

**President's address : the treatment of facial neuralgia by excision of intra-cranial portions of the fifth nerve / by L. McLane Tiffany.**

**Contributors**

Tiffany, L. McLane.  
Royal College of Surgeons of England

**Publication/Creation**

[Baltimore] : [publisher not identified], 1893.

**Persistent URL**

<https://wellcomecollection.org/works/hgbs73cv>

**Provider**

Royal College of Surgeons

**License and attribution**

This material has been provided by This material has been provided by The Royal College of Surgeons of England. The original may be consulted at The Royal College of Surgeons of England. where the originals may be consulted. This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection  
183 Euston Road  
London NW1 2BE UK  
T +44 (0)20 7611 8722  
E [library@wellcomecollection.org](mailto:library@wellcomecollection.org)  
<https://wellcomecollection.org>

*Rec'd Jan 11 1894*

*73  
7.*

PRESIDENT'S ADDRESS.

---

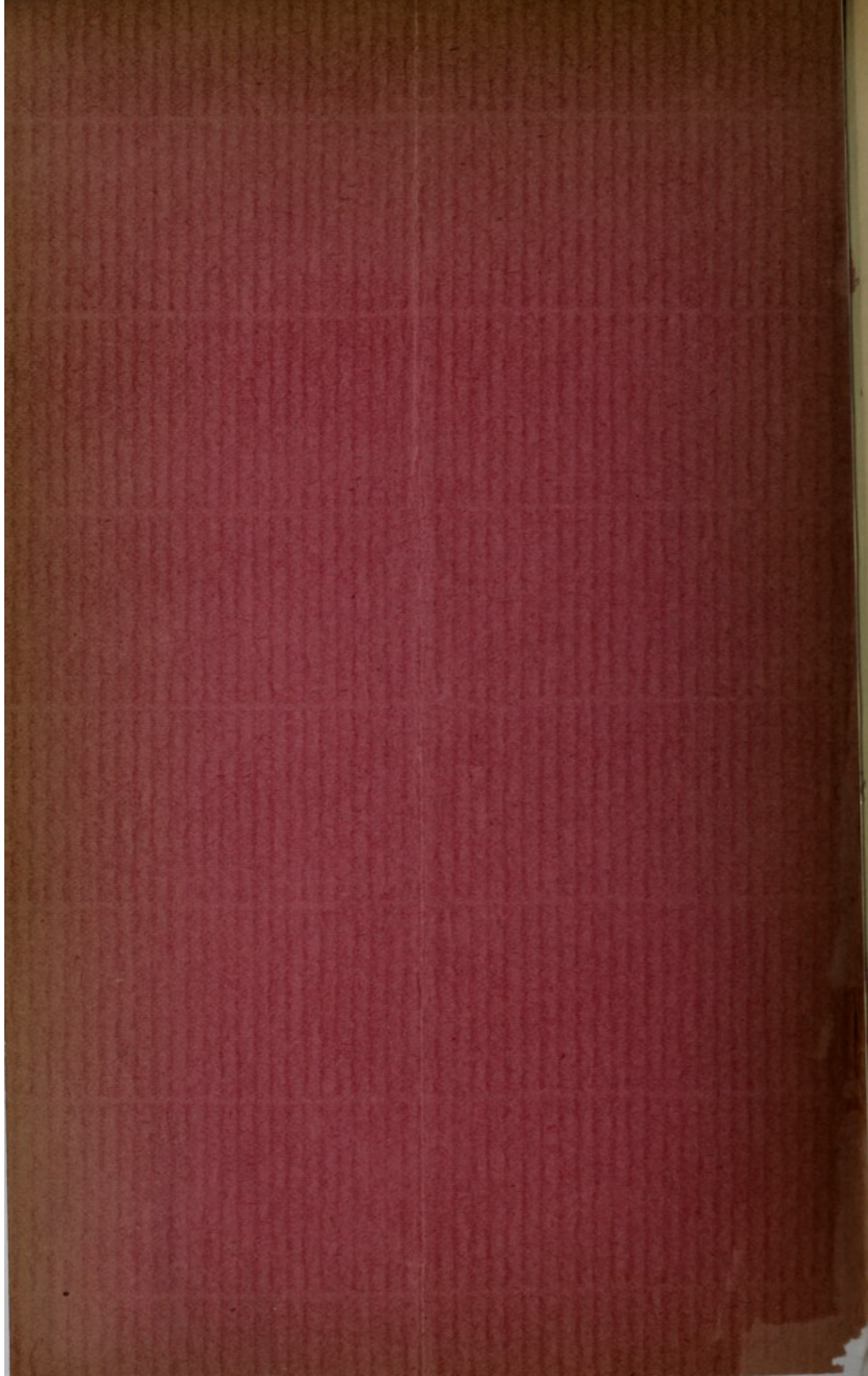
THE TREATMENT OF FACIAL  
NEURALGIA BY EXCISION  
OF INTRA-CRANIAL POR-  
TIONS OF THE FIFTH  
NERVE.

