



# Cranial Nerve Disorders

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## Table 1: Anosmia

### Differential list for anosmia

<b>Neoplastic</b>	<ul style="list-style-type: none"><li>● Esthesioneuroepithelioma</li><li>● Olfactory groove meningioma</li><li>● Suprasellar meningioma</li><li>● Frontal lobe glioma</li></ul>
<b>Vascular</b>	<ul style="list-style-type: none"><li>● Subarachnoid hemorrhage</li><li>● ACA aneurysm</li><li>● Sheehan's syndrome</li><li>● Scleroderma</li></ul>
<b>Infectious</b>	<ul style="list-style-type: none"><li>● Upper respiratory infection (e.g. Influenza which damages neuroepithelium)</li><li>● Intracranial abscess</li><li>● Meningitis</li><li>● Herpes encephalitis</li><li>● Osteomyelitis (frontal, ethmoid)</li><li>● Syphilis (impact membranes)</li></ul>
<b>Endocrine</b>	<ul style="list-style-type: none"><li>● Diabetes mellitus</li></ul>
<b>Metabolic</b>	<ul style="list-style-type: none"><li>● Hypothyroidism</li><li>● Vitamin deficiency</li></ul>
<b>Toxic</b>	<ul style="list-style-type: none"><li>● Aminoglycosides</li><li>● Amphetamines</li><li>● Cocaine</li><li>● Lead</li><li>● Cadmium</li></ul>

	<ul style="list-style-type: none"> <li>• Hypercalcemia</li> <li>• Heavy smoking</li> </ul>
<b>Inflammatory</b>	<ul style="list-style-type: none"> <li>• Chronic rhinitis</li> <li>• Chronic sinusitis</li> <li>• Nasal polyposis</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>• Traumatic neuropathy (2nd most common cause)</li> <li>• Alzheimer's disease</li> <li>• Kallmann syndrome</li> <li>• Paget's disease</li> <li>• Chronic atrophic rhinitis</li> <li>• Albinism</li> </ul>

## Table 2: Oculomotor Nerve Palsy

### Differential for oculomotor nerve palsy

<b>Neoplastic</b>	<ul style="list-style-type: none"> <li>• Meningioma (extra-/intra-orbital)</li> <li>• Glioma</li> <li>• Pituitary adenoma</li> <li>• Orbital hemangioma</li> <li>• Carcinomatous meningitis</li> <li>• Orbital epidermoid</li> <li>• Neurofibroma</li> <li>• Orbital lipoma</li> <li>• Nasopharyngeal extension</li> <li>• Melanoma metastasis to the orbit</li> <li>• Other metastasis</li> </ul>
<b>Vascular</b>	<ul style="list-style-type: none"> <li>• Aneurysm (P-comm, SCA, PCA, ICA, basilar tip)</li> <li>• Midbrain infarction (paramedian PCA branches or basilar bifurcation perforators)</li> <li>• Nerve trunk infarction (Diabetes mellitus)</li> <li>• Cavernous sinus thrombosis</li> <li>• Caroticocavernous fistula</li> <li>• Hemorrhage (SAH, epidural, subdural)</li> <li>• Dural AVM</li> <li>• Arteritis</li> </ul>

	<ul style="list-style-type: none"> <li>• Pituitary apoplexy</li> </ul>
<b>Infectious</b>	<ul style="list-style-type: none"> <li>• Meningitis (bacterial, fungal)</li> <li>• Mucormycosis</li> <li>• Mononucleosis</li> <li>• Meningovascular syphilis</li> <li>• Herpes zoster encephalitis</li> </ul>
<b>Endocrine</b>	<ul style="list-style-type: none"> <li>• Thyrotoxicosis (mimic)</li> </ul>
<b>Inflammatory</b>	<ul style="list-style-type: none"> <li>• Multiple sclerosis</li> <li>• INO (mimic)</li> <li>• Sarcoidosis</li> <li>• MG (mimic)</li> <li>• GBS (including Miller-Fisher variant)</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>• Traumatic neuropathy (blowout fracture of the orbit)</li> <li>• Latent strabismus (mimic)</li> <li>• Orbital fibrous dysplasia</li> <li>• Tolosa-Hunt syndrome</li> </ul>

## Table 3: Trochlear Nerve Palsy

### Differential list for trochlear nerve palsy

<b>Neoplastic</b>	<ul style="list-style-type: none"> <li>• Pituitary adenoma</li> <li>• Glioma</li> <li>• Trochlear schwannoma</li> <li>• Tentorial/parasellar/tuberculum sella/diaphragma sella meningioma</li> <li>• Choriocarcinoma</li> <li>• <a href="#">Teratoma</a></li> <li>• <a href="#">Germinoma</a></li> <li>• Dysgerminoma</li> <li>• Carcinomatous meningitis</li> <li>• <a href="#">Metastasis</a></li> </ul>
<b>Vascular</b>	<ul style="list-style-type: none"> <li>• Hemorrhage (SAH, epidural, subdural)</li> <li>• Aneurysm (intracavernous ICA)</li> </ul>

