Lateropulsion
Lateropulsion (deviation) of the eyes towards the side of the lesion, under closed lids.
Figure 1 shows a hypothetical scheme to account for lateropulsion of saccades. Interruption of climbing fibers originating from the inferior olivary nucleus may occur prior to their crossing in the medulla (1) or as they enter the inferior cerebellar peduncle in Wallenberg’s syndrome. (2) Loss of climbing fiber inputs to Purkinje cells in the dorsal vermis causes the latter to inhibit the fastigial nucleus (4), which causes ipsipulsion of saccades. Pharmacological inactivation of the dorsal vermis (3) causes contrapulsion (although clinical lesions produce bilateral hypometria). Interruption of crossed fastigial nucleus outputs in the superior cerebellar peduncle (uncinate fasciculus, (5) causes contrapulsion. Thus contrapulsion arises at sites 1, 3 and 5 and ipsipulsion at sites 2-4.
Box 12-1. Ocular Motor Findings In Wallenberg’s Syndrome Of Dorsolateral Medullary Infarction

- Lateropulsion (deviation) of the eyes towards the side of the lesion occurs in darkness, behind closed lids, or with a blink
- Lateropulsion (ipsipulsion) of horizontal saccades: Ipsilateral (to the lesion side) saccades are hypermetric, contralateral are hypometric
- Lateropulsion of vertical saccades causing an oblique trajectory, with an inappropriate horizontal component towards the side of the lesion
- Torsipulsion—inappropriate torsional “blips”— may occur during horizontal saccades
- Smooth pursuit is impaired for targets moving away from the side of the lesion
- Spontaneous nystagmus (often mixed horizontal-torsional) occurs with the eyes in central position; slow phases may be directed towards or away from the side of the lesion
- Ocular tilt reaction (OTR): Skew deviation with ipsilateral hypotropia, head tilt towards side of lesion, ipsilateral cyclodeviation (top poles of eyes rolled ipsilaterally); ipsilateral deviation of subjective visual vertical

For pathophysiology, see: Disorders of Saccadic Accuracy in Chapter 3, and Skew Deviation And The Ocular Tilt Reaction (OTR) and Fig. 11-4 in Chapter 11. (Related Video Display: Medullary Syndromes)
Lateral Medullary Infarct

Figure 2  Axial T2WI in a patient with a classic Wallenberg syndrome shows a normal flow void in the left vertebral artery. The right vertebral artery is filled with thrombus which is isointense with brain. Note hyperintensity in the right olive as well as the lateral medulla. A small old infarct is also present in the left cerebellar hemisphere. Right PICA territory infarct. Courtesy of Anne Osborn, M.D.
Medial Medullary Infarct

Figure 3 Axial T2WI shows a hyperintensity in the olive and medial medulla.
Medial Medullary Infarct

Figure 4 Axial DWI shows restriction in the same territory.
Figure 5  MRA shows an occluded left vertebral artery with sparing of the anterior inferior cerebellar artery which arises from the basilar artery above the vertebral artery confluence.