kept in the mouth during smoking, in parts of India, Sardinia, Venezuela and Panama. Hard palate cancer is otherwise uncommon in most of the world.
  - Cancer of the lip associated with pipe smoking.
  - Cigarette smoking, the most popular form of tobacco use in this country clearly plays a causative role in tongue, pharyngeal, laryngeal, esophageal and lung cancer.

- **Alcohol**
  - Synergistic with tobacco
  - Ethanol per se, not a carcinogen, other factors implicated

- **Nutritional Deficiencies** - Specific role not established, but an area of increasing study and investigation

- **Occupational Factors** - e.g., nickel workers, wood workers implicated in paranasal sinus cancer

- **Epstein-Barr Virus (EBV)** - Possible etiological role in nasopharyngeal carcinoma

- **Genetic Factors** - An area of increasing study and interest. Certainly, some families have high incidence of cancer but genetic link not completely understood. However, some head and neck neoplasms have had recent chromosomal identification, e.g., retinoblastoma linked to q14 band of chromosome 13, medullary carcinoma of thyroid to chromosome 10, neurofibromatosis to chromosome 22.

- **Poor Oral Hygiene** - Oral cavity, especially floor of mouth cancer, tongue, and alveolar ridge neoplasms.

- **Radiation** - Ionizing radiation which was used in past to treat such benign conditions as acne, tonsillar and adenoid hypertrophy, enlarged thymus in newborn and chronic sialoadenitis has led to increased risk of
thyroid cancer, parotid neoplasms, malignant degeneration of papillomas and possibly other upper aerodigestive tract neoplasms.

- **Pathology Ulcerative or Exophytic**
  - **Histology**
    - Majority are squamous cell carcinoma (> 90%)
    - Adenocarcinoma
    - Verrucous carcinoma
    - Others
  - **Modes of Spread**
    - Epidermoid carcinomas of the head and neck usually remain localized and tend to progressively invade adjacent tissues.
    - Extension into regional lymph nodes are more likely in lesions with:
      - Large size
      - Sites with abundant lymphatic drainage
    - Hematogenous metastases-less common-seen in more aggressive tumors, and tumors present for some time
  - **Symptoms and Signs** - Reflect the anatomic location, the degree of advancement and growth characteristics
    - An obvious lesion
    - Bleeding
    - Malodorous breath
    - Odynophagia
    - Otalgia - local or referred
    - Trismus to muscles of mastication
    - Nasal stuffiness, unilateral nasal obstruction, postnasal drip, headache and epistaxis should not be attributed to sinusitis without careful investigation
    - Nasal speech
    - "Hot potato" voice
- Poorly fitting dentures
- Loosening of teeth
- Dysphagia
- Hoarseness
- Cranial nerve palsies
- Cervical adenopathy - in patient with known head and neck primary malignancy, approximately 85% are metastatic

**Diagnosis** - Most head and neck cancers are treatable and curable when discovered early. However, many cancers of the head and neck are large and extensive when diagnosed.

- History
- Occupational risks and social habits
- Symptoms and signs

**Physical Examination**
- Head and Neck Examination - both inspection and palpation especially oral cavity, base of the tongue, and palate
- General Physical Examination - distant metastases, coexisting medical problems

- Radiographic and Laboratory Studies
- Chest roentgenogram, complete blood count and platelet count, prothrombin time, partial thromboplastin time, SMA15, urinalysis and electrocardiogram
- Radionuclide scanning utility is dependent upon the likelihood of metastatic disease

- Biopsy - histologic confirmation of the diagnosis is mandatory before proceeding with any definite therapy
- Superficial lesions - punch biopsy - ideal for readily accessible lesions of the skin or mucosa
- Deeper lesions
  - Needle biopsy
  - Fine needle aspiration with cytology
- Large bore needle

- Incisional biopsy - violates capsule and potentially seeds tumor. Useful when all diagnostic modalities have failed to establish a diagnosis and excisional biopsy of the mass is not technically feasible.

- Excisional biopsy - removal of a suspected tumor mass in its entirety. Rarely indicated in squamous cell carcinomas of the upper aerodigestive tract.

- **Evaluation of the Neck Mass** - any neck mass in an adult that persists more than four to six weeks should be considered potentially malignant until proven otherwise, especially in patients with a history of smoking, drinking or neck radiation. The proper evaluation of this particular patient does not consist of immediate open neck biopsy, but begins with a complete physical examination with an emphasis on the head and neck. Appropriate blood studies and radiographs should be carried out. If complete examination of the head and neck does not reveal a primary lesion, then the patient should undergo endoscopy under general anesthesia. He should have nasopharyngoscopy, direct laryngoscopy, bronchoscopy, and esophagoscopy performed. In most instances, a primary lesion will be identified at the time of endoscopy and appropriate biopsies can be taken. A treatment plan can then be outlined based on the information obtained at endoscopy. In a small percentage of patients, no primary lesion will be grossly evident. Selected random biopsies should be performed of the nasopharynx, pyriform sinus, base of tongue, and tonsillar fossa, as these areas have been identified in previous studies as the most common sites for occult head and neck primaries. With this careful systematic evaluation, the primary tumor will be identified in almost all cases. However, in a small percentage of cases, no primary lesion will be found. If this is the case, then exploration of the neck with biopsy of the mass is indicated. The patient should be prepared for a neck dissection which is indicated if frozen section analysis reveals squamous carcinoma. In the case of adenocarcinoma or lymphoma, then a neck dissection is not performed and further diagnostic work-up and definitive therapy should be pursued.

**Staging**
The most commonly accepted staging in the United States is that of the American Joint Committee for Cancer Staging and End Results Reporting.

**Specific and Supportive Management**

- **General Consideration of Specific Therapy for Various Stages of Disease** - Choice of treatment should be based on the histopathology of the tumor, the staging classification of the tumor, the general physical status of the patient and the psychosocial condition of the patient at the
time of diagnosis. These considerations will determine whether treatment should be directed at cure or palliation or simply support. Any treatment employed may affect respiration, deglutition, phonation and aesthetic appearance. It is important that the patient be an informed and active participant in treatment decisions throughout the course of therapy. The patient's ultimate decision should be respected at all times. By the same token, the patient should be made aware of the consequences of failing to pursue active treatment.

- The principles of therapy of head and neck cancer directed at cure of the disease should try to meet three objectives:
  1. To eradicate the neoplasm completely
  2. To give the patient the best functional result by careful planning of the radiation fields or appropriate reconstructive techniques for surgical defects
  3. To leave the patient with as good a cosmetic result as possible

Principles of Palliation Therapy. In cancers which are deemed unresectable because of local extension or deemed incurable because of diffuse metastastic spread, treatment can be directed toward palliation.

- Palliative treatment may be employed to:
  1. Control local advancement of tumor
  2. Provide relief from pain, e.g., the use of radiotherapy for bone metastasis can be quite helpful in relieving the extreme pain incurred from such metastases
  3. Provide relief from obstruction, e.g., a patient with a far advanced laryngeal tumor may benefit greatly from a tracheostomy to prevent suffocation
  4. To control bleeding

Concern for the patient's quality of life should guide the treatment decisions. The choice of treatment modalities will depend on:

- The size of the tumor and the location of the lesion
- The gross characteristics of the tumors, i.e., exophytic or infiltrative
- Histopathologic differentiation of the tumor
- Presence of local bone and muscle involvement
- Presence or absence of nodal disease
• The general medical condition of the patient
• Socio-economic condition and occupation of the patient
• The experience of the surgeon, radiotherapist and oncologist in treating head and neck tumors

The tools at the disposal of the radiotherapist, the surgeon, and the medical oncologist differ greatly. Only a thorough understanding of the nature of the biologic process as well as the capabilities and limitations of each treatment modality will allow selection of the most appropriate therapy for any individual patient.

• Radiation Therapy
  o Megavoltage therapy. Despite the tremendous advance in technological equipment available to the radiation therapist, including computerized dosimeters, the proper treatment of lesions with minimal side effects requires an experienced and sophisticated therapist who understands both the nature of these tumors as well as the capabilities and limitations of his equipment.
    o External Beam
    o Interstitial

• Surgery
  o Gross removal of the primary tumor in its entirety
  o Removal of all involved lymph nodes dependent on the histopathology of the tumor, the location of the tumor, the propensity for the tumor to metastasize, and general status of the patient
    • Classical radical neck dissection—En bloc resection of lymphatics and soft tissue contained in superficial layer of deep cervical fascia to deep layer of deep cervical facia from the trapezius to the clavicle to the midline to mandible. Weakness of the shoulder because of the sacrifice of cranial nerve XI. The carotid artery and remaining cranial nerves are spared.
    • Modified (conservation) neck dissection—resection of lymphatics and soft tissue within the limits defined above but with preservation of the sternocleidomastoid muscle, strap muscles, internal jugular vein, and cranial nerve XI. This is a technically difficult procedure and should be attempted only by experienced head and neck surgeons.
  o Restoration of physiologic function and reconstruction of all significant physiological and cosmetic defects dependent on:
- Location of the tumor
- Extent of resection
- Reconstructive methods employed
- Patient's motivation and ability to adapt

- **Chemotherapy** - Head and neck tumors frequently respond to chemotherapeutic agents. However, these drugs are used primarily for palliation or as adjuvant therapy in conjunction with surgery and radiation and have not replaced other modalities. Some drugs with proven activity in head and neck cancers:
  - Methotrexate
  - Bleomycin
  - Hydroxyurea
  - Cisplatin
  - 5-Fluorouracil

- **Supportive Measures**
  - Treat underlying medical condition
  - Supplemental nutrition

- **Rehabilitation**
  It often involves relearning such basic skills as swallowing and talking.
  - Laryngectomy
  - Esophageal speech
  - Electrical vibratory device
  - Pharyngotracehal fistula
  - Palatal and Orbital Resection Prostheses
  - Allow swallowing and normal sounding speech
  - Camouflage of large nasal and orbital defects
  - Radical Neck Dissection-may need a physical therapist for shoulder weakness

- **Follow-up**
  - Monitor the patient's response to therapy
To detect recurrence or second primary
- Every two months in the first year
- Every three months the second and third year
- At least every six months in the fourth and fifth years
- Yearly thereafter

**Salivary Gland Tumors**

The salivary glands are divided into the major glands (parotid, submandibular and sublingual) and minor glands (found in the submucosa of the nose, sinuses, mouth and upper aerodigestive tract). Tumors arise in both the major and minor glands, but are more frequent in the former. The most common site for a salivary tumor is the parotid gland and fortunately 70-80% are benign. Occurring less frequently than parotid lesions, submandibular and sublingual tumors are malignant in approximately 50% of cases. Minor salivary gland tumors are unusual and approximately 60% are malignant.

- **Types of Tumors**
  - **Benign**
    - **Benign Mixed Tumor** (Pleomorphic adenoma) - The most common tumor of the parotid gland
    - **Warthin's Tumor** (papillary cystadenoma lymphomatosum) - Occurs most frequently in the "tail" of the parotid gland of white, middle aged males. Appear "hot" on Tc99 scan. Bilateral lesions not uncommon.
  - **Malignant**
    - **Adenoid Cystic Carcinoma** - Very lethal even when treated early. Although five-year survivals are quite good, 20 year survival is very poor-15% or less depending on site of origin. Most patients die of pulmonary metastases. This tumor also has a proclivity for perineural spread.
    - **Mucoepidermoid Carcinoma** - Graded into high grade (very malignant and lethal) to low grade (very curable with surgery alone). The most common parotid tumor seen in childhood. Generally metastatic to lymph nodes.
    - **Acinic Cell Carcinoma** - Low grade malignancy
    - **Squamous Cell Carcinoma** - Very aggressive tumor. Must rule out metastasis from a skin lesion to parotid lymph nodes. Primary parotid lesions tend to metastasize to cervical lymph nodes.
• **Diagnosis**
  
  o It is generally difficult to reliably differentiate benign from malignant lesions on the basis of history and physical examination. Facial paralysis and pain are almost exclusively associated with malignant lesions. A several year history of a slowly enlarging, lobulated mass is suggestive of a benign mixed tumor.

  o Computerized axial tomography may be helpful, but is unreliable in accurately differentiating benign from malignant lesions.

  o Thin needle aspiration is frequently accurate in diagnosing the lesions, but generally does not change the therapy which is surgical removal. Except for readily accessible, minor salivary gland lesions, open, incisional biopsy is to be condemned as this may lead to "seeding" or spread of the tumor, particularly the benign mixed tumor.

• **Treatment**
  
  o **Parotid Lesion** - Complete excision of the tumor with a margin of surrounding normal salivary gland. Since the vast majority of lesions occur in the superficial lobe (lateral to the facial nerve) then the primary operation is a superficial parotidectomy with facial nerve dissection. This is potentially curative for all benign lesions and is generally the only surgery necessary for many malignant lesions. If a branch of the facial nerve is involved by a malignancy (particularly the adenoid cystic carcinoma) then that branch and perhaps all of the parotid gland and the facial nerve may need to be removed. A neck dissection is frequently indicated in squamous and high grade mucoepidermoid carcinomas.

  o **Submandibular and Sublingual Glands** - Complete excisions of the gland and tumor. If a malignancy is discovered, then a neck dissection and perhaps excision of the floor of mouth may be indicated depending on the tumor type.

  o **Minor Salivary Glands** - The operation depends on the location of the involved gland, but complete excision with a margin of normal tissue is essential. In the case of adenoidcystic carcinomas, surrounding nerves must be sampled for possible invasion and excised if involved.