	<ul style="list-style-type: none"> <li>• Cavernous sinus thrombosis</li> <li>• Caroticocavernous fistula</li> <li>• Infarction</li> </ul>
<b>Infectious</b>	<ul style="list-style-type: none"> <li>• Meningitis</li> <li>• Mastoiditis</li> <li>• Herpes zoster encephalitis</li> </ul>
<b>Endocrine</b>	<ul style="list-style-type: none"> <li>• Diabetes mellitus (related infarction, most common cause)</li> <li>• Thyrotoxicosis (mimic)</li> </ul>
<b>Inflammatory</b>	<ul style="list-style-type: none"> <li>• Multiple sclerosis</li> <li>• MG (mimic)</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>• Traumatic neuropathy</li> <li>• Latent strabismus (mimic)</li> <li>• Tolosa-Hunt syndrome</li> <li>• Brown's syndrome</li> </ul>

## Table 4: Trigeminal Neuropathy

### Differential for trigeminal neuropathy

<b>Neoplastic</b>	<ul style="list-style-type: none"> <li>• Glioma (pontine, orbital)</li> <li>• <a href="#">Vestibular schwannoma</a> (CPA)</li> <li>• Trigeminal schwannoma</li> <li>• Meningioma (orbital and non-orbital)</li> <li>• Orbital hemangioma</li> <li>• Neurofibroma</li> <li>• <a href="#">Dermoid cyst</a> (CPA)</li> <li>• <a href="#">Epidermoid cyst</a> (CPA)</li> <li>• Lipoma</li> <li>• Metastatic melanoma</li> <li>• <a href="#">Metastasis</a></li> </ul>
<b>Vascular</b>	<ul style="list-style-type: none"> <li>• Infarction (cerebral or brainstem)</li> <li>• Aneurysm (intracavernous ICA)</li> <li>• Cavernous sinus thrombosis</li> <li>• Vasculitis (SLE, PSS, Scleroderma, Sjogren's syndrome,</li> </ul>

	Amyloidosis)
<b>Infectious</b>	<ul style="list-style-type: none"> <li>• Petrositis (Gradenigo's syndrome)</li> </ul>
<b>Endocrine</b>	<ul style="list-style-type: none"> <li>• Diabetic neuropathy</li> </ul>
<b>Inflammatory</b>	<ul style="list-style-type: none"> <li>• Multiple sclerosis</li> <li>• Orbital pseudotumor</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>• Traumatic neuropathy</li> <li>• Fibrous dysplasia</li> <li>• Trigeminal neuralgia</li> <li>• Tolosa-Hunt syndrome</li> <li>• Chiari malformation</li> </ul>

## Table 5: Abducens Nerve Palsy

### Differential for abducens nerve palsy

<b>Neoplastic</b>	<ul style="list-style-type: none"> <li>• Glioma (pontine)</li> <li>• Pituitary adenoma</li> <li>• <a href="#">Vestibular schwannoma</a> (CPA)</li> <li>• Meningioma (CPA, diaphragm sella, tuberculum sella, parasellar)</li> <li>• Chordoma (clival)</li> <li>• Chondroma (clival)</li> <li>• <a href="#">Epidermoid tumor</a> (CPA)</li> <li>• CNS lymphoma</li> <li>• Carcinomatous meningitis</li> <li>• <a href="#">Metastasis</a></li> </ul>
<b>Vascular</b>	<ul style="list-style-type: none"> <li>• Infarction</li> <li>• Aneurysm (CPA, intracavernous ICA)</li> <li>• Cavernous sinus thrombosis</li> <li>• Caroticocavernous fistula</li> <li>• Hemorrhage (SAH)</li> </ul>
<b>Infectious</b>	<ul style="list-style-type: none"> <li>• Meningitis (bacterial, fungal)</li> </ul>

	<ul style="list-style-type: none"> <li>• Meningovascular syphilis</li> <li>• Herpes zoster encephalitis</li> <li>• Petrositis (Gradenigo's syndrome)</li> </ul>
<b>Endocrine</b>	<ul style="list-style-type: none"> <li>• Diabetes mellitus (related infarction)</li> <li>• Thyrotoxicosis (mimic)</li> </ul>
<b>Toxic</b>	<ul style="list-style-type: none"> <li>• Wernicke's encephalopathy</li> </ul>
<b>Congenital</b>	<ul style="list-style-type: none"> <li>• Mobius syndrome</li> </ul>
<b>Inflammatory</b>	<ul style="list-style-type: none"> <li>• Multiple sclerosis</li> <li>• INO</li> <li>• MG (mimic)</li> <li>• Sarcoidosis</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>• Traumatic neuropathy</li> <li>• <a href="#">Arachnoid cyst</a></li> <li>• Migraine (mimic)</li> <li>• Paget's disease</li> <li>• Tolosa-Hunt syndrome</li> </ul>

