Ophthalmoplegia in Stroke:

Brainstem Localization

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Disclosures

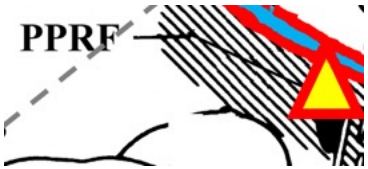
- None

Learning Objectives

After completion of this lecture, participants should be able to:

1. **Understand the localizing value of brainstem structures that commonly cause ophthalmoplegia in acute stroke**
2. **Identify vertical and horizontal supranuclear gaze palsies on examination**
3. **List the features of and describe the anatomic structures that lead to the dorsal midbrain syndrome and the one-and-a-half syndrome**

Rostral interstitial medial longitudinal fasciculus = Vertical supranuclear gaze palsy



Paramedian pontine reticular formation = Horizontal supranuclear gaze palsy

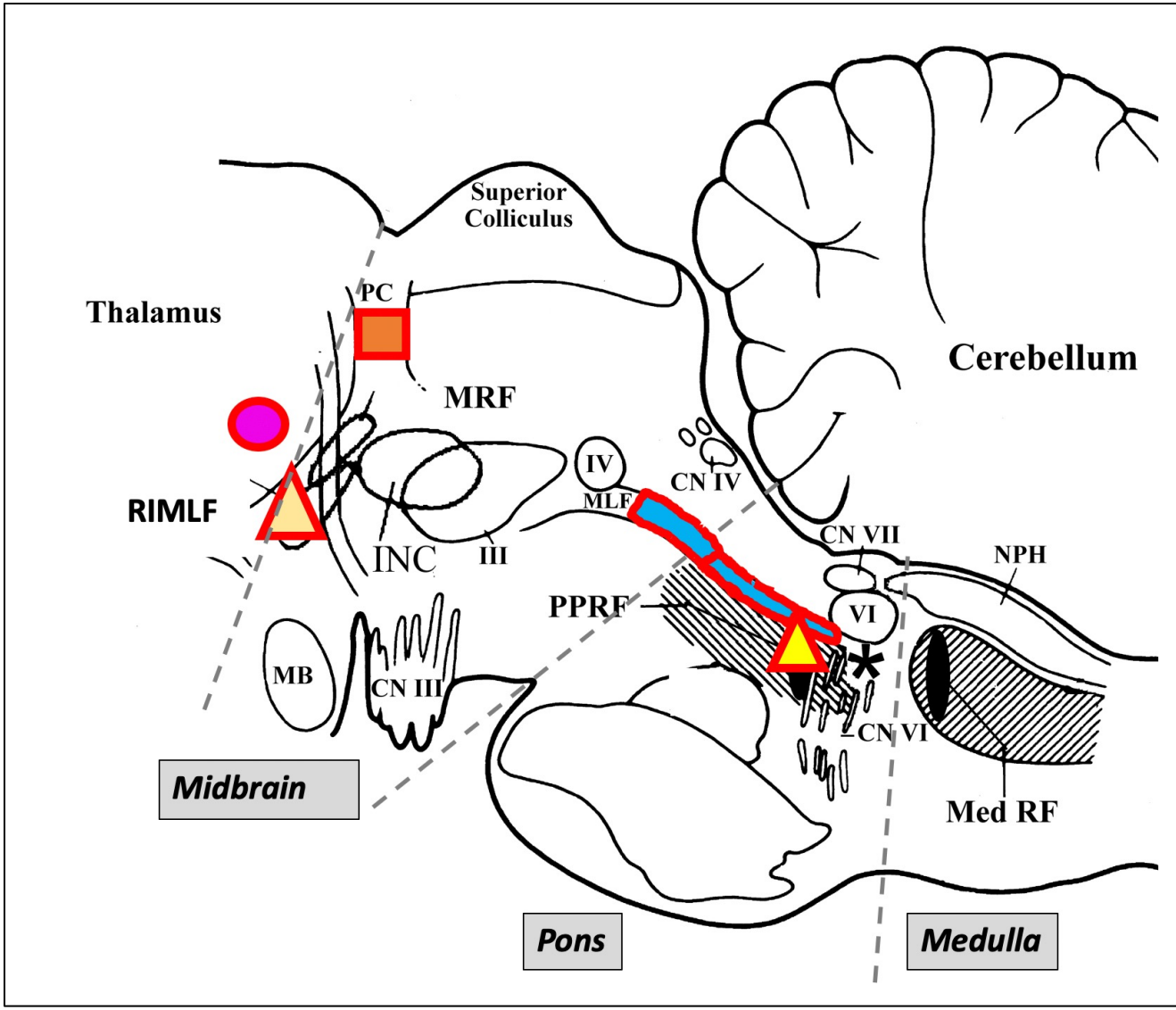
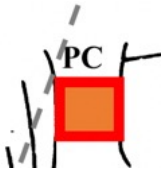