• **Radiation Therapy** - Although not curative, most malignant salivary gland tumors respond to radiation therapy and it is usually incorporated into the treatment plan of the more ominous lesions (adenoid cystic carcinoma, adenocarcinoma, high grade mucoepidermoid carcinomas and squamous cell carcinomas). Radiation is used as the primary treatment for malignancies in patients who are poor surgical candidates. Radiation of benign lesions is not the accepted therapy in most circumstances in this country.
Preface

Mission Statement

The mission of The Otolaryngology/Oro-Facial Plastic Surgery residency program at Des Peres Hospital is to educate and provide residents with the opportunities to become competent, proficient and professional Osteopathic Otolaryngologists/Oro-facial plastic surgeons. The department of Otolaryngology/Oro-facial Plastic Surgery is committed to following the basic standards as stated by the American Osteopathic Association along with the pursuit of new knowledge, competence, and improvement in each resident of the program.
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Log Forms – See samples in New Innovations
  Monthly Surgical Log Cover Sheet
  Monthly Surgical Log Template
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  Resident Cumulative Surgical Logs Year Total
  Patient Tracking Spreadsheet

Otology Notes from Dr. Van Ness – Appendix I
  Medical Library Books Relevant to ENT – Appendix II

Books suggested to purchase that are not on list:
  Otologic Surgery by Brackmann and Shelton
  Surgery of the Ear by Glasscock and Shambaugh; there are multiple editions
  Pathology of the Ear by Schuknecht
  Tympanoplasty and Stapedectomy by Fisch

AOA Basic Standards for Otolaryngology/Oro-facial Plastic Surgery
AOA Basic Standards for Otolaryngic Allergy Fellowship Training
Educational Goals:
The overall educational goals of the Department of Otolaryngology/Oro-Facial Plastic Surgery Residency are:

1. To provide a strong background in the basic and clinical sciences related to Otolaryngology/Oro-Facial Plastic Surgery
2. To assist in the development of clinical and surgical expertise
3. To provide the opportunity to learn and practice research skills

All residents participate in a series of didactic lectures, clinical conferences, journal reading assignments, and independent reading which is directed primarily toward achieving the first goal. The effectiveness of this program is monitored by resident evaluation of the program, results of Home Study Course testing, results of the Annual Otolaryngology Examination, and success with the American Board of Otolaryngology certification process.

Common to all years will be the goals of the seven core competencies listed below:

Osteopathic philosophy and osteopathic manipulative medicine:
- Demonstrate and apply knowledge of accepted standards in OMT appropriate to Otolaryngology/Oro-facial Plastic Surgery
- Integrate osteopathic concepts and OMT into the medical care provided to patients as appropriate
- Demonstrate the treatment of people rather than symptoms
- Understand and integrate osteopathic principles and philosophy into all clinical and inpatient care activities

Interpersonal and Communication skills:
- Understand the importance of good communication, and its impact on patient care.
- Develop excellent communication skills with patients, peers, staff, and attendings.
- Learn how to interact with other health care professionals in a courteous manner.

Professionalism:
- Learn how to ethically treat patients and always work in their best interest.
- Understand the importance of timeliness in dictations, rounding, charting.
- Understand the need for showing sensitivity to patients’ ethnicity, age and disabilities.
- Learn how to practice medicine with integrity and honesty.

Systems-based practice:
- Learn how to work with an interdisciplinary team in the pre- and post-
operative care of the surgical patient.

- Become adept at interacting with social work for the post-hospital care of our patients.
- Learn how to approach patient care problems from a systems-based approach rather than the “band-aid” approach.
- Begin to develop a feel for providing cost-effective medicine without compromising patient care.

Practice-based learning:
- Learn how to evaluate your own practice of medicine and correct any inefficient or incorrect behaviors.
- Learn how to use evidence-based medicine to better care for the patients.
- Become proficient at using the electronic medical record and the use of the Internet to look up medical information.
- Understand how professionals learn and the best way to teach medical students.

Medical Knowledge:
- Residents will demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral science, as well as the application of this knowledge to patient care.

Patient Care:
- Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

Graduated Levels of responsibility:

OGME I – Individuals in the OGME I year are closely supervised by more senior level residents and/or faculty. Examples of tasks that are expected of OGME I physicians include: perform a history and physical, start intravenous lines, draw blood, order medication and diagnostic tests, collect and analyze test results and communicate those to the other members of the team and faculty, obtain informed consent, place urinary catheters and nasogastric tubes, assist in the operating room performing tracheotomies and skin grafts and closure of wounds and perform other invasive procedures under the supervision of the faculty or senior residents at the discretion of the responsible faculty member. The resident is expected to exhibit a dedication to the principles of professional preparation that emphasizes primacy of the patient as the focus for care. The first year resident must develop and implement a plan for study, reading and research of selected topics that promotes personal and professional growth and be able to demonstrate successful use of the literature in dealing with patients. The resident should be able to communicate with patients and families about the disease process and the plan of care as outlined by the attending. At all levels, the resident is expected to demonstrate an understanding of the socioeconomic, cultural, and managerial factors inherent in providing cost effective care. Communication is emphasized this year including the ability to interact between health care services and exhibiting knowledge of systems-based practice

Indirect supervision is adequate for the following patient care situations:

1. Initial evaluation and management of inpatients.
2. Preoperative & postoperative evaluation and management.
3. Patient transfers between floors and/or hospitals.
4. Discharging patients from the hospital.
5. Interpretation of lab results.
6. Procedures such as placement of IV’s, nasogastric tubes, Foley catheters, and arterial punctures.

Direct supervision is required for the following patient care situations, until competency can be demonstrated and documented:
1. Initial evaluation and management of patients with urgent or emergent conditions.
2. Evaluation and management of postoperative complications.
4. Management of patients in cardiac arrest. ACLS certification should be obtained.
5. Procedures such as:
   a. Advanced vascular access
   b. Closure of surgical incisions and/or lacerations
   c. Excision of superficial skin lesions
   d. Tubethorascomy
   e. Paracentesis
   f. Joint aspiration
   g. Airway management, including orotracheal intubation and tracheostomy
   h. Tracheotomy tube exchanges
   i. Nasal Packing for epistaxis
   j. Drainage of peritonsillar abscess

Competency in each of the above listed skills will require being “signed off” by a more senior level resident and/or attending. Upon the notification of competency, the information can be submitted to either the Program Director or his/her designee for proper documentation in New Innovations.

**OGME II** – Individuals in the second post graduate year are expected to perform independently the duties learned in the first year and may supervise the routine activities of the first year residents. The OGME II may perform some procedures without direct (on-site) supervision such as facial laceration repair, debridement of wounds, endoscopy and foreign body removal from the nasal passageway and ear. Residents at this level can perform procedures and endoscopy under the direct supervision of faculty or senior level residents. The OGME II should be able to demonstrate continued sophistication in the acquisition of knowledge and skills in Otolaryngology and further ability to function independently in evaluating patient problems and developing a plan for patient care. The resident at the second year level may respond to consults and learn the elements of an appropriate response to consultation in conjunction with the faculty member. The resident should take a leadership role in teaching the OGME I and medical students the practical aspects of patient care and be able to explain complex diagnostic and therapeutic procedures to the patient and family. The resident should be adept at the interpersonal skills needed to handle difficult situations. The OGME II should be able to incorporate ethical concepts into patient care and discuss these with the patient, family, and other
members of the health care team.

**OGME III** – In the third year, the resident should be capable of managing patients with virtually any routine or complicated condition and of supervising the OGME I and OGME II in their daily activities. The resident is responsible for coordinating the care of multiple patients on the team assigned. Individuals in the third postgraduate year may perform all routine diagnostic and therapeutic procedures including endoscopy without direct (on-site) supervision. The OGME III can perform progressively more complex procedures under the direct (on-site) supervision of the faculty. It is expected that the third year resident be adept in the use of the literature and routinely demonstrate the ability to research selected topics and present these to the team. At the completion of the third year, the resident should be ready to assume senior level responsibility in those specialties requiring three years of training.

**OGME IV** – Individuals in the fourth post graduate year assume an increased level of responsibility as the chief or senior resident on selected services and can perform the full range of complex procedures expected of Otolaryngology under the supervision of the faculty. The fourth year is one of senior leadership and the resident should be able to assume responsibility for organizing the service and supervising junior residents and students. The resident should have mastery of the information contained in standard texts and be facile in using the literature to solve specific problems. The resident will be responsible for presentations at conferences and for teaching junior residents and students on a routine basis. The OGME IV should begin to have an understanding of the role of the practitioner in an integrated health care delivery system and to be aware of the issues in health care management facing patients and physicians.

**OGME V** – The fifth year resident, under the supervision of the faculty, takes responsibility for the management of the major surgical teaching services. The OGME V can perform most complex and high risk procedures expected of a physician with the approval of the attending physician. During the final year of training the resident should have the opportunity to demonstrate the mature ethical, judgmental and clinical skills needed for independent practice. At the Program Director’s discretion, the OGME V may be asked to present a formal presentation at scientific assemblies, or participate as a member of a discussion panel as well as assuming a leadership role in teaching on the service. The mores and values of the profession should be highly developed, including the expected selfless dedication to patient care, a habit of lifelong study and commitment to continuous improvement of self and the practice of medicine.

**ALL YEARS – ALL RESIDENTS:**
WHAT TO KNOW AND WHAT TO DO AS A FIRST YEAR RESIDENT

First Year Resident Checklist (OGME-2) – To be done by the 10th month of Intern Year (OGME-1)

• During resident orientation (beginning of OGME-1 year), be sure to get the manual from Medical Education which describes policies, etc. of Des Peres Hospital in conjunction with the resident manual, syllabus, and curriculum of the Otolaryngology/Oro-facial Plastic Surgery Program.

• Confirm with Medical Education that all pertinent information has been sent to med staff offices at DePaul, St. Joseph Health Care and Barnes St. Peters.

• Familiarize the log database sent to you with CPT codes and formatted templates present at hospitals in which you rotate and the attending’s offices

• Become a member of:

• Confirm Membership with Medical Education for AOA, AOCOO-HNS, MAOPS, and SLAOPS

• Sign up for Home Study Course with membership ID from the Academy www.entlink.net/education/programs/hsc.cfm (Home study required for 2 years out of your residency) It is suggested to begin the course in R2. There are 8 units—4 each year. You are required to submit your testing answers prior to the first deadline with a copy to the Program Director. If you submit your answers late, they may be scored; however, the Program Director will not give you credit for that section

• In Service exam required every year (2-5)

• Obtain Permanent License by the end of this year

Medical License # ________________________________

AOA ID # ______________________________________

MAOPS ID # ____________________________________

AOCOOHNS # __________________________________

AAO-HNS # _____________________________________
AOCCO-HNS Resident Submissions by Year

- Year End Reports due by July 30th
- First Year (specialty track internship)-Forms available on AOCCO-HNS website
  - Resident’s Annual Report (surgery logs)
  - Accumulated Tracking Log Form
  - General Surgery Director’s Annual Report and Program Requirements checklist

- Second Year
  - Resident’s Annual Report, Residency Checklist
  - Program Director’s Annual Report
  - Professional Paper (see Appendix IV of the Basic Standards)
  - Home Study Course
  - Accumulated Tracking Log Form

- Third Year
  - Resident’s Annual Report, Residency Checklist
  - Program Director’s Annual Report
  - Professional Paper (see Appendix IV of the Basic Standards)
  - Home Study Course
  - Accumulated Tracking Log Form

- Fourth Year
  - Resident’s Annual Report, Residency Checklist
  - Program Director’s Annual Report
  - Professional Paper (see Appendix IV of the Basic Standards)
  - Home Study Course
  - Accumulated Tracking Log Form

- Fifth Year
  - Resident’s Annual Report, Residency Checklist
  - Program Director’s Annual Report
  - Accumulated Tracking Log Form
Otolaryngology Resident Vacation and Holiday Policy

- Residents are allowed 3 weeks of vacation per academic year

- Three major and four minor holidays

  **Major:**
  - Christmas
  - New Year
  - Thanksgiving

  **Minor:**
  - Memorial Day
  - Labor Day
  - Easter
  - Fourth of July

- The Chief Resident will be assigned 4th of July holiday call. Each of the other residents will work one major and one minor holiday. The OGME IV resident will select their holiday call first, followed by others.

- Vacation taken between Christmas and New Year will be allowed only if the Otolaryngology service is adequately covered. If 3 residents are needed and 2 residents request vacation during this same time-the following policy:
  
  - Which ever resident has not taken previous vacation time during this period between Christmas and New Years will be granted the vacation time.

  - If both residents have taken previous vacation time during this period then it will alternate. You may not take vacation during this period 2 years in a row.

  - Any exceptions are only with the Program Director’s approval.

**Council of Resident Representatives**

- This is a council that is to have one spokesperson, who is a resident from both divisions of the college (1 OPTH, 1 ENT)
- The council rep is at all of the college board meetings and is the resident’s representative. The council rep’s job is to take your problems to the board and decimate information to the residents.

- Our program is to have a resident whom the council representative can contact and vice versa.

- The OGME 4 resident is the contact person from our program. The OGME 4 resident is responsible for finding out the council representative for ENT and contacting them to notify the representative of how to get a hold of our contact person (phone, email, etc). Notify the Program Director as soon as you have done this.

**Resident Paper Deadlines**

- Subject: October 1st
- Outline: January 1st
- Rough Draft: March 1st
- Final Paper: May 1st

**AOCOOHNS Course Requirements: (See Basic Standards)**

- Allergy
- Facial Plastic Surgery
- Head and Neck Surgery
- Laser Surgery
- Temporal Bone Surgery
- Basic Science Course

Head and Neck Anatomy and Basic Science course required during first or second year:

Iowa City, Iowa [www.iowabasicscience.org](http://www.iowabasicscience.org)

Indianapolis, Indiana [www.iupui.edu/~cmeweb/05127/Histo04Reg.htm](http://www.iupui.edu/~cmeweb/05127/Histo04Reg.htm)

SLU provides many CME courses that meet these requirements:
http://pa.slu.edu/index.phtml?page=CMEWorkshops

Iowa also has Head and Neck Surgery/Laser Course
Out-Rotations

- AOCOOHNS Regulations:
  - No more than 6 months at an outside facility consecutively
  - No more than 16 months on out rotations total (1/3)
  - No out rotations during last 6 months of final year

Recommendations for Out-Rotations

OGME 2: Pediatrics (3 months total – 1, 2 or 3 months this year-the remainder next year) Facial Plastics (2-3 months –depending on the numbers you achieve)
OGME 3: Pediatrics (whatever hasn’t been done prior)
  Facial Plastics (1 month, if needed)
  SLU Head and Neck (3 months)
OGME 4 and PGY5: Otology (3 months)/Neuro-Otology
  Head and Neck Oncology (2-3 months) This may be done in OGME 3, if it can be worked out
  See attached Appendix: Otology notes from Dr. Van Ness (when you go on this rotation, these are his suggestions)

OGME1 – Internship Rotations

Please notify the Program Director as soon as possible of your rotations to be sure the rotations are appropriate for ENT.

Medical Records

- Medical Records must be done weekly. There should never be a time when the Program Director is notified that a resident is delinquent. EMR-during clinics residents will learn to manage this system
- Operative Reports should be done as close to the time of the surgery as possible. As an example, doing a report 5 days after surgery – a resident could leave out that arch bars were used before plating.
Educational Protocol
In order to provide the best educational training for residents, the below rules are to be followed. Residents are to abide by the following rules, by order of importance of their duties, in determining where they need to be. The in-house senior resident is responsible for scheduling residents according to this protocol.

