

# Clinical Appropriateness Guidelines: Advanced Imaging

Appropriate Use Criteria: Pediatric Head & Neck

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8600 W Bryn Mawr Avenue

South Tower - Suite 800

Chicago, IL 60631

P. 773.864.4600

[www.aimspecialtyhealth.com](http://www.aimspecialtyhealth.com)

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# Description and Application of the Guidelines



AIM's Clinical Appropriateness Guidelines (hereinafter "AIM's Clinical Appropriateness Guidelines" or the "Guidelines") are designed to assist providers in making the most appropriate treatment decision for a specific clinical condition for an individual. As used by AIM, the Guidelines establish objective and evidence-based, where possible, criteria for medical necessity determinations. In the process, multiple functions are accomplished:

- To establish criteria for when services are medically necessary
- To assist the practitioner as an educational tool
- To encourage standardization of medical practice patterns
- To curtail the performance of inappropriate and/or duplicate services
- To advocate for patient safety concerns
- To enhance the quality of healthcare
- To promote the most efficient and cost-effective use of services

AIM's guideline development process complies with applicable accreditation standards, including the requirement that the Guidelines be developed with involvement from appropriate providers with current clinical expertise relevant to the Guidelines under review and be based on the most up to date clinical principles and best practices. Relevant citations are included in the "References" section attached to each Guideline. AIM reviews all of its Guidelines at least annually.

AIM makes its Guidelines publicly available on its website twenty-four hours a day, seven days a week. Copies of AIM's Clinical Appropriateness Guidelines are also available upon oral or written request. Although the Guidelines are publicly-available, AIM considers the Guidelines to be important, proprietary information of AIM, which cannot be sold, assigned, leased, licensed, reproduced or distributed without the written consent of AIM.

AIM applies objective and evidence-based criteria and takes individual circumstances and the local delivery system into account when determining the medical appropriateness of health care services. The AIM Guidelines are just guidelines for the provision of specialty health services. These criteria are designed to guide both providers and reviewers to the most appropriate services based on a patient's unique circumstances. In all cases, clinical judgment consistent with the standards of good medical practice should be used when applying the Guidelines. Guideline determinations are made based on the information provided at the time of the request. It is expected that medical necessity decisions may change as new information is provided or based on unique aspects of the patient's condition. The treating clinician has final authority and responsibility for treatment decisions regarding the care of the patient and for justifying and demonstrating the existence of medical necessity for the requested service. The Guidelines are not a substitute for the experience and judgment of a physician or other health care professionals. Any clinician seeking to apply or consult the Guidelines is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient's care or treatment.

The Guidelines do not address coverage, benefit or other plan specific issues. If requested by a health plan, AIM will review requests based on health plan medical policy/guidelines in lieu of AIM's Guidelines.

The Guidelines may also be used by the health plan or by AIM for purposes of provider education, or to review the medical necessity of services by any provider who has been notified of the need for medical necessity review, due to billing practices or claims that are not consistent with other providers in terms of frequency or some other manner.

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# Administrative Guideline: Ordering of Multiple Studies



Requests for multiple imaging studies to evaluate a suspected or identified condition and requests for repeated imaging of the same anatomic area are subject to additional review to avoid unnecessary or inappropriate imaging.

## Simultaneous Ordering of Multiple Studies

In many situations, ordering multiple imaging studies at the same time is not clinically appropriate because:

- Current literature and/or standards of medical practice support that one of the requested imaging studies is more appropriate in the clinical situation presented; or
- One of the imaging studies requested is more likely to improve patient outcomes based on current literature and/or standards of medical practice; or
- Appropriateness of additional imaging is dependent on the results of the lead study.

When multiple imaging studies are ordered, the request will often require a peer-to-peer conversation to understand the individual circumstances that support the medical necessity of performing all imaging studies simultaneously.

Examples of multiple imaging studies that may require a peer-to-peer conversation include:

- CT brain and CT sinus for headache
- MRI brain and MRA brain for headache
- MRI cervical spine and MRI shoulder for pain indications
- MRI lumbar spine and MRI hip for pain indications
- MRI or CT of multiple spine levels for pain or radicular indications
- MRI foot and MRI ankle for pain indications
- Bilateral exams, particularly comparison studies

There are certain clinical scenarios where simultaneous ordering of multiple imaging studies is consistent with current literature and/or standards of medical practice. These include:

- Oncologic imaging – Considerations include the type of malignancy and the point along the care continuum at which imaging is requested
- Conditions which span multiple anatomic regions – Examples include certain gastrointestinal indications or congenital spinal anomalies

## Repeated Imaging

In general, repeated imaging of the same anatomic area should be limited to evaluation following an intervention, or when there is a change in clinical status such that imaging is required to determine next steps in management. At times, repeated imaging done with different techniques or contrast regimens may be necessary to clarify a finding seen on the original study.

Repeated imaging of the same anatomic area (with same or similar technology) may be subject to additional review in the following scenarios:

- Repeated imaging at the same facility due to motion artifact or other technical issues
- Repeated imaging requested at a different facility due to provider preference or quality concerns
- Repeated imaging of the same anatomic area (MRI or CT) based on persistent symptoms with no clinical change, treatment, or intervention since the previous study
- Repeated imaging of the same anatomical area by different providers for the same member over a short period of time

# Administrative Guideline: Pre-Test Requirements



Critical to any finding of clinical appropriateness under the guidelines for specific imaging exams is a determination that the following are true with respect to the imaging request:

- A clinical evaluation has been performed prior to the imaging request (which should include a complete history and physical exam and review of results from relevant laboratory studies, prior imaging and supplementary testing) to identify suspected or established diseases or conditions.
- **For suspected diseases or conditions:**
  - Based on the clinical evaluation, there is a reasonable likelihood of disease prior to imaging; and
  - Current literature and standards of medical practice support that the requested imaging study is the most appropriate method of narrowing the differential diagnosis generated through the clinical evaluation and can be reasonably expected to lead to a change in management of the patient; and
  - The imaging requested is reasonably expected to improve patient outcomes based on current literature and standards of medical practice.
- **For established diseases or conditions:**
  - Advanced imaging is needed to determine whether the extent or nature of the disease or condition has changed; and
  - Current literature and standards of medical practice support that the requested imaging study is the most appropriate method of determining this and can be reasonably expected to lead to a change in management of the patient; and
  - The imaging requested is reasonably expected to improve patient outcomes based on current literature and standards of medical practice.
- If these elements are not established with respect to a given request, the determination of appropriateness will most likely require a peer-to-peer conversation to understand the individual and unique facts that would supersede the pre-test requirements set forth above. During the peer-to-peer conversation, factors such as patient acuity and setting of service may also be taken into account.