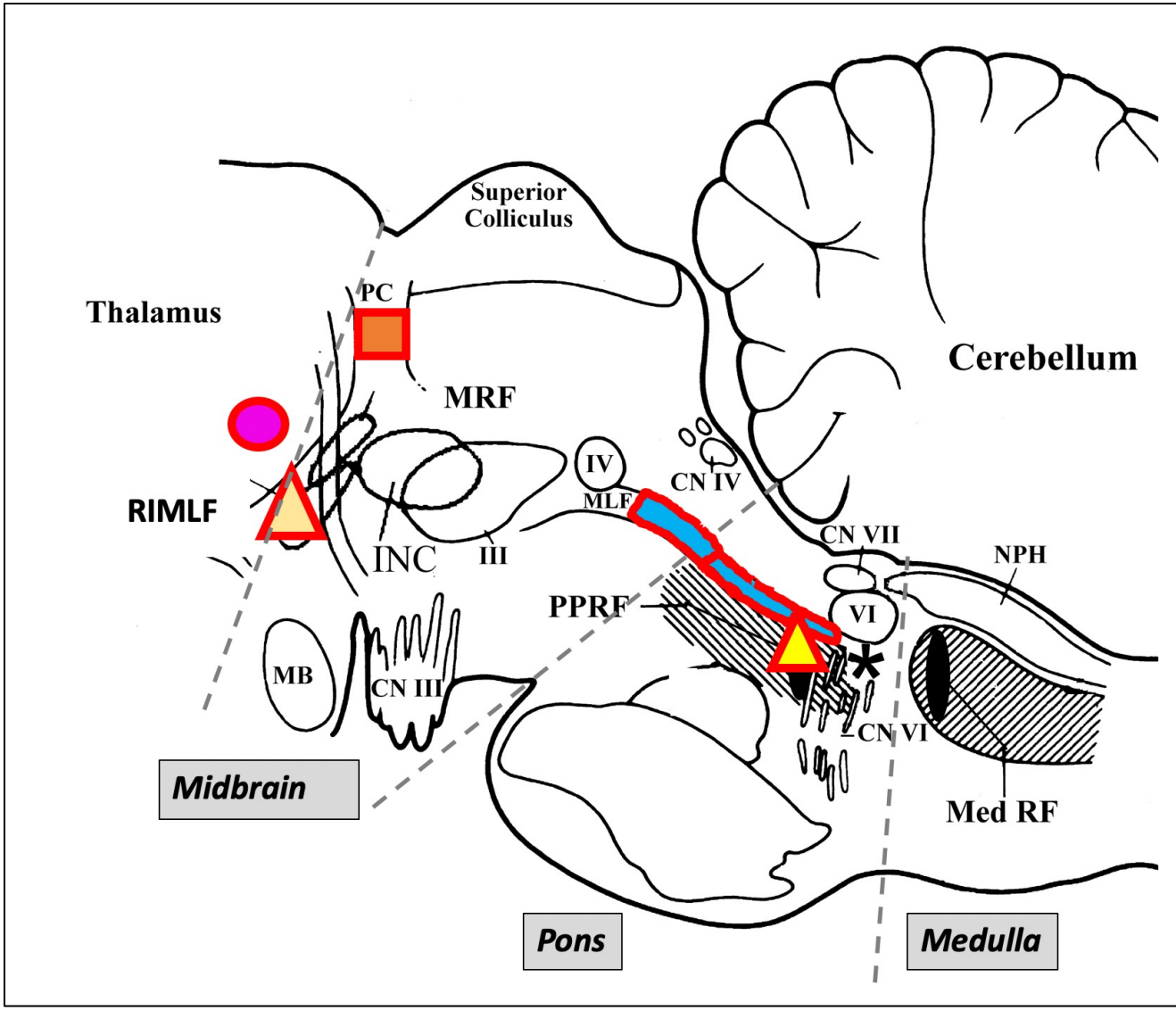
Figure adapted from
Buttner U, Buttner-Ennever JA. Prog Brain Res 2005;151:1-42.