1. **Grand rounds** and Lectures at SLU 7:30-8:30am (residents would not be available on Wed till 9 am because they must go to the lecture)

2. **Surgeries** Any major cases take precedence over clinic. (if there is a conflict with not enough residents for all the cases, the residents are to select the best cases and let the other attending(s) know that he will not have coverage) Residents are to do any surgeries available before any clinics. Residents should apply common sense in making decisions….3 residents shouldn’t show up for a set of tubes and not have clinic covered. On the other hand, a frontal sinus or radical neck (major cases) should have all residents as opposed to any resident doing clinic.

3. **Post Op Clinic** should be covered by a resident. It may need to be moved/rescheduled to be sure that surgeries are covered first, then post op clinic. It is important that post op clinic remain covered, so it would need to be moved/rescheduled to accommodate this. The in-house senior resident should monitor this and move/reschedule post op clinics if conflicts occur.

4. **Medicaid clinic** Clinic is to be covered for each doctor on an equal basis, if there is ever a conflict where there are not enough residents to cover clinics--whomever has the most Medicaid clinic patients is where the resident is to go. At no time, should two residents participate in one clinic leaving the other clinic without a resident.

5. **Temporal Bone Lab** (done only when other things are completed, the dilemma is that it maybe available only when clinic is running, the resident should alert the attending that there will be no resident that day)

6. **Educational requirements** At this time, you have 5 educational opportunities per week that are expected of you. (this does not apply to the R-1 level...that person can attend what they can make)
To recap what these are:

1. Monday afternoon lecture series **(also includes temporal bone lab*)
2. Monday evening allergy lecture**
3. Wednesday morning SLU lectures **
4. Wednesday afternoon red book studies (board review)**
5. Friday morning book club**

* The only educational opportunity that you cannot make up would be temporal bone drilling if you are on an out rotation--ex: Indianapolis,Otology
** These are to be done no matter where you are-ex: If you are in Indianapolis on a Friday book club--you are still responsible for those chapters. Further—ex: If you missed the Wednesday allergy lecture about asthma-- you should still have read on the subject. If you miss the afternoon red book studies--you need to cover the same subject.

Any required or suggested meetings are to be considered after the five educational requirements above.

**Weekly Book Club**  *(Do not get lax in doing this)*

1. Book club dates and times are to be on the master resident schedule. There should be at least 4 weekly book club meetings a month.
2. A sign in sheet is to be kept and a copy of said sheet is to be given to the Administrative DME and myself monthly.
3. Is it the responsibility of the senior resident to schedule book club meetings and make sure that the sign in sheets are handled appropriately. If the senior resident is out for any reason, this responsibility will fall to the next most senior resident to complete.

**Reading**

1. A minimum of 1 book per year should be read by each resident
   A: OGME 1 – general ENT/Ballenger
   B: OGME 2 – Cummings
   C: OGME 3 – Bailey
   D: OGME 4 – Otology/head and neck
2. I want to talk to each one of you individually about what books you have read so that we can make sure this fits with what has already been done.
3. Of course, you will supplement with other reading depending on what rotation you are doing.

   *The above is separate from weekly book club reading*
In Service Review Form

Based on grading of your year, if your in-service scores are one (1) or two (2) in the cumulative or composite scale, this would mean you scored in the lower 3-5% in the test. The following will be done in order to help correct this problem:

1. Daily reading of at least an hour from a book that is mutually agreed upon by the resident and program director—until the book is completed. If the book is completed—we will pick a new book. This is outside of your normal reading. Ex: preparing for a case.
2. This is to be completed 7 days a week—no exceptions (vacations, etc.)
3. A weekly summary from the book read, chapter and page numbers to be given to Program Director.
   a. Ex: KJLee, Chapter 1, pages 1-38 week 1
4. Five questions from the week’s of reading
   a. Ex: Week 1 – KJLee, Chapter, Pages, 1-38
      i. Question 1 in multiple choice answer
      ii. Question 2 in multiple choice answer
      iii. Question 3 in multiple choice answer
      iv. Question 4 in multiple choice answer
      v. Question 5 in multiple choice answer
5. In a rolling one-year time frame—52 summary/logs with questions are to be completed and numbered 1-52.
6. The summary with questions is due once a week for the previous week. Ex: week 1—June 16-22. The summary is due to the director on Monday, June 23. There should be no exceptions to this without prior authorization.
7. The summaries may be placed in the directors’ box on Mondays or e-mailed. Whatever format chosen should be consistent.
8. If ones in-service scores are low again for a second year—the process will be repeated.
9. This is a condition of your continuation of residency within our program.

The Program Director has gone over my in-service review form and I am aware of my requirements as listed above.

Print: ________________________________  Date: __________
Resident Name

Sign: ________________________________  Date: __________
Resident Signature

Sign: ________________________________  Date: __________
Paul E. Burk, D.O., F.O.C.O.O.
POLICIES

In addition to the policies below, you are to comply with all applicable policies and procedures of Des Peres Hospital and any other hospitals in which you are doing an out-rotation or relevant clinical facilities. During orientation, you will receive a manual from the Medical Education Office that lists policies that are not covered below.

A. Technical Qualifications for residents

Technical standards for Otolaryngology have been established to allow the resident candidate to determine their ability to perform the required duties in compliance with the Americans with Disabilities Act.

An otolaryngology resident must have abilities and skills in five categories: observation, communication, motor, intellectual, behavioral and social. However, it is recognized that degrees of ability vary widely between individuals.

1. Observation: A candidate must be able to observe a patient accurately at a distance and close at hand. In detail, observation necessitates the functional use of the sense of vision and other sensory modalities. Full color vision and binocular vision are necessary for the successful performance of otolaryngology surgery.

2. Communications: A candidate must be able to communicate effectively and sensitively with patients. The focus of this communication is to elicit information, describe changes in mood, activity, and posture, and perceive nonverbal communications. Communication includes not only speech, but reading and writing. The candidate must be able to communicate effectively and efficiently in oral and written formats with all members of the health care team.

3. Motor: Candidates must have sufficient motor function to elicit information from patients by palpation, auscultation, percussion, and other diagnostic maneuvers. A candidate must be able to execute motor movements reasonably required to provide general care and emergency treatments to patients. Such actions require coordination of both gross and fine muscular movements, equilibrium, and functional use of the senses of the touch and vision.

4. Intellectual-Conceptual, Integrative and Quantitative Abilities: These abilities include measurement, calculation, reasoning, analysis, and synthesis of complex information.

5. Behavioral and Social Attributes: A candidate must possess the emotional health required for full utilization of his or her intellectual abilities, the exercise of good judgment, the prompt completion of all responsibilities attendant to the diagnosis and care of patients, and the development of mature, sensitive, and effective relationships with patients. Candidates must be able to tolerate physically taxing workloads and to function effectively under stress. They must be able to adapt to changing environments, to display flexibility, and learn to function in the face of
uncertainties inherent in the clinical problems of many patients. Compassion, integrity, interpersonal skills, interest and motivation are all personal qualities that are assessed during the selection and education process.

B. Social Networking Policy – As medical professionals, resident physicians are expected to conduct themselves with the utmost in professionalism, whether in personal interactions or when online. Residents should refrain from engaging in any unprofessional behavior, inappropriate language, posting of offensive photos or materials when engaged in online activities. Failure to maintain the minimum standards of professionalism may result in disciplinary action.

C. Sick Leave
   a. If, for any reason you need to take sick leave, call or speak with the Residency Program Director

D. Vendor/Industry Interactions
   b. Residents may not accept gifts from vendors/industry, regardless of value
   c. Residents are not permitted to accept books, instruments and other teaching aids from industry representatives or vendors.
   d. On-site access by industry representatives or vendors is restricted to non-patient care and public areas only. Industry representatives and vendors are permitted access to patient care areas and non-public areas only when their presence is necessary for educational purposes and then only by appointment and, when appropriate, with the prior consent of the patient. Such on-site access by industry representatives and vendors must be under the constant supervision of a COM faculty member.

E. Residents must abide by the rules and policies as stated in the AOA Basic Standards for Otolaryngology/Oro-facial Plastic Surgery residents. See section 7- Resident Requirements.

F. Meetings - Section 7.7 states residents must attend 70% of all meetings as directed by the Program Director. Residents are to attend various meetings throughout the five year academic training program. These may include national meetings such as the ACA, educational meetings such as the Basic Allergy, local political meetings such as MAOPS and SLAOPS, Journal clubs, book clubs, reading club, OMT, Board Review, and hospital committee meetings. The Program Director will designate meetings which are mandatory and those which are suggested.

   Mandatory meetings require 100% attendance; suggested meetings require 70% attendance. Residents should follow the order of educational protocol in attending any suggested meetings. If unable to attend the meeting due to other educational criteria, review of the minutes or subject of the meeting will suffice. The Program Director will notify the resident in writing if the above protocol requirements for meetings are not being met.

   Educational Protocol:
   1. Didactics (lectures)
   2. Board Reviews
   3. Surgery
   4. Meetings of various types
   5. Clinic

Residents may participate in educational and CME activities that conform to AOA/ACGME requirements.
## Des Peres Hospital

### ENT Schedule

(Subject to change)

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APPENDIX I : NOTES FROM DR. VAN NESS

Otology

Rounds

- Mastoid dressings
  - Gantz – change every day.
  - Hansen - change every other day.
  - Dressing supplies include: adaptec, bacitracin, kerlix lite rolls, kerlix fluffs (10), scissors, +/- elastoplast. Have the mastoid dressings removed prior to rounds.
- Check FN function, nystagmus, and incision site daily.

Clinic

- Med students are NOT allowed to clean ears
- In Gantz clinic, med students should staff with resident first so that resident can examine and fill out the physical exam portion.
- Basic ear H&P: otalgia, otorrhea, hearing loss, vertigo, tinnitus, prior ear surgeries, family hx
- General Pre-op:
  - ALL ear cases need audio w/in 3 months of surgery:
  - All translabs, mega skullbase, and Marlan’s MCFs should include abdominal fat graft on consent; Ask if need possible placement of lumbar drain in consent. Also risk of stroke, embolism, death, facial paralysis, taste dysfunction, inbalance, deafness, CSF leak, meningitis.
- EAC dermatitis (itchy ears)
  - Gantz – Synalar 0.25% cream tid in 15g tube or 0.01% solution tid in 20ml bottle
  - Hansen – Valisone 0.1% ointment qday to bid

General considerations

- All big otology cases should get full lab panel including coags and medicine clearance if deemed necessary
- Document facial nerve function, Weber, Rinne, audiogram within 6 months
- General otology/neurotology antibiotics (unless specified below)
  - Perioperative
    - Adults and children- Cefazolin IV and Decadron before incision.
    - Penicillin allergic - Clindamycin IV and Decadron before incision.
  - Postoperative
    - All other otology procedures aside from CWR, CI and BAHA – No postop oral antibiotics – (this includes skull base procedures).
• Transcanal procedures - antibiotic drops (MH-fluoroquinolone, BG-cortisporin) BID until follow-up appointment with attending at one month.
• Bacitracin to endaural and postauricular incisions BID starting after dressing removal.

OR prep: Tape up pre-op audio. No paralysis. Position patient on bed closer to operative side, head on Reston, bump under head if necessary to keep from rolling, tube taped off opposite. Turn 180deg, strap and test roll.

Case specific pearls

Middle ear cases
• if done under local, use Phenergan, Demerol, and Versed IV for sedation.

Cochlear implants
• most patients will stay for 23 hr obs (usually in CRC). They may take their mastoid dressing off on POD #2. They should go home w/ Abx. Will return to AUDIOLOGY in 1 month for hookup, not our clinic.
• Keflex / clindamycin PO 1 week post-op

BAHA
• usually outpatient. Keflex/ clindamycin x 1 week post-op
• BAHA’s follow-up in one week in MH clinic for healing cap removal.

Stapedectomy/stapedotomy
• most patients will go home same day (Marlan) or stay for 23 hr obs (Gantz). For Gantz patients he wants them to lie flat for 6 hrs after surgery.
• Always do Weber test to ensure that they lateralize to operated ear.
• Stapes and any cases with inner ear fistula get fluoroquinolone drops BID starting morning after surgery until follow-up appointment with attending at one month. Home care instructions: dry ear, nose blowing precautions, avoid flying. Should come immediately to the hospital if they are having vertigo or hearing loss! If so, needs to be seen immediately and checked with audiogram and nystagmus. No postop oral antibiotics.
• F/u in 1 month for ear cleaning, f/u 4 months for audiogram

Tymp-mastoid
• f/u 7 days for suture and packing removal, then use gtts until f/u at 1 month. RTC for bowl cleanings q6mo

Canal Wall Reconstruction Tympanomastoidectomy
• Gantz admits for 48 hours of IV antibiotics, D/C Penrose drain POD #2, and home on Levaquin. Marlan will usually D/C day of surgery, home on Levaquin.
• Adults - Zosyn and Cipro 750 bid IV before incision and for 48 hours postoperatively. Discharge on Cipro PO X 2 wk.
• Children - Zosyn IV before incision and for 48 hours postoperatively. Discharge on Augmentin PO X 2 wk.
• Penicillin allergic adults - Clindamycin and Cipro IV before incision and for 48 hours postoperatively. Discharge on Levaquin PO X 2wk.
- Penicillin allergic children - [Clindamycin](https://www.webmd.com/drugs/1139138-clindamycin) IV before incision and for 48 hours postoperatively. Discharge on Clindamycin PO X 2wk.
- Antibiotic drops (MH-Ciprodex, BG-Cortisporin) used BID starting after packing/suture removal at one week in ROD clinic and continuing until follow-up visit with attending at one month.
- Bacitracin to incision BID starting after dressing removed.

**Endaural and Canal Wall Down procedures**
- packing/suture removal in ROD clinic at one week then antibiotic drops (MH-fluoroquinolone, BG-cortisporin) BID until follow-up appointment with attending at one month

**Acoustic Neuromas**
- Make sure pt has preop ABR and we have preop films.
- Call SICU in AM to check they are expecting the patient.
- Advise anesthesia to run the patient dry and have in the room mannitol 0.25-0.5 g/kg.
- Need NIMS; no paralysis for ANY ear case (all general cases use NIMS), and Foley MCF
- Gantz - also need to order 4-view Stenver skull film. Will use temporalis fascia Hansen – no Stenvers. Consent for abdominal fat graft. Use ResorbX plating system. Preop: 3 days of valcylovir.
- Patients will stay in SICU overnight for NSG monitoring. Some may have LD placed which will be managed by NSG. On POD #1 rounds be sure to be prepared with transfer orders (can use admit acoustic neuroma 3JPW orders) in hand. We have an agreement that if the patients are stable we will have transfer orders prepared by rounds. Home on POD #3-5 if leak test is negative, ambulating well, taking PO, no sign of meningitis. Dressings for Gantz to stay on 5 days, Hansen to stay on 4 days. F/U in 7-10 days for suture removal unless their PMD will remove for them.