## CPT Codes

- 70450..... CT of head, without contrast
- 70460..... CT of head, with contrast
- 70470..... CT of head, without contrast, followed by re-imaging with contrast

## Standard Anatomic Coverage

- From the skull base to vertex, covering the entire calvarium and intracranial contents
- Scan coverage may vary, depending on the specific clinical indication

## Technology Considerations

- MRI of the head is preferable to CT in most clinical scenarios, due to its superior contrast resolution and lack of beam-hardening artifact adjacent to the petrous bone (which may limit visualization in portions of the posterior fossa and brainstem on CT)
- Exceptions to the use of brain MRI as the neuroimaging study of choice and clinical situations where CT head is preferred:
  - initial evaluation of recent craniocerebral trauma
  - evaluation of acute intracranial hemorrhage (parenchymal, subarachnoid, subdural, epidural)
  - evaluation of calcified intracranial lesions
  - osseous assessment of the calvarium, skull base and maxillofacial bones, including detection of calvarial and facial bone fractures

## Common Diagnostic Indications

This section begins with general pediatric indications for CT Head, followed by neurologic signs and symptoms and vascular indications.

### General Head/Brain

#### Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

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#### Ataxia, congenital or hereditary

*Examples include ataxia-telangiectasia, fragile X syndrome, congenital anomalies of the posterior fossa.*

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#### Congenital or developmental anomaly

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital anomaly or developmental condition

*Examples include Chiari malformation, craniosynostosis, macrocephaly, and microcephaly.*

- Ultrasound is required as the initial study to evaluate macrocephaly in patients under 5 months of age.

# Common Diagnostic Indications

## Developmental delay

Evaluation of either of the following conditions:

- Cerebral palsy
- Global developmental delay, defined as significant delay or loss of milestones in **at least two** of the following domains:
  - Activities of daily living
  - Cognition
  - Motor skills (gross/fine)
  - Social/personal
  - Speech/language

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## Hearing loss

Evaluation for a structural cause of conductive, sensorineural or mixed hearing loss

**Note:** MRI is preferred for sensorineural hearing loss. CT is preferred for conductive or mixed hearing loss.

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## Horner's syndrome\*\*

\*\*Requires contraindication to MRI

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## Hydrocephalus/ventricular assessment

- Evaluation of signs or symptoms suggestive of increased intracranial pressure or hydrocephalus
  - Ultrasound is required as the initial study in patients under 5 months of age
- Management of established hydrocephalus and ventricular shunts

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## Infectious disease

Diagnosis or management (including perioperative evaluation) of parenchymal lesions associated with CNS infection

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## Inflammatory disease

Diagnosis or management of inflammatory disease with CNS involvement

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## Lumbar puncture risk assessment

Evaluation prior to lumbar puncture when **at least one** of the following is present

- Papilledema
- Absent venous pulsations on fundoscopic exam
- Altered mental status
- Abnormal neurological exam
- Evidence for meningeal irritation

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## Multiple sclerosis and other white-matter diseases\*\*

- Diagnosis of suspected demyelinating disease
- Management or surveillance of established disease

\*\*Requires contraindication to MRI

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## Neurocutaneous disorders

Diagnosis or management (including perioperative evaluation) of CNS lesions associated with a known neurocutaneous disorder

*Examples include neurofibromatosis, Sturge-Weber syndrome, tuberous sclerosis, and von Hippel-Lindau disease.*

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## Papilledema

# Common Diagnostic Indications

## Pseudotumor cerebri

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### Seizures and epilepsy

#### Neonatal/Infantile seizure (age 2 years or younger)

- Initial evaluation of seizure not associated with fever
- Periodic follow-up at 6-month intervals up to 30 months, if initial imaging study is non-diagnostic

#### Childhood/Adolescent seizure (over age 2)

- When **at least one** of the following is present:
  - Focal neurologic findings at the time of the seizure
  - Persistent neurologic deficit in the postictal period
  - Idiopathic epilepsy with atypical clinical course
  - Partial seizures
  - Seizures increasing in frequency and severity despite optimal medical management
  - Electroencephalogram (EEG) findings inconsistent with idiopathic epilepsy

#### Complex febrile seizure (age 6 months – 5 years)

- When **either** of the following is present:
  - More than one seizure during a febrile period
  - Seizure lasting longer than 15 minutes

**Note:** *Imaging is not generally indicated for simple febrile seizures.*

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## Trauma

### Evaluation following head trauma when **at least one** of the following is present:

- Non-accidental injury (NAI)
- Trauma associated with any of the following features:
  - Altered mental status
  - Change in behavior
  - Vomiting
  - Loss of consciousness
  - History of high risk MVA or other mechanism of injury
  - Scalp hematoma if less than 2 years of age
  - Evidence of basilar skull fracture

**Note:** *This indication does not apply to patients with bleeding diathesis or intracranial shunts.*

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## Tumor (benign or malignant)

- Diagnosis of suspected tumor when supported by the clinical presentation
- Management (including perioperative evaluation) of established tumor when imaging is required to direct treatment
- Surveillance of established tumor

# Common Diagnostic Indications

## Neurologic Signs & Symptoms

This section contains indications for Bell's palsy, headache, mental status change, syncope, vertigo/dizziness, and visual disturbance.

Advanced imaging based on nonspecific signs or symptoms is subject to a high level of clinical review.

Appropriateness of imaging depends upon the context in which it is requested. At a minimum, this includes a differential diagnosis and temporal component, along with documented findings on physical exam.

Additional considerations which may be relevant include comorbidities, risk factors, and likelihood of disease based on age and gender.

In general, the utility of structural brain imaging is limited to the following categories, each with a unique set of clinical presentations:

- Identification of a space occupying lesion or other focal abnormality (tumor, CVA)
- Detection of parenchymal abnormalities (atrophy, demyelinating disease, infection, ischemic change)
- Identification of ventricular abnormalities (hydrocephalus)

**There are a number of common symptoms or conditions for which the likelihood of an underlying central nervous system process is extremely low. The following indications include specific considerations and requirements which help to determine appropriateness of advanced imaging for these symptoms.**

### Bell's palsy (peripheral facial weakness)

- When associated with additional neurologic findings suggestive of intracranial pathology
- Symptoms persisting beyond six (6) weeks in the absence of additional neurologic findings

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### Headache

**Onset within the past 30 days with no prior history of headache, when at least one of the following is present:**

- Personal or family history of disorders that may predispose one to central nervous system (CNS) lesions and clinical findings suggesting CNS involvement (including, but not limited to, vascular malformations, aneurysms, brain neoplasms, infectious/inflammatory conditions such as sarcoidosis or personal history of meningitis and tuberculosis)
- Associated neurologic findings on physical exam
- Developmental delay
- Headache that awakens the patient repeatedly from sleep or develops upon awakening
- Sudden onset and severe headache (includes thunderclap headache or worst headache of life)

