|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Rotation:** Neuroradiology | | **Rotation Duration:** 4 wks | | **Month(s): 5** | |
| **Institution:** Stanford, VA | | **Call Responsibility:** Evening and night residents | | **Night(s):** covered by 2nd year and fellow (MRI) | |
| **Responsible Faculty Member(s):**  Scott W. Atlas, MD, Section Chief  Pat Barnes, MD  Huy M. Do, MD  Nancy J. Fischbein, MD  Bart Lane, MD:  Michael Marks, MD  Zina Payman, MD  Kristen Yeom, MD  Greg Zaharchuk, MD, PhD  Michael Zeineh, MD, PhD | | | | **Location:** SUH, LPCH, VA, Sherman Ave | |
| **Phone Numbers:**  **Administrative Assts:**  Kari Guy: 723-7426  Barbara Hargis: 723-6767 | |
| **Technologists/Technical Staff:**  Michele Thomas, Lead CT tech  Teresa Nelson, Lead MRI tech  Patrick Strain, Fluoro | | | | **Training Level:**  Years 1 and 2: SUH  Years 3 and 4: VA/Sherman | |
| **Goals & Objectives**  The **Neuroradiology** rotation gives the resident graduated clinical exposure to CT, MRI, and other diagnostic imaging studies of patients suspected of harboring diseases involving the brain, spine, and head and neck. | | | | | |
| **Rotation One**  **Medical Knowledge**  Emergency evaluation of pediatric and adult patients:   1. Normal head CT 2. Normal spine CT 3. CT of intracranial hemorrhage 4. CT of cerebral infarction 5. CT in head and spine trauma 6. Indications for CT versus MRI versus cerebral angiography 7. Understand the rationale for ordering emergency head CT 8. CT of the brain in non-traumatic emergency settings (e.g. seizures) 9. CT of the spine in non-traumatic emergency settings (e.g. spinal cord compression) 10. Contraindications to MRI 11. Treatment of contrast reactions 12. Procedures for MRI and CT in pregnancy 13. Processing and interpretation of Craniocervical CTA 14. Basic neck CT interpretation in adult and pediatric patients   OtherKnowledge Based Objectives: At the end of the rotation, the resident should be able to:   * Given normal neuro images, demonstrate a proficient knowledge of the anatomy of the head and neck, spine, and central nervous system. * Discuss the basic principles of CT physics, artifacts and pitfalls. * Describe, in considerable detail, CT and, to some extent, MR imaging protocols. * Given an appropriate abnormal image, recognize basic neuropathology and give a differential diagnosis.   Technical Skills: At the end of the rotation, the resident should be able to:   * Screen, protocol, and supervise routine neuroimaging procedures.   Decision-Making and Value Judgment Skills: At the end of the rotation, the resident should be able to:   * Interact with primary care physicians and specialists (neurosurgeons, neurologists) in consultation when more common pathologies are at question. * Provide guidance regarding appropriate imaging strategies   **Patient Care**   * The resident arrives at the neuroradiology service at 8:30 -8:45 am, after a.m. conference * Generally there are at least two case readouts. These occur in the morning and afternoon, but specific readout times vary, depending on the attending, the specific assignment in neuroradiology, and the workload on any given day. Typically, morning readout begins around 9:00 am, and afternoon readout occurs around 3 pm. * Residents are expected to have previewed all cases before the readout session begins. They are also expected to be readily available at all times, except when in resident teaching conferences, for consultations with clinicians, for questions about protocols from technologists, and for answering questions from medical students and visitors. * The resident is expected to be familiar with all histories, reasons for scans, radiological findings, and changes from previous studies. The resident is also expected to have formulated a reasonable clinical differential diagnosis to explain the findings on the studies. * For each case, the resident should be prepared with the requisition in hand, the history and the reason for the scan. During the interpretation of the study with the attending, the resident may be asked questions about findings, normal anatomy, or differential diagnosis. For the final interpretation, the resident should write down the pertinent findings as the attending has explained them, so that the dictations accurately reflect the discussion by the attending. * Following the end of readout, the resident is expected to dictate all the cases that he has gone over with the attending. * Intermittently, attendings or housestaff from other clinical services will come into the reading room to ask about their patients’ imaging studies. The First year Radiology resident is expected to provide a preliminary interpretation to these physicians ONLY if the case has been reviewed also with a fellow or attending. Residents are expected to protocol neuroradiology imaging studies with the assistance of fellows and attendings, as needed.. * Emergency CT scans are intermittently ordered by the Emergency Department. The resident should provide a preliminary report on these cases immediately upon their completion and later document the date, time, and to whom they spoke in the formal, dictated report. * During downtimes, it is expected that the resident read about neuroradiology.   **Practice-Based Learning and Improvement**  **Goal**  Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning. *Residents are expected to develop skills and habits to be able to:*  **Knowledge Objectives:**   * Assess CT images for quality and suggest methods of improvement.   **Skill Objectives:**   * Demonstrate independent self-study using various resources including texts, journals, teaching files, and other resources on the internet, and * Facilitate the learning of students and other health care professionals.   **Behavior and Attitude Objectives:**   * Incorporate formative feedback into daily practice, positively responding to constructive criticism, and * Follow-up interesting or difficult cases without prompting and share this information with appropriate faculty and fellow residents.   **Systems Based Practice**  **Goal**  Residents must demonstrate an awareness of, and responsiveness to, the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. *Residents are expected to:*  **Knowledge Objectives:**   * Understand how their image interpretation affects patient care.   **Skill Objectives:**   * Provide accurate and timely interpretations to decrease length of hospital and emergency department stay, * Appropriately notify the referring clinician if there are urgent or unexpected findings and document such without being prompted; and * Practice using cost effective use of time and support personnel.   **Behavior and Attitude Objectives:**   * Advocate for quality patient care in a professional manner, particularly concerning imaging utilization issues.   **Professionalism**  **Goal**  Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. *Residents are expected to demonstrate:*  **Knowledge Objectives:**   * Understanding of the need for respect for patient privacy and autonomy, and * Understanding of their responsibility for the patient and the service, including arriving in the reading room promptly each day, promptly returning to the reading room after conferences, completing the work in a timely fashion, and not leaving at the end of the day until all work is complete. If the resident will be away from a service (for time off, meeting, board review, etc.), this *must* be arranged in advance with the appropriate faculty and/or fellow.   **Skill Objectives:**   * Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.   **Behavior and Attitude Objectives:**   * Respect, compassion, integrity, and responsiveness to patient care needs that supersede self-interest.   **Interpersonal and Communication Skills**  **Goal**  Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and teaming with patients, their families, and professional associates. *Residents are expected to:*  **Knowledge Objectives:**   * Know the importance of accurate, timely, and professional communication.   **Skill Objectives:**   * Produce concise and accurate reports on most examinations, * Communicate effectively with physicians, other health professionals, and * Obtained informed consent with the utmost professionalism.   **Behavior and Attitude Objectives:**  Work effectively as a member of the patient care team. | | | | | |
| II. **Rotation 2 (CTA Stanford/LPCH)**  This is a relatively new rotation that will allow the resident a two-week block during which to focus on CTA processing and interpretation, as well as two weeks on pediatric neuroradiology  **Medical Knowledge**  Knowledge Based Objectives: At the end of the rotation, the resident should be able to:   * Recognize intracranial aneurysms on CTA * Assess atherosclerotic disease on CTA * Understand when CTA should be performed * Peds neuro—recognize the appearance of a normal brain at various ages, as well as pathologies particular to the pediatric population such as child abuse, congenital malformations, and pediatric-specific neoplasms   Technical Skills: At the end of the rotation, the resident should be able to:   * Post-process CTA to provide 3-D volume rendered images of Circle of Willis and carotid arteries. * Peds neuro—interpret post-processed 3D images of the calvarium (craniosynostosis), facial bones (trauma, congenital syndromes), and spine (scoliosis)   Decision-Making and Value Judgment Skills: At the end of the rotation, the resident should be able to:   * Interact with primary care physicians and specialists (neurosurgeons, neurologists) in consultation when more common pathologies are at question. * Provide guidance regarding appropriate imaging strategies * In the event that the resident does not understand the findings or feels uncomfortable providing such reports, the resident should ask for help, either from the fellows or attendings in neuroradiology.   **Patient Care**   * The resident arrives at the neuroradiology service at 8:30 -8:45 am, after a.m. conference * Generally there are at least two case readouts. These occur in the morning and afternoon, but specific readout times vary, depending on the attending, the specific assignment in neuroradiology, and the workload on any given day. Typically, morning readout begins around 9:00 am, and afternoon readout occurs around 3 pm. * Residents are expected to have previewed all cases before the readout session begins. They are also expected to be readily available at all times, except when in resident teaching conferences, for consultations with clinicians, for questions about protocols from technologists, and for answering questions from medical students and visitors. * The resident is expected to be familiar with all histories, reasons for scans, radiological findings, and changes from previous studies. The resident is also expected to have formulated a reasonable clinical differential diagnosis to explain the findings on the studies. * For each case, the resident should be prepared with the requisition in hand, the history and the reason for the scan. During the interpretation of the study with the attending, the resident may be asked questions about findings, normal anatomy, or differential diagnosis. For the final interpretation, the resident should write down the pertinent findings as the attending has explained them, so that the dictations accurately reflect the discussion by the attending. * Following the end of readout, the resident is expected to dictate all the cases that he has gone over with the attending. * Intermittently, attendings or housestaff from other clinical services will come into the reading room to ask about their patients’ imaging studies. The First year Radiology resident is expected to provide a preliminary interpretation to these physicians ONLY if the case has been reviewed also with a fellow or attending. Residents are expected to protocol neuroradiology imaging studies with the assistance of fellows and attendings, as needed.. * Emergency CT scans are intermittently ordered by the Emergency Department. The resident should provide a preliminary report on these cases immediately upon their completion and later document the date, time, and to whom they spoke in the formal, dictated report. * During downtimes, it is expected that the resident read about neuroradiology.   **Practice-Based Learning and Improvement**  **Goal**  Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning. *Residents are expected to develop skills and habits to be able to:*  **Knowledge Objectives:**   * Assess CT and CTA images for quality and suggest methods of improvement.   **Skill Objectives:**   * Demonstrate independent self-study using various resources including texts, journals, teaching files, and other resources on the internet, and * Facilitate the learning of students and other health care professionals.   **Behavior and Attitude Objectives:**   * Incorporate formative feedback into daily practice, positively responding to constructive criticism, and * Follow-up interesting or difficult cases without prompting and share this information with appropriate faculty and fellow residents.   **Systems Based Practice**  **Goal**  Residents must demonstrate an awareness of, and responsiveness to, the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. *Residents are expected to:*  **Knowledge Objectives:**   * Understand how their image interpretation affects patient care.   **Skill Objectives:**   * Provide accurate and timely interpretations to decrease length of hospital and emergency department stay, * Appropriately notify the referring clinician if there are urgent or unexpected findings and document such without being prompted; and * Practice using cost effective use of time and support personnel.   **Behavior and Attitude Objectives:**   * Advocate for quality patient care in a professional manner, particularly concerning imaging utilization issues.   **Professionalism**  **Goal**  Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. *Residents are expected to demonstrate:*  **Knowledge Objectives:**   * Understanding of the need for respect for patient privacy and autonomy, and * Understanding of their responsibility for the patient and the service, including arriving in the reading room promptly each day, promptly returning to the reading room after conferences, completing the work in a timely fashion, and not leaving at the end of the day until all work is complete. If the resident will be away from a service (for time off, meeting, board review, etc.), this *must* be arranged in advance with the Chief residents.   **Skill Objectives:**   * Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.   **Behavior and Attitude Objectives:**   * Respect, compassion, integrity, and responsiveness to patient care needs that supersede self-interest.   **Interpersonal and Communication Skills**  **Goal**  Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and teaming with patients, their families, and professional associates. *Residents are expected to:*  **Knowledge Objectives:**   * Know the importance of accurate, timely, and professional communication.   **Skill Objectives:**   * Produce concise and accurate reports on most examinations, * Communicate effectively with physicians, other health professionals, and * Obtained informed consent with the utmost professionalism.   **Behavior and Attitude Objectives:**   * Work effectively as a member of the patient care team. | | | | | |
| III. **Rotation 3 (primarily MRI, Stanford)**  **Medical Knowledge**    Knowledge Based Objectives: At the end of the rotation, the resident should be able to:   * Understand routine MR imaging protocols for brain and spine, and have some beginning exposure to head and neck imaging * Recognize common pathophysiological entities on MRI, including strokes, brain tumors, demyelinating lesions * Recognize pathologies of the skull base, cavernous sinuses, and orbits * Interpret MRA of intracranial and extracranial circulation * Have some understanding of MR perfusion techniques   Technical Skills: At the end of the rotation, the resident should be able to:   * Screen, protocol, and supervise neuro MRI studies * Calculate GFR and address issues related to gadolinium-based contrast agents   **Practice-Based Learning and Improvement**  **Goal**  Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning. *Residents are expected to develop skills and habits to be able to:*  **Knowledge Objectives:**   * Assess CT and MRI images for quality and suggest methods of improvement.   **Skill Objectives:**   * Demonstrate independent self-study using various resources including texts, journals, teaching files, and other resources on the internet, and * Facilitate the learning of students and other health care professionals.   **Behavior and Attitude Objectives:**   * Incorporate formative feedback into daily practice, positively responding to constructive criticism, and * Follow-up interesting or difficult cases without prompting and share this information with appropriate faculty and fellow residents.   **Systems Based Practice**  **Goal**  Residents must demonstrate an awareness of, and responsiveness to, the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. *Residents are expected to:*  **Knowledge Objectives:**   * Understand how their image interpretation affects patient care.   **Skill Objectives:**   * Provide accurate and timely interpretations to decrease length of hospital and emergency department stay, * Appropriately notify the referring clinician if there are urgent or unexpected findings and document such without being prompted; and * Practice using cost effective use of time and support personnel.   **Behavior and Attitude Objectives:**   * Advocate for quality patient care in a professional manner, particularly concerning imaging utilization issues.   **Professionalism**  **Goal**  Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. *Residents are expected to demonstrate:*  **Knowledge Objectives:**   * Understanding of the need for respect for patient privacy and autonomy, and * Understanding of their responsibility for the patient and the service, including arriving in the reading room promptly each day, promptly returning to the reading room after conferences, completing the work in a timely fashion, and not leaving at the end of the day until all work is complete. If the resident will be away from a service (for time off, meeting, board review, etc.), this *must* be arranged in advance with the appropriate faculty and/or fellow.   **Skill Objectives:**   * Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation.   **Behavior and Attitude Objectives:**   * Respect, compassion, integrity, and responsiveness to patient care needs that supersede self-interest.   **Interpersonal and Communication Skills**  **Goal**  Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and teaming with patients, their families, and professional associates. *Residents are expected to:*  **Knowledge Objectives:**   * Know the importance of accurate, timely, and professional communication.   **Skill Objectives:**   * Produce concise and accurate reports on most examinations, * Communicate effectively with physicians, other health professionals, and * Obtained informed consent with the utmost professionalism.   **Behavior and Attitude Objectives:**  Work effectively as a member of the patient care team. | | | | | |
| IV and V. **Rotations 4 and 5 (VA Neuroradiology and Sherman Ave OP facility)**  **Medical Knowledge**  Knowledge Based Objectives: At the end of the rotation, the resident should be able to:   * Demonstrate increased ability to recognize pathology and develop a differential diagnosis.   Technical Skills: at the end of the rotation, the resident should be able to:   * Dictate neuroimaging studies after review with the attending neuroradiologist. * Screen, protocol, and supervise, with an increasing level of responsibility, most neuroimaging procedures. * Demonstrate proficiency in performance and interpretation of lumbar, thoracic and cervical myelograms. * Demonstrate proficiency as an assistant angiographer for routine neuroangiography.   Decision-Making and Value Judgment Skills: At the end of the rotation, the resident should be able to:   * Perform, in a responsible manner, pre-angiography patient consultations and post-procedure patient follow-ups, identifying patient conditions that require specific action on the part of the angiography team. * Consult, with increasing confidence, with primary care physicians and neurologists/neurosurgeons in regard to most neuroimaging procedures.   **Patient Care**   * Arrive on service promptly, immediately after a.m. conference * Generally there are at least two case readouts. These occur in the morning and afternoon, but specific readout times vary, depending on the attending, the specific assignment in neuroradiology, and the workload on any given day. Typically, morning readout begins around 9:00 am, and afternoon readout occurs around 3 pm. * Preview all cases before the readout session begins. * Be readily available at all times, except when in resident teaching conferences, for consultations with clinicians, for questions about protocols from technologists, and for answering questions from medical students and visitors. * Be familiar with all histories, reasons for scans, radiological findings, and changes from previous studies. * Formulate a reasonable clinical differential diagnosis to explain the findings on the studies. * For each case, the resident should be prepared with the requisition in hand, the history and the reason for the scan. During the interpretation of the study with the attending, the resident may be asked questions about findings, normal anatomy, or differential diagnosis. For the final interpretation, the resident should write down the pertinent findings as the attending has explained them, so that the dictations accurately reflect the discussion by the attending. * Following the end of readout, the resident is expected to dictate all the cases that he has gone over with the attending. * Intermittently, attendings or housestaff from other clinical services will come into the reading room to ask about their patients’ imaging studies. The Radiology resident is expected to provide a preliminary interpretation to these physicians and to protocol neuroradiology imaging studies with the assistance of fellows and attendings, as needed.. * Emergency CT scans are intermittently ordered by the Emergency Department. The resident should provide a preliminary report on these cases immediately upon their completion and later document the date, time, and to whom they spoke in the formal, dictated report. * During downtimes, it is expected that the resident read about neuroradiology.   **Practice-Based Learning and Improvement**  **Goal**  Residents must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning. *Residents are expected to develop skills and habits to be able to:*  **Knowledge Objectives:**   * Assess CT images for quality and suggest methods of improvement.   **Skill Objectives:**   * Demonstrate independent self-study using various resources including texts, journals, teaching files, and other resources on the internet, and * Facilitate the learning of students and other health care professionals.   **Behavior and Attitude Objectives:**   * Incorporate formative feedback into daily practice, positively responding to constructive criticism, and * Follow-up interesting or difficult cases without prompting and share this information with appropriate faculty and fellow residents.   **Systems Based Practice**  **Goal**  Residents must demonstrate an awareness of, and responsiveness to, the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. *Residents are expected to:*  **Knowledge Objectives:**   * Understand how their image interpretation affects patient care.   **Skill Objectives:**   * Provide accurate and timely interpretations to decrease length of hospital and emergency department stay, * Appropriately notify the referring clinician if there are urgent or unexpected findings and document such without being prompted; and * Practice using cost effective use of time and support personnel.   **Behavior and Attitude Objectives:**   * Advocate for quality patient care in a professional manner, particularly concerning imaging utilization issues.   **Professionalism**  **Goal**  Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. *Residents are expected to demonstrate:*  **Knowledge Objectives:**   * Understanding of the need for respect for patient privacy and autonomy, and * Understanding of their responsibility for the patient and the service, including arriving in the reading room promptly each day, promptly returning to the reading room after conferences, completing the work in a timely fashion, and not leaving at the end of the day until all work is complete. 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| **Where to go**  Generally, the radiology resident reports to the inpatient reading room in Stanford Hospital adjacent to the MRI Suite. Exceptions occur when the resident is assigned to pediatric neuroradiology, for which he reports to the MRI Reading Room in the basement of LPCH; when the resident is assigned to outpatient neuroradiology, for which he reports to the Neuroradiology Reading room at Sherman Avenue; and when the resident is assigned to VA Neuroradiology, for which he reports to the Diagnostic Radiology Center at the Palo Alto VA Hospital. If there is no faculty member covering VA Neuro, the resident should report to the outpatient neuroimaging reading room at Sherman Ave.  All rotations start following morning conference at 8:30 am.  Inpatient Reading Room: Stanford Hospital HD001  Outpatient Reading Room: Sherman Avenue Imaging center  LPCH Reading Room: Radiology /Basement  Cath-angio Room 8: Second floor – Cath-angio Studies performed: 1. CT scans of the brain, spine, and head and neck, including CT angiography  2. MRI scans of the brain, spine, and head and neck, including MR angiography  3. Myelography  4. Cerebral angiography  5. CT-guided or MR-guided biopsy  **Preparing Cases**   * Except for occasional myelograms and angiograms, all cases are interpreted on a PACS monitor. All cases are interpreted with any relevant previous studies for comparison. Residents are expected to have ascertained the clinical history and reason for the study. It is also expected that the resident preview all cases and comparisons prior to readout with the attending. | | | | | |
| **Resident Conference Schedule/Format** | | | | | |
| **Title** | **Day** | | **Time** | | **Location** |
| Neuro case conference | Tuesday | | 7:30 AM | | Lucas |
| Neuro core conference | Monday | | Noon | | Lucas |
|  |  | |  | |  |
| WORK/EDUCATIONAL/INTERDISCIPINARY CONFERENCES **Stanford Hospital**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | DAY | **TIME** | **FREQUENCY** | **TITLE/DEPARTMENT** | **VENUE** | | Monday | 7:30 a.m. | Weekly | Pediatric Neuro-Oncology Conference | LPCHS Conf. Room | | Wednesday | 4:00 p.m. | Weekly | Neurology Case Conference | H3150 | | Thursday | 10:00 a.m. | Weekly | ENT Tumor Staging Conference | Cancer Center | | Friday | 12:00 noon | Weekly | Neuro-oncology Conference | H3150 |   **VA Hospital**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Wednesday | 8:30 a.m. | Weekly | Neurosurgery Case Conference | DRC Reading Room | | Thursday | 8:30 a.m. | Weekly | Spinal Cord Conference | Spinal Cord Conference Room | | Friday | 8:30 a.m. | Weekly | Rehab. Med. Case Conference | DRC Reading Room | | | | | | |
| **Method of Assessment of Performance:**   * Written evaluation of resident by responsible faculty members monthly * Verbal feedback to resident by faculty * ACR In-Training Service Exam annually | | | | | |
| **Recommended Comprehensive and Reference Reading**   1. *Magnetic Resonance Imaging of the Brain and Spine*; SW Atlas, editor, 3rd edition, Lippincott Williams and Wilkins, 2002. 2. *Head and Neck Imaging*; P. Som and H. Curtin, editors, 4th edition, Mosby, 2002. 3. *Pediatric Neuroimaging*; J. Barkovich, editor; 3rd edition, Williams and Wilkins, 1999.  4. ***Teaching atlas of brain imaging / Nancy J. Fischbein,* Thieme, 2000. On reserve at Lane** | | | | | |
| Additional readings, with a focus on a comprehensive introduction to neuroradiology as well as excellent case reviews: Neuroradiology: The Requisites by Robert Grossman and David Yousem Much less inclusive than the Diagnostic Imaging series (Amirsys, see below), with fewer images and far fewer pages. It is however an efficient introduction to neuroradiology. The introductory chapters on Neuroradiology in the Brant and Helms textbook are also a useful introduction. Diagnostic Imaging: Brain, by Ann Osborn et al An extensive case review with excellent illustrations  **Diagnostic Imaging: Head and Neck, by Ric Harnsberger et al**  Another entry in the outstanding Amirsys series of case-based reviews  D**iagnostic Imaging: Spine, by Jeffrey Ross et al**  The spine entry in the Amirsys series  The Neuroradiology attendings are also happy to discuss additional reading options for residents and to provide materials from their own personal libraries for resident use. | | | | | |

**Appendix:**

**Neuroradiology curriculum in RadPrimer**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **RADPRIMER HEAD & NECK** | | |  |  |
|  |  |  | **Seq** | **Name** |
| **Pre-call** |  |  |  |  |
|  |  |  | 1 | AOM with Complication |
|  |  |  | 2 | Fractures, Trans-facial (LeFort) |
|  |  |  | 3 | Suppurative Lymph Nodes |
|  |  |  | 4 | Abscess, Retropharyngeal Space |
|  |  |  | 5 | Abscess, Subperiosteal, Orbit |
|  |  |  | 6 | Abscess, Tonsillar/Peritonsillar |
|  |  |  | 7 | Bell Palsy |
|  |  |  | 8 | Cellulitis, Orbit |
|  |  |  | 9 | Foreign Body, Esophagus |
|  |  |  | 10 | Foreign Body, Trachea |
|  |  |  | 11 | Fracture, Inferior Orbital Blowout |
|  |  |  | 12 | Fracture, Medial Orbital Blowout |
|  |  |  | 13 | Fracture, Skull Base |
|  |  |  | 14 | Fracture, Naso-orbital-ethmoidal |
|  |  |  | 15 | Fracture, Zygomaticomaxillary Complex |
|  |  |  | 16 | Fractures, Temporal Bone |
|  |  |  | 17 | Fungal Sinusitis, Invasive |
|  |  |  | 18 | Optic Neuritis |
|  |  |  | 19 | Ossicular Dislocation |
|  |  |  | 20 | Parotitis, Acute |
|  |  |  | 21 | Retinal Detachment |
|  |  |  | 22 | Sialadenitis, Sublingual Gland |
|  |  |  | 23 | Sialadenitis, Submandibular Gland |
|  |  |  | 24 | Supraglottitis |
|  |  |  | 25 | Fracture, General |
|  |  |  | 26 | Thrombosis, Jugular Vein, Neck |
|  |  |  | 27 | Trauma, General |
|  |  |  | 28 | Trauma, Larynx |
|  |  |  | 29 | Trauma, Orbit |
| **Head and Neck** | |  |  |  |
|  | **Cerebellopontine Angle-Internal Auditory Canal** | | | |
