Greater Superficial Petrosal Nerve Dissection: Back to Front or Front to Back?

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OBJECTIVE: To introduce a novel surgical technique for the dissection of the greater superficial petrosal nerve (GSPN) in the middle fossa approach.

METHODS: Interdural temporal elevation was performed with a front-to-back technique to preserve the GSPN in 12 sides of 6 injected cadaveric heads dissected through a middle fossa approach.

RESULTS: The GSPN emerged from the facial hiatus in a shallow bony groove proximally, ran into a deeper sphenopetrosal groove, and eventually reached the mandibular nerve. With front-to-back dissection, this nerve was easily identified at the posterior border of the mandibular nerve. Dissection from front to back minimized the retraction force applied to the proximal part of the GSPN, which was preserved in all specimens.

CONCLUSION: The temporal dura can be elevated safely with a front-to-back technique to preserve the GSPN and to help maintain the physiological integrity of the facial nerve.

KEY WORDS: Geniculate ganglion, Greater superficial petrosal nerve, Middle fossa approach, Surgical-anatomic study

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The middle fossa approach became popular in 1961 (17), because of its value in accessing the lateral internal acoustic canal (IAC). With various modifications aimed at extending the middle fossa approach or anterior petrosectomy (19, 24, 34), the widened surgical corridor provides additional perspective when accessing posterior fossa structures. This approach is also applicable for exploring the petrous carotid artery, cavernous sinus, infratemporal fossa, and middle ear structures.

Various surgical anatomic landmarks, such as the greater superficial petrosal nerve (GSPN), mandibular branch of the trigeminal nerve, middle meningeal artery (MMA), middle ear cavity, and arcuate eminence, have been used to ensure safe exploration of this area. One of the most important landmarks for identifying the IAC is the GSPN (13, 17). Because of its vulnerable location in the surgical field, the GSPN can be injured during dural elevation, electrocoagulation, or bone drilling. Inadvertent traction on the GSPN as it courses to the geniculate ganglion has been suggested as a potential cause of postoperative facial nerve impairment (14). Early identification with subsequent division of the GSPN has been suggested as a way to eliminate this problem (10, 21, 24). Preservation of this nerve is also recommended by others (1, 23, 33).

The rich surgical literature on this region and the GSPN recommends that dissection proceed from the back to the front to avoid traction injury to the geniculate ganglion (1, 5, 9, 16, 18, 28, 33, 37). Unfortunately, it is not feasible to control traction forces and to measure the forces on related structures during actual operations. The lack of an anatomic study supporting the standard dissection technique led us to question its efficacy. Based on cadaveric dissections that we performed, we now propose that an alternate means of dissecting the GSPN (i.e., from front to back) might be preferred.

ABBREVIATIONS: GSPN, greater superficial petrosal nerve; **IAC**, internal acoustic canal; **LSPN**, lesser superficial petrosal nerve; **MMA**, middle meningeal artery; **V3**, mandibular nerve

MATERIALS AND METHODS

Cadaveric Dissection and Technique

Twelve sides of 6 cadaveric heads were used to dissect the GSPN via a front-to-back technique (Figs. 1 and 2). A standard temporal craniotomy as used in the middle fossa approach was performed. The tem-