---

BY L. McLANE TIFFANY, M. D.  
Professor of Surgery, Univer-  
sity of Maryland.

---

Reprint from  
TRANSACTIONS  
MEDICAL AND CHIRURGICAL FACULTY  
OF MARYLAND,  
1893.



## PRESIDENT'S ADDRESS.

---

### THE TREATMENT OF FACIAL NEURALGIA BY EXCISION OF INTRA-CRANIAL PORTIONS OF THE FIFTH NERVE.

BY LOUIS McLANE TIFFANY, M. D.,  
Professor of Surgery, University of Maryland.

The term facial neuralgia is applied to pain in the area of distribution of the fifth nerve, and it is needless to say that it has nothing to do with the seventh, or facial nerve, with which in former times it was believed to be associated.

The three divisions (first, second and third), with their respective territories, are not affected equally often. In order of frequency, the second division should stand first; the lower jaw division second; and most rarely, the first or ophthalmic branch.

No satisfactory explanation for the frequent occurrence of facial neuralgia can be said to be accepted. Certain conditions are met with and challenge attention. It is met with in women more often than men; on the right side probably more often than on the left; very rarely in the young; far more frequently in adults; advanced middle age being the period of life when the disease is most apt to be encountered. This, in women, might have something to do with the change in the reproductive organs, and has been given as one of the possible causes, but I am not able to accept this suggestion. Nor am I able to accept the suggestion of 'catching cold' as a cause, which seems to be given whenever there is no other special reason obtainable. We know, however, that the fifth nerve sends its branches through many bony canals, and we also know that with advancing years a tendency to thickening of bone may take place, hence pressure at bony foramina may occur.

Neuralgia shows itself more often at points where nerves emerge from bony channels than elsewhere. Thus, in the first branch, pain may be felt at the supra-orbital foramen. Also where the nasal nerve merges upon the face between bone and cartilage. The second division is apt to be painful at the infra-orbital foramen. The third division seems to be especially painful at the mental foramen, while pain referred to the teeth is so often seen as not to require comment.

The pain may be preceded by a sense of discomfort and uneasiness for a variable length of time; perhaps stiffness and itching, then flying pains through the region to be affected become apparent, and then decided neuralgia makes its appearance.

Pain is always paroxysmal, the intermissions being at first long; subsequently they shorten, until finally the pain may become almost continuous. Anything that touches or moves, or in any way tends to change the existing temperature or condition of the face, will bring on an attack of pain, so that, when the disease is well marked, the unfortunate sufferer will abstain from swallowing saliva, will abstain from talking, etc. It is not possible to see a more painful affection, or one that appeals more directly for help to the surgeon. Life is truly a burden under such circumstances, and the patient only too willing to undergo any operation which offers a prospect of relief from pain.

I have found that such patients would submit to anything, whether dangerous to life or not, provided a prospect of relief was offered. The danger to life seems not to be taken into consideration—simply the relief from pain, and any proposition will be accepted by the patient.

The territory supplied by one branch of the nerve is always first affected. Subsequently, another, and even a third branch can be affected. I have never seen both sides of the face affected at once.

There is usually no local change in the skin. It may, however, be somewhat glazed or reddened or rough, but will always be held immobile, giving a stolid, wooden appearance to the face. The patient will usually have had all the

teeth on the affected side extracted, and will chew on the other side of the mouth. If the patient happens to have false teeth, they will probably not be worn, lest pain follow. I do not think I have ever noticed severe neuralgia (facial) in a fat, florid person; but rather in those of lax fibre and pale face. Atrophy of the muscles in the affected area has been noticed as well as unilateral furring of the tongue. Pain may radiate from one division of the nerve to some other part, and it may even be not easy to localize the nerve directly involved.

Spasm of the muscles supplied by the seventh (facial) nerve is seen, and may be more or less marked, either as a simple trembling or as a convulsive distortion. Contractions of the muscles of mastication, singularly enough, are rarely seen. Increased secretion of saliva may be present, and in case the patient suffers in swallowing, the saliva will be allowed to drip from the open mouth. Disturbance of the general health is very exceptionable, and the disease goes on for years.

Treatment by drugs in many cases effects a cure. Quinine is probably more efficacious than any other single remedy. Hence malarial causation is often cited. Arsenic, possibly for the same reason, is beneficial. Aconitia pushed to the point of tolerance so as to produce formication on the surface of the body may be effectual, and the constant current is lauded.

It goes without saying, that in making the diagnosis central disease is to be excluded; fortunately this is rare, in the great majority of cases the disease being peripheral.

The administration of narcotics in large doses will relieve pain, but will almost invariably induce the opium habit, which is worse than the disease.

Carnochan is the first surgeon of modern times who attacked the trunk of the nerve, removing it, and his operation, more or less modified, has been repeated many times.

It may be a matter of interest to Maryland surgeons to recall the fact that his first patient was a physician from this State, and that the operation was successful.