|  |  | **Congenital** | |  |
|  |  |  | 30 | Epidermoid Cyst, CPA-IAC |
|  |  |  | 31 | Arachnoid Cyst, CPA-IAC |
|  |  |  | 32 | Neurofibromatosis Type 2, CPA-IAC |
|  |  |  | 33 | Sarcoidosis, CPA-IAC |
|  |  | **Inflammation** | |  |
|  |  | **Vascular** |  |  |
|  |  |  | 34 | Aneurysm, CPA-IAC |
|  |  |  | 35 | Superficial Siderosis, CPA-IAC |
|  |  | **Neoplasm, Benign** | | |
|  |  |  | 36 | Vestibular Schwannoma |
|  |  |  | 37 | Meningioma, CPA-IAC |
|  |  | **Neoplasm, Malignant** | | |
|  |  |  | 38 | Metastases, CPA-IAC |
|  | **Temporal Bone** | |  |  |
|  |  | **Congenital/Genetic** | | |
|  |  |  | 39 | External Ear Dysplasia, Congenital |
|  |  |  | 40 | Congenital Cholesteatoma, Middle Ear |
|  |  |  | 41 | Congenital Cholesteatoma, Petrous Apex |
|  |  |  | 42 | Oval Window Atresia |
|  |  |  | 43 | Internal Carotid Artery, Aberrant |
|  |  |  | 44 | Labyrinthine Aplasia |
|  |  |  | 45 | Large Vestibular Aqueduct (IP-II) |
|  |  | **Infection** |  |  |
|  |  |  | 46 | Necrotizing External Otitis |
|  |  |  | 47 | Acute Otomastoiditis with Abscess |
|  |  |  | 48 | Apical Petrositis |
|  |  | **Inflammation** | |  |
|  |  |  | 49 | Cholesteatoma, EAC |
|  |  |  | 50 | Chronic Otomastoiditis with Tympanosclerosis |
|  |  |  | 51 | Acquired Cholesteatoma, Pars Flaccida |
|  |  |  | 52 | Labyrinthine Ossificans |
|  |  |  | 53 | Cholesterol Granuloma, Petrous Apex |
|  |  |  | 54 | Trapped Fluid, Petrous Apex |
|  |  | **Neoplasm, Benign** | | |
|  |  |  | 55 | Paraganglioma, Glomus Tympanicum |
|  |  |  | 56 | Venous Malformation (Hemangioma), Facial Nerve, T-Bone |
|  |  |  | 57 | Schwannoma, Facial Nerve, T-Bone |
|  |  |  | 58 | Schwannoma, Intralabyrinthine |
|  |  |  | 59 | Endolymphatic Sac Tumor |
|  |  | **Neoplasm, Metastatic** | | |
|  |  |  | 60 | Perineural Parotid Malignancy, T-Bone |
|  |  | **Tumor-Like Lesions** | | |
|  |  |  | 61 | Fibrous Dysplasia, T-Bone |
|  |  |  | 62 | Paget Disease, T-Bone |
|  |  |  | 63 | Langerhans Cell Histiocytosis, T-Bone |
|  |  | **Trauma** |  |  |
|  |  | **Miscellaneous/Idiopathic** | | |
|  |  |  | 64 | Semicircular Canal Dehiscence |
|  |  |  | 65 | Fenestral Otosclerosis |
|  |  |  | 66 | Cochlear Otosclerosis |
|  | **Skull Base** | |  |  |
|  |  | **Normal Variant** | | |
|  |  |  | 67 | Jugular Bulb, Dehiscent |
|  |  | **Vascular** |  |  |
|  |  |  | 68 | Dural Sinus Thrombosis, Skull Base |
|  |  |  | 69 | Dural A-V Fistula, Skull Base |
|  |  | **Neoplasm, Benign** | | |
|  |  |  | 70 | Paraganglioma, Glomus Jugulare |
|  |  |  | 71 | Schwannoma, Jugular Foramen |
|  |  |  | 72 | Meningioma, Jugular Foramen |
|  |  |  | 73 | Meningioma, Skull Base |
|  |  |  | 74 | Schwannoma, Trigeminal, Skull Base |
|  |  | **Neoplasm, Malignant** | | |
|  |  |  | 75 | Chordoma, Clivus |
|  |  |  | 76 | Chondrosarcoma, Skull Base |
|  |  | **Tumor-Like Lesions** | | |
|  |  |  | 77 | Fibrous Dysplasia, Skull Base |
|  |  |  | 78 | Paget Disease, Skull Base |
|  |  |  | 79 | Langerhans Cell Histiocytosis, Skull Base |
|  |  | **Trauma** |  |  |
|  | **Orbit** |  |  |  |
|  |  | **Congenital/Genetic** | | |
|  |  |  | 80 | Coloboma |
|  |  |  | 81 | Persistent Hyperplastic Primary Vitreous |
|  |  |  | 82 | Dermoid and Epidermoid, Orbit |
|  |  |  | 83 | Neurofibromatosis 1, Orbit |
|  |  |  | 84 | Lymphatic Malformation, Orbit |
|  |  |  | 85 | Orbital Cavernous Hemangioma |
|  |  |  | 86 | Venous Varix, Orbit |
|  |  | **Infection** |  |  |
|  |  | **Inflammation** | |  |
|  |  | **Degenerative** | |  |
|  |  |  | 87 | Phthisis Bulbi |
|  |  | **Neoplasm, Benign** | | |
|  |  |  | 88 | Infantile Hemangioma, Orbit |
|  |  |  | 89 | Meningioma, Optic Nerve Sheath |
|  |  |  | 90 | Benign Mixed Tumor, Lacrimal |
|  |  | **Neoplasm, Malignant** | | |
|  |  |  | 91 | Retinoblastoma |
|  |  |  | 92 | Melanoma, Ocular |
|  |  |  | 93 | Glioma, Optic Pathway |
|  |  |  | 94 | Adenoid Cystic Carcinoma, Lacrimal |
|  |  |  | 95 | Lymphoproliferative Lesions, Orbit |
|  |  | **Tumor-Like Lesions** | | |
|  |  |  | 96 | Idiopathic Inflammatory Pseudotumor, Orbit |
|  |  | **Trauma** |  |  |
|  |  |  | 97 | Trauma, Ocular |
|  |  | **Miscellaneous/Idiopathic** | | |
|  |  |  | 98 | Thyroid Ophthalmopathy |
|  | **Nose & Sinus** | |  |  |
|  |  | **Congenital/Genetic** | | |
|  |  |  | 99 | Choanal Atresia, Nasal |
|  |  |  | 100 | Nasal Glioma |
|  |  |  | 101 | Nasal Dermal Sinus |
|  |  |  | 102 | Pyriform Aperture Stenosis, Congenital Nasal |
|  |  | **Infection** |  |  |
|  |  |  | 103 | Rhinosinusitis, Acute |
|  |  |  | 104 | Rhinosinusitis, Complications |
|  |  |  | 105 | Fungal Sinusitis, Mycetoma |
|  |  | **Inflammation** | |  |
|  |  |  | 106 | Polyposis, Sinonasal |
|  |  |  | 107 | Polyp, Solitary, Sinonasal |
|  |  |  | 108 | Mucocele, Sinonasal |
|  |  |  | 109 | Fungal Sinusitis, Allergic |
|  |  |  | 110 | Wegener Granulomatosis, Sinonasal |
|  |  | **Neoplasm, Benign** | | |
|  |  |  | 111 | Juvenile Angiofibroma |
|  |  |  | 112 | Inverted Papilloma, Sinonasal |
|  |  |  | 113 | Osteoma, Sinonasal |
|  |  |  | 114 | Ossifying Fibroma, Sinonasal |
|  |  | **Neoplasm, Malignant** | | |
|  |  |  | 115 | SCCa, Sinonasal |
|  |  |  | 116 | Esthesioneuroblastoma |
|  |  |  | 117 | Non-Hodgkin Lymphoma, Sinonasal |
|  |  |  | 118 | Undifferentiated Carcinoma, Sinonasal |
|  |  | **Tumor-Like Lesions** | | |
|  |  |  | 119 | Fibrous Dysplasia, Sinonasal |
|  | **Facial Bones** | |  |  |
|  |  | **Trauma** |  |  |
|  | **Suprahyoid & Infrahyoid Neck** | | | |
|  |  | **Pharyngeal Mucosal Space** | | |
|  |  |  | 120 | Tornwaldt Cyst |
|  |  |  | 121 | Retention Cyst, PMS |
|  |  |  | 122 | Tonsillar Inflammation |
|  |  |  | 123 | Nasopharyngeal Carcinoma |
|  |  |  | 124 | SCCa, Lingual Tonsil |
|  |  |  | 125 | SCCa, Lingual Tonsil |
|  |  |  | 126 | SCCa, Palatine Tonsil |
|  |  |  | 127 | Non-Hodgkin Lymphoma, PMS |
|  |  | **Lymph Node Diseases** | | |
|  |  |  | 128 | Tuberculosis, Lymph Nodes |
|  |  |  | 129 | Reactive Lymph Nodes |
|  |  |  | 130 | Non-Hodgkin Lymphoma, Lymph Nodes |
|  |  |  | 131 | SCCa, Nodes |
|  |  |  | 132 | Differentiated Thyroid Carcinoma, Nodal |