**Persistent or recurrent headache, when at least one of the following is present:**

- Change in quality (pattern or intensity) of a previously stable headache
- Headache persisting for a period of up to 6 months duration and not responsive to medical treatment, and no prior imaging has been done to evaluate the headache
- Headache associated with at least one of the following:
  - Abnormal reflexes
  - Altered mental status
  - Cranial nerve deficit
  - Gait/motor dysfunction
  - Nystagmus
  - Seizure
  - Sensory deficit
  - Sign of increased intracranial pressure (increased head circumference, vomiting, papilledema, symptoms that worsen with valsalva)

**Note:** *Imaging is not generally indicated for typical presentations of migraine.*

# Common Diagnostic Indications

## Mental status change (including encephalopathy), with documented evidence on neurologic exam

### Syncope

Evaluation for a structural brain lesion when associated with any of following:

- Seizure activity was witnessed or is highly suspected at the time of the episode.
- There is a documented abnormality on neurological examination.
- At least one persistent neurological symptom is present

### Vertigo and dizziness

- Evaluation of signs or symptoms suggestive of a CNS lesion
- Symptoms associated with abnormal audiogram or auditory brainstem response

**Note:** *Vertigo or dizziness which is clearly related to positional change does not require advanced imaging.*

### Visual disturbance

Evaluation for central nervous system pathology when suggested by the ophthalmologic exam

## Vascular indications

This section contains indications for aneurysm, cerebrovascular accident/transient ischemic attack, hemorrhage/hematoma, and other vascular abnormalities.

### Aneurysm

- **Screening** in asymptomatic, high-risk individuals
  - At least two (2) first degree relatives with intracranial aneurysm or subarachnoid hemorrhage
  - Presence of a heritable condition which predisposes to intracranial aneurysm (examples include autosomal dominant polycystic kidney disease and Ehlers-Danlos syndrome type IV)
- **Diagnosis** of suspected aneurysm based on neurologic signs or symptoms (for isolated headache, see **Headache** indication)
- **Management** (including perioperative evaluation) of known (treated or untreated) intracranial aneurysm when associated with new or worsening neurologic symptoms
- **Surveillance** of known aneurysm in the absence of new or worsening symptoms
  - Initial evaluation at 6–12 months following diagnosis, then every 1–2 years
  - Follow-up after treatment with clips, endovascular coil or stenting

## Cerebrovascular accident (CVA or stroke) and transient ischemic attack (TIA)

### Hemorrhage/hematoma

### Other vascular abnormalities

- Arteriovenous malformation (AVM)
- Cavernous malformation
- Cerebral vein thrombosis
- Dural arteriovenous fistula (DAVF)
- Dural venous sinus thrombosis
- Venous angioma

**Note:** *CTA or MRA is generally preferred for these indications.*

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# Magnetic Resonance Imaging (MRI) Head/Brain – Pediatrics



## CPT Codes

- 70551..... MRI Head, without contrast
- 70552..... MRI Head, with contrast
- 70553..... MRI Head, without contrast, followed by re-imaging with contrast

## Standard Anatomic Coverage

- From skull base to vertex, covering the entire calvarium and intracranial contents, including the internal auditory canals
- Scan coverage may vary, depending on the specific clinical indication

## Technology Considerations

- MRI of the head is preferable to CT in most clinical scenarios, due to its superior contrast resolution and lack of beam-hardening artifact adjacent to the petrous bone (which may limit visualization in portions of the posterior fossa and brainstem on CT).
- Exceptions to the use of brain MRI as the neuroimaging study of choice and clinical situations where CT head is preferred:
  - initial evaluation of recent craniocerebral trauma
  - evaluation of acute intracranial hemorrhage (parenchymal, subarachnoid, subdural, epidural)
  - evaluation of calcified intracranial lesions
  - osseous assessment of the calvarium, skull base and maxillofacial bones, including detection of calvarial and facial bone fractures

## Common Diagnostic Indications

This section begins with general pediatric indications for MRI Head/Brain, followed by neurologic signs and symptoms and vascular indications.

### General Head/Brain

#### Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

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#### Ataxia, congenital or hereditary

*Examples include ataxia-telangiectasia, fragile X syndrome, congenital anomalies of the posterior fossa.*

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#### Congenital or developmental anomaly

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital anomaly or developmental condition

*Examples include Chiari malformation, craniosynostosis, macrocephaly, and microcephaly.*

- Ultrasound is required as the initial study to evaluate macrocephaly in patients under 5 months of age.

# Common Diagnostic Indications

## Developmental delay

Evaluation of either of the following conditions:

- Cerebral palsy
- Global developmental delay, defined as significant delay or loss of milestones in **at least two** of the following domains:
  - Activities of daily living
  - Cognition
  - Motor skills (gross/fine)
  - Social/personal
  - Speech/language

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## Hearing loss

Evaluation for a structural cause of conductive, sensorineural or mixed hearing loss

**Note:** MRI is preferred for sensorineural hearing loss. CT is preferred for conductive or mixed hearing loss.

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## Horner's syndrome

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## Hydrocephalus/ventricular assessment

- Evaluation of signs or symptoms suggestive of increased intracranial pressure or hydrocephalus
  - Ultrasound is required as the initial study in patients under 5 months of age
- Management of established hydrocephalus and ventricular shunts

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## Infectious disease

Diagnosis or management (including perioperative evaluation) of parenchymal lesions associated with CNS infection

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## Inflammatory disease

Diagnosis or management of inflammatory disease with CNS involvement

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## Multiple sclerosis and other white-matter diseases

- Diagnosis of suspected demyelinating disease
- Management or surveillance of established disease

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## Neurocutaneous disorders

Diagnosis or management (including perioperative evaluation) of CNS lesions associated with a known neurocutaneous disorder

*Examples include neurofibromatosis, Sturge-Weber syndrome, tuberous sclerosis, von Hippel-Lindau disease.*

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## Papilledema

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## Pseudotumor cerebri

# Common Diagnostic Indications

## Seizures and epilepsy

### Neonatal/Infantile seizure (age 2 years or younger)

- Initial evaluation of seizure not associated with fever
- Periodic follow-up at 6-month intervals up to 30 months, if initial imaging study is non-diagnostic

### Childhood/Adolescent seizure (over age 2)

- When **at least one** of the following is present:
  - Focal neurologic findings at the time of the seizure
  - Persistent neurologic deficit in the postictal period
  - Idiopathic epilepsy with atypical clinical course
  - Partial seizures
  - Seizures increasing in frequency and severity despite optimal medical management
  - Electroencephalogram (EEG) findings inconsistent with idiopathic epilepsy

### Complex febrile seizure (age 6 months – 5 years)

- When **either** of the following is present:
  - More than one seizure during a febrile period
  - Seizure lasting longer than 15 minutes

**Note:** *Imaging is not generally indicated for simple febrile seizures.*

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## Trauma

### Evaluation following head trauma when **at least one** of the following is present:

- Non-accidental injury (NAI)
- Trauma associated with any of the following features:
  - Altered mental status
  - Change in behavior
  - Vomiting
  - Loss of consciousness
  - History of high risk MVA or other mechanism of injury
  - Scalp hematoma if less than 2 years of age
  - Evidence of basilar skull fracture

**Note:** *This indication does not apply to patients with bleeding diathesis or intracranial shunts.*

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## Tumor (benign or malignant)

- Diagnosis of suspected tumor when supported by the clinical presentation
- Management (including perioperative evaluation) of established tumor when imaging is required to direct treatment
- Surveillance of established tumor

# Common Diagnostic Indications

## Neurologic Signs & Symptoms

This section contains indications for Bell's palsy, headache, mental status change, syncope, vertigo/dizziness, and visual disturbance.