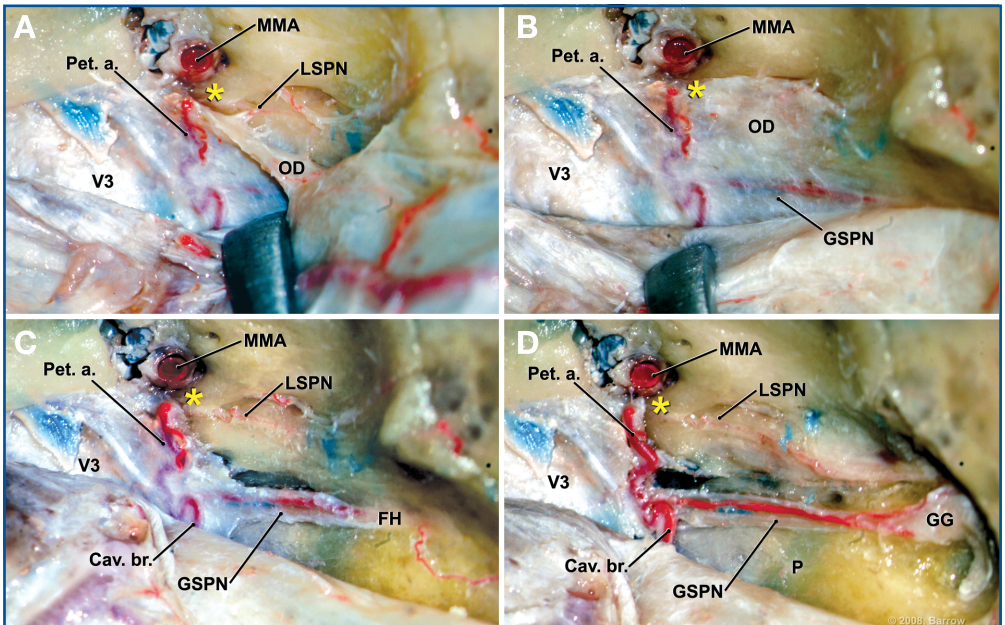

FIGURE 1. *Front-to-back dissection in the right middle fossa.* **A**, *an interdural plane of dissection was created just behind the mandibular nerve (V3).* **B**, *the outer dural layer (OD) was left adherent to the middle fossa. The direction of the greater superficial petrosal nerve (GSPN) can be identified in this step.* **C**, *removal of the OD demonstrates the relevant neurovascular structures.* **D**, *additional drilling of facial hiatus (FH) demonstrates the geniculate ganglion (GG). The region of petrous drilling (P) is medial to the GSPN. The petrosal artery (Pet. a.) was cut at its origin where it exits distal to the foramen spinosum (asterisk). MMA, middle meningeal artery; LSPN, lesser superficial petrosal nerve; Cav. br., cavernous branch of the petrosal artery. (Courtesy of the Barrow Neurological Institute, Phoenix, AZ.)*

poral base was drilled and flattened to approach the foramen spinosum where the MMA enters the cranial cavity. The MMA was then divided completely. The mandibular nerve (V3) was identified just anteromedial to the MMA.

At this point, separation of the dural plane was begun in a medial direction along V3. Along the posterior margin of V3, the outer dural layer adheres to the cranial base. This dural layer becomes the periosteum of the foramen ovale. Dural elevation along V3 continued medially for about 1 cm until the distal part of the GSPN could be identified. Together with the petrosal artery of the MMA, the GSPN courses in the sphenopetrosal groove. At this point, the exact plane of dural elevation could be identified.

The direction of dissection continued posteriorly along the GSPN until the facial hiatus was reached in the proximal portion of the GSPN. The facial hiatus was further drilled to confirm the position of the geniculate ganglion. Photographs were taken to show the direction of dissection. The pertinent length on the exposed GSPN and related structures were observed and measured (Fig. 3).

RESULTS

The mean length of the exposed GSPNs from the facial hiatus to the V3 was 10.0 ± 2.0 mm (range, 6.5–13.5 mm). The mean distance from the foramen ovale to where the GSPN intersected V3 was 7.5 ± 2.9 mm (range, 3.0–12.0 mm). The mean distance from the foramen spinosum to the facial hiatus was 11.6 ± 2.0 mm (range, 8.5–14.5 mm) (Table 1). The geniculate ganglion was covered with bone in all but one side, in which it was dehiscent and partially exposed to the basal temporal dura.

After the front-to-back dissection in all 12 sides, the GSPN was preserved anatomically from its distal to proximal portions. In all specimens, the surgical plane was easily identified and the nerve preserved because of its deep location in the distal sphenopetrosal groove where it was covered with a bony ledge and dense endosteum. Proximally toward the facial hiatus, the GSPN was always located in a more shallow position. In 4 sides, the proximal portion of the GSPN adhered to the dura of the temporal base with no intervening bony edge (Fig. 2). However, all GSPNs were dissected safely without anatomic injury to the nerve or penetration of the dura. While using the front-to-back technique, we observed no significant tension or elevation of the proximal GSPN. When we intentionally applied high distraction force to create a dissecting plane, tension was observed in the distal portion of the GSPN rather than on its proximal portion (Fig. 4).