**Skull base procedures**
- need ophtho, NSG consults
- Consent for possible abdominal fat graft
- Periop abx - Vancomycin 1gm q 12, Flagyl 500mg q 6, Ceftax 2gm q 8 (from* Kraus*, Standardized regimen of abx in skull base surgery)
Appendix

II

DES PERES HOSPITAL, HOLDINGS, TEXTBOOKS

Otolaryngology/Facial Plastic Surgery textbooks  
February, 2016


Krouse. Allergy and Immunology: an Otolaryngic approach. Lippincott, Williams and Wilkins, c2002.


Board Review

Osler Otolaryngology Board Review, audio CD’s

Otolaryngology/Facial Plastic Surgery, Current Journal Subscriptions

Annals of Otology, Rhinology and Laryngology
JAMA, Otolaryngology – Head and Neck Surgery
Otolaryngology Clinics of North America

Otolaryngology/Facial Plastic Surgery E-Books, Available through the ATSU portal
Gutloff. Oculoplastics and Orbit. Springer-Verlag, 2007
Ito. Regenerative Medicine in Otolaryngology. Springer, 2015
Jahnke. Middle Ear Surgery: Recent Advances and Future Directions. Thieme, 2004
Health/Lippincott Williams & Wilkins, 2013
Langdon. Understanding Cosmetic Laser Surgery. (Understanding health and sickness series). University of Mississippi, 2004
Levine. Anesthesiology and Otolaryngology. Springer, 2013
Lucente. Essentials of otolaryngology. Lippincott Williams & Wilkins, 2004
Mankekar. Swallowing – Physiology, Disorders, Diagnosis and Therapy. Springer, 2015
Mankekar. Implantable Hearing Devices other than Cochlear Implants. Springer, 2014
Mansour. Tympanic Membrane Retraction Pocket Overview and Advances in Diagnosis and Management. Springer, 2015
Pagel. Primary Care Sleep Medicine A Practical Guide. Springer, 2014
Pankey. *Contemporary Diagnosis and Management of Sinusitis.* Charles W. Associates in Medical Marketing, 2004
Pensak. Controversies in Otolaryngology. Thieme, 2001
Pensak. *Otolaryngology cases the University of Cincinnati clinical portfolio.* Thieme, 2010
Pensak. Clinical Otology. Thieme, 2014
Schulze. Plastic Surgery Case Review. Thieme, 2014
Staecker. Otolaryngology, Basic Science and Clinical Review. Thieme, 2006
Valente. *Audiology Answers for Otolaryngologists.* Thieme, 2011
Wada. *Proceedings of the 3rd Symposium on Middle Ear Mechanics in Research and Otology.* 2003
Waltzman. *Cochlear implants.* Thieme, 2014

**Otolaryngology/Facial Plastic Surgery, E-Journals,** Available through the ATSU portal

- Acta Chirurgiae Plasticae, 2011 to present
- Acta Oto-Laryngologica, 1998 to present, Full text delay: 18 months
- Advances in Cellular and Molecular Otolaryngology, 2013 to present
- Aesthetic plastic surgery, 1997 to present
- American Journal of Otolaryngology, 2007 to present
- American Journal of Otology, 1979 to 2000
- American Journal of Rhinology & Allergy: Official Journal of the American Rhinologic Society and the International Rhinologic Society, 2009 to present
- Annals of Otology, Rhinology & Laryngology, 2002 to present
- Annals of Plastic Surgery, 1978 to present
- Archives of facial plastic surgery, 1999 to 2012
- Archives of otolaryngology – head and neck surgery, 1998 to 2012
- Archives of Plastic Surgery, 2012 to present
- Arquivos Internacionais de Otorrinolaringologia, 1997 to present
- Audiology and Neuro-otology, 2005 to 2011
- Auris Nasus Larynx, 2008 to present
- Bangladesh Journal of Otorhinolaryngology, 2008 to present
- Bangladesh Journal of Plastic Surgery, 2010 to 2013
- BMC Ear, Nose, and Throat Disorders, 2001 to present
- Brazilian Journal of Otorhinolaryngology, 2005 to present
- British Journal of Plastic Surgery, 1995 to 2005
- Case Reports in Otolaryngology, 2011 to present
- Cirugia Plastica Ibero-Latinoamericana, 2006 to present
Journal of Otolaryngology, 1997 to 2007
Journal of Otolaryngology – Head and Neck Surgery, 2013 to present
Journal of Plastic Reconstructive and Aesthetic Surgery, 2007 to present
Journal of Plastic Surgery and Hand Surgery, 2010 to present
Journal of Whiplash & Related Disorders, 6/06 to 12/06
Kulak-Burun-Bogaz ve Bas-Boyun Cerrahisi Dergisi = Turkish Journal of Ear, Nose, and Throat, 2011 to present
The Laryngoscope, 1997 to present
Microsurgery, 2012 to present, Full text delay: 1 year
Modern Plastic Surgery, 2011 to present
National Journal of Maxillofacial Surgery, 2010 to present
National Journal of Otorhinolaryngology and Head and Neck Surgery, 2005 to present
Online Journal of Otolaryngology, 2011 to present
The Open Otorhinolaryngology Journal, 2007 to present
Operative Techniques in Otolaryngology – Head and Neck Surgery, 2007 to present
Ophthalmic Plastic & Reconstructive Surgery, 1985 to present
Otolaryngologic Clinics of North America, 2007 to present
Otorinolaryngologie a Foniatrie, 2011 to present
Otorynolaryngologia, 2007 to present
Otolaryngology – Head and Neck Surgery, 1999 to present
Otolaryngology – Head and Neck Surgery (Elsevier), 1997 to 2010
Otology & neurotology, 2001 to present
Otology Japan, 1991 to 2014
Patient Management Perspectives in Otolaryngology, 2011 to present
Pediatric Otorhinolaryngology Japan, 1980 to present
Plastic & Reconstructive Surgery, 1946 to 1999
Plastic and Reconstructive Surgery, 1962 to present
Plastic Surgery, 2014 to present
Plastic Surgery: An International Journal, 2013 to present
Plastic Surgery International, 2010 to present
Plastic Surgery Practice, 2012 to present
Revista Brasileira de Cirurgia Plastica (Impresso), 2010 to present
Rhinology, 2008 to present
Rhinology. Supplement, 2010 to present
Seminars in Plastic Surgery, 2004 to present, Full text delay, 1 year
World Articles in Ear, Nose and Throat, 2012 to present
SYLLABUS

OF THE

OTOLARYNGOLOGY/FACIAL PLASTIC SURGERY RESIDENCY TRAINING PROGRAM

AT

DES PERES HOSPITAL

Program Director:
Paul E. Burk, D.O., FOCOO
Mission Statement

The mission of the Des Peres Hospital osteopathic otolaryngology/facial plastic surgery training program is to provide residents with comprehensive structured cognitive and clinical education that will enable them to become competent, proficient and professional osteopathic otolaryngologists/facial plastic surgeons.
OBJECTIVES, DESCRIPTION AND PHILOSOPHY OF OTOLARYNGOLOGY FACIAL PLASTIC SURGERY RESIDENCY PROGRAM

The training program in Otolaryngology/Facial Plastic Surgery will consist of a period of five years of specialized training in Otolaryngology/Facial Plastic Surgery. This includes a first year of tracked OGME-1 and four years in the specialty area. Training will include supervised clinical and technical training, in addition to instruction and study in the basic sciences that apply to Otolaryngology/Facial Plastic Surgery. The program contains all of the necessary components to satisfy the requirements of the American Osteopathic Association and the American Osteopathic Colleges of Ophthalmology and Otolaryngology-Head and Neck Surgery and, if successfully completed, will qualify the resident to be Board Eligible.

Otolaryngology/Facial Plastic Surgery training shall include the teaching of all types of general commonly known diagnoses, pre & postoperative care and allied subjects as related by other departments. This will be supplemented by conferences, seminars, lectures, DVDs, audiotapes, Journal Clubs, labs, and all meetings required by the hospital for general resident training. The speed by which the resident is allowed to advance in actual work at the operating table will be determined by the resident's technical ability, judgment, attitude, and knowledge of methods—all of which will be accelerated by and in proportion to study and teaching program.

Throughout the five years of training, the resident is required to teach undergraduate osteopathic medical students, OGME-1(s), and visiting residents on the Otolaryngology/Facial Plastic Surgery service. The Otolaryngology/Facial Plastic Surgery resident must keep monthly reports of his/her activities and assist in preparation of the annual report to the American Osteopathic Colleges of Ophthalmology and Otolaryngology-Head and Neck Surgery. The Otolaryngology/Facial Plastic Surgery resident must complete at least one scientific paper suitable for publication during his/her second, third and fourth years of training.
A. SELECTION OF THE RESIDENT
   a. Resident recruitment and selection shall be conducted following the Rules and Regulations of the Committee on Postdoctoral Training of the A.O.A. and of the American Osteopathic Colleges of Ophthalmology and Otolaryngology-Head and Neck Surgery. Applicants will submit their application through ERAS.
   b. Admission to the Residency Program shall not be influenced by race, color, sex, religion, creed, national origin, age, or handicap.
   c. Applications are accepted from Osteopathic medical students who have rotated at Des Peres Hospital and evaluated by the clinical faculty while on rotation.
   d. Fully completed ERAS applications will be evaluated by the Program Director and candidates will be selected for an interview. Applicants selected for an interview will be notified by the Medical Education Coordinator.
   e. After all personal interviews and review of ERAS application information candidates are ranked. The rank listing is given to the Administrative DME for participation in the National Matching Service Osteopathic match. Candidates are notified as to whether it is highly likely, likely or unlikely that a match will take place.
   f. Once the match results are in, contact is made with the matched applicant and a residency contract is mailed to the OGME-1 within 10 working days of the match.
   g. The incoming OGME-1 will be notified of the dates of the Resident Orientation and will be expected to attend. Resident manuals will be distributed at this orientation.

B. REQUIREMENTS FOR ADMISSION TO RESIDENCY TRAINING
   2. The candidate must have a temporary license and a BNDD in the State of Missouri.
   3. The candidate shall be familiar with the Code of Ethics of A.O.A.

C. DEPARTMENT RESOURCES
   a. There is an organized Department of Otolaryngology/Facial Plastic Surgery which is a sub section of the Department of Surgery.
   b. There are board certified Otolaryngology/Facial Plastic Surgery surgeons and board eligible or certified physicians in Radiology, Anesthesia, Neurosurgery, Neurology, and Vascular Surgery.
c. There is an organized Department of Pathology for the integration of clinical pathology with the training program.
d. There are adequate facilities, furnished by the hospital for study.
e. There is a current library with access to Up-To-Date available. A full time Librarian is available to assist the residents. For specific Otolaryngology/Facial Plastic Surgery holdings in the Medical Library please see Appendix I.

D. PROGRAM DIRECTOR QUALIFICATIONS

a. The Program Director is certified in Otolaryngology/Facial Plastic Surgery by the American Osteopathic Association.
b. The Program Director has a minimum of five (5) years of clinical experience in Otolaryngology/Facial Plastic Surgery following completion of his/her residency training program.
c. The Program Director may or may not be the Chairman of the Department of Otolaryngology/Facial Plastic Surgery.
d. The Program Director shall be a full-time, practicing Otolaryngology/Facial Plastic surgeon, educationally and attitudinally suited to conduct an AOA approved residency.
e. The Program Director shall be a member of the American Osteopathic Colleges of Ophthalmology and Otolaryngology-Head and Neck Surgery.
f. The Program Director shall meet and continue to meet the Continuing Medical Education requirements of the American Osteopathic Colleges of Ophthalmology and Otolaryngology-Head and Neck Surgery; the American Osteopathic Association and the State of Missouri.

E. PROGRAM DIRECTOR RESPONSIBILITIES

a. The Program Director shall be responsible for providing a complete training program in Otolaryngology/Facial Plastic Surgery as defined in the Basic Standards. Acceptable procedures for satisfying deficiencies in a training program may include:
   i. An exchange program.
   ii. A clinical rotation outside the parent institution to augment the Base program.
   iii. College or university courses in basic sciences, otorlaryngology, facial plastic surgery, or allied specialties.
   iv. Other postgraduate courses approved by the Program Director.
b. The Program Director shall register the resident with the American Osteopathic Colleges of Ophthalmology and Otolaryngology-Head and Neck Surgery.
c. The Program Director shall notify the American Osteopathic Colleges of Ophthalmology and Otolaryngology-Head and Neck Surgery in the event of a change of status of his/her resident(s) or training program.
d. The Program Director shall inform the A.O.A. Office of Osteopathic Education and the American Osteopathic Colleges of Ophthalmology and Otolaryngology-Head and Neck Surgery of a resident's successful completion of his/her program.

e. The Program Director will assure that the resident's annual scientific paper is of an acceptable nature.

f. The Program Director shall certify the monthly documentation of the work completed by the resident, including resident's logs, work hours, annual papers, and other pertinent records within the training program.

g. The Program Director will arrange for the resident to take the in-service Examination.

h. The Program Director will arrange formal Affiliation Agreements for outside rotations necessary or advantageous to meet the program's objectives.

F. EDUCATIONAL GOALS

The overall educational goals of the Department of Otolaryngology/Oro-Facial Surgery Residency are:

a. To provide a strong background in the basic and clinical sciences related to Otolaryngology/Oro-Facial Plastic Surgery

b. To assist in the development of clinical and surgical expertise

c. To provide the opportunity to learn and practice research skills

All residents participate in a series of didactic lectures, clinical conferences, journal reading assignments, and independent reading which is directed primarily toward achieving the goals. The effectiveness of this program is monitored by resident evaluation of the program, results of Home Study Course testing, results of the Annual Otolaryngology Examination, and success with the AOB00 certification process.