It is thus described by Carnochan :

"The principal instruments necessary for this operation are a trephine, the crown of which is three-quarters of an inch in diameter, an elevator, chisels of different shapes and sizes, a leaden or iron mallet, the bone forceps of Luer, small pieces of sponge tied to sticks or pieces of whalebone, and a small fixed trephine of half an inch in diameter, which may be used to perforate the anterior wall of the antrum. The assistants being properly arranged, the patient was seated upon a solid chair, opposite a good light, and was put under the influence of chloroform. The head was rested upon the breast of an assistant, who maintained it in this position. An incision was now made on the cheek, commencing near the internal angle of the eye, on the inferior edge of the orbit, opposite the anterior lip of the lachrymal groove. This incision was carried downwards and slightly outwards, for about an inch, to a point opposite to the furrow on the lower portion of the ala of the nose. Another incision, which also terminated at this point, was made, commencing about half an inch below the external angle of the eye, opposite the edge of the orbit, thus forming a V incision, in the area of which is situated the foramen infra-orbitale. The flap thus resulting was thrown upwards, and the branches of the second branch of the fifth, sought for. Some of these being found, they served as a ready guide to the trunk of the nerve. This was now isolated from the surrounding tissues up to the point of exit upon the face from the foramen. The lip was now everted, and the mucous membrane detached from the superior maxilla along the line of junction between the cheek and the gum. A sharp-pointed bistoury was now inserted at the apex of the V incision, into the mouth, and carried downwards, so as to divide entirely the tissues of the cheek and upper lip, along a line passing midway between the ala of the nose and the commissure of the lips. The two flaps thus formed were now dissected from the osseous tissue beneath, one being reflected outwards, towards the ear, the other internally, towards the nose. The whole front wall of the antrum

maxillare, with the nerve passing through the foramen infra-orbitale, was thus exposed. The crown of the trephine was now applied on the anterior wall of the antrum, immediately below the foramen infra-orbitale, and an irregular disk of bone removed, so as to expose freely the cavity of the antrum. The circumference of the foramen, the hardest portion of the canalis infra-orbitalis, was now destroyed by Luer's forceps and a small chisel. The trunk of the nerve was now traced along the osseous canal in the floor of the orbit, which was broken down with care, so as not to encroach upon the tissues in the cavity of the orbit. Arriving at the back of the antrum, the posterior wall of this cavity was broken down with a small chisel, and the portions of bone removed. The trunk of the nerve was now still further isolated from the other tissues in the sphenomaxillary fossa. The posterior dental nerves being divided, and the dissection being carried still further, the branches given off to form the ganglion of Meckel, were reached. These were divided, and also the branch given off to run up towards the orbit. Lastly, by the use of blunt-pointed scissors, curved on the flat side, the trunk of the nerve was divided from below upwards, close to the foramen rotundum. The hemorrhage was not very profuse, the labial arteries being easily controlled by pressure of the fingers, and the branches of the internal maxillary artery, in the sphenomaxillary fossa, by dry lint, or what is better, the compressed sponge. The lips of the wound were brought together and maintained in place by thirteen points of twisted suture, the German or Carlsbad pins being used."

Since his time, various routes have been pursued to divide the nerve trunks without the skull, and within the last year or two the skull itself has been invaded and the nerves divided adjacent to the Gasserian ganglion, a portion or the whole of which has been taken away.

To Rose, of London, is due the credit of having first performed this operation. He removed the right upper jaw and trephined through the base of the skull at the foramen ovale, using fine forceps with which he removed the Gasserian



ganglion. In this operation, while the neuralgia was cured, the eye was lost, through interference with its nerve supply. Rose now operates through the temporal fosa, as does Andrews, of Chicago, who seems to practice a more or less similar method. His (Andrews) operation is as follows :

“The field of operations was rendered as aseptic as possible, the right side of the scalp being shaved and the utmost pains being taken to guard against infection. Beginning near the external angular process a curved incision was made extending horizontally above the zygomatic arch, curving down in front of the ear and terminating near the angle of the jaw, care being taken to avoid the pes anserinus. The flap thus made was turned down and stitched to the ala of the nose ; the zygomatic arch was sawed through at each extremity and reflected down carrying with it the attached masseter muscle; the coronoid process of the lower jaw was then sawed off and turned up on to the temple, carrying with it the attachment of the temporal muscle, and was stitched to the scalp. Now some fat and connective tissue was exposed containing in it the internal maxillary artery, which was tied. Persistent oozing hæmorrhage had compromised each step of the operation and was particularly troublesome at this stage; the blood would well up into the wound almost as fast as an assistant could sponge it away, and owing to this masking of the parts involved, the operator had to literally feel his way in the dark. Search was now made for the inferior dental nerve which should serve as a guide to the foramen ovale, but it was not found, owing no doubt to the fact that it had been entirely torn away at one of the former operations. Therefore the finger of the operator felt for the posterior sharp edge of the external pterygoid plate of the sphenoid bone and passed it up to its base, near which the foramen is situated, and through which a probe was passed, the ganglion being transfixed thereby. Just external to the foramen ovale is a triangular free space on the under surface of the base of the skull and here a specially devised trephine with a long shank and a long center pin, was applied and the button of bone removed. The narrow isthmus of bone intervening between the trephine hole and the foramen ovale was

bitten away with a pair of rongeur forceps and through the large opening thus made a surgical spoon was passed and the ganglion scraped away.