The fibers of the lesser superficial petrosal nerve (LSPN) were small and difficult to identify. These fibers run beneath the outer (endosteal) dura lateral to the GSPN. With appropriate interdural dissection, the fibers can be left adherent to the cranial base together with the outer dural layer, which was the case in all 12 sides.

In most of the specimens, the petrosal artery, a branch of the MMA, ran medially along the posterior margin of V3 and continued along the sphenopetrosal groove. The petrosal artery supplies the GSPN, LSPN, geniculate ganglion, and facial nerve. The artery originated distal to the foramen spinosum in 6 of 12 sides. In these 6 sides with distal branching, the arteries were divided at the origin together with the MMA during dissection. In 8 sides, the cavernous branch of the petrosal artery continued medially posterior to V3. This branch supplied the trigeminal ganglion and communicated with the cavernous portion of the internal carotid artery via the inferolateral trunk.

DISCUSSION

The GSPN, a branch of the facial nerve, contains both sensory and parasympathetic fibers. The GSPN exits from the geniculate

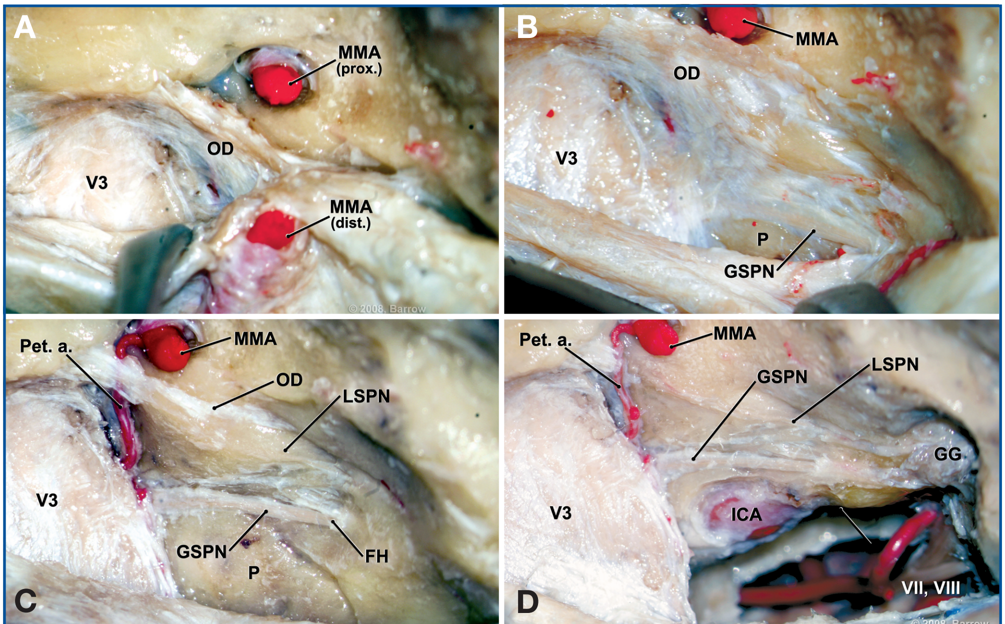

FIGURE 2. *Front-to-back dissection in the right middle fossa from another specimen.* **A**, *the plane of the outer dural layer (OD) was identified.* **B**, *when the OD is reflected to the middle fossa, the neurovascular structures are covered and hence protected. The proximal greater superficial petrosal nerve (GSPN) adhered to the dura of the temporal base. The petrous apex (P) was identified medially to the GSPN.* **C**, *removal of OD shows that the origin of the petrosal artery (Pet. a.) has been preserved. The lesser superficial petrosal nerve (LSPN) and GSPN were located beneath the OD.* **D**, *anterior petrosectomy exposes the facial and auditory nerves in the internal carotid artery (IAC) and the structures of the posterior fossa. FH, facial hiatus; MMA, middle meningeal artery; V3, mandibular nerve; GG, geniculate ganglion; VII and VIII, facial and vestibulocochlear nerves. (Courtesy of the Barrow Neurological Institute, Phoenix, AZ.)*