Core Competencies:

Common to all years will be goals of the seven core competencies. Residents are required to attain and demonstrate competencies in the core competencies of the osteopathic profession to a level expected of a new practitioner. Implementation of the seven core competencies is phased into the residency teaching program and outlined below:
OSTEOPATHIC PHILOSOPHY AND OSTEOPATHIC MANIPULATIVE MEDICINE

Residents are expected to demonstrate and apply knowledge of accepted standards in OMT appropriate to Otolaryngology/FPS.

Goals:
- Demonstrate competency in the understanding and application of OMT appropriate to Otolaryngology/Facial Plastic Surgery.
- Integrate osteopathic concepts and OMT into the medical care provided to patients as appropriate.
- Understand and integrate osteopathic principles and philosophy into all clinical and inpatient care activities.
- Demonstrate the treatment of people rather than symptoms.
- Demonstrate understanding of somato-visceral relationships and the role of the Musculoskeletal system in Otolaryngic disease.

Teaching Methods:
- Provide opportunities for active participation, when appropriate, for residents in hospital and ambulatory sites for OMT training
- Observe residents in the performance of OMT by assessing their diagnostic skills, medical knowledge, and problem solving abilities
- Participation in OMT Club. OMT club incorporates supervision of practice of a range of OMM modalities
- Have residents assume increasing responsibility for the incorporation of osteopathic concepts in patient care
- Have residents participate in activities that provide educational programs at the student and intern level

Evaluation methods:
- Periodic evaluations in the clinic setting by Attendings
- Assessing appropriate use of OMT as it pertains to Otolaryngology/Oro-facial Plastic Surgery by faculty
- Record reviews
- Patient Evaluation Forms—evaluation by OMT Specialist
- 360 degree evaluation

Outcome Measures:
- After completing the residency program, residents will be able to demonstrate and apply the accepted standards in Osteopathic Manipulative Medicine as appropriate to Otolaryngology/Oro-facial Plastic Surgery
MEDICAL KNOWLEDGE
Residents are expected to demonstrate and apply knowledge of accepted standards of clinical medicine, remain current with new developments in medicine, and participate in lifelong learning activities, including research with special emphasis on the specialty of Otolaryngology/Oro-Facial Plastic Surgery.

Goals:
- Demonstrate competency in the understanding and application of clinical medicine to patient care.
- To instill habits in the residents that will lead to lifelong learning.
- To teach the residents the clinical aspects of Otolaryngology/Oro-Facial Plastic Surgery.
- To teach the residents the basic science concepts of Otolaryngology/Oro-Facial Plastic Surgery.
- To teach the residents how to critically evaluate the literature and apply it to patient care.
- Know and apply the foundations of clinical and behavioral medicine as appropriate to Otolaryngology/Oro-facial Plastic Surgery.

Teaching Methods:
- In-service examination
- Home Study Course
- Supervised observation of clinical decision-making abilities
- Participation in directed reading program and Journal Club
- Performance COMLEX III
- Attendance at seminars and/or CME

Evaluation Methods:
- Evaluation of competency during directed discussion forums such as Journal Club, teaching and research conferences, or in patient-specific discussions as appropriate.
- 360 degree evaluations
- Written examination – In-service score/home study course
- Direct observation
- Routinely assess the skill and outcomes of residents in their performance of medical procedures

Outcome Measures:
- Score within the upper 50% for resident’s year of training on in-service exam. A score lower than 25% will result in remediation.
- Achieve a score above 80% on the Home Study Course.
- Improve participation/answers in lectures/OR/teaching rounds.
- Improve quality of lectures to sub specialist level
- Improvement and increased skill in performance of medical procedures

PATIENT CARE
Residents must demonstrate the ability to effectively treat patients, provide medical care that incorporates the osteopathic philosophy, patient empathy, awareness of behavioral issues, the incorporation of preventative medicine, and health promotion.

Goals:
- To develop residents that will be able to independently deliver compassionate, appropriate, effective, and expert medical care for otolaryngology/oro-facial plastic surgery disorders
- Provide health-care services consistent with osteopathic philosophy, including preventive medicine and health promotion that are based on current scientific evidence and understanding of behavioral medicine.

Teaching Methods:
- Teach residents to gather accurate, essential information from all sources, including medical interviews, physical examinations, medical records and diagnostic/therapeutic plans and treatments.
- Instill in residents the need to provide a caring attitude that is mindful of cultural sensitivities, patient apprehensions and accuracy of information
- Supervise the performance of medical interviewing techniques to assess the resident skill and ability
- Provide instruction on the development and implementation of effective patient management plans
- Teach residents the proper methods for requesting and sequencing diagnostic tests and consultative services
- Teach residents to work with professionals from varied disciplines as a team to provide effective medical care to patients that address their diverse health-care needs.
- Teach residents to counsel patients and their families on health-care promotion and lifestyle activities related to good health maintenance
- Instruct residents in the performance of medical procedures, any potential complications and known risks to the patient (informed consent)
- Journal club
- Conferences
- Question and answer sessions on teaching rounds

Evaluation methods:
- Direct observation
- Record review
- 360 degree evaluation tool
- Monthly evaluation of competency
• Procedure case logs
• Clinical outcomes of the patients under the resident’s care
• Surgical skill assessment
• Validate competency in the performance of diagnostics, treatments and procedures appropriate to the specialty

Outcome Measures:
• Improvement in surgical skills to the point of independence
• Improvement in clinical acumen and skills to the point of independence
• Improvement in clinical laboratory sessions until skill set is mastered

INTERPERSONAL AND COMMUNICATION SKILLS

Residents are expected to demonstrate interpersonal and communication skills that enable them to establish and maintain professional relationships with patients, families and other members of the health-care teams.

Goals:
• To develop residents who can easily interact with peers, patients, staff, attendings, and other medical professionals
• To teach residents to proper way to interact with staff and other medical professionals
• To teach residents to exhibit effective listening, written and oral communication skills in professional interactions with patients and health-care professionals
• To teach residents how to therapeutically interact with patients, including the difficult patient
• Demonstrate effectiveness in developing appropriate doctor-patient relationships
• To teach residents how to involve patients and families in decision-making
• To teach residents to search out resources to assist with communication-impaired patients

Teaching methods:
• Small group sessions centered on communication, patient interviewing techniques, understanding of cultural and religious issues and sensitivities in doctor-patient relationships, appropriate use of verbal and nonverbal skills when communicating, ability to assess the health of non-English speaking and deaf patients, maintaining comprehensive, timely, and legible medical records
• Direct observation by faculty in clinics and lectures
• Standardized patient session and review
• Giving lectures to faculty and other residents with feedback on lecture style

Evaluation Methods:
• Monthly evaluation of competence
• Direct observation of patient, family and health-care team interactions
• 360 degree evaluations
Outcome Measures:

- To achieve consistently high marks on interpersonal skills from faculty, peers, nurses and patients
- To have the ability to communicate effectively with faculty and peers regarding patient care issues
- Elicit medical information in effective ways
- Demonstrate an understanding of resources available to physicians to assist with assessment of communication-impaired patients
- Demonstrate respectful interactions with health-care practitioners, patients and families
- Ability to communicate medical problems and patient options at appropriate levels of understanding

PROFESSIONALISM
Residents are expected to uphold the Osteopathic Oath in the conduct of their professional activities that promote advocacy of patient welfare, adherence to ethical principles, and collaboration with health-care professionals, life-long learning and sensitivity to a diverse patient population. Residents should be cognizant of their own physical and mental health in order to effectively care for patients.

Residents will:

- Demonstrate respect for patients and families and advocate for the patients’ welfare and autonomy
- Demonstrate adherence to ethical principles in the practice of medicine
- Demonstrate awareness and pay proper attention to issues of culture, religion, age, gender, sexual orientation, and mental and physical disabilities

Goals:

- To develop residents who are consummate professionals in their everyday work environment
- To develop residents who will understand conflicts of interest inherent in medicine and the appropriate responses to societal, community and health-care industry pressures
- To teach residents to use limited medical resources effectively and avoid the utilization of unnecessary tests and procedures
- To help foster a sense of ethics and morality in the residents
- To teach the residents how to avoid becoming, and how to deal with, impaired physicians
- Develop residents who will pursue life-long learning goals in clinical medicine, humanism, ethics, and gain insight into the understanding of patient concerns and the proper relationship with the medical industry
- To teach a sense of timeliness in the residents
- Advocate for continuous quality of care for all patients
• Prevent the discrimination of patients based on defined characteristics
• Understand the legal obligations of physicians in the care of patients
• To become knowledgeable and responsive to the special needs and cultural origins of patients
• Recognize the inherent vulnerability and trust accorded by patients to physicians and uphold the highest moral principles that avoid exploitation for sexual, financial and/or other private gain

Teaching Methods:
• Small group sessions focused on the importance of professionalism and how to go about it
• Direct observation of residents in their interactions with staff, residents, patients, colleagues
• Introspective questions and responses in small group discussions

Evaluation Methods:
• Direct observation
• 360 degree evaluation
• Lectures/Seminars
• Monthly evaluations of competence

Outcome measures:
• To actively participate in small group discussions
• To maintain high evaluation remarks on professionalism

PRACTICE BASED LEARNING AND IMPROVEMENT
Residents must demonstrate the ability to critically evaluate their methods of clinical practice, integrate evidence-based medicine into patient care, show an understanding of research methods, and improve patient care practices.

Goals:
• To develop residents who are able to use evidence based medicine as the primary driving force for medical decision making
• To teach residents how to interpret new literature for pertinence and reliability and apply it to patient care
• To teach residents how to critically evaluate and continually improve their own practice of medicine
• To teach residents how to facilitate the learning of other health care professionals
• To teach residents to treat patients in a manner consistent with the most up-to-date information on diagnostic and therapeutic effectiveness
• To teach residents to use reliable and current information in diagnosis and treatment
• To teach residents to understand how to use the medical library and electronically mediated sources and how to discover pertinent medical information
• To develop residents who will demonstrate the ability to extract and apply evidence from scientific studies to patient care
• To have residents who will systematically analyze practice using quality improvement methods and implement changes with the goal of practice improvement
• To teach residents to perform self-evaluation of clinical practice patterns and practice based improvement activities using a systematic methodology
• Residents will understand research methods, medical informatics and the application of technology as applied to medicine

Teaching Methods:

• Direct observation during patient care, rounds, conferences and OR
• Home Study Course
• Resident Study Groups
• Faculty and resident lectures
• Resident attendance at QI meetings (senior residents, if approved)
• Utilize core measures at hospital
• Participate in in quality assurance activities at the hospital and ambulatory sites
• In-service exam
• Participate in research activities as required by the AOCCO-HNS

Evaluation Methods:

• Direct observation of improvement in resident in clinical setting, improvements in surgical technique with repeated performance of procedures
• Scores on Home Study course
• 360 degree evaluation
• Chart and record Reviews
• Evaluation by faculty when presenting patients
• In-service exam
• Evaluation in Journal Club
• Chart Review
• Attendance at Medical QI at hospital (senior residents, if approved)
• Demonstrate computer literacy, information retrieval skills and understanding of computer technology applied to patient care and hospital systems

Outcome Measures:

• Show evidence of study habits that will lead to lifelong learning

SYSTEMS-BASED PRACTICE
Residents are expected to demonstrate an understanding of health-care delivery systems, provide effective and qualitative patient care within the system and practice cost-effective medicine.

Goals:

- Understand national and local health-care delivery systems and how they impact patient care and professional practice
- Demonstrate knowledge of business applications in medical practice
- Show operational knowledge of health-care organizations, state and federal programs
- Understand the role of the resident as a member of the health-care team in the hospital, clinic and community
- Participate in annual presentation by MAOPS to learn of activities of state professional organization
- Advocate for quality health-care on behalf of patients and assist them in the interactions with the complexities of the medical system
- Understand local medical resources available to patients for treatment and referral
- Participate in advocacy activities that enhance the quality of care provided to patients
- Practice clinical decision making in the context of cost, allocation of resources and outcomes
- To develop residents with a sense of the intricate parts of the health care system and their role therein

Teaching Methods:

- Small group sessions focusing on a particular problem related to the residency
- Coding and billing group discussions
- Information technology discussions
- Head and Neck Tumor Board
- Direct observation of faculty interacting amongst the different levels of medical consults and administration

Evaluation Methods:

- Attendance at seminars
- 360 degree evaluations
- Discussions with faculty
- Record Review
- Participation in team conferences when appropriate
- Involvement of case worker/social worker when appropriate
• Evaluation by faculty when presenting patients

Outcome Measures:

• Develop leadership skills
• Understand issues with coding and billing
• Understand the system of health-care and be able to provide the optimal health-care to patients
YEAR-SPECIFIC GOALS

OGME -1  Individuals in the PGY I year are closely supervised by more senior level residents and/or faculty. The core competencies are introduced at this level. Examples of tasks that are expected of PGY I physicians include: perform a history and physical, start intravenous lines, draw blood, order medication and diagnostic tests, collect and analyze test results and communicate those to the other members of the team and faculty, obtain informed consent, place urinary catheters and nasogastric tubes, assist in the operating room performing tracheotomies and skin grafts and closure of wounds and perform other invasive procedures under the supervision of the faculty or senior residents at the discretion of the responsible faculty member. The resident is expected to exhibit a dedication to the principles of professional preparation that emphasizes primacy of the patient as the focus for care. The first year resident must develop and implement a plan for study, reading and research of selected topics that promotes personal and professional growth and be able to demonstrate successful use of the literature in dealing with patients. The resident should be able to communicate with patients and families about the disease process and the plan of care as outlined by the attending. At all levels, the resident is expected to demonstrate an understanding of the socioeconomic, cultural, and managerial factors inherent in providing cost effective care. Communication is emphasized this year including the ability to interact between health care services and exhibiting knowledge of systems-based practice.

Indirect supervision is adequate for the following patient care situations:

1. Initial evaluation and management of inpatients.
2. Preoperative & postoperative evaluation and management.
3. Patient transfers between floors and/or hospitals.
4. Discharging patients from the hospital.
5. Interpretation of lab results.
6. Procedures such placement of IV’s, nasogastric tubes, Foley catheters, and arterial punctures.