|  |  | **Hypopharynx & Larynx** | | |
|  |  |  | 133 | Epiglottitis, Child |
|  |  |  | 134 | Croup |
|  |  |  | 135 | Laryngocele |
|  |  |  | 136 | Lateral Hypopharyngeal Pouch |
|  |  |  | 137 | SCCa, Pyriform Sinus |
|  |  |  | 138 | SCCa, Larynx, Supraglottic |
|  |  |  | 139 | SCCa, Larynx, Glottic |
|  |  |  | 140 | SCCa, Larynx, Subglottic |
|  |  |  | 141 | Chondrosarcoma, Larynx |
|  |  |  | 142 | Vocal Cord Paralysis |
|  |  | **Oral Cavity** | |  |
|  |  |  | 143 | Lingual Thyroid |
|  |  |  | 144 | Dermoid and Epidermoid, Oral Cavity |
|  |  |  | 145 | Abscess, Oral Cavity |
|  |  |  | 146 | Ranula |
|  |  |  | 147 | Benign Mixed Tumor, Submandibular Gland |
|  |  |  | 148 | Carcinoma, Submandibular Gland |
|  |  |  | 149 | SCCa, Oral Tongue |
|  |  |  | 150 | SCCa, Floor of Mouth |
|  |  |  | 151 | SCCa, Retromolar Trigone |
|  |  |  | 152 | Motor Denervation CN12 |
|  |  | **Mandible/Maxilla** | | |
|  |  |  | 153 | Cyst, Dentigerous (Follicular) |
|  |  |  | 154 | Osteomyelitis, Mandible-Maxilla |
|  |  |  | 155 | Ameloblastoma |
|  |  |  | 156 | Odontogenic Keratocyst |
|  |  |  | 157 | Osteosarcoma, Mandible-Maxilla |
|  |  | **Temporomandibular Joint** | | |
|  |  | **Masticator Space** | | |
|  |  |  | 158 | Abscess, Masticator Space |
|  |  |  | 159 | Schwannoma, CNV3, MS |
|  |  |  | 160 | Chondrosarcoma, Masticator Space |
|  |  |  | 161 | Sarcoma, Other, Masticator Space |
|  |  |  | 162 | Perineural Tumor, CNV3, MS |
|  |  |  | 163 | Motor Denervation CNV3 |
|  |  | **Paratid Space** | |  |
|  |  |  | 164 | Benign Lymphoepithelial Lesions-HIV |
|  |  |  | 165 | Sjogren Syndrome, Parotid |
|  |  |  | 166 | Parotid Duct Obstruction, Calculus |
|  |  |  | 167 | Benign Mixed Tumor, Parotid |
|  |  |  | 168 | Warthin Tumor |
|  |  |  | 169 | Mucoepidermoid Carcinoma, Parotid |
|  |  |  | 170 | Adenoid Cystic Carcinoma, Parotid |
|  |  |  | 171 | Perineural Tumor, CN7, PS |
|  |  | **Carotid Space** | |  |
|  |  |  | 172 | Dissection, Carotid Artery, Neck |
|  |  |  | 173 | Fibromuscular Dysplasia, Carotid, Neck |
|  |  |  | 174 | Paraganglioma, Glomus Vagale |
|  |  |  | 175 | Paraganglioma, Carotid Body |
|  |  |  | 176 | Schwannoma, Carotid Space |
|  |  |  | 177 | Neurofibroma, Carotid Space |
|  |  | **Retropharyngeal Space** | | |
|  |  |  | 178 | Suppurative Adenopathy, RPS |
|  |  |  | 179 | Reactive Adenopathy, RPS |
|  |  |  | 180 | SCCa, Nodal, RPS |
|  |  | **Perivertebral Space** | | |
|  |  |  | 181 | Infection, Perivertebral Space |
|  |  |  | 182 | Longus Colli Tendonitis, Acute Calcific |
|  |  |  | 183 | Schwannoma, Brachial Plexus, PVS |
|  |  |  | 184 | Metastasis, Vertebral Body, PVS |
|  |  | **Visceral Space** | | |
|  |  |  | 185 | Thyroiditis, Chronic Lymphocytic (Hashimoto) |
|  |  |  | 186 | Multinodular Goiter |
|  |  |  | 187 | Differentiated Carcinoma, Thyroid |
|  |  |  | 188 | Anaplastic Carcinoma, Thyroid |
|  |  |  | 189 | Non-Hodgkin Lymphoma, Thyroid |
|  |  |  | 190 | Diverticulum, Esophagopharyngeal (Zenker) |
|  |  | **Posterior Cervical Space** | | |
|  |  |  | 191 | SCCa, Spinal Accessory Node |
|  |  |  | 192 | Non-Hodgkin Lymphoma in Spinal Accessory Node |
|  | **Trans-Spatial or Multi-Spatial & Peds** | | | |
|  |  | **Congenital** | |  |
|  |  |  | 193 | 2nd Branchial Cleft Cyst |
|  |  |  | 194 | Thyroglossal Duct Cyst |
|  |  |  | 195 | Lymphatic Malformation |
|  |  |  | 196 | Venous Vascular Malformation |
|  |  |  | 197 | Dermoid and Epidermoid |
|  |  | **Neoplasm, Benign** | | |
|  |  |  | 198 | Infantile Hemangioma |
|  |  |  | 199 | Hemangiopericytoma |
|  |  |  | 200 | Plexiform Neurofibroma |
|  |  | **Neoplasm, Malignant** | | |
|  |  |  | 201 | Rhabdomyosarcoma |
|  |  | **Tumor-Like Lesion** | | |
|  |  |  | 202 | Fibromatosis of H&N |
|  |  | **Trauma** |  |  |
|  |  |  | 203 | Fibromatosis Colli |

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| **RADPRIMER SPINE** | |  |  |  |
|  |  |  | **Seq** | **Name** |
| **Pre-call** |  |  |  |  |
|  |  |  | 1 | Anterior Compression Fracture, Thoracic |
|  |  |  | 2 | Atlanto-Occipital Dislocation |
|  |  |  | 3 | Intervertebral Disc Herniation, Lumbar |
|  |  |  | 4 | Epidural Paravertebral Abscess |
|  |  |  | 5 | Spondylolisthesis |
|  |  |  | 6 | Chance Fracture |
|  |  |  | 7 | Traumatic Disc Herniation |
|  |  |  | 8 | Hyperflexion-Rotation Injury, Cervical |
|  |  |  | 9 | Hematoma, Epidural-Subdural |
|  |  |  | 10 | Hematoma, Subdural, Traumatic |
|  |  |  | 11 | Hyperextension Injury, Cervical |
|  |  |  | 12 | Hyperflexion Injury, Cervical |
|  |  |  | 13 | Jefferson C1 Fracture |
|  |  |  | 14 | Ligamentous Injury |
|  |  |  | 15 | Occipital Condyle Fracture |
|  |  |  | 16 | Odontoid C2 Fracture |
| **Spine** |  |  |  |  |
|  | **Congenital and Genetic Disorders** | | | |
|  |  | **Congenital** | |  |
|  |  |  | 17 | Chiari II Malformation |
|  |  |  | 18 | Lipoma, Spinal |
|  |  |  | 19 | Dermoid Cysts |
|  |  |  | 20 | Epidermoid Cysts |
|  |  |  | 21 | Tethered Spinal Cord |
|  |  |  | 22 | Caudal Regression Syndrome |
|  |  |  | 23 | Meningocele, Anterior Sacral |
|  |  |  | 24 | Teratoma, Sacrococcygeal |
|  |  |  | 25 | Diastematomyelia |
|  |  |  | 26 | Klippel-Feil Spectrum |
|  |  |  | 27 | Os Odontoideum |
|  |  |  | 28 | Chiari I Malformation |
|  |  |  | 29 | Neurofibromatosis Type 1 |
|  |  |  | 30 | Neurofibromatosis Type 2 |
|  |  |  | 31 | Achondroplasia |
|  |  |  | 32 | Mucopolysaccharidoses |
|  |  |  | 33 | Sickle Cell |
|  |  |  | 34 | Osteogenesis Imperfecta |
|  |  |  | 35 | Thanatophoric Dwarfism |
|  |  |  | 36 | Coccygeal Dimple, Simple |
|  |  |  | 37 | Myelomeningocele |
|  |  |  | 38 | Lipomyelomeningocele |
|  |  |  | 39 | Failure of Vertebral Formation |
|  |  |  | 40 | Partial Vertebral Duplication |
|  |  |  | 41 | Vertebral Segmentation Failure |
|  |  |  | 42 | Incomplete Fusion, Posterior Element |
|  |  |  | 43 | Neurenteric Cyst |
|  |  | **Scoliosis** |  |  |
|  |  |  | 44 | Scoliosis |
|  | **Trauma** |  |  |  |
|  |  | **Vertebral Column, Discs, and Paraspinal Muscle** | | |
|  |  |  | 45 | Burst Fracture, C2 |
|  |  |  | 46 | Hangman's C2 Fracture |
|  |  |  | 47 | Posterior Column Injury, Cervical |