Advanced imaging based on nonspecific signs or symptoms is subject to a high level of clinical review.

Appropriateness of imaging depends upon the context in which it is requested. At a minimum, this includes a differential diagnosis and temporal component, along with documented findings on physical exam.

Additional considerations which may be relevant include comorbidities, risk factors, and likelihood of disease based on age and gender.

In general, the utility of structural brain imaging is limited to the following categories, each with a unique set of clinical presentations:

- Identification of a space occupying lesion or other focal abnormality (tumor, CVA)
- Detection of parenchymal abnormalities (atrophy, demyelinating disease, infection, ischemic change)
- Identification of ventricular abnormalities (hydrocephalus)

**There are a number of common symptoms or conditions for which the likelihood of an underlying central nervous system process is extremely low. The following indications include specific considerations and requirements which help to determine appropriateness of advanced imaging for these symptoms.**

### Bell's palsy (peripheral facial weakness)

- When associated with additional neurologic findings suggestive of intracranial pathology
- Symptoms persisting beyond six (6) weeks in the absence of additional neurologic findings

### Headache

**Onset within the past 30 days with no prior history of headache, when at least one of the following is present:**

- Personal or family history of disorders that may predispose one to central nervous system (CNS) lesions and clinical findings suggesting CNS involvement (including, but not limited to, vascular malformations, aneurysms, brain neoplasms, infectious/inflammatory conditions such as sarcoidosis or personal history of meningitis and tuberculosis)
- Associated neurologic findings on physical exam
- Developmental delay
- Headache that awakens the patient repeatedly from sleep or develops upon awakening
- Sudden onset and severe headache (includes thunderclap headache or worst headache of life)

**Persistent or recurrent headache, when at least one of the following is present:**

- Change in quality (pattern or intensity) of a previously stable headache
- Headache persisting for a period of up to 6 months duration and not responsive to medical treatment, and no prior imaging has been done to evaluate the headache
- Headache associated with at least one of the following:
  - Abnormal reflexes
  - Altered mental status
  - Cranial nerve deficit
  - Gait/motor dysfunction
  - Nystagmus
  - Seizure
  - Sensory deficit
  - Sign of increased intracranial pressure (increased head circumference, vomiting, papilledema, symptoms that worsen with valsalva)

**Note:** *Imaging is not generally indicated for typical presentations of migraine.*

# Common Diagnostic Indications

## Mental status change (including encephalopathy), with documented evidence on neurologic exam

### Syncope

Evaluation for a structural brain lesion when associated with any of following:

- Seizure activity was witnessed or is highly suspected at the time of the episode.
- There is a documented abnormality on neurological examination.
- At least one persistent neurological symptom is present

### Vertigo and dizziness

- Evaluation of signs or symptoms suggestive of a CNS lesion
- Symptoms associated with abnormal audiogram or auditory brainstem response

**Note:** *Vertigo or dizziness which is clearly related to positional change does not require advanced imaging.*

### Visual disturbance

Evaluation for central nervous system pathology when suggested by the ophthalmologic exam

## Vascular indications

This section contains indications for aneurysm, cerebrovascular accident/transient ischemic attack, hemorrhage/hematoma, and other vascular abnormalities.

### Aneurysm

- **Screening** in asymptomatic high-risk individuals
  - At least two (2) first degree relatives with intracranial aneurysm or subarachnoid hemorrhage
  - Presence of a heritable condition which predisposes to intracranial aneurysm (examples include autosomal dominant polycystic kidney disease and Ehlers-Danlos syndrome type IV)
- **Diagnosis** of suspected aneurysm based on neurologic signs or symptoms (for isolated headache, see **Headache** indication)
- **Management** (including perioperative evaluation) of known (treated or untreated) intracranial aneurysm when associated with new or worsening neurologic symptoms
- **Surveillance** of known aneurysm in the absence of new or worsening symptoms
  - Initial evaluation at 6–12 months following diagnosis, then every 1–2 years
  - Follow-up after treatment with clips, endovascular coil or stenting

## Cerebrovascular accident (CVA or stroke) and transient ischemic attack (TIA)

### Hemorrhage/hematoma

### Other vascular abnormalities

- Arteriovenous malformation (AVM)
- Cavernous malformation
- Cerebral vein thrombosis
- Dural arteriovenous fistula (DAVF)
- Dural venous sinus thrombosis
- Venous angioma

**Note:** *CTA or MRA is generally preferred for these indications.*

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## CPT Codes

70496..... Computed tomographic angiography, head, with contrast material(s), including noncontrast images, if performed, and image postprocessing

70544..... Magnetic resonance angiography, head, without contrast

70545..... Magnetic resonance angiography, head, with contrast

70546..... Magnetic resonance angiography, head, without contrast, followed by re-imaging with contrast

*Angiography includes imaging of all blood vessels, including arteries and veins. The codes above include CT/MR Venography.*

## Standard Anatomic Coverage

- CTA or MRA may be performed to assess the major intracranial arteries of the anterior and posterior circulations (including the Circle of Willis) as well as the venous structures (major cerebral veins and dural venous sinuses).
- For specific clinical indications, exams may be tailored to the region of interest.
- MRA of the head includes imaging of the entire arteriovenous system of the brain. Separate requests for concurrent imaging of the arteries and the veins in the head are inappropriate.

## Choice of Imaging Study

### Advantages of CTA

- Higher sensitivity for detection of mural calcification
- Absence of in-plane flow phenomenon which can exaggerate the degree of stenosis
- Improved detection of surgical clips and stents
- Shorter scan time, resulting in less motion artifact and better quality images

### Advantages of MRA

- Provides information about the age of blood
- No need for iodinated contrast material
- No exposure to ionizing radiation

## Combination with MRI

- In the majority of clinical situations, appropriateness of a second imaging study is dependent on the results of the lead study. This is particularly true with regard to MRI and MRA of the same anatomic region, as there is considerable overlap in visualizing vascular structures. Therefore, it is prudent to begin with the optimal study for the indication requested.
- When ordered in combination, peer to peer conversation will be required to understand the individual and unique facts that would support the medical necessity of all imaging studies requested.