In closing up the wound Dr. Andrews advocates wiring together the bones sawed through."—*Four. Am. Med. Assoc. Feb. 18, 1893.*

Roswell Park, of Buffalo, follows the same method, but also ties the common carotid artery. It is noteworthy that others have advised ligation of the carotid for the cure of facial neuralgia; hence Park has two strings to his bow.

Novaro has exercised great care in avoiding injury to the inner and upper portion of the ganglion as is seen on reading the following description of his operation:

"A cutaneous incision—V shaped—was cut in the masseteric region, one branch of the V terminating opposite the tragus, on the root of the zygoma. The other (anterior branch) terminated on the molar bone, on a level with a line drawn downward from the external angular process of the frontal. The loop of the V rested about midway of the masseter muscle. The flap of skin thus circumscribed was lifted up; the temporal aponeurosis exposed on the zygoma was divided parallel with this arch; the masseter was lifted away from its attachment to the jaw and zygoma, and with the help of a second cutaneous incision, which circumscribed the angle of the maxilla, the external surface of this bone was sufficiently denuded of its overlying parts to allow it to be sawn through in a vertical direction behind the third molar. The ascending ramus of the maxillary, which was thus mobilized, was bodily elevated, disarticulated, and removed, after section of the temporalis tendon, pterygoids, and articular ligaments. The inferior dental and artery had to be divided. After the extirpation of the bone, an assistant retracted the temporalis muscle upward, and the operator was thus allowed to denude the inferior surface of the great wing of the sphenoid and zygomatic fossa. With the help of a narrow chisel, the base of the pterygoid process and the great wing of the sphenoid was attacked in the space which

lies between the round and oval foramina, great care being taken not to open the cavernous sinus.

After removing enough bone, Novaro gently detached the dura mater, and, having exposed the second and third branches of the fifth, they were seized with forceps and entrusted to an assistant, who, by making traction upon them, helped the operator in the work of completing the dissection of the ganglion, which was removed piecemeal with the aid of a fine rat-tooth forceps and sharp curette. The chief aim of the operator throughout was to avoid injuring the antero-internal portion of the ganglion, which contains the trophic centres of the eye and is attached to the walls of the cavernous sinus. The operator succeeded completely, and the whole of the condemned part of the ganglion was removed with the two inferior divisions up to their foramina of exit. The wound was then carefully packed with an iodoform-gauze tampon. The operation consumed one and a half hours. Forty-five days after, the patient was in excellent condition; the eye remained sound and he was totally free from pain. Notwithstanding the complete extirpation of the second and third divisions of the fifth, the territory supplied by these nerves remained normally sensitive."—*Jour. de Med. de chi. et de Phar.*, Sept. 30, 1891, Brussels.

Horsley has thought it expedient to remove the nerve proximal to the ganglion. While the result of the operation was not favorable, both conception and execution thereof were worthy of its distinguished author:

"This exposure of the temporo-sphenoidal lobe in man I have carried out by making a large temporal flap, starting from the anterior extremity of the zygomatic process, and running upwards to the temporal ridge, following that line and descending along it to the asterion. The temporal muscle, after being separated from the bone, is then best removed, so far as its posterior half is concerned, and then the whole of the squamous portion of the temporal taken away by means of a trephined hole and suitable bone forceps. Anteriorly the middle meningeal artery may be dealt with where exposed, being simply ligatured in the dura mater.

The dura mater is then to be opened along the full length of the area of bone removed, and the temporo-sphenoidal lobe thus laid bare. A broad copper retractor, with smooth and everted edges, is then gently slipped underneath the lobe and slowly, but steadily raised. The lobe is partly moulded, partly lifted upwards, and the floor of the skull is then easily seen and illuminated with the electric light. The guide to the fifth nerve now is the upper border of the petrous bone. The lobe being raised a little more, the edge of the tentorium will be defined and the point at which the fifth nerve passes beneath it could, in the first case I operated upon, be seen. The position of the canal in which the nerve is lying just above the ganglion must then be estimated, and a small puncturing incision made into it. As it is about a quarter of an inch in diameter, it can be recognized as soon as the puncturing instrument passes into it, and the dura forming its roof should then be further slit open. The nerve in this way is exposed, and is found to be freely lying in the little passage.

