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# Transovale Trigeminal Cistern Puncture: Modified Fluoroscopically Guided Technique

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A simple, safe, and rapid radiologic technique is described for trigeminal puncture via the foramen ovale. A radiopaque marker is placed 3 cm lateral to the labial commissure. Then, under fluoroscopic guidance, the patient's head is turned until the marker is projected vertically, over the foramen ovale. The needle can be advanced along the anatomically safe line determined by the foramen ovale and the lateral labial puncture site. Needle or patient misalignment is detected readily and can be corrected using fluoroscopic guidance. The technique is learned easily, obviates multiple needle passes, and takes less than 5 min.

Transovale cisternal puncture for trigeminal neuralgia therapy was introduced in 1911 [1]. Selective ablation of pain fibers has been accomplished by the controlled application of heat or chemicals. Various contrast materials have been used to confirm needle location before therapy or for diagnostic cisternography [2-5]. The standard anterior approach to the foramen ovale is via a puncture 2.5-3 cm lateral to the labial commissure. The needle is then directed in the coronal plane to the lateral border of the lacrimal caruncle and in the sagittal plane to 3.5-4 cm in front of the anterior wall of the external auditory canal [1, 6, 7]. The piercing of the dura is accompanied by pain in the trigeminal distribution and can be appreciated by the physician, as in lumbar puncture. Placement in the medial third of the foramen ovale with cerebrospinal fluid return is preferred. A gloved finger placed in the patient's mouth is necessary to prevent needle contamination from mucosal penetration.

Usually multiple needle passes are required. Submentovertex radiography or intermittent fluoroscopic monitoring is necessary for better orientation. Using this technique we have required 20-40 min for needle placement. Posteriorly misdirected needles have pierced the internal carotid or entered the medial middle fossa [5, 7].

## Technique

The procedure is performed using a high-quality fluoroscopic unit at 60 kV. A radiopaque marker is placed 3 cm lateral to the labial commissure. Under fluoroscopy the head is turned until the marker is projected vertically over the foramen ovale, a submentovertex position, slightly oblique, with contralateral rotation (fig. 1). The needle is then directed straight down toward the foramen ovale with intermittent fluoroscopic monitoring. Initially a finger is kept next to the buccal mucosa to prevent mucosal penetration. After dural penetration, the trigeminal-cistern volume is determined by the amount of metrizamide needed to fill the cistern, usually 0.2-0.6 ml. Anteroposterior and lateral spot films then document needle position (fig. 2). The neurosurgeon then proceeds with therapy. We currently use glycerol injection [8, 9]. With this technique we usually place the needle on first pass and in less than 5 min.

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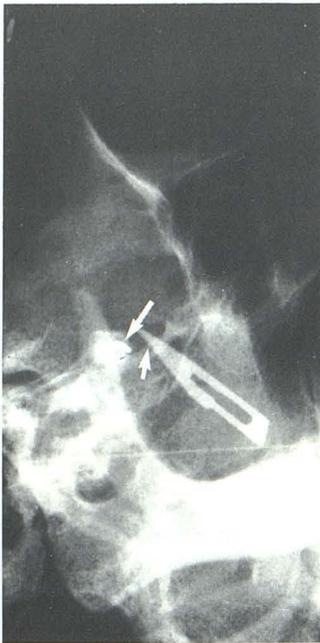


Fig. 1.—Tip of surgical blade marker is 3 cm lateral to labial commissure and is projected over foramen ovale (short arrow). Needle in foramen ovale is seen end-on (long arrow).

### Discussion

The objective is to advance the needle along the anatomically safe line determined by the foramen ovale and the lateral labial puncture site. Clearly, superimposing these two points provides the simplest and most accurate guidance. In the standard technique the operator has to synthesize this line from the visual cues of puncture site and landmarks and from the fluoroscopic image of the foramen ovale. By using a marker, all the information is available fluoroscopically, and there is no need to study the patient directly. Needle or patient misalignment can be detected readily and accurately and can be corrected using fluoroscopy. The technique is easily mastered by the radiologist and can be performed in the modern fluoroscopy suites available in most radiology departments.

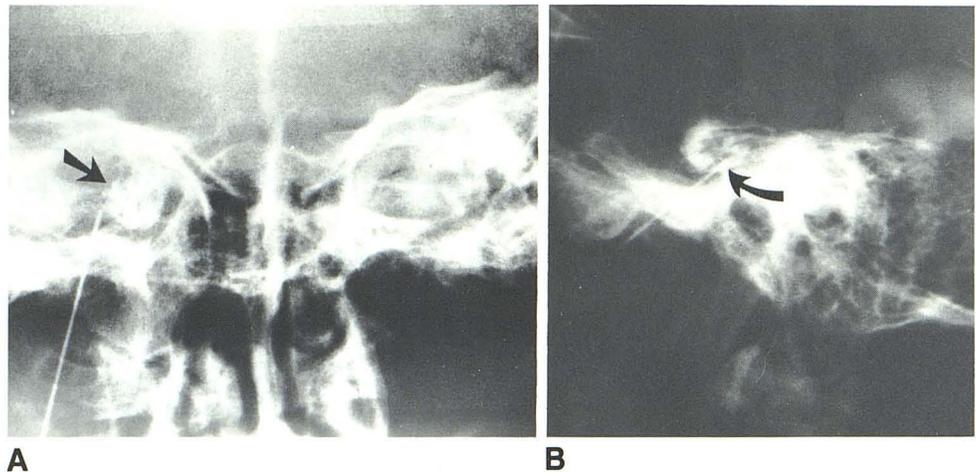


Fig. 2.—Anteroposterior (A) and lateral (B) films of needle position on metrizamide trigeminal cisternogram (arrows). Preganglionic fibers are discernible.

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