## Common Diagnostic Indications

### Abnormal imaging findings

**Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment**

# Common Diagnostic Indications

## Aneurysm

- **Screening** in asymptomatic, high-risk individuals
  - At least two (2) first degree relatives with intracranial aneurysm or subarachnoid hemorrhage
  - Presence of a heritable condition which predisposes to intracranial aneurysm (examples include autosomal dominant polycystic kidney disease and Ehlers-Danlos syndrome type IV)
- **Diagnosis** of suspected aneurysm based on neurologic signs or symptoms (for isolated headache, see **Headache** indication)
- **Management** (including perioperative evaluation) of known (treated or untreated) intracranial aneurysm when associated with new or worsening neurologic symptoms
- **Surveillance** of known aneurysm in the absence of new or worsening symptoms
  - Initial evaluation at 6–12 months following diagnosis, then every 1–2 years
  - Follow-up after treatment with clips, endovascular coil or stenting

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## Cerebrovascular accident (CVA)

- Evaluation for stenosis or occlusion of the intracranial arteries following confirmation of recent non-hemorrhagic CVA on MRI, CT or ultrasound of the brain
- Evaluation for a vascular etiology following confirmation of a recent hemorrhagic CVA on MRI, CT or ultrasound of the brain

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## Congenital or developmental vascular anomaly

**Diagnosis or management (including perioperative or periprocedural management) of a suspected or known cerebrovascular anomaly**

*Examples include arteriovenous malformation (AVM), cavernous malformation, dural arteriovenous fistula (DAVF).*

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## Dissection

**Diagnosis or management (including perioperative evaluation) of intracranial arterial dissection**

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## Headache

Evaluation for a vascular etiology when **at least one** of the following is present:

- Exertional headache
- Positional headache
- Sudden onset of worst headache of life

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## Hemorrhage / hematoma

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## Pulsatile tinnitus

- Evaluation for vascular etiology

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## Stenosis or occlusion of intracranial arteries

- Diagnosis or management of known or suspected steno-occlusive disease

*Examples include Moyamoya disease, sickle cell anemia, and idiopathic progressive arteriopathy of childhood.*

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## Thromboembolic disease of major intracranial arterial or venous systems

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## Trauma

- When vascular involvement is known or suspected

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## Tumor (benign or malignant)

- Evaluation of vascular supply to established tumor

## Common Diagnostic Indications

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### Vasculitis

Diagnosis or management of vasculitis with known or suspected CNS involvement

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### Venous thrombosis or compression

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1. Uchino A, Sawada A, Takase Y, Kudo S. MR angiography of anomalous branches of the internal carotid artery. *AJR Am J Roentgenol.* 2003 Nov;181(5):1409-1414.

# Functional Magnetic Resonance Imaging (fMRI) Brain – Pediatrics



## CPT Codes

- 70554..... Magnetic resonance imaging, brain, functional MRI; including test selection and administration of repetitive body part movement and/or visual stimulation, not requiring physician or psychologist administration
- 70555..... Magnetic resonance imaging, brain, functional MRI; including test selection and administration of repetitive body part movement and/or visual stimulation, requiring physician or psychologist administration of entire neurofunctional testing

## Standard Anatomic Coverage

- From the skull base to vertex, covering the intracranial contents
- Scan coverage may vary, depending on the specific clinical indication

## Technology Considerations

- Functional MRI of the brain may be used to localize eloquent areas in the brain, prior to resection of neoplasm or medically intractable epileptogenic foci.
- Studies have shown excellent agreement in language localization, when comparing functional brain MRI with the Wada test and direct electrical stimulation.
- Advantages of functional brain MRI over a Wada test include the non-invasive technique (not requiring catheter placement and contrast injection), lack of ionizing radiation, shorter time-requirement, lower cost and quicker post-procedural recovery. Additionally, the Wada test is considered limited in right hemisphere dominance.
- Advantages of functional brain MRI over intraoperative electrocortical stimulation include its non-invasive technique and more extensive anatomic brain mapping. Direct electrical stimulation is an invasive procedure, which usually evaluates only one hemisphere (limiting assessment for partial or bilateral language dominance) and usually identifies only eloquent brain regions on the surface of the brain.
- Functional MRI may successfully map primary brain activities related to motor, sensory and language functions. Examples of tasks which may be used include sentence completion (to map language) and bilateral hand squeeze task (for sensory motor mapping).

## Common Diagnostic Indications

### Brain tumor

- For preoperative neurosurgical planning, as a replacement for a Wada test or direct electrical stimulation mapping

### Seizures/epilepsy refractory to medical treatment

- For preoperative neurosurgical planning, as a replacement for a Wada test or direct electrical stimulation mapping

# Positron Emission Tomography (PET) Brain Imaging – Pediatrics



## CPT Codes

78608..... PET brain, metabolic evaluation

78609..... PET brain, perfusion evaluation

## Commonly Used Radiopharmaceuticals

- 2-(fluorine-18) fluoro-2-deoxy-d-glucose (FDG) Scan coverage may vary, depending on the specific clinical indication

## Common Diagnostic Indications

### Brain tumor

- Diagnosis or staging
- Differentiation of post treatment scarring from residual or recurrent disease

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### Refractory seizures/epilepsy

- Presurgical evaluation to identify a focus of seizure activity in patients who have failed conventional medical therapy

## References

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# Computed Tomography (CT) Orbit, Sella Turcica, Posterior Fossa, Temporal Bone, including Mastoids – Pediatrics



## CPT Codes

- 70480..... CT of orbit, sella or posterior fossa and outer, middle or inner ear, without contrast
- 70481..... CT of orbit, sella or posterior fossa and outer, middle or inner ear, with contrast
- 70482..... CT of orbit, sella or posterior fossa and outer, middle or inner ear, without contrast, followed by re-imaging with contrast

## Standard Anatomic Coverage

- The anatomic coverage and protocol specifications will vary, depending on the clinical indication. Anatomic evaluation includes the internal auditory canals (IACs), posterior fossa, sella turcica, orbits and temporal bone, with the mastoid air cells.
- Targeted evaluation, such as CT of the temporal bones, involves collimated views through the region of interest, often in two imaging planes: axial images (petrous bones through mastoid tips) and coronal views (temporomandibular joints through temporal bones).

## Technology Considerations

- CT is often the preferred study for suspected fracture or follow-up of a known fracture, foreign body detection, assessment of calcified lesions and temporal bone evaluation.
- With capability for high-resolution osseous imaging, CT can provide detailed anatomic depiction of the temporal bone anatomy, including the middle and inner ear structures.
- MRI (unless contraindicated) is usually preferred over CT for evaluation of the sella turcica, internal auditory canal regions and visual pathways, as well as for most soft tissue tumor evaluation.
- Bony changes from a sellar, parasellar or orbital mass or infectious process are usually well demonstrated by CT.

## Common Diagnostic Indications

This section begins with general pediatric indications, followed by orbital and otic indications.