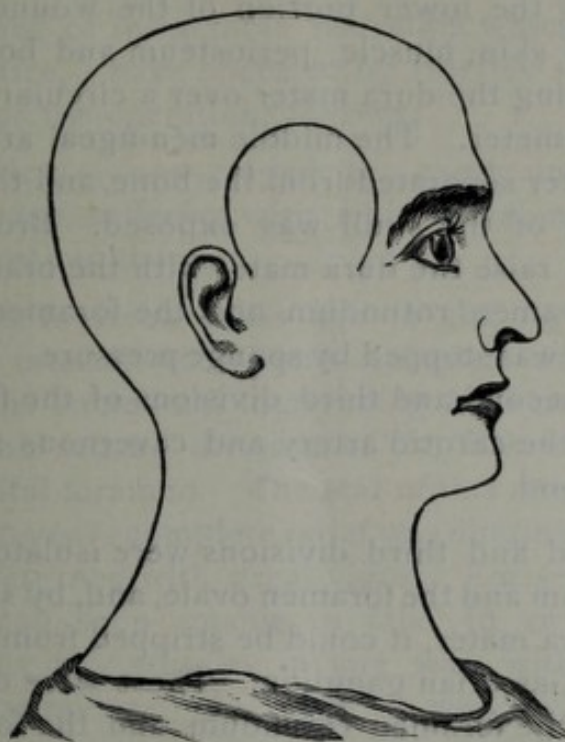
The first case on which I operated in this manner was the patient No. 5 in the table, in whom I had, as is shown there, previously removed a portion of the inferior dental and of the infra-orbital. The recurrence of pain, for which she then desired further operative relief, began in the auriculo-temporal nerve, the only branch remaining of the inferior division which had not been cut. As the pain, however, also ultimately invaded apparently the stump of the middle division, I thought it best to attempt the operation of dividing the nerve behind the ganglion. The patient had not eaten any solid food for several months, and was not in a good condition to undergo the operation. However, as her state was a very desperate one, I agreed to perform the operation, warning the friends that there might be fatal collapse even on the table. As a matter of fact, the operation presented no special difficulty beyond that of being very tedious. I resected the zygoma in order to have more room, but I feel sure now that that was a useless complication—that it was quite possible to have reached the nerve without it, and I

regret having done it, because I think it of course aided in producing the shock which caused a fatal termination to the case. On opening the dura mater the brain bulged moderately into the opening, but as soon as the effect of the shock began to show itself it of course sank. On exposing the nerve in the canal behind the ganglion, I passed a small blunt hook around it, and it then occurred to me that the small branch of the basilar artery which accompanies the nerve might give some trouble. I therefore thought one might safely attempt avulsion of the nerve from its attachment to the pons, and on gently drawing on it with a hook this was easily accomplished, and without even any noteworthy oozing. The wound was closed in the usual way. Unfortunately the patient never rallied from the operation, and died seven hours afterwards, obviously from shock.

At the post-mortem examination—which I obtained with some difficulty, and further details of which will be given in a paper on the pathology of the disease shortly to be published—I found that there was no cause of death except that already mentioned. There has been a slight amount of oozing into the subarachnoid space, but nothing to produce any compression at all, and of course of that there were no symptoms during life. At the moment when the fifth nerve was separated from the pons, although the patient was well under the anæsthetic, there was arrest of the respiration and the pulse could not be felt. This lasted for probably not more than three to four seconds, and then the respiratory movements and the pulse became normal. On reviewing the result of this operation I am satisfied that the unfavorable termination was due to the special circumstances of the case, and the considerable series of experiments on the lower animals which have been made involving the division of the fifth nerve show clearly that the mere exposure and section of the nerve is not of itself dangerous to life."—*Horsley. Brit. Med. J. Dec. 12, 1891.*

Hartley, in the *New York Medical Journal* of March 1st, 1892, published the history of a case in which he had divided the second and third branches and removed the Gasserian

ganglion, by opening the head in the temporal region and turning the flap downwards. The account of his operation is as follows:—*N. Y. Med. Jour.*, Mar. 1, 1892.



Showing the skin incision in Hartley's Operation.

An omega-shaped incision was made, having its base at the zygoma and measuring a distance marked by a line drawn from the external angular process of the frontal bone to the tragus of the ear.

The curved and rounded portion of this incision reached as high as the supratemporal ridge, the diameter of said circle being three inches. The skin and deeper tissues were cut in the shape of the Greek capital letter omega. This incision was carried down to the periosteum of the skull in all portions of the incision, except in the straight part at the base; the tissues were then retracted and the periosteum divided upon the bone in the same direction and as far as the straight part at the base.

With a chisel a groove was cut in the bone corresponding to the divided periosteum. This groove went to the vitreous plate, except at the upper angle over the rounded portion, where it included the vitreous plate.

A periosteum elevator was here inserted and used as a lever to snap the bone on a line between the ends of the circular portion of the incision. In this way the breakage occurs along the lower portion of the wound, and a flap, consisting of skin, muscle, periosteum and bone, is thrown down, exposing the dura mater over a circular area of three inches in diameter. The middle meningeal artery was tied, the dura mater separated from the bone, and the floor of the middle fossa of the skull was exposed. Broad retractors were used to raise the dura mater with the brain, and to expose the foramen rotundum and the foramen ovale. The hæmorrhage was stopped by sponge pressure. The exposure of the first, second and third divisions of the fifth nerve, together with the carotid artery and cavernous sinus, was exceedingly good.

