



Cranial Nerves: Anatomy and Imaging

SOFIE VAN CAUTER 

SHORT ABSTRACT

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ABSTRACT

Twelve pairs of cranial nerves control the sensory and motor functions of the head and neck region, with exception of the tenth nerve, the vagus nerve which also is responsible for the parasympathetic and viscerosensory innervation of the thoracoabdominal organs. MRI is the cornerstone in the study of cranial nerves. Next to the traditional sequences that depict general anatomical findings and pathological changes, two additional sequences should be included in every imaging protocol for cranial nerves. High-resolution steady-state free precession is important for the visualization of the cisternal courses of the cranial nerves. These sequences have a high spatial resolution and additionally show dark cranial nerves against a background of bright CSF. Three-dimensional T1-weighted GE sequences, preferentially with fat suppression, provide a good evaluation of nerve enhancement. The twelve cranial nerves are individually discussed from the intra-axial segments to the distal extracranial branches. There is a specific emphasis on the connections between different cranial nerves. Finally, new imaging techniques are highlighted.

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Twelve pairs of cranial nerves control the sensory and motor functions of the head and neck region, with exception of the tenth nerve, the vagus nerve, which also is responsible for the parasympathetic and viscerosensory innervation of the thoracoabdominal organs.

Magnetic resonance imaging (MRI) is the cornerstone in the study of cranial nerves. Next to the traditional sequences that depict general anatomical findings and pathological changes, two additional sequences should be included in every imaging protocol for cranial nerves.

High-resolution steady-state free precession is important for the visualization of the cisternal courses of the cranial nerves. These sequences have a high spatial resolution and additionally show dark cranial nerves against a background of bright CSF.

Three-dimensional T1-weighted GE sequences, preferentially with fat suppression, provide a good evaluation of nerve enhancement.

The twelve cranial nerves are individually discussed from the intra-axial segments to the distal extracranial branches. [Figure 1](#) demonstrates the cisternal course of the lower cranial nerves. There is a specific emphasis on the connections between different cranial nerves. Finally, new imaging techniques are highlighted.

COMPETING INTERESTS

Member of the subcommittee “head and neck neuroradiology” in the European Society of Neuroradiology (ESNR).

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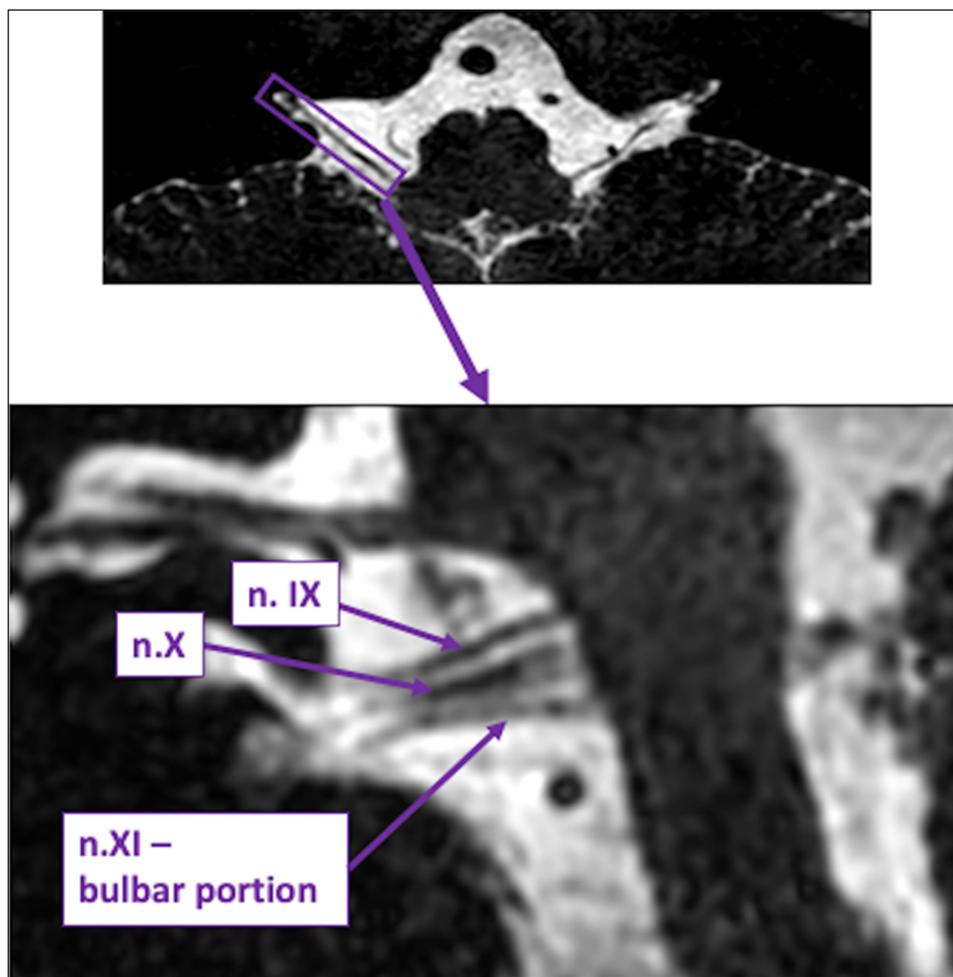


Figure 1 Parasagittal reconstructions of the lower cranial nerves in the lateral medullary cistern show the cisternal courses of the glossopharyngeal, the vagus, and the bulbar portion of the accessory nerve.

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