### General indications

#### Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

#### Congenital or developmental anomaly

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital anomaly or developmental condition of the orbit, temporal bone, sella turcica or posterior fossa (see Standard Anatomic Coverage for detail)

#### Infectious disease

Diagnosis or management (including perioperative evaluation) of infection involving the orbit, temporal bone, sella turcica or posterior fossa

#### Inflammatory disease

Diagnosis or management of inflammatory disease known to involve the orbit, temporal bone, sella turcica or posterior fossa

#### Localized facial pain – when persistent and unexplained

# Common Diagnostic Indications

## Osseous lesions

*Examples include fibrous dysplasia, Paget's disease, and otosclerosis.*

## Trauma to the orbit, temporal bone, or skull base

## Tumor (benign or malignant)

Diagnosis or management (including perioperative evaluation) of benign or malignant tumor of the orbit, temporal bone, sella turcica or posterior fossa

## Orbital indications

### Evaluation of any of the following:

- Absence of red reflex
- Dysconjugate gaze
- Exophthalmos (or proptosis)
- Extraocular muscle weakness
- Nystagmus
- Optic neuritis
- Orbital pseudotumor
- Papilledema
- Strabismus
- Thyroid ophthalmopathy

## Foreign body in the orbit

- Following non-diagnostic radiograph

## Visual disturbance

Evaluation for orbital or optic nerve pathology when suggested by the ophthalmologic exam

## Otic indications

### Cholesteatoma

### Cochlear implant

Preoperative and post-operative evaluation

### Hearing loss

Evaluation for a structural cause of conductive, sensorineural or mixed hearing loss

**Note:** *CT is preferred for conductive or mixed hearing loss. MRI is preferred for sensorineural hearing loss.*

### Pulsatile tinnitus

### Vertigo and dizziness

- Evaluation of signs or symptoms suggestive of a CNS lesion
- Symptoms associated with abnormal audiogram or auditory brainstem response

**Note:** *Vertigo or dizziness which is clearly related to positional change does not require advanced imaging.*

## References

1. Huang BY, Zdanski C, Castillo M. Pediatric sensorineural hearing loss, part 1: Practical aspects for neuroradiologists. *AJNR Am J Neuroradiol*. 2012;33(2):211-217
2. Huang BY, Zdanski C, Castillo M. Pediatric sensorineural hearing loss, part 2: syndromic and acquired causes. *AJNR Am J Neuroradiol*. 2012;33(3):399-406.
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# Magnetic Resonance Imaging (MRI) Orbit, Face & Neck (Soft Tissues) – Pediatrics



## CPT Codes

- 70540..... MRI orbit, face and neck, without contrast
- 70542..... MRI orbit, face and neck, with contrast
- 70543..... MRI orbit, face and neck, without contrast, followed by re-imaging with contrast

## Standard Anatomic Coverage

- Scan coverage is dependent on the specific anatomic area of clinical interest and may include the following:
  - Facial structures
  - Larynx and subglottic regions
  - Nasopharynx, oropharynx and hypopharynx
  - Neck soft tissues, surrounding the airway and glands
  - Optic nerve
  - Orbit
  - Salivary glands
  - Sinuses
  - Thyroid and parathyroid gland

## Choice of Imaging Study

- CT is generally the modality of choice for traumatic injury, calcified lesions, localized infection (for example, orbital extension of an adjacent complicated sinusitis), and foreign body evaluation following initial radiographic evaluation for a radiopaque foreign body.
- CT is preferred for visualization of soft tissue structures in the neck.
- MRI of the orbit, face and neck is not indicated for imaging the internal auditory canals (see MRI brain, CPT codes 70551–70553).

## Common Diagnostic Indications

This section begins with general pediatric indications, followed by nasal, neck, and orbital indications.

### General indications

#### Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

#### Congenital anomalies

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital anomaly of the orbit, maxillofacial area, or soft tissue structures of the neck (see Standard Anatomic Coverage for detail)

#### Horner's syndrome

#### Infectious disease (excluding sinusitis)

Diagnosis or management (including perioperative evaluation) of infection involving the orbit, maxillofacial area, or soft tissue of the neck

**Note:** For sinus infection, see CT Paranasal Sinus and Maxillofacial Area

# Common Diagnostic Indications

## Inflammatory disease

Diagnosis or management of inflammatory disease known to involve the orbit, maxillofacial area, or soft tissue structures of the neck

*Example includes Wegener's granulomatosis (granulomatosis with polyangiitis)*

## Osteonecrosis of the jaw

- Evaluation following non-diagnostic Panorex/radiographs

## Trauma to facial structures or soft tissues of the neck

## Tumor (benign or malignant)

Diagnosis or management (including perioperative evaluation) of suspected or known malignancy when imaging is required to direct treatment

## Nasal indications

### Evaluation of any of the following:

- Anosmia
- Recurrent epistaxis
- Nasal airway obstruction or polyposis refractory to medical therapy

## Neck indications

### Hoarseness, dysphonia or vocal cord weakness/paralysis

- Following laryngoscopy, when findings suggest recurrent laryngeal nerve dysfunction or identify a suspicious lesion
- Symptoms persisting longer than one month which are unexplained by laryngoscopy

## Lymphadenopathy

Evaluation of unexplained lymphadenopathy in any of the following clinical scenarios:

- Ultrasound findings suggestive of nodal malignancy
- Non-diagnostic ultrasound and failure to resolve following a six (6) week course of empiric therapy
- Non-diagnostic ultrasound and presence of **at least one**\* of the following features:
  - Constitutional symptoms
  - Firm/immobile and larger than 3 cm in diameter
  - Persistent enlargement on exam for longer than 2 weeks
  - Presence of ulceration
  - Supraclavicular or posterior triangle location

*\*Note: Biopsy may be more appropriate than imaging when any of these features are present.*

## Neck mass

- Initial evaluation of a palpable neck mass when ultrasound demonstrates a solid mass other than a lymph node
- Management of known cystic neck mass or other benign tumor when ultrasound is not sufficient to guide treatment
- Evaluation of a retropharyngeal neck mass

## Parathyroid adenoma

- Evaluation of suspected adenoma following abnormal parathyroid ultrasound or scintigraphy
- Preoperative planning in patients with aberrant anatomy
- Localization of residual parathyroid tissue following failed parathyroidectomy

## Common Diagnostic Indications

### Stridor

- Evaluation of acute stridor
- For subacute or chronic stridor, following non-diagnostic radiograph and ENT evaluation

### Thyroid nodule or thyromegaly (goiter)

- Following non-diagnostic thyroid ultrasound or thyroid scintigraphy
- When associated with mass effect on the upper airway or esophagus
- For preoperative evaluation

### Torticollis

- Evaluation of childhood (acquired) torticollis when clinical findings suggest a secondary cause (such as infection, neoplasm, trauma)
- Evaluation of congenital muscular torticollis when all of the following apply:
  - Age 8 months or younger
  - Following non-diagnostic ultrasound of the neck
  - Following non-diagnostic cervical spine radiograph
  - Failure to respond to at least four (4) weeks of conservative treatment

### Tracheal stenosis

### Upper airway obstruction

### Orbital indications

#### Evaluation of any of the following:

- Absence of red reflex
- Dysconjugate gaze
- Exophthalmos (or proptosis)
- Extraocular muscle weakness
- Nystagmus
- Optic neuritis
- Orbital pseudotumor
- Papilledema
- Strabismus
- Thyroid ophthalmopathy

### Visual disturbance

Evaluation for orbital or optic nerve pathology when suggested by the ophthalmologic exam

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## CPT Codes

70486..... CT of maxillofacial area, without contrast

70487..... CT of maxillofacial area, with contrast

70488..... CT of maxillofacial area, without contrast, followed by re-imaging with contrast

## Standard Anatomic Coverage

- Includes the sinuses, facial structures and maxillary regions. Individual scan coverage depends on the specific clinical request, but generally includes images through the entire frontal, ethmoid, maxillary and sphenoid sinuses. Coverage may be extended to include the mandible and temporomandibular joint (TMJ) in select cases and depending on the clinical indication. CT sections may be obtained in one or two (usually coronal and axial) planes.