The second and third divisions were isolated at the foramen rotundum and the foramen ovale, and, by slight pressure upon the dura mater, it could be stripped from the nerves to beyond the Gasserian ganglion. These were divided with a tenatome at the foramen rotundum and the foramen ovale, and that part between these and a point beyond the Gasserian ganglion was excised. As this amount of nerve is not very great, the ends of the nerves were pushed through the two foramina so as, if possible, to interfere with any re-union. In the retraction of the dura mater, owing to imperfect instruments, the third, fourth and sixth nerves were somewhat injured. As no bleeding was present, the brain was allowed to fill the fossa. The flap—consisting of bone, periosteum, muscle, and skin—was replaced. The irregular edge of the vitreous plate which remained attached to the bone not involved in the flap acted as a shelf on which the flap rested, and prevented its falling in upon the dura mater. The periosteum was stitched, the muscles secured in place, and the skin sewn with silk. One drainage tube was inserted at the lower angle; an antiseptic dressing was applied. Time of operation, one hour and forty minutes; the patient was carried to the ward in good condition. The disadvantage

was the inability to resect as long a piece as could be done in some of the other methods.

Krause has since operated by nearly the same method.

In two cases of intractable neuralgia which have fallen under my notice, I have operated by Hartley's method, and the account of the operations follows:

Case 1. Mrs.———, aged 59, came under my care September, 1892, suffering with right facial neuralgia, and gave the following history:

Pain began fourteen years ago in the right upper jaw nerve. The intermissions were complete and of varied length, months sometimes intervening between paroxysms. June, 1890, the second division of the fifth was divided at the infra-orbital foramen. The scar of this operation is visible. For two years complete relief was obtained. Then the paroxysms returned with great vigor. For several months the patient had been unable to talk, to swallow, laugh, or to use the face muscles in any way, without bringing on severe paroxysms. So much so was this the case that she carried a tablet on which to write instead of speaking. She avoided solid food, and took only liquids. Her condition was one of very great suffering, almost all the time—even when as quiet as possible agonizing attacks of pain came on.

The second and third divisions of the fifth were affected, cheek, lips, tongue, palate, gums, and especially the auriculo-temporal region.

September 8th, 1892, the operation was done in the usual way. The middle meningeal artery was torn in separating the flap of bone, and was ligated by passing a thread in a curved needle through the dura. On turning down the flap of bone the opening in the skull was found to be not large enough to give sufficient room, and so more bone was bitten away with forceps. There was an escape of cerebro-spinal fluid from the aperture made in the dura at the time of wounding the artery. The second and third divisions of the nerve, together with the Gasserian-ganglion



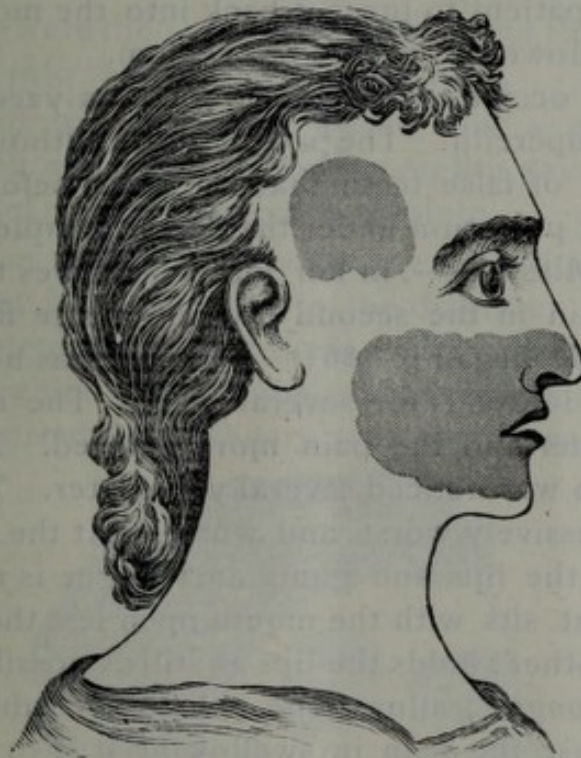
were well exposed to view. The nerves, and so much of the ganglion as seemed to be attached to the nerves, were removed, and the distal ends of the nerves tucked into their respective foramina. The bone was not replaced when the flap was put in position. A piece of silver wire, bent on itself, was laid at the posterior angle of the skin wound, so as to permit drainage, if required. A voluminous dry dressing was then applied. The flow of cerebro-spinal fluid was so great during the first twenty-four hours as to necessitate on two occasions that a folded sheet under the head should be changed. In twenty-four hours the cotton and gauze dressing was replaced by a dry one. This was again necessary on the second and on the third day, although the flow of fluid was less, when the wire was removed. Stitches were removed on the seventh day. Pain ceased from the moment of operation, and the patient had an uninterrupted recovery. No disturbance to the eye in any way was noted, and the patient was soon able to return to her usual life. The patient has no teeth, they having been extracted several years ago, in hope of relieving the pain.