ganglion and courses anteromedially to the superior surface of the temporal bone where it exits via the facial hiatus. It surfaces in the middle cranial fossa where it courses along the sphenopetrosal groove. From this point, it passes under V3 and joins the deep petrosal nerve from the sympathetic carotid plexus to become the vidian nerve in the vidian canal. The vidian nerve terminates on the sphenopalatine ganglion. The postganglionic fibers innervate the lacrimal gland and mucous membranes of the nasal cavity and palate. The sensory fibers pass through the ganglion and continue to the nasal cavity and palate.

Identification of the GSPN is one of the most important steps in surgery involving the middle fossa. By knowing the location of the GSPN relative to the petrous apex, the direction of the IAC can be identified and drilling can proceed safely. Several strategies can be used to identify the IAC when the GSPN is used as a landmark. In House's (17) technique, the GSPN is traced back to the geniculate ganglion to identify the IAC. In the technique of Garcia-Ibanez and Garcia-Ibanez (13), the bisection of the angle between the GSPN and the arcuate eminence is used to identify the direction of the IAC. There are also several options for identifying the facial nerve or IAC without using the GSPN as a landmark (4, 7, 11). However, to expose the IAC completely or to extend surgery into the posterior fossa, a well-defined exposure of the middle fossa floor must be maintained. Either way, the GSPN can be resected or preserved and followed after its direction has been determined.

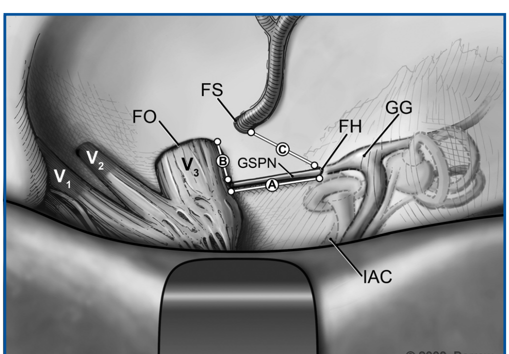

FIGURE 3. *Illustration showing measurements of the exposed greater superficial petrosal nerve (GSPN) (***A***), foramen ovale (FO) to the distal GSPN (***B***), and foramen spinosum (FS) to the facial hiatus (FH) (***C***). GG, geniculate ganglion; IAC, internal carotid artery; V_1, ophthalmic nerve; V_2, maxillary nerve; V_3, mandibular nerve. (Courtesy of the Barrow Neurological Institute, Phoenix, AZ.)*

Interdural Dissection

The GSPN plane can be identified by knowledge of the dural layers. The cranial dura is composed of 2 layers: the outer or endosteal layer and the inner or meningeal layer (dura propria).

TABLE 1. **Distance of related structures from the greater superficial petrosal nerve in 12 cadaveric specimens**[a]

Structures	Mean ± SD (mm)	Range (mm)
Exposed GSPN	10.0 ± 2.0	6.5–13.5
FO to distal GSPN	7.5 ± 2.9	3.0–12.0
FS to FH	11.6 ± 2.0	8.5–14.5

[a] SD, standard deviation; GSPN, greater superficial petrosal nerve; FO, foramen ovale; FS, foramen spinosum; FH, facial hiatus.