|  |  |  | 48 | Insufficiency Fracture, Sacral |
|  |  |  | 49 | Compression Fractures |
|  |  | **Cord, Dura, and Vessels** | | |
|  |  |  | 50 | Dissection, Vertebral Artery |
|  |  |  | 51 | Dissection, Carotid Artery |
|  |  |  | 52 | SCIWORA |
|  |  |  | 53 | Post-traumatic Syrinx |
|  |  |  | 54 | Spinal Cord Injury |
|  |  |  | 55 | Spinal Cord Herniation |
|  | **Degenerative Disease and Arthritides** | | | |
|  |  | **Degenerative Diseases** | | |
|  |  |  | 56 | Intervertebral Disc Extrusion, Foraminal |
|  |  |  | 57 | Facet Joint Synovial Cyst |
|  |  |  | 58 | DISH |
|  |  |  | 59 | OPLL |
|  |  |  | 60 | Periodontoid Pseudotumor |
|  |  |  | 61 | Spondylosis, Cervical |
|  |  |  | 62 | Disc Bulge |
|  |  |  | 63 | Intervertebral Disc Herniation, Cervical |
|  |  |  | 64 | Intervertebral Disc Herniation, Thoracic |
|  |  |  | 65 | Scheuermann Disease |
|  |  |  | 66 | Stenosis, Acquired Spinal, Lumbar |
|  |  | **Spondylolisthesis and Spondylolysis** | | |
|  |  |  | 67 | Spondylolysis |
|  |  | **Inflammatory, Crystalline and Miscellaneous Arthritides** | | |
|  |  |  | 68 | Rheumatoid Arthritis, Adult |
|  |  |  | 69 | Juvenile Idiopathic Arthritis |
|  |  |  | 70 | Spondyloarthropathy, Seronegative |
|  |  |  | 71 | Gout |
|  |  |  | 72 | CPPD |
|  |  |  | 73 | Neurogenic (Charcot) Arthropathy |
|  |  |  | 74 | Ankylosing Spondylitis |
|  | **Infection and Inflammatory Disorders** | | | |
|  |  | **Infections** | |  |
|  |  |  | 75 | Pyogenic Osteomyelitis, Spine |
|  |  |  | 76 | Granulomatous Osteomyelitis, Spine |
|  |  |  | 77 | Viral Myelitis |
|  |  |  | 78 | Abscess/Myelitis, Spinal Cord |
|  |  |  | 79 | Meningitis, Spinal |
|  |  | **Inflammatory & Autoimmune** | | |
|  |  |  | 80 | Guillain-Barre Syndrome |
|  |  |  | 81 | Multiple Sclerosis, Spinal Cord |
|  |  |  | 82 | Neuromyelitis Optica |
|  |  |  | 83 | Degeneration, Subacute Combined |
|  |  |  | 84 | ADEM, Spinal Cord |
|  | **Neoplasms, Cysts, & Other Masses** | | | |
|  |  | **Neoplasms** | |  |
|  |  |  | 85 | Metastases, Blastic Osseous |
|  |  |  | 86 | Metastases, Lytic Osseous |
|  |  |  | 87 | Osteoid Osteoma |
|  |  |  | 88 | Osteoblastoma |
|  |  |  | 89 | Aneurysmal Bone Cyst |
|  |  |  | 90 | Giant Cell Tumor |
|  |  |  | 91 | Osteochondroma |
|  |  |  | 92 | Chondrosarcoma |
|  |  |  | 93 | Osteosarcoma |
|  |  |  | 94 | Chordoma |
|  |  |  | 95 | Ewing Sarcoma |
|  |  |  | 96 | Plasmacytoma |
|  |  |  | 97 | Multiple Myeloma |
|  |  |  | 98 | Langerhans Cell Histiocytosis |
|  |  |  | 99 | Meningioma |
|  |  |  | 100 | Schwannoma |
|  |  |  | 101 | Neurofibroma |
|  |  |  | 102 | Astrocytoma, Spinal Cord |
|  |  |  | 103 | Ependymoma, Cellular, Spinal Cord |
|  |  |  | 104 | Ependymoma, Myxopapillary, Spinal Cord |
|  |  |  | 105 | Hemangioma |
|  |  |  | 106 | Lymphoma |
|  |  |  | 107 | Leukemia |
|  |  |  | 108 | Malignant Nerve Sheath Tumors |
|  |  |  | 109 | Metastases, CSF Disseminated |
|  |  |  | 110 | Paraganglioma |
|  |  |  | 111 | Hemangioblastoma, Spinal Cord |
|  |  | **Non-Neoplastic Cysts and Tumor Mimics** | | |
|  |  |  | 112 | Arachnoid Cyst |
|  |  |  | 113 | Fibrous Dysplasia |
|  |  |  | 114 | Perineural Root Sleeve Cyst |
|  | **Vascular and Systemic Disorders** | | | |
|  |  | **Vascular Lesions** | | |
|  |  |  | 115 | Type I DAVF |
|  |  |  | 116 | Cavernous Malformation, Spinal Cord |
|  |  |  | 117 | Spinal Cord Infarction |
|  |  |  | 118 | Type II AVM |
|  |  |  | 119 | Type III AVM |
|  |  |  | 120 | Type IV AVF |
|  |  | **Spinal Manifestations of Systemic Diseases** | | |
|  |  |  | 121 | Paget Disease |
|  |  |  | 122 | Renal Osteodystrophy |
|  |  |  | 123 | Extramedullary Hematopoiesis |
|  | **Peripheral Nerve and Plexus** | | | |
|  |  | **Plexus & Peripheral Nerve Lesions** | | |
|  |  |  | 124 | Brachial Plexus Traction Injury |
|  | **Spine Post-procedural Imaging** | | | |
|  |  | **Post-Procedural Imaging and Complications** | | |
|  |  |  | 125 | Arachnoiditis, Lumbar |
|  |  |  | 126 | Peridural Fibrosis |
|  |  |  | 127 | Intervertebral Disc Herniation, Recurrent |
|  |  |  | 128 | Post-Operative Infection |

Pediatric Neuroradiology

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| **Brain** |  |  |  |
|  | **Congenital Malformations** | | |
|  |  | 195 | Cavernous Malformation |
|  |  | 196 | Sturge-Weber Syndrome |
|  |  | 197 | The Dandy Walker Malformation |
|  |  | 198 | Callosal Dysgenesis |
|  |  | 199 | Schizencephaly |
|  |  | 200 | Chiari 2 |
|  |  | 201 | Tuberous Sclerosis |
|  |  | 202 | Sturge-Weber Syndrome |
|  |  | 203 | Neurofibromatosis Type 1 |
|  |  | 204 | The Holoprosencephalies |
|  |  | 205 | Hemimegalencephaly |
|  |  | 206 | Lissencephaly |
|  | **Cysts and Neoplasms** | | |
|  |  | 207 | Colloid Cyst |
|  |  | 208 | Juvenile Pilocytic Astrocytoma |
|  |  | 209 | Craniopharyngioma |
|  |  | 210 | Choroid Plexus Tumors |
|  | **Traumatic and Vascular Lesions** | | |
|  |  | 211 | Diffuse Cerebral Edema |
|  |  | 212 | Periventricular Leukomalacia |
|  |  | 213 | Vein of Galen Aneurysmal Malformation |
|  |  | 214 | Cavernous Malformation |
|  | **Metabolic, Infectious, and Inflammatory Disorders** | | |
|  |  | 215 | TORCH Infections, Overview |
|  |  | 216 | Acute Encephalitis |
| **Spine** |  |  |  |
|  | **Congenital Spinal Malformations** | | |
|  |  | 217 | Caudal Regression Syndrome |
|  |  | 218 | Tethered Spinal Cord |
|  | **Neoplasms** | |  |
|  |  | 219 | Sacrococcygeal Teratoma |
|  | **Inflammatory Lesions** | | |
|  | **Trauma** |  |  |
|  |  | 220 | Chance Fracture |
| **Head and Neck** | |  |  |
|  | **Nasal and Oral Cavity** | | |
|  |  | 221 | Choanal Atresia |
|  |  | 222 | Congenital Nasal Pyriform Aperture Stenosis |
|  |  | 223 | Nasolacrimal Duct Mucocele |
|  |  | 224 | Juvenile Nasopharyngeal Angiofibroma |
|  |  | 225 | Lingual Thyroid |
|  | **Orbit** |  |  |
|  |  | 226 | Retinoblastoma |
|  | **Temporal Bone** | | |
|  | **Syndromes with Craniofacial Involvement Neck Masses** | | |
|  |  | 227 | Thyroglossal Duct Cyst |
|  |  | 228 | 2nd Branchial Cleft Anomaly |
|  |  | 229 | Acute Parotitis |
|  |  | 230 | Infantile Hemangioma |
|  |  | 231 | Rhabdomyosarcoma |
|  |  | 232 | Fibromatosis Colli |