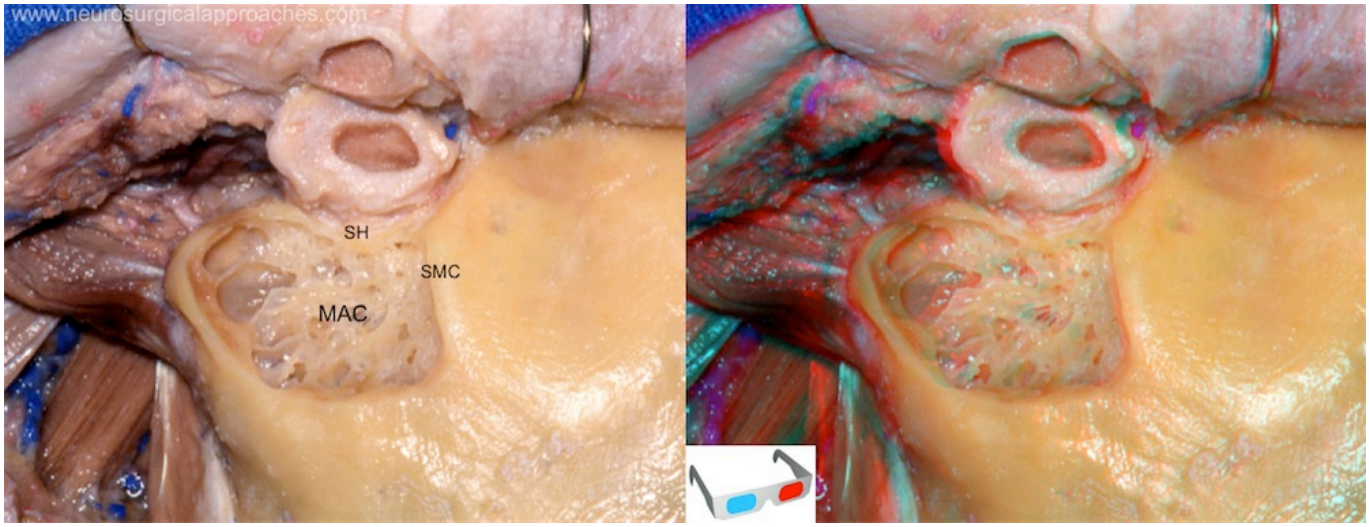
Mastoid air cells

A section of the mastoid process of the temporal bone of the cranium shows it to be hollowed out into a number of spaces, the mastoid cells, which exhibit great variety in their size and number.



MAC: mastoid air cells; SH: spine of Henle; SMC: suprameatal crest.

At the upper and front part of the process they are large and irregular and contain air (a form of skeletal pneumaticity), but toward the lower part they diminish in size, while those at the apex of the process are frequently quite small and contain marrow; occasionally they are entirely absent, and the mastoid is then solid throughout. At birth the mastoid is not pneumatized, but becomes aerated over the first year of life. Poor pneumatization is associated with eustachian tube dysfunction.

Lin et al., from the Guangdong Second Provincial General Hospital, analyzed treatment of microvascular decompression using the retrosigmoid approach (RA) in primary trigeminal neuralgia and hemifacial spasm using preoperative images combined with intraoperative microscopic navigation to avoid unnecessarily opening the mastoid air cells (MACs).

Ten patients with primary trigeminal neuralgia and 20 patients with hemifacial spasm (test group) were treated using retrosigmoid approach (RA) for microvascular decompression. Preoperative head magnetic resonance angiography and temporal bone computed tomography were performed and the images registered using SPM12 and fused with MRIcron to determine the relationship between mastoid air cells (MACs) and sigmoid sinuses. An O-arm was used for navigation, and the transverse sinus-sigmoid sinus was projected under a microscope to guide RA. A control group comprised 139 patients who had the same surgical procedure as the test group but without image processing or intraoperative navigation.

The relationship between mastoid air cells (MACs) and the ipsilateral sigmoid sinus was classified as follows: I, MACs did not exceed the lateral edge of the ipsilateral sigmoid sinus (10/60); II, MACs exceeded the ipsilateral lateral edge of the sigmoid sinus but did not exceed the medial edge (42/60); and III, MACs exceeded the medial edge of the ipsilateral sigmoid sinus (8/60). Test and control groups showed significant differences in the incidences of opening MACs ($P = 0.003$). There was no cerebrospinal fluid leakage or scalp and intracranial infection at follow-up.

Image processing and intraoperative microscopic navigation can avoid unnecessarily opening MACs and might reduce postoperative cerebrospinal leakage and scalp infection after RA craniotomy [1].

1)
Lin J, Zhang Y, Peng R, Ji X, Luo G, Luo W, Wang M, Zhu M, Sun X, Zhang Y. Preoperative Imaging and Microscopic Navigation During Surgery Can Avoid Unnecessarily Opening the Mastoid Air Cells Through Craniotomy Using the Retrosigmoid Approach. World Neurosurg. 2019 Jan;121:e15-e21. doi: 10.1016/j.wneu.2018.08.181. Epub 2018 Sep 3. PubMed PMID: 30189308.