## Common Diagnostic Indications

### Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

### Congenital anomaly

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital maxillofacial anomaly when imaging is required to direct treatment

### Infectious disease

Diagnosis or management (including perioperative evaluation) of the following:

- Fungal or other complex sinus infections
- Osteomyelitis of the facial bones

### Inflammatory disease

Diagnosis or management of inflammatory disease known to involve the maxillofacial region

*Examples include Wegener's granulomatosis (granulomatosis with polyangiitis)*

### Osteonecrosis of the jaw

Evaluation following non-diagnostic Panorex/radiographs

### Sinus and nasal indications

Diagnosis or management (including perioperative evaluation) of the following:

- Anosmia
- Foreign body in the maxillofacial region
- Mucocoele of paranasal sinuses
- Nasal airway obstruction refractory to medical therapy
- Polyposis
- Recurrent epistaxis

# Common Diagnostic Indications

## Sinusitis, acute and subacute

(any **one** of the following)

- Screening of immunocompromised patient or a patient who is likely to become immunocompromised by therapy (for example, prior to chemotherapy or transplant)
- Management of complications of acute sinusitis (**any one of the following**)
  - Abscess, intracranial or orbital
  - Encephalitis or cerebritis
  - Meningitis
  - Sinus thrombosis
  - Invasive fungal sinusitis in immunocompromised patients

**Note:** Any episode of sinusitis with duration of less than 30 (acute) or 31-90 (subacute) days. Sinusitis is generally rare in patients under 3 years of age.

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## Sinusitis, chronic or recurrent

(any **one** of the following)

- Corroborate diagnosis of chronic sinusitis prior to a prolonged course of antibiotics
- Diagnose underlying medical condition (**any one of the following**)
  - Chronic allergies or asthma
  - Ciliary motility disorder
  - Craniofacial abnormality
  - Cystic fibrosis
  - Immunodeficiency
- Diagnose unilateral sinusitis
- Post-operative management of complications
- Pre-operative evaluation to determine whether the patient is a surgical candidate
- Pre-operative image guidance study

**Note:** Any episode of sinusitis that persists beyond ninety (90) days. Indication includes recurrent acute bacterial sinusitis (RABS), defined as episodes of sinusitis lasting less than 30 days with at least 10 symptom-free days in-between. At least three (3) such episodes within six (6) months or four (4) episodes within a year are required to qualify.

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## Temporomandibular disease (TMD)

Diagnosis of a temporomandibular joint (TMJ) source of TMD when **at least one** of the following applies:

- Panorex is inconclusive or not available
- Panorex findings are unclear or require further characterization:
- Panorex is normal but high clinical suspicion for TMJ pathology remains and the results will change management (including perioperative evaluation)

**Note:** Temporomandibular disease is a collective term, which includes disorders of both the masticatory muscles and the TMJ. CT is generally not indicated when a muscular etiology for TMD is suspected. Most TMJ pathology can be evaluated with a Panorex radiograph.

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## Trauma to the facial bones

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## Tumor or mass lesion in the sinus or nasal region

Diagnosis or management (including perioperative evaluation) of benign or malignant tumor

## References

1. American Academy of Orofacial Pain. *Orofacial Pain: Guidelines for Assessment, Diagnosis, and Management*. De Leeuw R, Klasser GD, eds. Chicago: Quintessence Publishing Co., Inc.; 2013.
2. American Association of Oral and Maxillofacial Surgeons (AAOMS). *Clinical Paper: Temporomandibular Disorders*. Rosemont, IL: AAOMS; 2013.
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5. Wald ER, Applegate KE, Bordley C, et al; American Academy of Pediatrics. Clinical practice guideline for the diagnosis and management of acute bacterial sinusitis in children aged 1 to 18 years. *Pediatrics*. 2013;132(1):e262-e280.

## CPT Codes

70336..... MRI of Temporomandibular Joint(s)

## Standard Anatomic Coverage

- Bilateral study, including open and closed mouth views, often performed with surface coils
- Images may be obtained in axial, (oblique) sagittal and (oblique) coronal planes

## Common Diagnostic Indications

### Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

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### Arthropathy of the temporomandibular joints

Following non-diagnostic radiograph, or Panorex view of the TMJ

*Examples include traumatic, inflammatory or infectious arthritis*

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### Frozen jaw

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### Juvenile idiopathic arthritis (JIA)

Management of JIA when radiographs are not sufficient to guide therapy

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### Temporomandibular joint dysfunction

Evaluation of persistent symptoms when all of the following requirements are met:

- X-ray or Panorex has not provided sufficient information to guide treatment.
- Intervention is being considered.
- Symptoms have not improved with conservative treatment, including NSAIDs or acetaminophen, a short-term trial of soft diet and proper chewing techniques, and an oral appliance (such as a bite block).

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### Trauma to the temporomandibular joints

- Evaluation of meniscal position and integrity

**Note:** *Conventional radiographs, Panorex views or CT of the TMJ are preferred for initial evaluation of trauma.*

## References

1. Magni-Manzoni S, Malattia C, Lanni S, Ravelli A. Advances and challenges in imaging in juvenile idiopathic arthritis. *Nat Rev Rheumatol*. 2012 Mar 27;8(6):329-36.