Case 2. B——, aged 67, male, has been operated on for neuralgia of the second division of the fifth, right side, several times. The nerve has been cut away at the infra-orbital foramen; then more deeply, and finally Carnochan's operation was done. Temporary relief was afforded after each operation, but the pain subsequently returned. In February, 1893, I divided the middle division of the fifth, but did not divide the third division, as the patient did not suffer from neuralgia of this branch. Recovery was uneventful, and he went out of the hospital in three weeks. I have not been able to see him since the operation, and therefore his present condition is unknown to me. (The artery was divided as in the first case, and required to be tied.)

Since reading the above paper before the Faculty, two additional cases of intractable Trigeminal neuralgia have been operated on by me. I append a short history of each patient, together with the condition of the three patients whom I have been able to examine in regard to taste, sensation, etc.

An examination of case 1 thirteen and a half months after the operation shows as follows :

Motion of tongue unimpaired ; the muscles of mastication are paralyzed. This did not appear to be so immediately after the operation. There are no trophic changes in the area to which the divided portions of the nerve are distributed ; the skin is normal and does not show enervation ; it is not shiny or red. Sensation on the face is wanting in the area shown on the accompanying chart. Outside the area of complete loss of sensation there is perverted sensation.



Case 1. The shaded portion indicates the area of skin anæsthesia.

The front part of the tongue and the antro-lateral aspect is without sensation, but a touch is recognized just in front of the circumvallate papillæ. The hard palate is without sensation. The soft palate is indistinctly sensitive. The mucous lining of the cheek in its anterior part is without sensation ; further back sensation is present. Heat and cold are recognized in portions of the tongue where ordinary sensation is wanting. Taste on the tongue is not interfered with. The method of investigating taste was as follows: The tongue was drawn beyond the lips, and securely held. Its surface was then dried with a soft rag, and a drop of warm water,

containing sugar or salt in solution, was put on the part of the tongue entirely without sensation, either of general touch or heat or cold. Almost instantly the patient was able to tell whether sugar or salt was put on her tongue, and this, of course, without drawing the tongue into the mouth, but while the tongue was firmly held outside the lips.

The patient states that the tongue is now more sensitive than it was at first. She complains of a feeling as though the gum and cheek of the affected side were covered with India rubber. She chews on the left side, for occasionally food which is being eaten gets into the right cheek, and it is necessary for the patient to press it back into the mouth with the hand; this, however, occurs but seldom.

The right occipito-frontalis is not paralyzed, nor is the corrugator supercilii. The patient wears without discomfort the same set of false teeth that she wore before the operation. Slight pulsation under the flap. Temple concave.

Case 3. Miss——, in her 79th year, gives the following history: Pain in the second division of the fifth nerve on the right side began in 1863. The pain was not great and occurred at intervals for several years. The intermissions became shorter and the pain more marked. In the third division, pain was noticed several years later. The pain became progressively worse and worse. At the present time the pain in the lips and gums and tongue is most intense.

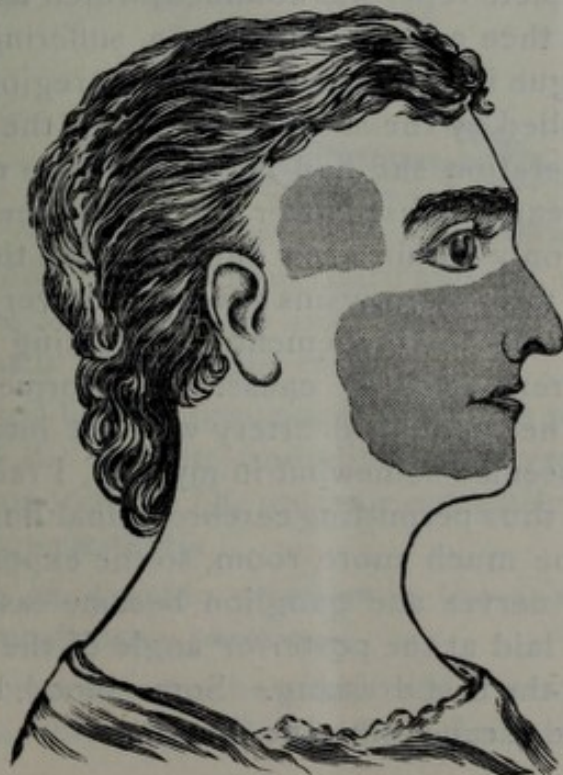
The patient sits with the mouth open lest the lips should touch each other; holds the lips as still as possible; does not move the tongue; allows the saliva to dribble from the mouth because the pain in swallowing it is so great. This pain is not in the throat itself, but is referred to the tongue, lips and side of the cheek. She has had no teeth extracted on account of neuralgia; one of the very few cases about whom this can be said. Yawning is impossible on account of pain which is referred to the lower jaw joint. She has taken no solid food for some years, and has lived on soft toast, soft eggs, tea, etc., etc. There is on the right side hyperæsthesia of the face, the skin is rough and coarse. The condition of the patient was most distressing. She had been subjected to no operation, and had borne her sufferings as

best she could. I operated in the usual way, June 30th, 1893, notwithstanding the patient's advanced age. She seemed active and strong, and I did not think her number of years should prevent my affording relief, if I was able so to do.

