VARIATIONS IN THE TRIFURCATION OF THE SEMILUNAR GANGLION AND SURGICAL IMPLICATIONS

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Occasionally, after performing what one considers to be an adequate section of the posterior sensory root of the trigeminal ganglion for tic douloureux by the temporal route, he is surprised that the postoperative examination shows the area of anesthesia on the face to be considerably less than was anticipated.

In 1932 van Nouhuys, on the basis of anatomical dissections, concluded that “the sensory root of the fifth nerve is not composed of the three parts that correspond to the three peripheral branches from the gasserian ganglion” and that because of the interlacing ramifications and anastomoses within it, partial section of the sensory root “cannot be regarded as an absolutely reliable procedure.”

The interlacing fibers within the posterior root had been noted by others yet, aware of that, Spiller and Frazier took issue with van Nouhuys, insisting that despite such interlacings, on purely clinical evidence from their own vast experience with this operation, the conclusion was indubitable that the supply of the mandibular division was from the outer portion of the root; of the maxillary division, from the middle portion of the root; and of the ophthalmic division, from the inner portion. In view of the general satisfaction of most neurosurgeons since then with partial section of the posterior root transtemporally, the conclusions of Spiller and Frazier seem justified. Nevertheless, others have been impressed with occasional atypical areas of skin anesthesia following operations for which van Nouhuys’ observations, if pertinent, may not offer the complete solution. The possibility occurred to us that variations in the topography of the semilunar ganglion, its roots and branches, not appreciated by the surgeon in his limited surgical exposure, were responsible for such results. This matter has prompted the following investigation.

The points at which the semilunar ganglion branches into its three divisions anteriorly (Fig. 1, a and b) are definitive in determining the relationship of the posterior sensory root and the ganglion to commonly used surgical landmarks. If the trifurcation of the ganglion takes place far anteriorly (pre-fixed ganglion), the surgical anatomy would be somewhat different than if it occurs relatively far posteriorly (post-fixed ganglion). In the latter instance, a surgeon could, for example, in orienting himself from the foramen spinosum, readily mistake the fibers of the mandibular division.
for those of the ganglion itself or even for those of the entire posterior sensory root. Accordingly, the purpose of this study was to determine by actual measurements whether such significant variations actually do occur.

Measurements were made in 16 fresh anatomical specimens of the semilunar ganglion of each side *in situ*. Particular attention was paid to the re-

![Diagram](image1.png)

![Diagram](image2.png)

![Diagram](image3.png)

![Diagram](image4.png)

lationship of the points of trifurcation (Fig. 1, a and b) to certain anatomical landmarks. Certain other dimensions were taken also. In each dissection the overlying dura and dura propria of the ganglion were stripped off sufficiently to visualize the borders of the roots and ganglion clearly without disturbing their anatomical setting.

The posterior edge of the petrous ridge at the groove for the trigeminal nerve (Fig. 1, c) and the foramina ovale and rotundum were used as anatomical reference points. From these points measurements were made to determine variations of trifurcation in an anteroposterior direction. Four such measurements were made: A, B, C, and D (Fig. 2).

In a transverse direction variations in the location of points of trifurca-