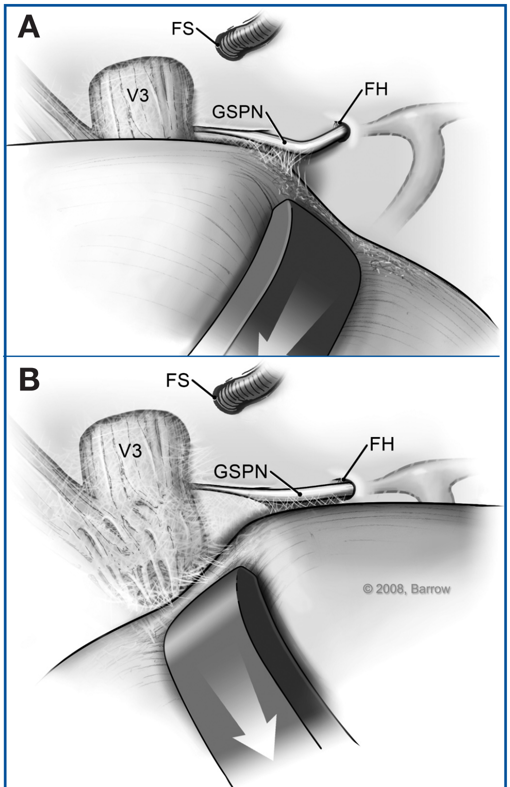

FIGURE 4. *The potential traction force applied to the nerves depends on the direction of dissection.* **A**, *back-to-front.* **B**, *front-to-back. FS, foramen spinosum; V3, mandibular nerve; GSPN, greater superficial petrosal nerve; FH, facial hiatus. (Courtesy of the Barrow Neurological Institute, Phoenix, AZ.)*

The outer dural layer adheres to the cranial base and pierces the cranial foramina. The meningeal layer provides tubular sheaths for the cranial nerves. These 2 dural layers usually fuse except where they are separated to provide space for the dural venous sinuses, venous plexus, and cranial nerves (8, 20).

Accordingly, the trigeminal ganglion is located in the interdural space before it exits the cranial foramina. In contrast, the facial nerve has already pierced the dura at the lateral fundus of the IAC before the GSPN exits the facial nerve. The GSPN reenters the middle fossa floor via the facial hiatus. Consequently, this nerve is in the extradural layer of the middle fossa.

A dissection plane that preserves the GSPN can be created safely by leaving the outer dural layer intact with the middle fossa floor (12, 27). Hence, preservation of the outer dural layer helps prevent direct manipulation of or injury to both the GSPN and LSPN. Based on our observations, the petrous bone medial to the GSPN was often covered by only a thin outer dural layer. Occasionally, after the dura was elevated, no dural covering was observed in contrast to the lateral portion of the GSPN. In all specimens, the GSPN was identified without removing this dural layer. Sharp dural dissection to clear the middle fossa floor (if required) caused no observable traction injury on the GSPN and geniculate ganglion. Drilling the petrous apex medial to the GSPN was completed without disturbing the outer dural layer lateral to the GSPN.

The LSPN is composed of parasympathetic efferent fibers from the tympanic plexus in the middle ear cavity. This nerve emerges through a small opening lateral to the facial hiatus in the floor of the middle cranial fossa. The LSPN continues anteriorly to descend through a small foramen near the foramen spinosum and foramen ovale and terminates in the otic ganglion. The postganglionic fibers supply secretomotor function of the parotid gland (18, 36). With interdural dissection, this nerve is left intact with the outer dural layer of the middle fossa floor. Apparently, however, sacrifice of this nerve has no major clinical relevance.

Facial Palsy after Dural Elevation

In the early literature, Gardner et al. (14) reported 7 cases of facial paralysis after resecting 31 GSPNs for the treatment of unilateral headache. Elevation and manipulation of the GSPN and traction force to the geniculate ganglion were the reasonable explanations for this event.

Peet and Schneider (26) reported immediate (2.8%) and delayed (3.7%) postoperative facial palsy after performing 553 trigeminal rhizotomies through the temporal approach. The delayed onset of facial weakness mostly occurred during the first 4 days after surgery. However, some cases of facial weakness developed as late as 14 days after the procedure. Direct injury to the geniculate ganglion or facial nerve might not be the only cause of postoperative facial nerve palsy. Delayed swelling by traumatic dissection, perineural hematoma, or neural ischemia could be other explanations.

