Cranial Nerve Decompression in Cavernous sinus tumors: A Lego-Like Concept Representation

JAI DEEP THAKUR, M.D., CHRISTOPHER STOREY, M.D., PhD, BHARAT GUTHIKONDA, M.D., ANIL NANDA, M.D., MPH.
Louisiana State University Health Science Center, Shreveport, LA

Aims and Objectives
Tumors occupying the para-sellar areas often affect cranial nerve function and majority of the time goals of surgery is to decompress the cranial nerves. We utilize a Lego-Like concept to enhance the understanding of the complex anatomy and reflect this concept towards cranial nerve decompression in tumors of the cavernous sinus (CS) areas.

Methods
The cavernous sinus was dissected in five formalin-fixed cadaver specimens (10 sides). The craniotomy was performed, while preserving the neural and vascular structures associated with the canal. Using Lego like concept, we stalked up the different neuro-vascular structures over the skull base and created a 3D model incorporated in a 2D illustration (Figure 1).

Results
CN2 does not run within the CS however given the increased incidence of secondary CS tumors, it’s one of the most common nerve affected and best decompressed within the optico-carotid triangle and clinoidal triangle Figure 2. Cranial nerve (CN) 3 was seen to be best decompressed at the entry into the posterior roof of cavernous sinuses in addition to lateral wall of CS and oculomotor triangle (Figure 3). CN4 decompression zone was more inferior to the entry of CN3 in the posterior wall of CS and it shared very close relation with the tentorium (Figure 4). Dorello’s canal and Parkinson’s triangle (retracting the V1 inferiorly) were defined to be CN 6 decompression zones (Figure 4). CNS and its branches were best seen to be decompressed within the zone of Meckel’s cave, lateral wall of CS, Parkinson’s triangle, Mullan’s triangle and anterolateral triangle (Figure 5).

Conclusions
Our Lego-Like concept illustration model helps understand the surgical anatomy of cranial nerves transgressing the Cavernous Sinus in a building block like fashion. This could act as a valuable tool for the neuroscience students and aspiring neurosurgeons.

Contact
Jai Deep Thakur, M.D.
Louisiana State University Health Science Center, Shreveport, LA
jthaku@lsuhsc.edu
universityneurosurgery.com

References