Direct supervision is required for the following patient care situations, until competency can be demonstrated and documented:

1. Initial evaluation and management of patients with urgent or emergent conditions.
2. Evaluation and management of postoperative complications.
4. Management of patients in cardiac arrest. ACLS certification should be obtained.
5. Procedures such as:
   a. Advanced vascular access
   b. Closure of surgical incisions and/or lacerations
   c. Excision of superficial skin lesions
   d. Tubethoracotomy
   e. Paracentesis
   f. Joint aspiration
   g. Airway management, including orotracheal intubation and tracheostomy
   h. Tracheotomy tube exchanges
   i. Nasal Packing for epistaxis
   j. Drainage of peritonsillar abscess
Head and Neck Rotation

OGME-2 are expected to improve on all above objectives as well as the following:

Medical Knowledge:
- Acquire advanced knowledge of the anatomy of the head and neck
- Develop an understanding of normal physiologic properties of the head and neck.
- Know TNM staging for head and neck cancer sites
- Learn the pathophysiology of head and neck cancer.
- Learn pathophysiology of thyroid/parathyroid disease.
- Learn airway management for the critical airway
- Learn mechanics and application of regional and free flaps

Patient Care:
- Become efficient in clinic and on rounds
- Be able to supervise OGME-1 residents with inpatient consults
- Become proficient at the head and neck exam
- Begin to learn treatment algorithms for outpatient otolaryngology disorders
- Learn surgical techniques of tracheostomies; approaches to the neck, oral, and Sino nasal areas; endoscopies including laryngoscopy, bronchoscopy and esophagoscopy; skin graft harvest; and closure of complex wounds.
- Understand and show competence in management of epistaxis

Systems-based practice:
- Become proficient at obtaining consults from Communicative Disorders, Social Work, Radiation, Oncology, Endocrinology, Oral Surgery and Interventional Radiology
- Understand the importance of the head and neck junior resident on obtaining quality patient care
- Look for ways to improve the efficiency of the service

Practice-based learning:
- Read before every surgical case
- Develop the habit of researching disease processes seen in clinic that day
- Recognize mistakes made and develop solutions to prevent them from reoccurring

Osteopathic Manipulative Therapy:
- Perform and document a basic general-body osteopathic evaluation in the supine, standing, and seated position

Professionalism:
- Learn how to ethically treat patients and always work in their best interest
- Understand the importance of timeliness in dictations, rounding, charting

Interpersonal and communication skills:
• Understand the importance of good communication, and its impact on patient care
• Develop excellent communication skills with patients, peers, staff, and attendings

OGME-3 residents are expected to improve on all of the above Objectives as well as the following:

Medical Knowledge:
• Will learn enough of head and neck cancer management to discuss prognosis and treatment options
• Show advanced knowledge of head and neck anatomy
• Show advanced acquisition of head and neck physiology
• Improve understanding of pathophysiology of thyroid/parathyroid, head and neck cancer, granulomatous diseases, salivary gland disorders, and Sino nasal disorders.
• Understand underlying disorder/treatment for GERD/LPR, dysphagia, dysphonia

Patient Care:
• Obtain skills necessary to handle the acute airway.
• Become facile with head and neck trauma
• Be able to staff consults with the junior residents
• Improve surgical skills in neck dissections, parotidectomies, thyroidectomies, endoscopic sinus surgery
• Be able to perform lower level cases independently: tracheotomies, DL, bronchoscopy, esophagoscopy, complex wound closure

Interpersonal and Communication skills:
• Be able to discuss end of life issues professionally
• Learn how to communicate effectively with junior residents
• Learn how to interact with other health care professionals in a courteous manner

Systems-based practice:
• Take an active role in medical student and junior resident education.

Osteopathic Manipulative Therapy:
Perform the following Basic Osteopathic Techniques, from start to finish without error:
• Compression of the 4th Cranial Ventricle (CV-4 by any method).
• Suboccipital Release (any method)
• Cervical Direct Soft Tissue Technique
• General HVLA Cervical Spine
• Sinus Direct Effleurage
• Release of the Transverse Diaphragms using Indirect Technique
• Pelvic diaphragm
• Thoraco-abdominal diaphragm
• Thoracic inlet
• Tentorium cerebelli
• Lymphatic Pump (any technique)

Professionalism:
• Learn how to practice medicine with integrity and honesty
• Understand the need for showing sensitivity to patient’s ethnicity, age and disabilities

**Practice Based Learning and Improvement:**
• Learn how to use evidence-based medicine to better care for the patients
• Become proficient at using the electronic medical record and the use of the Internet to look up medical information
• Understand how professionals learn and the best way to teach medical students

OGME-4 residents are expected to improve on the above skills and progress in their ability to arrive at appropriate diagnoses and institute treatment plans as well as the following:

**Medical Knowledge:**
• Advance knowledge of otolaryngology diseases to be able to develop a reasonable short differential diagnosis
• Expand knowledge base of head and neck tumors, granulomatous disease, endocrine dysfunction, vasculitides, maxillofacial trauma, and difficult airway management

**Patient Care:**
• Be able to independently perform neck dissections, parotidectomy, thyroidectomies, maxillofacial trauma repair and perform routine endoscopic sinus surgery
• Be able to perform partial maxillectomies, closure of surgical defects with local or regional flaps
• Be able to care for post-operative issues for the head and neck team patients
• Be able to formulate a treatment plan for patients seen in outpatient clinic.

**Interpersonal and Communication skills:**
• Show excellent communication with medical students, junior residents and attendings

**Systems-based practice:**
• Demonstrate the ability to be chief of service
• Be able to teach the junior resident surgical procedures.
• Learn how to fix patient care problems by making system changes

**Practice-based learning:**
• Be able to lead M&M conference for the service.
• Discuss with attendings the business side of medicine

**Osteopathic Manipulative Therapy:**
• Perform and document a specific Osteopathic Evaluation of the following sites:
  • Temporal Bones
  • Facial Bones and Orbits
  • Cranial Rhythmic Impulse (CRI) and Skull Base
  • OA and AA Joints
C3-7 levels
- Hyoid Complex and Larynx

**Professionalism:**
- Learn how to practice medicine with integrity and honesty

**OGME-5** residents are expected to improve on the above skills as well as the following:

**Medical Knowledge:**
- Will acquire the full breadth of knowledge of otolaryngology disorders

**Patient Care:**
- Will be able to independently diagnose and develop treatment plans for outpatient disorders
- Will be able to perform all operations except for those that require a tertiary care referral

**Osteopathic Manipulative Therapy:**
- Perform the following Osteopathic Techniques, from start to finish without error:
  - Eustachian Tube indirect release under general anesthesia
  - Spheno-basilar decompression (any method)
  - Indirect release of facial bone strains
  - OA and AA HVLA and Muscle Energy techniques
  - TMJ Muscle Energy and Indirect techniques
  - Level specific HVLA of Cervical Spine
  - First rib techniques (any method)
  - Rib Raising technique
  - Hyoid and Laryngeal direct and indirect techniques
  - Lumbo-sacral decompression (any method)

**Professionalism:**
- Hone professional skills from previous years
- Act as a mentor to junior residents to assist with developing professionalism

**Interpersonal and Communication Skills:**
- Achieve the ability to teach and communicate to junior residents
- Polish and hone communication skills for private practice
- Review management of employees

**Systems-based practice:**
- Be able to schedule patients for surgery
- Learn administrative duties necessary for running a practice
- Review contracts with insurance companies
- Understand business aspects of medicine

**Practice-based learning:**
- Show mastery of habits that will lead to life-long learning.
**Otology and Laryngology Service**

This rotation consists of otology/neurotology and laryngology. Both junior and senior residents rotate at the same time on this rotation. Our goal on this rotation is to facilitate an orderly progression from the more simple knowledge and skills, to the more complex clinical and surgical problems. All skills from the Head and Neck Service are expected to be attained by each year as well as the following goals specific to each following service.

**OGME-2**

**Medical Knowledge:**
- Acquire advanced knowledge of the anatomy of the ear and temporal bone
- Develop an understanding of normal physiologic properties of hearing and balance.
- Know TNM staging for otologic and temporal bone cancer
- Learn the pathophysiology of cholesteatoma.
- Learn the pathophysiology of balance disorders.
- Learn the pathophysiology of hearing loss both conductive and sensorineural.
- Learn pathophysiology of infections of the ear.
- Understand the physics of hearing and audiometry
- Understand dysphagia, GERD/ LPR and how it relates to these patients
- Acquire advanced knowledge of the anatomy of the head and neck
- Develop an understanding of normal physiologic properties of the swallowing and phonation.
- Learn airway management for the critical airway
- Learn the pathophysiology of dysphonia and dysphagia
- Learn the pathophysiology of neurological diseases of the larynx
- Learn to interpret reports and examinations from Speech pathology

**Patient Care:**
- Become efficient in clinic and on rounds
- Be able to supervise OGME-1 residents with inpatient consults
- Become proficient at the otologic exam
- Learn surgical techniques of microscope use, cerumen debridement, foreign body removal of the external canal, and tympanostomy tube placement.
- Learn the basic set up for otologic procedures.
- Know the risks and benefits of otologic procedures and be able to relate these to the patient in appropriate language.
- Develop an understanding for the post-operative course of patients undergoing otologic procedures.
- Become proficient at the head and neck exam
- Begin to learn treatment algorithms for outpatient otolaryngologic disorders including which diagnostic endoscopy to perform
- Learn surgical techniques of tracheostomies; laryngoscopy, bronchoscopy and esophagoscopy with biopsy; microscopic examination
• Learn to perform outpatient endoscopic procedures including Transnasal laryngoscopy with and without stroboscopy and fiberoptic endoscopic evaluation of swallow; assist in flexible biopsy
• Begin to learn interpretation of stroboscopy examination
• Become familiar with the setup for jet ventilation

**Interpersonal and Communication skills:**
• Become proficient at communicating results/patient care issues with other residents and Attendings
• Learn to discuss sensitive issues with patients suffering from hearing loss, vertigo, infections and tumors
• Learn to discuss sensitive issues with patients
• Learn to discuss findings of examination in manner that patient may understand
• Learn to discuss airway concerns with Anesthesiology team and operating room nursing staff to properly prepare for the potential difficult airway

**Systems-based practice:**
• Become proficient at obtaining consults from Communicative Disorders, Social Work, Audiologists, Neurosurgery and Interventional Radiology
• Understand the importance of the otology junior resident on obtaining quality patient care
• Look for ways to improve the efficiency of the service

**Practice-based learning:**
• Read before every surgical case
• Develop the habit of researching disease processes seen in clinic that day
• Recognize mistakes made and develop solutions to prevent them from reoccurring
• Review laryngeal examination prior to surgical case

**Osteopathic Manipulative Therapy:**
• Continue to improve on skills obtained in prior years

**Professionalism:**
• Hone professional skills from previous years
OGME-3 residents are expected to improve on all of the above as well as the following:

**Medical Knowledge:**
- Learn the treatment of otologic emergencies including mastoiditis, acute hearing loss, acute onset of vertigo.
- Show advanced knowledge of otologic anatomy
- Show advanced acquisition of otologic pathophysiology to include vertigo, hearing loss, infections and tumors.
- Will learn enough of dysphagia and dysphonia management to discuss prognosis and treatment options
- Show advanced knowledge of head and neck anatomy
- Show advanced acquisition of swallowing and phonation
- Understand underlying disorder/treatment for GERD/LPR, dysphagia, dysphonia.

**Patient Care:**
- Improve skills started in the OGME-2.
- Improve diagnostic and therapeutic skills in the outpatient clinic.
- Be able to staff consults with the junior residents
- Improve surgical skills in simple tympanoplasty, mastoidectomy and tympanostomy tube placement.
- Obtain skills necessary to handle the acute airway.
- Improve surgical skills in vocal fold injection, biopsy, esophagoscopy, tracheoesophageal puncture
- Be able to begin to identify esophageal pathology
- Be able to perform lower level cases independently: tracheotomies, DL, bronchoscopy, esophagoscopy
- Be able to determine anesthetic technique appropriate for operative case

**Interpersonal and Communication skills:**
- Learn how to communicate effectively with junior residents
- Be able to discuss dysphagia issues professionally (i.e. need for G Tube, inability to tolerate oral intake)

**Systems-based practice:**
- Take an active role in medical student and junior resident education

**Practice-based learning:**
- Continue to improve on skills from prior years

**Osteopathic Manipulative Therapy:**
- Continue to improve on skills from prior years
- Identify any deficiencies in OMT
- Attend lectures, review tapes, attend seminars

**Professionalism:**
- Continue to mentor junior residents
- Continue to improve on previous skills learned
OGME-4 residents are expected to improve on the above skills and progress in their ability to arrive at appropriate diagnoses and institute treatment plans.

**Medical Knowledge:**
- Advance knowledge of otolaryngologic diseases to be able to develop a reasonable short differential diagnosis
- Expand knowledge base of hearing loss: conductive, sensorineural and mixed, vertigo: BPPV, neural, central, infections: external middle and inner ear, tumors: paraganglioma, acoustic neuromas, carcinomas, sarcomas, cholesteatoma
- Expand knowledge base of dysphonia and dysphagia
- Become competent in interpretation of stroboscopy examination
- Become competent in interpretation of esophageal examination

**Patient Care:**
- Be able to independently perform simple mastoidectomies, tympanoplasty and tympanostomy tube
- Be able to care for post-operative issues for the otologic patients
- Be able to formulate a treatment plan for patients seen in outpatient clinic.
- Be able to independently assess stroboscopy, vocal fold biopsy
- Be able to perform microflap excision, thyroplasty
- Be able to care for post-operative issues for the dysphagia and dysphonia patient
- Be able to formulate a treatment plan for patients seen in outpatient clinics

**Interpersonal and Communication skills:**
- Show excellent communication with medical students, junior residents and attending

**Systems-based practice:**
- Demonstrate the ability to be chief of service including scheduling OR cases
- Be able to teach the junior resident surgical procedures.
- Show the ability to teach medical students and junior residents in the clinic, OR and temporal bone lab.
- Learn how to fix patient care problems by making system changes

**Practice-based learning:**
- Be able to lead M&M conference for the service.
- Be able to communicate with Speech pathology needs and concerns for patient

**Osteopathic Manipulative Therapy:**
- Continue to improve on skills from prior years
- Identify any deficiencies in OMT
- Attend lectures, review tapes, attend seminars

**Professionalsm:**
- Continue to mentor junior residents
- Continue to improve on previous skills learned
OGME-5 residents are expected to improve on the above skills as well as the following:

**Medical Knowledge:**
- Will acquire the full breadth of knowledge of otolaryngologic disorders

**Patient Care:**
- Will be able to independently diagnose and develop treatment plans for outpatient disorders
- Will be able to perform all operations except for those that require a tertiary care referral to include tympanomastoidectomy, ossicular chain reconstruction, and stapedectomy.
- Will be able to perform all operations except for those that require a tertiary care referral

**Systems-based practice:**
- Be able to schedule patients for surgery
- Learn administrative duties necessary for running a practice

**Practice-based learning:**
- Show mastery of habits that will lead to life-long learning

**Osteopathic Manipulative Therapy:**
- Continue to improve on skills from prior years
- Identify any deficiencies in OMT
- Attend lectures, review tapes, attend seminars

**Professionalism:**
- Continue to mentor junior residents
- Continue to improve on previous skills learned

**Interpersonal and Communication Skills:**
- Improve in ability to teach and communicate to junior residents
- Lecture to medical students, nursing staff
- Prepare lecture for ACA for presentation, if requested
Pediatric and General Otolaryngology Service

Residents on the Pediatric and General Otolaryngology Service are exposed to children with Otolaryngological problems and children and adults with voice and swallowing disorders, as well as general otolaryngology. This experience is attained in the clinic, on the floors, and in the operating room. All skills from above are expected to be attained by each year as well as the following goals.

