Multiple Cranial Nerve Lesions

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| **Syndrome** | **Cranial nerves** | | | | | | | | | | | | **Associated lesions** |
| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
| Extraparenchymal | | | | | | | | | | | | | |
| **Foix** (superior orbital fissure) |  |  | + | + | V1 | + |  |  |  |  |  |  |  |
| **Tolosa-Hunt**  (lateral wall of cavernous sinus) |  |  | + | + | V1 | + |  |  |  |  |  |  |  |
| **Jacod** (retro-sphenoid space) |  | + | + | + | + | + |  |  |  |  |  |  |  |
| **Marcus Gunn** |  |  | + |  | + |  |  |  |  |  |  |  |  |
| **Gradenigo** (apex of petrous bone) |  |  |  |  | + | + | ± | ± |  |  |  |  |  |
| internal auditory meatus |  |  |  |  |  |  | + | + |  |  |  |  |  |
| pontocerebellar angle |  |  |  |  | + |  | + | + | ± | ± |  |  | ataxia |
| **Vernet**  (jugular foramen) |  |  |  |  |  |  |  |  | + | + | + |  |  |
| **Collet-Sicard**  (retropharyngeal, posterior laterocondylar space) |  |  |  |  |  |  |  |  | + | + | + | + |  |
| **Villaret** (posterior retroparotid space) |  |  |  |  |  |  |  |  | + | + | + | + | Horner’s syndrome |
| **Tapia** |  |  |  |  |  |  |  |  |  | + |  | + |  |

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| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
| intraparenchymal | | | | | | | | | | | | | |
| **Jackson** |  |  |  |  |  |  |  |  |  | + | + | + |  |
| **Schmidt** |  |  |  |  |  |  |  |  |  | + | + |  |  |
| **Weber** (ventral midbrain syndrome) |  |  | + |  |  |  | + 3 |  |  |  |  |  | *cerebral peduncle* (CHP) |
| **Claude** |  |  | + |  |  |  |  |  |  |  |  |  | *red nucleus* or *dentato-rubro-thalamic tract* |
| **Benedikt** |  |  | + |  |  |  |  |  |  |  |  |  | *red nucleus*,  *cerebral peduncle* (CHP) |
| **Nothnagel** |  |  | + |  |  |  |  |  |  |  |  |  | ipsilateral cerebellar ataxia, dizziness, staggering and rolling gait, often nystagmus |
| central midbrain syndrome |  |  | + |  |  |  |  |  |  |  |  |  | *red nucleus, subst. nigra,*  *medial lemniscus* |
| **Foville** |  |  |  |  |  | + |  |  |  |  |  |  | CHP |
| **Millard-Gubler** |  |  |  |  |  |  | + |  |  |  |  |  | CHP |
| medial medullary syndrome |  |  |  |  |  |  |  |  |  |  |  | + | CHP, *medial lemniscus* |
| medial pontine syndrome |  |  |  |  |  | + |  |  |  |  |  |  | CHP, *medial lemniscus, MLF* (internuclear ophthalmoplegia), *cerebellar connections* |
| **Wallenberg**  (lateral medullary syndrome) |  |  |  |  | + 2 |  | + 1 |  | + | + |  |  | lateral medullopontine structures:  *tr. spinothalamicus,*  *tr. reticulospinalis* (sympathetic fibers),  *vestibular connections,*  *inf. cerebellar peduncle* |
| **Marie-Foix** (lateral inferior pontine syndrome**)** |  |  |  |  |  | + | + |  |  |  |  |
| lateral superior pontine syndrome |  |  |  |  |  |  |  |  |  |  |  |
| pseudobulbar paralysis |  |  |  |  |  |  |  | + | + | + |  | + |  |
| bulbar paralysis |  |  |  |  |  |  |  |  | + | + |  | + |  |

CHP - contralateral hemiplegia 1only nucl. tractus solitarii (taste) 2nucl. sensorii of CN5 3supranuclear CN7 palsy

**Intraparenchymal** lesions - ***crossed*** sensory or motor paralysis (cranial nerve signs on one side of body and tract signs on opposite side).

Lesions on **brainstem surface**:

* + involvement of ***adjacent*** cranial nerves (often occurring in succession);
  + late and rather slight involvement of ***long*** ***pathways*** (sensory and motor) and segmental structures lying within brainstem.

**Extra-axial** lesions - likely to cause ***bone erosion*** (e.g. enlargement of foramens of exit of cranial nerves); causes of multiple extra-axial cranial nerves involvement:

1. diabetes
2. trauma
3. tumors
4. localized infections (e.g. herpes zoster)
5. granulomatous disease (e.g. Wegener's granulomatosis), Behçet's disease, sarcoidosis, chronic glandular tuberculosis (scrofula)
6. enlarging saccular aneurysms
7. platybasia, basilar skull invagination, Chiari malformation.

**Idiopathic multiple cranial nerve involvement**

* on one or both sides of face.
* subacute onset of boring facial ***pain*** → ***paralysis*** of motor cranial nerves.
* clinical features overlap those of *Tolosa-Hunt syndrome*.
* frequently responsive to **steroids**.

Bibliography for ch. “Cranial Neuropathies” → follow this [link >>](http://www.neurosurgeryresident.net/CN.%20Cranial%20Neuropathies\CN.%20Bibliography.pdf)

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