In general, the geniculate ganglion is dehiscent in 15% to 16% of cases (2, 25, 28, 29). We observed that it partially lacked the bony covering in 1 of the 12 sides. Delayed facial palsy is difficult to attribute to direct trauma to the geniculate ganglion alone. In 30% of the cases cited by Paullus et al. (25), the proximal portion of the GSPN lacked a bony covering beyond its origin at the geniculate ganglion. We also observed direct adherence of the dura to the nerve without an adequate bony covering in the proximal portion of the GSPN in 33% of the sides. During dural dissection, this portion of the nerve is vulnerable to injury from traction or manipulation.

Back to Front or Front to Back?

Sennaroglu and Slattery (30) reported the mean perpendicular distance from the inner table of the middle fossa to the GSPN as 21.5 mm (range, 19.0–24.0 mm) based on radiological data and as 22.5 mm (range, 15.0–26.5 mm) based on anatomic dissections. These results can help surgeons to familiarize themselves with the general location of the GSPN. However, the range is wide. Furthermore, in actual surgical conditions, the direction of the surgical route is not easily defined by this plane. To approach this region with confidence requires additional strategies.

To date, only information related to dissection of the GSPN via the standard back-to-front technique has been reported (1, 5, 9, 16, 18, 28, 33, 37). Use of this technique has been justified by stating that it helps reduce traction injury to the GSPN. However, this accepted standard has never been compared with other major dissection techniques and no anatomic comparisons have been performed.

Indeed, the provenance for the development of back-to-front GSPN dissection is unclear. The logic underlying this technique for dissecting the GSPN may lie with the experience gained during the development of trigeminal surgery. For example, in 1931, Frazier (12) sectioned the sensory root of the trigeminal nerve to treat trigeminal neuralgia. He attributed transient postoperative facial paralysis to injury of the GSPN. He recommended never baring the bone posterior to the trigeminal ganglion. In 1960, Poppen (27) wrote that preservation of the outer layer of the dura over the petrosal nerves prevents their injury. In 1963, Asenjo (3) described an extradural dissection technique for dividing the sensory root in the treatment of trigeminal neuralgia. In experienced hands, he recommended concentrating dissection on the trigeminal ganglion and avoiding posterior dissection to the petrous bone, which could result in postoperative facial paralysis. The potential to encounter significant bleeding could further complicate the surgical field. Recently, Kakizawa et al. (18) suggested that the posterior portion of the GSPN could be identified before it could be confused with the LSPN when back-to-front dissection is used.

Various dissection strategies to prevent postoperative facial nerve palsy have been reported. For approaching the trigeminal ganglion, direct surgical exposure of the trigeminal nerve anteriorly in the middle fossa has been recommended instead of posterior dissection along the petrous bone or over the facial hiatus (3, 12, 29). As in our study, the interdural dissection used to resect trigeminal neuromas respects the dural plane (15, 37). Transdural techniques were developed to avoid stripping the dura from the middle fossa floor (31, 35). However, clear bony landmarks are not easily defined, and facial palsy can also follow other surgical maneuvers (e.g., electrocoagulation) (35).

Based on our anatomic studies, using back-to-front dissection of the GSPN can cause inadvertent injury of the GSPN or geniculate ganglion for 3 reasons. First, the position of the facial hiatus can only be poorly estimated because of the anatomic variation in the temporal bone. The mean distance from the foramen spinosum is 11.6 ± 2.0 mm, but no nearby or reliable structure in the posterior part of the dissection can be followed before the facial hiatus is encountered. The GSPN can also be confused with the LSPN. Second, the proximal (posterior) portion of the GSPN lies in a more shallow position than its distal portion. This difference in depth can make it difficult to ensure the correct surgical plane. Third, when the dura is elevated, the retraction force on the proximal portion of the GSPN can increase, and the resulting traction can injure the geniculate ganglion.