OGME-2
Medical Knowledge:
- Acquire advanced knowledge of the embryology and anatomy of the head and neck
- Develop an understanding of normal physiologic properties of pediatric airway and paranasal sinuses.
- Learn the pathophysiology behind adenotonsillitis
- Learn the pathophysiology of otitis media
- Learn the pathophysiology of sinusitis
- Learn the differential diagnosis and treatment of the pediatric neck mass
- Understand dysphagia, GERD/ LPR and how it relates to these patients
- Understand sleep studies and the pathophysiology behind OSA.

Patient Care:
- Become efficient in clinic and on rounds
- Be able to supervise OGME-1 residents with inpatient consults
- Become proficient at the pediatric ENT exam
- Begin to learn treatment algorithms for outpatient pediatric otolaryngologic disorders
- Learn surgical techniques of microscope use, cerumen debridement, foreign body removal of the external canal, and tympanostomy tube placement.
- Become proficient at adenotonsillectomies.
- Be able to perform direct laryngoscopy, bronchoscopy and esophagoscopy.
- Begin to learn how to navigate the sinonasal cavities with endoscopes.
- Develop an understanding for the post-operative course of patients undergoing pediatric and general ENT procedures

Interpersonal and Communication skills:
- Become proficient at communicating results/patient care issues with other residents and with attendings
- Become proficient at communicating results with patients
- Learn to discuss sensitive issues with patients and/or their parents.

Systems-based practice:
- Become proficient at obtaining consults from Communicative Disorders, Social Work, and Audiologists
- Understand the importance of the junior resident on obtaining quality patient care
• Look for ways to improve the efficiency of the service

**Practice-based learning:**
• Read before every surgical case.
• Come to the OR prepared, knowing the patient’s history, work-up and indications for surgery.
• Develop the habit of researching disease processes seen in clinic that day
• Recognize mistakes made and develop solutions to prevent them from reoccurring

**Osteopathic Manipulative Therapy:**
• Continue to improve on skills from prior years
• Identify any deficiencies in OMT
• Attend lectures, review tapes, attend seminars

**Professionalism:**
• Continue to mentor junior residents
• Continue to improve on previous skills learned
OGME-3 residents are expected to improve on all of the above as well as the following:

**Medical Knowledge:**
- Learn the treatment of pediatric emergencies including airway emergencies
- Show advanced knowledge of head and neck anatomy and embryology
- Show advanced acquisition of pediatric pathophysiology to include otitis media, retropharyngeal/neck abscesses, neck masses, airway distress.
- Show advanced acquisition of adult pathophysiology to include sinonasal disorders, obstructive sleep apnea, and dysphagia

**Patient Care:**
- Improve skills started in the OGME-2.
- Improve diagnostic and therapeutic skills in the outpatient clinic.
- Be able to staff consults with the junior residents
- Improve surgical skills in adenotonsillectomy, tympanostomy tube placement, endoscopy of the aerodigestive tract, sinus endoscopy and treatment of OSA.

**Interpersonal and Communication skills:**
- Learn how to communicate effectively with junior residents

**Systems-based practice:**
- Take an active role in medical student and junior resident education

**Osteopathic Manipulative Therapy:**
- Continue to improve on skills from prior years
- Identify any deficiencies in OMT
- Attend lectures, review tapes, attend seminars

**Professionalism:**
- Continue to mentor junior residents
- Continue to improve on previous skills learned

**Practice-based learning:**
- Read before every surgical case.
- Come to the OR prepared, knowing the patient’s history, work-up and indications for surgery.
- Develop the habit of researching disease processes seen in clinic that day
- Recognize mistakes made and develop solutions to prevent them from reoccurring
OGME-4 residents are expected to improve on the above skills and progress in their ability to arrive at appropriate diagnoses and institute treatment plans.

Medical Knowledge:
- Advance knowledge of otolaryngologic diseases to be able to develop a reasonable short differential diagnosis
- Expand knowledge base of pediatric airway disorders, foreign bodies of the aerodigestive tract, congenital neck masses, OSA, sinonasal disorders, infections of the head and neck

Patient Care:
- Be able to independently perform basic sinus surgery, surgery for OSA, foreign body removal, endoscopy of the aerodigestive tract/pediatric trachs
- Be able to care for post-operative issues for the general ENT and pediatric patients
- Be able to formulate a treatment plan for patients seen in outpatient clinic.

Osteopathic Manipulative Therapy:
- Continue to improve on skills from prior years
- Identify any deficiencies in OMT
- Attend lectures, review tapes, attend seminars

Interpersonal and Communication skills:
- Show excellent communication with medical students, junior residents and attendings

Systems-based practice:
- Demonstrate the ability to be chief of service including scheduling OR cases
- Be able to teach the junior resident surgical procedures.
- Show the ability to teach medical students and junior residents in the clinic, and OR.
- Learn how to fix patient care problems by making system changes

Practice-based learning:
- Be able to lead M&M conference for the service.

Professionalism:
- Continue to mentor junior residents
- Continue to improve on previous skills learned
OGME-5 residents are expected to improve on the above skills as well as the following:

**Medical Knowledge:**
- Will acquire the full breadth of knowledge of otolaryngologic disorders

**Patient Care:**
- Will be able to independently diagnose and develop treatment plans for outpatient disorders
- Will be able to perform all operations except for those that require a tertiary care referral to include removal of aerodigestive foreign bodies, excision of congenital neck masses, supraglottoplasty, and tracheostomy on the infant/small child, microsurgery of the larynx, medialization laryngoplasty, and endoscopic sinus surgery.

**Systems-based practice:**
- Be able to schedule patients for surgery
- Learn administrative duties necessary for running a practice

**Practice-based learning:**
- Show mastery of habits that will lead to life-long learning.

**Osteopathic Manipulative Therapy:**
- Resident is expected to demonstrate and apply knowledge learned of accepted standards in OMT appropriate to Otolaryngology/Oro-facial Plastic Surgery

**Professionalism:**
- Will demonstrate respect for patients and families and advocate for the patients’ welfare and autonomy
- Demonstrate adherence to ethical principles in the practice of medicine
- Demonstrate awareness and pay proper attention to issues of culture, religion, age, gender, sexual orientation, and mental and physical disabilities

**Patient Care:**
- Demonstrate ability to effective treat patients, provide medical care that incorporates the osteopathic philosophy, patient empathy, awareness of behavioral issues, the incorporation of preventative medicine, and health promotion

**Interpersonal and Communication Skills:**
- Demonstrate interpersonal and communication skills that enables the resident to establish and maintain professional relationships with patients, families and other members of the health-care teams
Facial Plastics Service

OGME 4 and 5

OGME-4 and 5 residents will rotate on this service. The scope of this service includes treatment of sinonasal disorders, repair of cutaneous facial defects secondary to Moh’s micrographic surgery, facial cosmetic surgery, treatment of vascular malformations, hair transplantation, surgical treatment of certain congenital malformations, aging face surgery and craniofacial trauma. It is intended that the resident will participate in the workup of all patients. They will participate in the planning of reconstructive events. They will learn the preoperative and postoperative care of the above-mentioned patients. At all times there will be supervision and immediate feedback available from the attending on the service.

Medical Knowledge:
- Develop an understanding of nasal airway obstruction and sinonasal disorders.
- Learn the anatomy and physiology of the nose.
- Understand local flap physiology and the vasculature dynamics, including radiation effects.
- Learn the deficits and treatments associated with the aging face, congenital malformations and alopecia.
- Understand the pathophysiology and outcomes of skin cancer and its treatment, including MOH’s.
- Understand the basics of craniofacial trauma.

Osteopathic Manipulative Therapy:
- Resident is expected to demonstrate and apply knowledge learned of accepted standards in OMT appropriate to Otolaryngology/Oro-facial Plastic Surgery

Patient Care:
- Learn the fundamentals of rhinoplasty, septoplasty, functional nasal surgery, browlift, blepharoplasty, treatment of vascular malformations and the surgical correction of the aging face
- Learn the fundamental of planning and executing local flaps in the head and neck area for the purposes of reconstructing cutaneous defects.
- Learn the fundamentals of photography necessary to accurately document preoperative and postoperative conditions. Each resident should also become familiar with the methods available for archiving medical photography information.

Interpersonal and Communication skills:
- Become proficient at communicating results/patient care issues with the Attending on the service.
- Learn to discuss sensitive issues with cosmetic patients.
- Be able to discuss risks and complications of the various surgeries with the patient and obtain informed consent.
- Learn to interact with adjunct specialists in caring for these patients.
Systems-based practice:
- Become proficient at obtaining consults from the trauma service.
- Understand the uniqueness of a facial plastic service in context of the U.S. medical system particularly in its fee for service practice
- Understand the importance of the role of the resident in obtaining quality patient care
- Look for ways to improve the efficiency of the service

Practice-based learning:
- Read before every surgical case
- Develop the habit of researching disease processes seen in clinic that day
- Recognize mistakes made and develop solutions to prevent them from reoccurring

Professionalism:
- Will demonstrate respect for patients and families and advocate for the patients’ welfare and autonomy
- Demonstrate adherence to ethical principles in the practice of medicine
- Demonstrate awareness and pay proper attention to issues of culture, religion, age, gender, sexual orientation, and mental and physical disabilities
THE TRAINING PROGRAM

A. Didactics:
   a. Clinical Conference – An informal methodology is utilized for the purpose of discussing serious cases, problem cases, mortalities, mistakes of technique, or any questions the resident may have. At least one surgical procedure may be presented in detail at each meeting, as well as the anatomy. These are held once monthly. Formal education must be provided to the residents with supervision by the attending Otolaryngology/Facial Plastic Surgery staff. This may include case presentations, journal reviews, basic science review, gross surgical anatomy, anatomical dissections, Grand Rounds, mortality, and morbidity conferences.
   b. Monthly Meeting – At this time, the Chief Resident may assign a lecture to one resident to be presented at any time during resident discussions. It shall not be longer than twenty (20) minutes. These presentations should be recorded in the resident logs.
   c. The resident shall prepare a scientific paper during his/her second, third and fourth years, which shall meet the requirements completely for scientific publishable material. In lieu of one paper the resident may submit options as per the Basic Standards (See Appendix II)
   d. The resident is required to take yearly in-service exam.
   e. The resident must complete a suitable home study course approved by the Program Director during the second, third and fourth years of training. Documentation of the entire home study course is required by the end of the fourth year of training.
   f. The resident must be certified as a provider in advanced cardiac life support (ACLS) and pediatric advanced life support (PALS).

B. Practical:
   a. Resident shall examine every Otolaryngology/Facial Plastic Surgery patient as soon after admission as possible, write the preliminary orders and a progress note relative to his/her findings and diagnosis.
   b. Resident shall study the surgical anatomy and technique relevant to the surgery. During the surgery, the surgeon shall administer an oral exam to the resident concerning anatomy, physiology, pathology, physical diagnosis, and surgical technique pertaining to this case.
   c. Resident shall write postoperative orders and progress notes concerning the surgery performed.
   d. Resident shall make rounds on all Otolaryngology/Facial Plastic Surgery patients and report any changes of condition to the attending surgeon involved. The resident shall write any orders deemed necessary for the good of the patient.
   e. Resident shall keep a log record: This is divided into two parts:
      i. This is a record of work observed or actually done by the resident and should be so designated. It shall contain the following: date, patient's initials, hospital, surgical description, attending surgeon, the resident's status (assisted, performed, and observed).
The second part of the log shall be used for record of meetings or educational programs attended, giving the date, meeting, and title of the educational subject. The entire log is to be made available at end of each service for the inspection of and signature of the Residency Program Director and Director of Medical Education, to be sure that no phase of training is being neglected by either the student or the department members. The resident keeps the original for his/her use and for examination by hospital and specialty inspectors if requested; a copy will be kept on file in the Medical Education Office. The monthly resident log is due four weeks from the completion of each service rotation.

Residents are required to follow all policies of Des Peres Hospital as long as they are in compliance with the AOA Basic Standards. Residents receive copies of all Des Peres Hospital policies in Resident Orientation prior to the start of their OGME-1 year. See Appendix II.

The resident shall administer OMT when deemed necessary and assist the House Staff in the art of OMT.

The following are additional resident guidelines:

i. The resident should assess the status of all the patients on his/her service and possess a working knowledge of their hospital course prior to early morning surgery.

ii. Under normal circumstances, the Resident should assist on all Otolaryngology/Facial Plastic Surgery cases performed by members of the teaching staff. The proposed surgical procedure should be studied so that an intelligent discussion can take place with the Trainer. It is the attending Otolaryngology/Facial Plastic Surgeon's discretion not to allow the Resident to participate in the surgery if he feels that the resident is not adequately prepared.

iii. It is the resident's responsibility to complete all aspects of the patient's chart. This includes appropriate dictation at the discretion of the individual attending Otolaryngology/Facial Plastic Surgeon.

iv. It is the resident's responsibility to enter a progress note at least daily on each patient. Special circumstances may demand more than one daily note.

v. Every effort should be made to make rounds with the attending surgeons when they are in the hospital.

vi. The resident should make an effort to communicate with the ancillary services, assisting in the care of the Otolaryngology/Facial Plastic Surgery patient. This should include, but not be limited to Social Service, Case Management, Physical Therapy and Rehabilitation and Health Information Management (HIM).

vii. Reading assignments can be made at the discretion of the attending surgeons.
viii. In the event that all the hospital work has been completed, the resident should make an effort to take advantage of the teaching situation in the clinic setting.

ix. The Department expects that the service log be completed and turned in to the Medical Education Office within four weeks from the last day of the service.

x. Residents are encouraged to investigate consults prior to notification of the consulting physicians.

xi. Residents are encouraged to take advantage of the teaching situation that can occur at extracurricular event coverage.

xii. Residents must respond to all calls from the Emergency Department requesting Otolaryngology/Facial Plastic Surgery management of a particular case. If a question arises regarding the form this management should take, the resident should contact the on-call Otolaryngology/Facial Plastic Surgeon for clarification.

xiii. Elective time, outside of Des Peres Hospital may not be taken during the last six (6) months of the final year of the Residency Program.

xiv. Outside elective rotations are to be approved by the Residency Program Director and be scheduled with the Medical Education Office. Ninety day advanced notice is required for a new Affiliation Agreement.
The following is a recap of the progression of the training program in Otolaryngology/Facial Plastic Surgery:

**First Year: Basic Principles of Surgery**

A. Shall study and correlate with the actual hospital patient the following basic sciences:
   a. Surgical Anatomy
   b. Surgical Physiology
   c. Surgical Bacteriology
   d. Surgical Pathology
      i. Gross
      ii. Microscopic
      iii. Preparation and care of surgical specimen

B. Shall study and correlate basic surgical radiology with the patient under the guidance of the Department of Radiology.