## Table 6: Facial Nerve Palsy

### Differential diagnosis for facial nerve palsy

<b>Neoplastic</b>	<ul style="list-style-type: none"> <li>• Glioma (pontine)</li> <li>• Meningioma</li> <li>• <a href="#">Vestibular schwannoma</a> (CPA)</li> <li>• Trigeminal schwannoma</li> <li>• Facial schwannoma</li> <li>• Cholesteatoma</li> <li>• Glomus tumor</li> <li>• <a href="#">Dermoid cyst</a></li> <li>• <a href="#">Epidermoid cyst</a></li> <li>• <a href="#">Metastasis</a></li> <li>• Post-parotid surgery (lesion mandibular branch)</li> </ul>
<b>Vascular</b>	<ul style="list-style-type: none"> <li>• Infarction (pontine tegmentum)</li> </ul>

	<ul style="list-style-type: none"> <li>• Aneurysm</li> <li>• Post-carotid endarterectomy (mandibular branch)</li> <li>• Basilar dolichoectasia</li> </ul>
<b>Infectious</b>	<ul style="list-style-type: none"> <li>• Poliomyelitis</li> <li>• Herpes zoster (Ramsey-Hunt syndrome)</li> <li>• Lyme disease</li> <li>• Epstein-Barr virus</li> <li>• Mumps</li> <li>• Rubella</li> <li>• HIV</li> <li>• Meningovascular syphilis</li> </ul>
<b>Metabolic</b>	<ul style="list-style-type: none"> <li>• Porphyria</li> </ul>
<b>Inflammatory</b>	<ul style="list-style-type: none"> <li>• Multiple sclerosis</li> <li>• Sarcoidosis</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>• Traumatic neuropathy</li> <li>• Melkersson-Rosenthal syndrome</li> <li>• Progressive supranuclear palsy</li> <li>• Bell's palsy</li> <li>• Benign recurrent cranial nerve paralyses</li> </ul>

## Table 7: Glossopharyngeal, Vagus, and Accessory Nerve Pathology

Differential diagnosis for glossopharyngeal, vagus, or accessory nerve pathology

<b>Neoplastic</b>	<ul style="list-style-type: none"> <li>• Glioma</li> <li>• Schwannoma</li> <li>• Neurofibroma</li> <li>• Meningioma</li> <li>• Paraganglioma (<a href="#">Glomus jugulare</a>)</li> <li>• Cholesteatoma</li> <li>• Non-Hodgkin's lymphoma</li> <li>• Rhabdomyosarcoma</li> <li>• Nasopharyngeal carcinoma</li> </ul>
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	<ul style="list-style-type: none"> <li>• <a href="#">Metastasis</a></li> </ul>
<b>Vascular</b>	<ul style="list-style-type: none"> <li>• Infarction (medulla)</li> <li>• Hemorrhage (AVM, HTN)</li> <li>• Aneurysm (vertebral)</li> <li>• Vertebral artery ectasia</li> </ul>
<b>Infectious</b>	<ul style="list-style-type: none"> <li>• Meningitis</li> <li>• Malignant otitis externa</li> </ul>
<b>Metabolic</b>	<ul style="list-style-type: none"> <li>• Central pontine myelinolysis</li> </ul>
<b>Inflammatory</b>	<ul style="list-style-type: none"> <li>• Multiple sclerosis</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>• Traumatic neuropathy</li> <li>• Glossopharyngeal neuralgia</li> <li>• Iatrogenic injury post-radical neck dissection</li> <li>• Benign recurrent cranial nerve paralyses</li> <li>• Extracranial causes for vagus neuropathy (jugular vein thrombosis, aortic aneurysm, malignancy, infection)</li> </ul>

## Table 8: Hypoglossal Nerve Palsy

Differential diagnosis for hypoglossal nerve palsy

<b>Neoplastic</b>	<ul style="list-style-type: none"> <li>• Glioma</li> <li>• Meningioma</li> <li>• Schwannoma</li> <li>• Neurofibroma</li> <li>• Osteoma</li> <li>• Chordoma</li> <li>• Paraganglioma (<a href="#">Glomus jugulare</a>)</li> <li>• Sarcoma</li> <li>• <a href="#">Metastasis</a></li> </ul>
<b>Vascular</b>	<ul style="list-style-type: none"> <li>• Infarction (basal/paramedian medulla)</li> <li>• Hemorrhage (brainstem, SAH)</li> <li>• Aneurysm</li> </ul>