We think that there are advantages associated with using the opposite technique (i.e., front-to-back technique). As V3 exits the foramen ovale, it is easily identified just anteromedial to the MMA. At this point, the cleavage plane between the outer and meningeal dural layers is readily visible and easily dissected. By following V3 medially approximately 7.5 mm, the distal portion of the GSPN can be identified. The depth of the distal portion of the GSPN covered by the outer dural layer enables the meningeal dural layer to easily be elevated from the nerve. Even with careful dissection, elevation of basal dura in the front-to-back direction could apply some tension on the distal portion of the GSPN. However, this technique eliminates traction on the proximal portion of the GSPN, including the geniculate ganglion. The neural tissue is relatively well protected from injury during the dissection, especially when a well-defined endosteum covers the GSPN.

The front-to-back dissection may be applicable to most cases involving middle fossa surgery. With a limited temporal craniotomy, a more anteromedial position of the distal GSPN might be an awkward starting point for some surgeons compared with starting from the posterior GSPN (back-to-front). In any case, however, the MMA is still the first practical landmark from which to start when elevating the temporal dura. V3 is immediately anteromedial to this point, and front-to-back dissection is readily continued from there. The front-to-back technique may be most valuable in an anterior petrosectomy. A wide temporal craniotomy that allows an anterior-to-posterior trajectory to access the brainstem or basilar artery facilitates a front-to-back dissection.

Vascular Considerations

By respecting the anatomic plane during interdural dissection, bleeding from the periarterial or venous plexus near the trigeminal ganglion can be minimized. Disruption of the petrosal arterial blood supply to the geniculate ganglion can lead to facial palsy (35). This artery arises from the MMA either proximal (58% of the cases) or distal (42% of the cases) to the foramen spinosum (25). Likewise, in 50% of our specimens, the MMA gave rise to the petrosal branch distal to the foramen spinosum. Preserving the petrosal artery at the origin is not easy in such situations (Fig. 1). The inferolateral trunk of the intracavernous internal carotid artery also provides collateral supply to this petrosal branch (6, 22). During dissection of the proximal portion of the GSPN, which can sometimes adhere to the dura, the petrosal artery can also be injured. However, these risks are unavoidable regardless of the direction of dissection during the final elevation of the dura. However, the facial nerve also receives collaterals from the stylomastoid and labyrinthine arteries, which reduces the risk of an ischemic event to the nerve (32).

Study Limitations

The characteristics of living tissue cannot be reproduced by the use of formalin-fixed cadaveric tissue. The effect of positioning of the head to take advantage of gravity, placement of retractors, drainage of cerebrospinal fluid, arterial bleeding, venous oozing, and elasticity of the nervous tissue are different in cadaveric tissue compared with living tissue. Furthermore, functional outcomes related to the facial nerve cannot be addressed by this anatomic study. Such information can only be addressed by actual clinical cases. Nonetheless, we were able to detail the anatomy and plane of dissection while performing the same dissection technique that would be used in live surgery.

CONCLUSION

The middle fossa floor can be dissected safely and the GSPN identified via the front-to-back dissection. This technique is a simple but technically sound strategy for identifying the GSPN and preserving function of the facial nerve. The most valuable feature of this technique is that the dissection can be performed safely in the interdural plane. Furthermore, inadvertent direct or traction injury to the geniculate ganglion, which can cause postoperative facial nerve palsy, can be avoided by use of front-to-back dissection.

Disclosure

The authors have no personal financial or institutional interest in any of the drugs, materials, or devices described in this article.

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COMMENTS

The greater superficial petrosal nerve (GSPN) provides an important landmark for middle fossa approaches to the cranial base. The GSPN forms the lateral border of the Kawase rhomboid and marks the lateral margin of the underlying horizontal segment of the petrous internal carotid artery. The GSPN also provides an anatomic landmark for the internal auditory canal. The GSPN has an important physiological role as well; it carries preganglionic fibers that will eventually provide parasympathetic innervation to the lacrimal gland as well as some sensory fibers from the pharynx, and isolated injury to the GSPN can result in "dry eye." The GSPN originates from the facial nerve at the geniculate ganglion, and proximal traction on the GSPN can result in facial nerve injury.