C. Shall become familiar with operating room technique.
   a. Aseptic technique
   b. Surgical “set-up” and instruments for various surgical procedures.
   c. Preparation of supplies
   d. Sterilization of supplies
   e. Mechanics of operating room technique
   f. Postoperative Otolaryngology/Facial Plastic Surgery Care

D. Principles of Surgery - shall study and acquire the applications of the principles of Surgery.

E. Active duties shall include the following:
   a. Assisting surgeon in pre and postoperative care of patient.
   b. First assists on major Otolaryngology/Facial Plastic Surgery procedures.
   c. Assist in Outpatient Department with surgical procedures
   d. of acute, traumatic, and ENT cases.
   e. Care for surgical specimen and review pathological reports.
   f. Review case history, physical examination, laboratory procedures, radiologic and other pertinent materials on all patients admitted for Otolaryngology/Facial Plastic Surgery.
   g. Conduct seminar with OGME-Is on principles, basic sciences of Otolaryngology/Facial Plastic Surgery, and hospital routine each month.
   h. Responsible for case history and physical examinations of all patients admitted on his service.
   i. Prepare surgical technique procedures in outline form.
First Half of Second Year: Pre and Postoperative Care of the Surgical Patient

A. Shall study and correlate with the actual hospital patient the principles of pre and postoperative care.
   a. Preparation of the patient for operation.
   b. Postoperative care.
   c. Management of surgical complications.

B. Shall study the principles of anesthesiology as applied to surgery, under the direction of the head of that department.

Second Half of the Second Year: Surgical Technique

C. Study shall be devoted to the study of the various surgical techniques as applied to the systems of the body. Activity shall include the following:
   a. Responsible for case history and physical examinations on
   b. all patients admitted to his service.
   c. Review case history, physical examination, laboratory findings, radiologic and other pertinent material on all patients admitted for surgery.
   d. Pre and postoperative management of surgical patients under the supervision of the responsible surgeon.
   e. Assist in major surgery.
   f. Assist in Outpatient Department with surgical procedures and acute traumatic and Otolaryngology/Facial Plastic Surgery cases.
   g. Conduct seminar with OGME-Is on pre and postoperative care and surgical techniques each month.
Third Year: Study shall be devoted to the diagnosis of surgical conditions as they affect the various systems of the body.

A. Active duties shall include the following:
   a. Shall be essentially those of the second year with expanding responsibility as the individual's capabilities
   b. Indicate.
   c. Shall conduct seminar with OGME-Is on surgical diagnosis each month.

B. Resident shall spend some time each day in reading. He/she must take advantage of hospital library, reading from all surgical books, journals, and allied subjects.

C. The resident shall make use of the postgraduate courses given at the University of Missouri, Washington University, Saint Louis University, American Osteopathic Colleges of Ophthalmology and Otolaryngology-Head and Neck Surgery, Seminars, and other courses applicable to the specialty given by accredited organizations. Any courses are to be approved in writing by the Program Director prior to scheduling or attending the course.

D. Third year residents are encouraged to outside rotations with the approval of the Program Director. These rotations may include pediatric, otolaryngology, etc.

Second or Third Year:

   A. Attend a Basic Science course as required by the Academy.

   B. Attend the Temporal/Bone Lab, monthly, years 2-5

Fourth Year - Same as Third Year with completion of four months of elective.

Fifth Year - Same as fourth year
Appendix I

DES PERES HOSPITAL, HOLDINGS, TEXTBOOKS

Otolaryngology/Facial Plastic Surgery textbooks
February, 2016


Krouse.  Allergy and Immunology: an Otolaryngic approach.  Lippincott, Williams and Wilkins, c2002.


Bailey. **Head and neck surgery – otolaryngology.** Lippincott, Williams & Wilkins, c2006.

King. **Allergy in ENT practice.** Thieme, c2005.

Baker. **Local flaps in facial reconstruction.** Mosby Elsevier, c2007. (cataloged with WE)

Lore. **An atlas of head and neck surgery.** Elsevier Saunders, c2005. (cataloged with WE)

**Board Review**

Osler Otolaryngology Board Review, audio CD’s

**Otolaryngology/Facial Plastic Surgery, Current Journal Subscriptions**

Annals of Otology, Rhinology and Laryngology
JAMA, Otolaryngology – Head and Neck Surgery
Otolaryngology Clinics of North America

**Otolaryngology/Facial Plastic Surgery E-Books, Available through the ATSU portal**

Ahuja. **Practical Head and Neck Ultrasound.** Cambridge University Press, 2000
Alpini. **Whiplash Injuries Diagnosis and Treatment.** Springer, 2014
Anniko. **Otorhinolaryngology, head and neck surgery.** Springer, 2010
Bailey. **Head & Neck surgery-otolaryngology.** Lippincott Williams & Wilkins, 2006
Ballenger. **Ballenger’s Otorhinolaryngology: Head and Neck Surgery.** BC Decker, 2009
Batra. **Practical Medical and Surgical Management of Chronic Rhinosinusitis.** Springer, 2015
Becker. **Ear, nose, and throat diseases with head and neck surgery.** Thieme, 3009
Becker. **The Maxillary Sinus: Medical and Surgical Management.** Georg Thieme Verlag, 2011
Bowden. **Otolaryngology board reviews.** McGraw-Hill, 2012
Bull. Color atlas of ENT diagnosis. Thieme, 2010
Chokroverty. Sleep disorders medicine basic science, technical considerations, and clinical aspects. Saunders/Elsevier, 2009
Dhillon. Ear, nose, and throat and head and neck surgery an illustrated colour text. Elsevier, 2013
Dunnebier. Imaging for otolaryngologists. Thieme, 2011
Eiber. Middle Ear Mechanics in Research and Otology: Proceedings of the 4th International Symposium, 2006
Ekberg. Dysphagia Diagnosis and Treatment. Springer, 2012
Gutloff. Oculoplastics and Orbit. Springer-Verlag, 2007


Theissing. **ENT-head and Neck Surgery: Essential Procedures.** Thieme, 2011

Thomaidis. **Cutaneous Flaps in Head and Neck Reconstruction From Anatomy to Surgery.** Springer, 2014


Ulug. **Atlas of Temporal Bone Surgery.** Georg Thieme Verlag, 2010

Valente. **Audiology Answers for Otolaryngologists.** Thieme, 2011

Wada. **Proceedings of the 3rd Symposium on Middle Ear Mechanics in Research and Otology.** 2003

Waltzman. **Cochlear implants.** Thieme, 2014

Warner. **Otolaryngology and Head and Neck Surgery.** Oxford University Press, 2009

Waterhouse. **Cosmetic Surgery (Facts).** Oxford University Press, 2008


Weinstein. **Geriatric audiology.** Thieme, 2013


Wolff. **Raising of microvascular flaps.** A systematic approach. Springer, 2005

**Otolaryngology/Facial Plastic Surgery, E-Journals,** Available through the ATSU portal

Acta Chirurgiae Plasticae, 2011 to present

Acta Oto-Laryngologica, 1998 to present, Full text delay: 18 months

Advances in Cellular and Molecular Otolaryngology, 2013 to present

Aesthetic plastic surgery, 1997 to present

American Journal of Otolaryngology, 2007 to present

American Journal of Otology, 1979 to 2000

American Journal of Rhinology, 2003 to 2008

American Journal of Rhinology & Allergy: Official Journal of the American Rhinologic Society and the International Rhinologic Society, 2009 to present

Annals of Otology, Rhinology & Laryngology, 2002 to present

Annals of Plastic Surgery, 1978 to present

Archives of facial plastic surgery, 1999 to 2012

Archives of otolaryngology – head and neck surgery, 1998 to 2012

Archives of Plastic Surgery, 2012 to present

Arquivos Internacionais de Otorrinolaringologia, 1997 to present

Audiology and Neuro-otology, 2005 to 2011

Auris Nasus Larynx, 2008 to present

Bangladesh Journal of Otorhinolaryngology, 2008 to present

Bangladesh Journal of Plastic Surgery, 2010 to 2013

BMC Ear, Nose, and Throat Disorders, 2001 to present

Brazilian Journal of Otorhinolaryngology, 2005 to present

British Journal of Plastic Surgery, 1995 to 2005


Case Reports in Otolaryngology, 2011 to present

Cirugia Plastica Ibero-Latinoamericana, 2006 to present

Clinical and Experimental Otorhinolaryngology, 2008 to present

Clinical Medicine Insights: Ear, Nose and Throat, 2008 to present

Clinical otolaryngology, 2005 to present, Full text delay: 1 year

Clinical otolaryngology & Allied Sciences, 1998 to 2004

Clinical Otology Japan, 2974 to 1990
Clinics in Plastic Surgery, 2007 to present
Craniomaxillofacial Trauma and Reconstruction, 2008 to present
ENToday, 2006 to 2009
GMS Current Posters in Otorhinolaryngology: Head and Neck Surgery, 2009 to present
GMS Current Topics in Otorhinolaryngology, Head and Neck Surgery, 2004 to present
GMS German Plastic, Reconstructive and Aesthetic Surgery, Burn and Hand Surgery, 2011 to present
Current Opinion in Otolaryngology & Head & Neck Surgery, 1994 to present
Current Otorhinolaryngology Reports, 2013 to present
Ear, Nose & Throat Journal, 1994 to present
Eplasty, 2004 to present
Egyptian Journal of Ear, Nose, Throat and Allied Sciences, 2011 to present
European Annals of Otorhinolaryngology, Head and Neck Diseases, 2010 to present
European Archives of Oto-Rhino-Laryngology, 1997 to present
European Journal of Plastic Surgery, 1997 to present
Facial Plastic Surgery Clinics of North America, 2007 to present
Head and Neck, 2005 to present, Full text delay: 1 year
Head and Neck Oncology, 2009 to present
HNO, 1997 to present, Full text delay: 1 year
Indian Journal of Otolaryngology and Head & Neck Surgery, 2001 to present
Indian Journal of Otology, 2011 to present
Indian journal of plastic surgery, 2001 to present
International Archives of Otorhinolaryngology, 2005 to present
International journal of cosmetic surgery and aesthetic dermatology, 2000 to 2003
International Journal of Otolaryngology, 2009 to present
International Journal of Otolaryngology and Head & Neck Surgery, 2012 to present
International Journal of Pediatric Otorhinolaryngology, 2007 to present
Internet Journal of Otorhinolaryngology, 2000 to present
Internet Journal of Plastic Surgery, 2001 to present
Iranian Journal of Otorhinolaryngology, 2008 to present
ISRN Otolaryngology, 2011 to present
ISRN Plastic Surgery, 2013 to present
ISRN Surgery, 2011 to present
JAMA Facial Plastic Surgery, 2013 to present, Full text delay: 35 days
JAMA Otolaryngology – Head & Neck Surgery, 2013 to present, Full text delay: 35 days
Journal of the Association for Research in Otolaryngology: JARO, 2000 to present, Full text delay: 2 years
Journal of Hearing Science, 2011 to present
Journal of International Advanced Otology, 2009 to present
Journal of Laryngology & Otology, 2002 to present
Journal of Laryngology and Voice, 2011 to present
Journal of Japan Society of Immunology & Allegology in Otolaryngology, 2011 to present
Journal of Otolaryngology, 1997 to 2007
Journal of Otolaryngology – Head and Neck Surgery, 2013 to present
Journal of Plastic Reconstructive and Aesthetic Surgery, 2007 to present
Journal of Plastic Surgery and Hand Surgery, 2010 to present
Journal of Whiplash & Related Disorders, 6/06 to 12/06
Kulak-Burun-Bogaz ve Bas-Boyun Cerrahisi Dergisi = Turkish Journal of Ear, Nose, and Throat, 2011 to present
The Laryngoscope, 1997 to present
Microsurgery, 2012 to present, Full text delay: 1 year
Modern Plastic Surgery, 2011 to present
National Journal of Maxillofacial Surgery, 2010 to present
National Journal of Otorhinolaryngology and Head and Neck Surgery, 2005 to present
Online Journal of Otolaryngology, 2011 to present
The Open Otorhinolaryngology Journal, 2007 to present
Operative Techniques in Otolaryngology – Head and Neck Surgery, 2007 to present
Ophthalmic Plastic & Reconstructive Surgery, 1985 to present
Otolaryngologic Clinics of North America, 2007 to present
Otorinolaryngologie a Foniatrie, 2011 to present
Otorynolaryngologia, 2007 to present
Otolaryngology – Head and Neck Surgery, 1999 to present
Otolaryngology – Head and Neck Surgery (Elsevier), 1997 to 2010
Otology & neurotology, 2001 to present
Otology Japan, 1991 to 2014
Patient Management Perspectives in Otolaryngology, 2011 to present
Pediatric Otorhinolaryngology Japan, 1980 to present
Plastic & Reconstructive Surgery, 1946 to 1999
Plastic and Reconstructive Surgery, 1962 to present
Plastic Surgery, 2014 to present
Plastic Surgery: An International Journal, 2013 to present
Plastic Surgery International, 2010 to present
Plastic Surgery Practice, 2012 to present
Revista Brasileira de Cirurgia Plastica (Impresso), 2010 to present
Rhinology, 2008 to present
Rhinology. Supplement, 2010 to present
Seminars in Plastic Surgery, 2004 to present, Full text delay, 1 year
World Articles in Ear, Nose and Throat, 2012 to present
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