Thalamus

Lesions reported to cause forced downward gaze - lesions likely extend to RIMLF



Posterior commissure = Dorsal midbrain syndrome (convergence-retraction nystagmus, upgaze palsy, eyelid retraction, pupillary light-near dissociation)



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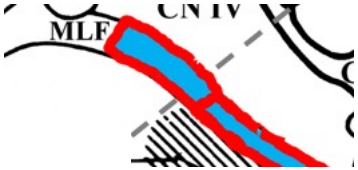
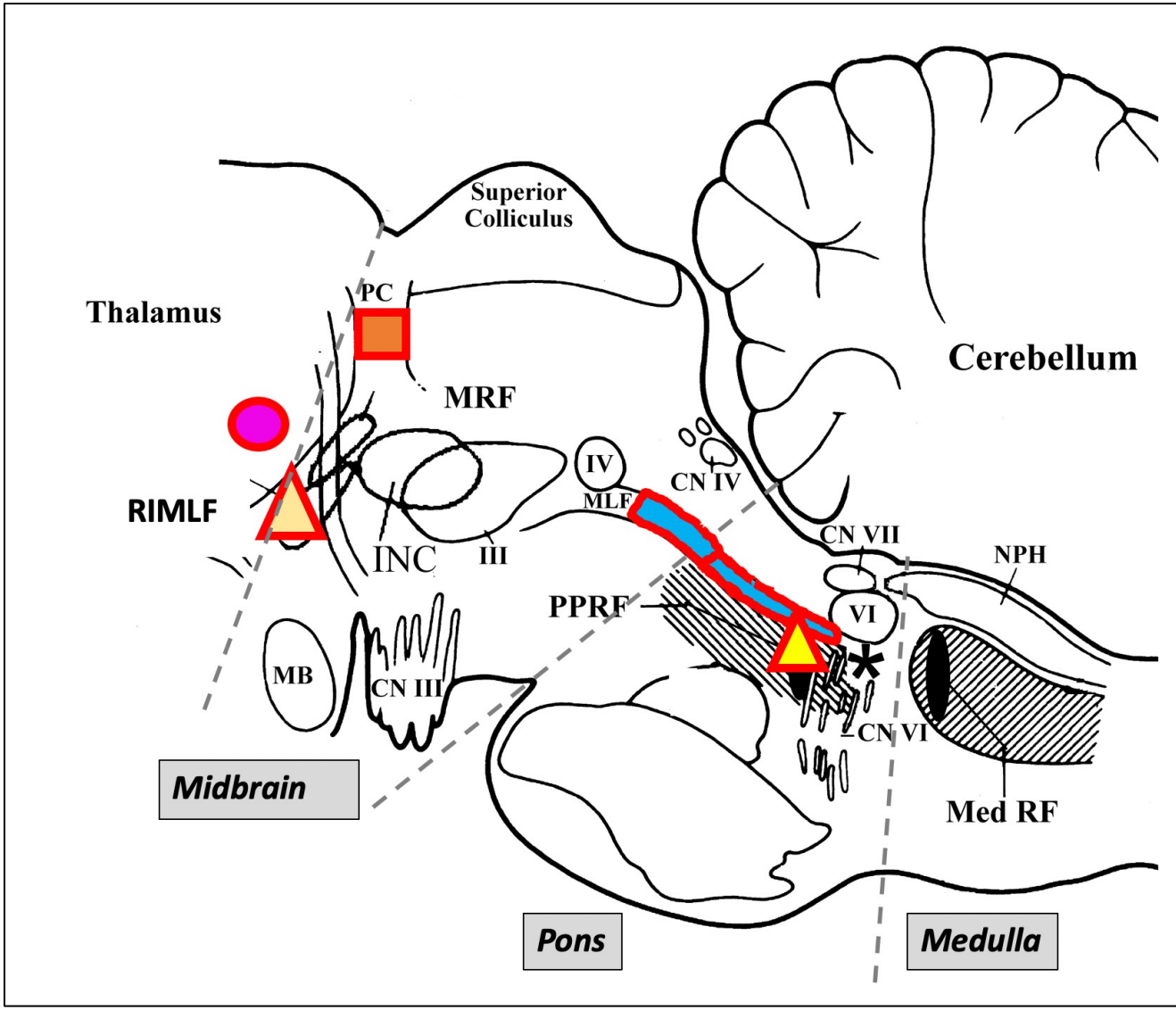