	<ul style="list-style-type: none"> <li>• Vertebrobasilar dolichoectasia</li> <li>• Basilar invagination</li> <li>• Post-carotid endarterectomy</li> </ul>
<b>Infectious</b>	<ul style="list-style-type: none"> <li>• Malignant otitis externa</li> <li>• Abscess</li> <li>• Mucormycosis</li> <li>• <a href="#">Aspergillosis</a></li> <li>• Poliomyelitis</li> <li>• Diphtheria</li> <li>• Botulism</li> </ul>
<b>Inflammatory</b>	<ul style="list-style-type: none"> <li>• Multiple sclerosis</li> <li>• Shy-Drager syndrome</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>• Traumatic neuropathy</li> <li>• Chiari malformation</li> <li>• Multiple systems atrophy</li> <li>• Post-radical neck dissection</li> <li>• Benign recurrent cranial nerve paralyses</li> </ul>

## Table 9: Multiple Cranial Neuropathies

### Differential list for cranial neuropathies

<b>Neoplastic</b>	<ul style="list-style-type: none"> <li>• <a href="#">Pituitary macroadenoma</a></li> <li>• Meningioma (sphenoid ridge)</li> <li>• Glioma</li> <li>• Paraganglioma</li> <li>• Orbital tumors</li> <li>• Chordoma</li> <li>• Osteoma</li> <li>• Sarcoma</li> <li>• Schwannoma</li> <li>• <a href="#">Teratoma</a></li> <li>• Glomus tumor</li> <li>• <a href="#">Epidermoid/dermoid cyst</a></li> <li>• Dysgerminoma</li> <li>• Nasopharyngeal carcinoma</li> </ul>
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	<ul style="list-style-type: none"> <li>● Neurofibroma</li> <li>● Lymphomatous meningitis</li> <li>● Multiple myeloma</li> <li>● <a href="#">Metastasis</a></li> </ul>
<b>Vascular</b>	<ul style="list-style-type: none"> <li>● Aneurysm (intracavernous internal carotid, P-Comm, PCA, basilar tip, SCA, vertebral)</li> <li>● Dural AVM</li> <li>● Carotid-cavernous fistula</li> <li>● Cavernous sinus syndrome (CN III, IV, V1, V2, VI)</li> <li>● Infarction (nucleus or tract involvement)</li> <li>● Basilar dolichoectasia</li> <li>● Basilar invagination</li> <li>● Hemorrhage (SAH, epidural, subdural)</li> <li>● Pituitary apoplexy</li> <li>● Vertebral artery ectasia</li> <li>● PAN</li> <li>● Granulomatosis with polyangiitis (CN VIII)</li> </ul>
<b>Infectious</b>	<ul style="list-style-type: none"> <li>● Acute or Chronic Meningitis (bacterial, viral, fungal)</li> <li>● Herpes zoster</li> <li>● Diphtheria</li> <li>● Botulism intoxication</li> <li>● <a href="#">Aspergillosis</a></li> <li>● Mucormycosis</li> <li>● Cryptococcal meningitis</li> <li>● Mastoiditis</li> <li>● Neurocysticercosis</li> <li>● Neurosyphilis</li> <li>● Lyme disease (CN VII)</li> </ul>
<b>Inflammatory</b>	<ul style="list-style-type: none"> <li>● GBS</li> <li>● Miller-Fisher syndrome</li> <li>● Sarcoidosis</li> <li>● Multiple sclerosis</li> <li>● Myasthenia gravis</li> <li>● Lambert-Eaton syndrome</li> <li>● Shy-Drager syndrome (CN XII)</li> <li>● Multiple system atrophy (CN XII)</li> <li>● Petrositis</li> </ul>

	<ul style="list-style-type: none"> <li>• Cholesteatoma</li> </ul>
<b>Metabolic</b>	<ul style="list-style-type: none"> <li>• Wernicke's encephalopathy (CN VI)</li> <li>• Porphyria (CN VII, X)</li> <li>• Leigh's disease</li> <li>• Central pontine myelinolysis (CN VI, VII)</li> </ul>
<b>Genetic or Congenital</b>	<ul style="list-style-type: none"> <li>• Mobius syndrome (CN VI, VII)</li> <li>• Progressive supranuclear palsy</li> <li>• Chiari malformation</li> <li>• Osteopetrosis</li> </ul>
<b>Miscellaneous</b>	<ul style="list-style-type: none"> <li>• Traumatic neuropathy (including surgical)</li> <li>• Status post-lumbar puncture</li> <li>• Amyloid</li> <li>• Fibrous dysplasia</li> <li>• Paget's disease (VIII &gt; II, III)</li> <li>• Hyperostosis cranialis interna</li> <li>• Polyneuritis cranialis</li> <li>• Idiopathic cranial polyneuropathy (III, IV, V)</li> </ul>

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