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THIS AUTHOR NOTES:

“The pupil of the eye and its associated structures can provide many valuable clues in diagnosing residual trauma from whiplash injuries.”

The parasympathetic nervous system constricts the pupil.

“The entire course of the pupillary constrictor elements [parasympathetic] is intracranial and thus relatively protected from cervical injury.”

The sympathetic nervous system dilates the pupil.

The efferent path of the dilator sympathetic fibers begin in the lateral horn of the spinal cord C8 to T4, travel with the anterior roots as white rami, and then go to the inferior, middle, and superior ganglia of the cervical sympathetic chain. Postganglionic sympathetic fibers leave the sympathetic chain ganglia as grey rami and enter the eye from the carotid plexus.

“Because of its vulnerable position in the cervical region, the sympathetic chain assumes the greater importance of the two systems.”

“The interruption or dysfunction of the sympathetic pathways to the head, which can occur in whiplash injuries to the cervical spine, may produce the well-known Horner syndrome, which has been described as a ‘sympathetic ophthalmoplegia’.”

Horner’s represents an interruption of the sympathetic pathway.

“It is of great interest that injury to the intracranial or protected portion of the carotid artery can produce Horner’s syndrome without ipsilateral pseudomotor paralysis.”

A post whiplash traumatic hematoma of the neck can compromise the sympathetic innervation to the eye.

The ciliospinal reflex uses the cervical sympathetic nerves, and works as follows: Painful pinching of the side of the neck causes dilation of the pupil on the same side (is best observed in subdued light).

“Patients with whiplash injuries frequently present vague visual complaints.”
These visual complaints have been described as:
1) Blurred vision
2) Objects seem to recede
3) I seem to lose my focus

“Sympathetic stimulation flattens the lens of the eye, anteroposteriorly, and accommodates the eye for distant objects. This is associated with dilation of the pupils. Dilated pupils and a flattened lens are part and parcel of the same stimulation.”

“In contrast, the parasympathetic system helps to focus closer objects.”

Changes in accommodation can be explained on the basis of sympathetic irritation or interruption.

“The current emphasis on pupillary changes in whiplash injury renews our detailed interest in the pupil as a valuable aid to diagnosis.”

The ophthalmic evaluation of the whiplash-injured patient is very important.

KEY POINTS FROM DAN MURPHY:

1) Because of anatomical reasons, the sympathetic nervous system is most vulnerable to whiplash trauma.

2) Whiplash irritation to the sympathetic nervous system to the eye can occur at the following locations:
   A) In the lateral horn of the spinal cord C8 to T4
   B) At the anterior nerve roots
   C) At the cervical sympathetic chain and ganglia
   D) At the postganglionic sympathetic fibers that travel with the internal carotid artery

3) Irritation to the sympathetic nervous system dilates the pupil, flattens the lens of the eye, and blurs the vision.