For the extradural middle fossa approach, traditional teaching is to elevate the dura from posterior to anterior ("back to front") to avoid traction on the geniculate ganglion (1), but this technique has never been validated by comparison to the "front-to-back" technique. The authors suggest that their approach may be safer than the traditional approach. Purported advantages of the "front-to-back" interdural dissection of the GSPN include a more reliable distal identification and development of the dissection plane, improved neural protection by maintaining the outer layer of dura, and less proximal traction (but more distal traction). The main drawback, as the authors point out, is that this study is purely anatomic and gives no physiological information.

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This anatomic exploration of 12 cranial sides supports the senior author's (MCP) suggestion that elevation of the middle cranial fossa dura from the floor and GSPN is more easily and more safely accomplished by dissection between the outer endosteal layer and the inner meningeal layer and from front to back rather than from back to front. Jittapiromsak et al. report that the interdural plane is readily identified at the posterior margin of V3 and the nerve is more readily preserved because the sphenopetrosal groove containing it is deeper distally (anterior) than proximally (posterior). They also argue that the front-to-back dissection is less likely to cause traction injury to the geniculate ganglion. Although the authors are unable to substantiate scientifically their claim of greater ease and safety of this manner of dissection, their suggestion is a logical one, and the method deserves testing clinically.

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Jittapiromsak et al. have presented a detailed, nicely illustrated anatomic study that specifies the optimal dissection technique to expose the GSPN while exposing the middle fossa floor. They studied a different surgical dissection strategy, from anterior to posterior, which, in their opinion, minimizes the risk of inadvertent direct or traction injury to the geniculate ganglion.

Injury to the geniculate ganglion may occur during the dural elevation process and during the isolation of the GSPN. A poor understanding of the meningeal anatomy may cause inadvertent direct or traction injury to the geniculate ganglion.

The authors describe a very important concept in the meningeal architecture: the dura of the middle fossa is composed of 2 layers, specifically, the outer or endosteal layer and the inner or meningeal layer (dura propria). These 2 dural layers usually blend, except where they are separated, to provide space for the dural venous sinuses, venous plexi, and cranial nerves. The GSPN is usually extradural but very adherent to the endosteal layer, and it can be easily identified if the 2 dural layers are separated. While elevating the dura from the middle fossa floor, it is crucial to identify a plane of separation between the 2 meningeal layers. This maneuver will reveal the GSPN on the floor of the middle fossa, usually mixed with endosteal fibers. It will also minimize the amount of bleeding typically encountered during this dissection. The major risk of traction and injury to the geniculate ganglion occurs when the elevation of the dura from the middle fossa is carried out without separating the 2 layers: the GSPN is elevated together with the dura with the consequent traction injury to the geniculate ganglion.

The other critical point while exposing the middle fossa floor is the process of isolating the GSPN from the endosteal fibers. I agree with the authors that posterior-to-anterior dissection carries the potential risk of traction injury to the geniculate ganglion. The anterior-to-posterior direction of dissection would undoubtedly be a safer alternative. In my personal experience, after using both techniques, I now mostly operate a sharp lateral-to-medial dissection with the direction of the blade from posterior to anterior, as this maneuver avoids traction force on the GSPN.

In those cases when the middle fossa approach is used to expose the intrapetrosal internal carotid artery and when, for the particular anatomy, it is necessary to sacrifice the GSPN, I completely expose and isolate the nerve, sever it at the posterior border of V3, and reflect it posteriorly.

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This is a nicely performed anatomic study of a modification of the dissection technique of the GSPN in the middle fossa approach. The rationale of the study is that a front-to-back dissection could decrease traction on the nerve and thus reduce the rate of facial nerve impairment.

Twelve sides of 6 injected cadaveric heads were used to dissect the nerve via a front-to-back technique. The relevant microsurgical anatomy is clearly described, and the significance of the GSPN as a main landmark during the middle fossa approach, especially regarding the location of the internal auditory canal, is underlined.

The study showed that, with this new technique, the nerve may be reliably identified at the posterior border of V3. Importantly, the front-to-back dissection allowed for anatomic preservation of the nerve in all cases, presumably owing to minimized retraction force. This interesting finding, however, remains theoretical until proven in real surgical conditions.

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