## CPT Codes

- 70490..... CT Soft Tissues of Neck, without contrast
- 70491..... CT Soft Tissues of Neck, with contrast
- 70492..... CT Soft Tissues of Neck without contrast, followed by re-imaging with contrast

## Standard Anatomic Coverage

- Axial images from the skull base to the clavicles

## Technology Considerations

- CT is generally the modality of choice for the following indications: detection of sialolithiasis (salivary gland calculi); following trauma to the soft tissues of the neck; and during foreign body evaluation, after initial radiographic assessment for a radiopaque foreign body

## Common Diagnostic Indications

### Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

### Congenital anomaly

Diagnosis or management (including perioperative evaluation) of a suspected or known congenital or developmental anomaly of the soft tissue structures of the neck

### Foreign body in the upper aerodigestive tract or surrounding neck tissue

- Following non-diagnostic neck radiograph

### Hoarseness, dysphonia, or vocal cord weakness/paralysis

- Following laryngoscopy, when vocal cord paralysis is demonstrated, or study is non-diagnostic
- Evaluation of symptoms persisting longer than one month when laryngoscopy has not been performed

### Horner's syndrome

### Infectious disease

Diagnosis or management (including perioperative evaluation) of infection involving soft tissue structures in the neck

### Inflammatory disease

Diagnosis or management of inflammatory disease involving soft tissue structures in the neck

### Laryngeal edema

# Common Diagnostic Indications

## Lymphadenopathy

Evaluation of unexplained lymphadenopathy in any of the following clinical scenarios:

- Ultrasound findings suggestive of nodal malignancy
- Non-diagnostic ultrasound and failure to resolve following a six (6) week course of empiric therapy
- Non-diagnostic ultrasound and presence of at least one\* of the following features:
  - Absence of pain or tenderness
  - Constitutional symptoms
  - Firm/immobile and size greater than 3 cm in diameter
  - Persistent enlargement on exam for longer than 2 weeks
  - Presence of ulceration
  - Supraclavicular or posterior triangle location

*\*Note: Biopsy may be more appropriate than imaging when any of these features are present.*

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## Neck mass

- Initial evaluation of a palpable neck mass when ultrasound demonstrates a solid mass other than a lymph node
- Management of known cystic neck mass or other benign tumor when ultrasound is not sufficient to guide treatment
- Evaluation of a retropharyngeal neck mass

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## Osteonecrosis of the jaw

Evaluation following non-diagnostic X-ray or Panorex

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## Parathyroid adenoma

- Evaluation of suspected adenoma following abnormal parathyroid ultrasound or scintigraphy
- Preoperative planning in patients with aberrant anatomy
- Localization of residual parathyroid tissue following failed parathyroidectomy

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## Salivary/parotid gland ductal calculi

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## Stridor

- Evaluation of acute stridor
- For subacute or chronic stridor, following non-diagnostic radiograph and ENT evaluation

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## Thyroid nodule or thyromegaly (goiter)

- Following non-diagnostic thyroid ultrasound or thyroid scintigraphy
- When associated with mass effect on the upper airway or esophagus
- For preoperative evaluation

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## Torticollis

- Evaluation of childhood (acquired) torticollis when clinical findings that suggest a secondary cause (such as infection, neoplasm, or trauma)
- Evaluation of congenital muscular torticollis when all of the following apply:
  - Age 8 months or younger
  - Non-diagnostic ultrasound of the neck
  - Non-diagnostic cervical spine X-ray
  - Failure to respond to at least four (4) weeks of conservative treatment

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## Tracheal stenosis

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## Traumatic injury to soft tissues structures of the neck

## Common Diagnostic Indications

### Tumor (benign or malignant)

Diagnosis or management (including perioperative evaluation) of suspected or known malignancy

### Upper airway obstruction

## References

1. American Academy of Otolaryngology — Head and Neck Surgery Foundation. *Choosing Wisely: Five Things Physicians and Patients Should Question*. ABIM Foundation; February 21, 2013. Available at [www.choosingwisely.org](http://www.choosingwisely.org).
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4. Haque S, Bilal Shafi BB, Kaleem M. Imaging of torticollis in children. *Radiographics*. 2012;32(2):557-571.
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8. Meier JD, Grimmer JF. Evaluation and management of neck masses in children. *Am Fam Physician*. 2014;89(5):353-358.
9. Morrison DL, MacEwen GD. Congenital muscular torticollis: observations regarding clinical findings, associated conditions, and results of treatment. *J Pediatr Orthop*. 1982;2(5):500-505.
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11. Pharisa C, Lutz N, Roback MG, Gehri M. Neck complaints in the pediatric emergency department: a consecutive case series of 170 children. *Pediatr Emerg Care*. 2009 Dec;25(12):823-826.
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15. Schwartz SR, Cohen SM, Dailey SH, et al. Clinical practice guideline: hoarseness (dysphonia). *Otolaryngol Head Neck Surg*. 2009;141(3 Suppl 2):S1-S31.
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## CPT Codes

- 70498..... CTA of neck, with contrast material(s), including noncontrast images, if performed, and image post-processing
- 70547..... MRA of Neck without contrast
- 70548..... MRA of Neck with contrast
- 70549..... MRA of Neck without contrast, followed by re-imaging with contrast

*Angiography includes imaging of all blood vessels (arteries and veins). The above CPT codes include venography.*

## Standard Anatomic Coverage

- CTA and MRA of the neck involve image acquisitions from the aortic arch to the skull base, to visualize major vessels which include the extracranial carotid arteries and vertebral arteries. The major venous structures may also be interrogated with CT and MR angiographic techniques.

## Choice of Imaging Study

- Duplex Doppler ultrasound is a first line imaging study for most carotid indications.

### Advantages of CTA

- Higher sensitivity for detection of mural calcification
- Absence of in-plane flow phenomenon which can exaggerate the degree of stenosis
- Improved detection of surgical clips and stents
- Shorter scan time, resulting in less motion artifact and better quality images

### Advantages of MRA

- Provides information about the age of blood
- No need for iodinated contrast material
- No exposure to ionizing radiation

## Common Diagnostic Indications

### Abnormal imaging findings

Follow up of abnormal or indeterminate findings on a prior imaging study when required to direct treatment

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### Aneurysm or dissection of carotid or vertebral arteries

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### Carotid stenosis or occlusion

Diagnosis or management of known or suspected steno-occlusive disease

- Following abnormal or equivocal duplex Doppler study, unless the diagnosis is supported by clinical exam findings.

*Examples include Moyamoya disease, sickle cell anemia, and idiopathic progressive arteriopathy of childhood.*

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### Congenital or developmental vascular anomaly

Diagnosis or management (including perioperative evaluation) of a vascular anomaly of the carotid or vertebral arteries including arteriovenous malformation (AVM)

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### Horner's syndrome

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### Intramural hematoma

## Common Diagnostic Indications

### Post-operative or post-procedure evaluation

**Note:** *This indication is for post-operative evaluation of conditions not specifically referenced elsewhere in this guideline.*

### Preoperative or pre-procedure evaluation

**Note:** *This indication is for preoperative evaluation of conditions not specifically referenced elsewhere in this guideline.*

#### Exclusion:

- MRV (or CTV) in preparation for either a neurosurgical or percutaneous procedure to treat multiple sclerosis is not considered appropriate.

### Thromboembolic disease of major extracranial arterial and/or venous systems

### Traumatic vascular injury to the extracranial carotid and vertebral arteries

### Vasculopathy (including fibromuscular dysplasia and vasculitis)

### Venous thrombosis or compression

### Vertebrobasilar stenosis or occlusion