

# Stylomastoid foramen puncture for hemifacial spasm treatment

[Stylomastoid foramen puncture](#) for [hemifacial spasm treatment](#) is a specialized technique employed, typically as part of a botulinum toxin injection procedure or in specific neurosurgical interventions.

1. Anatomical Considerations The stylomastoid foramen is located at the base of the skull, between the styloid process and the mastoid process of the temporal bone. It is the exit point for the facial nerve (cranial nerve VII) from the cranial cavity, making it an accessible target for interventions affecting the facial nerve. 2. Purpose The technique is used for direct access to the facial nerve to provide relief in cases of hemifacial spasm, a condition characterized by involuntary muscle contractions on one side of the face. Treatment options include: Botulinum toxin injections targeting specific branches of the facial nerve. Selective neurolysis in cases of severe, refractory HFS. 3. Procedure Steps Preparation: The patient is positioned to expose the area around the mastoid process. Local or general anesthesia may be used, depending on the procedure. Landmark Identification: Surface landmarks (e.g., mastoid process and ear canal) or imaging guidance (e.g., ultrasound or CT) are used for precise localization of the stylomastoid foramen. Puncture: A fine needle or electrode is introduced through the skin, directed toward the stylomastoid foramen. Intervention: For botulinum toxin delivery, the toxin is injected near the facial nerve branches exiting the foramen. For surgical intervention, neurolysis or decompression may be performed. 4. Advantages Targeted Approach: Minimizes exposure to surrounding structures. Direct access to the facial nerve reduces the risk of systemic side effects. Efficacy: Provides relief for patients with persistent or severe hemifacial spasm. Minimally Invasive: Injections or percutaneous neurolysis can be performed with minimal disruption of surrounding tissues. 5. Risks and Complications Facial Nerve Injury: Temporary or permanent weakness of facial muscles if the nerve is damaged. Pain or Discomfort: Discomfort at the puncture site, especially in the post-procedure period. Infection: Rare but possible, as with any percutaneous procedure. Hemorrhage: Injury to nearby blood vessels can cause localized bleeding. 6. Alternative Treatments Microvascular Decompression (MVD): For cases where HFS is caused by vascular compression of the facial nerve at the root exit zone in the posterior fossa. Botulinum Toxin Injections: Performed at the muscular level for symptom control. Medication: Oral antispasmodics or anticonvulsants, though often less effective. The stylomastoid foramen puncture is a highly specialized technique, often performed by experienced neurosurgeons or interventional specialists. It is particularly beneficial for patients with localized, treatment-resistant HFS.

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Conventionally, this procedure is performed under CT guidance. The present study highlights the authors' preliminary clinical experience with robot-assisted SMF puncture in 7 patients with HFS using a neurosurgical robot.

Patients were secured in a [skull clamp](#), and their heads were linked to the [Sinovation](#) neurosurgical robot's linkage arms for precise positioning. Bone fiducial registration was conducted using the robotic pointer. Under robotic guidance, a puncture needle was positioned at the skin entry point and then advanced to the target with a surgical blade incision. On target attainment, an RFA electrode was positioned, and the ablation was performed while monitoring facial nerve function. Preoperative and postoperative spasm grading, surgical metrics, and adverse events were meticulously documented.

Results: The puncture trajectories averaged 49.5 mm in length, and the overall operation duration

was 27.3 minutes. Guided by the robotic arm, all puncture attempts were successfully achieved without any obstructions, and SMF puncture was completed in a single attempt. Following RFA, immediate spasm relief was achieved, with all patients attaining Cohen spasm grade 0. Over a mean follow-up period of 12 months (range 6-15 months), no recurrence of spasms was reported. Facial paralysis was observed in 85.7% of patients, with 6 cases classified as House-Brackmann (HB) grade II and 1 case as grade III. At the final follow-up, 1 patient remained at HB grade II, while the remaining patients improved to grade I. No other lasting or severe complications were recorded.

Conclusions: SMF puncture and RFA emerge as a potent and minimally invasive treatment option for HFS. The robot-assisted approach, despite necessitating additional time for head fixation and registration, notably reduces the overall puncture time, puncture attempts, and radiation exposure, thereby enhancing the puncture success rate <sup>1)</sup>.

<sup>1)</sup>

Liu Q, Chen W, Wang C, Chen B, Chen W, Lu Y, Zhang C, Xu J. Robot-assisted stylomastoid foramen puncture and radiofrequency ablation for hemifacial spasm treatment: clinical outcomes and technique assessment. *Neurosurg Focus*. 2024 Dec 1;57(6):E8. doi: 10.3171/2024.9.FOCUS24405. PMID: 39616646.

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