Medial longitudinal fasciculus = Internuclear ophthalmoplegia

PPRF (or sixth nerve nucleus) + MLF = One and a half syndrome (Eight and half if facial nerve also affected)



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References

- Choi KD, Jung DS, Kim JS. Specificity of "peering at the tip of the nose" for a diagnosis of thalamic hemorrhage. Arch Neurol, 2004;61(3):417-22
- Eggenberger E. Eight-and-a-half syndrome: one-and-a-half syndrome plus cranial nerve VII palsy. J Neuroophthalmol, 1998;18(2):114-6
- Horn AK, Buttner-Ennever JA, Suzuki Y, Henn V. Histological identification of premotor neurons for horizontal saccades in monkey and man by parvalbumin immunostaining. J Comp Neurol, 1995;359(2):350-63
- Horn AK, Helmchen C, Wahle P. GABAergic neurons in the rostral mesencephalon of the macaque monkey that control vertical eye movements. Ann N Y Acad Sci, 2003;1004:19-28
- Kommerell G, Henn V, Bach M, Lucking CH. Unilateral lesion of the paramedian pontine reticular formation. Loss of rapid eye movements with preservation of vestibulo-ocular reflex and pursuit. Neuro-ophthlamology, 1987;7:93-8
- Matheus MG, Castillo M. Imaging of acute bilateral paramedian thalamic and mesencephalic infarcts. AJNR Am J Neuroradiol, 2003;24(10):2005-8
- Onofrj M, Iacono D, Luciano AL, Armellino K, Thomas A. Clinically evidenced unilateral dissociation of saccades and pursuit eye movements. J Neurol Neurosurg Psychiatry, 2004;75(7):1048-50
- Percheron G. The anatomy of the arterial supply of the human thalamus and its use for the interpretation of the thalamic vascular pathology. Z Neurol, 1973;205(1):1-13
- Ramat S, Leigh RJ, Zee DS, Optican LM. What clinical disorders tell us about the neural control of saccadic eye movements. Brain, 2007;130(Pt 1):10-35
- Ranalli PJ, Sharpe JA, Fletcher WA. Palsy of upward and downward saccadic, pursuit, and vestibular movements with a unilateral midbrain lesion: pathophysiologic correlations. Neurology, 1988;38(1):114-22
- Wall M, Wray SH. The one-and-a-half syndrome--a unilateral disorder of the pontine tegmentum: a study of 20 cases and review of the literature. Neurology, 1983;33(8):971-80