The middle meningeal artery was not divided. When the second division of the nerve was exposed at the base of the skull, I stripped the dura from it as usual. There was a gush of cerebro-spinal fluid, which subsequently welled up quite clear until perhaps two ounces were sponged away. The second and third divisions of the nerve and the Gasserian ganglion were then exposed, excised and the nerve ends pushed back into their respective foramina.

The wound was closed as usual, and a dry dressing applied, which was changed on the eighth day. Recovery was uneventful; relief from pain absolute.

Examination four months after the operation reveals anæsthesia of the face, as shown in the diagram. Outside the area of complete anæsthesia there exists a zone of irregular sensation, in which the difference between heat and cold is plainly recognized, but ordinary sensation is wanting.



Case 3. The shaded portion indicates the area of skin anæsthesia.

The tongue in its right lateral half, as far back as it can be touched, is anæsthetic. So also the inside of the cheek and the hard and soft palates.

Taste. Sugar and salt are plainly recognized on the anterior portion of the tongue where anæsthesia exists.

The muscles of mastication are paralyzed. The right anterior half of the occipito frontalis is paralyzed; also the right corrugator supercillii. Doubtless from division of the branch from the seventh by the superficial wound, electricity shows degenerative reaction.

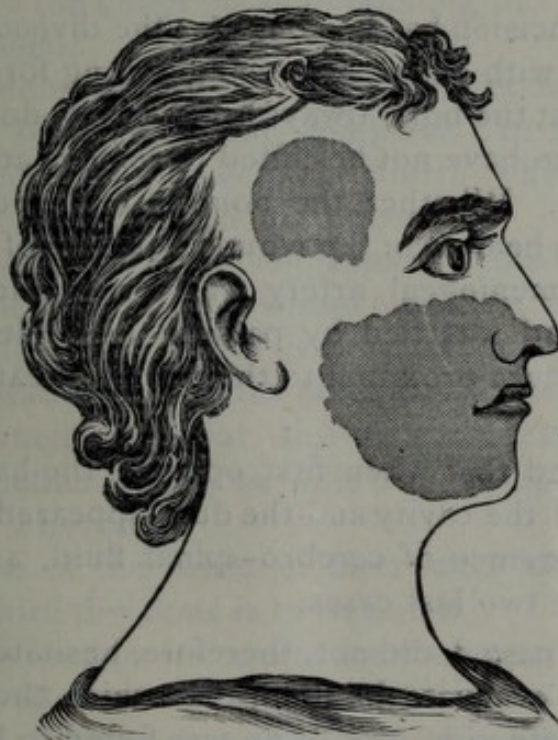
There is no pulsation to be recognized under the flap. Temple concave. A slight touch on the teeth in either the lower or upper jaw of this patient is felt distinctly. The harsh rough skin has become smooth and fair, the face has become that of a placid and contented woman.

Dr. F. T. Miles examined this case with me.

Case 4. Mrs. S——, aged 46, a widow, came under my care in 1892, suffering from neuralgia of the third division of the fifth. In the body of the lower jaw I chiselled the bone and excised one inch of the nerve. The wound healed at once and complete relief was obtained, which lasted thirteen months. She then consulted me again, suffering pain in the lower lip, tongue in the auriculo-temporal region, and in the territory supplied by the second division of the fifth. Prior to the first operation she had been subject to neuralgia for six or seven years, diffused over the side of the face, which was localized only within a few months of the time when she first consulted me. Paroxysms now came on very frequently. They were excited by movement, by touching the face, or without apparent exciting cause. I performed the usual operation. The meningeal artery was not interfered with. As the brain seemed somewhat in my way, I raised the dura and opened it, thus permitting cerebro-spinal fluid to escape, which gave me much more room, so the exposure and removal of the nerves and ganglion became easy. A bit of bent wire was laid at the posterior angle of the wound, and removed with the first dressing. Some blood, but no cerebro-spinal fluid escaped into the dressing.

On the sixth day the patient put her hand by the side of her eye and scratched the wound, under the dressing, which she said itched very much. This irritated the wound somewhat, and on removing the dressing two days thereafter, I found some redness at the point where she had scratched. The dressings were changed and stitches removed, and everything went well.

*Present Condition.*—Pain entirely relieved. Anæsthesia of the face is shown in the diagram.



Case 4: The shaded portion indicates the area of skin anæsthesia.

The right half of the tongue, hard and soft palates, gums, and inside of left cheek are anæsthetic, but not extending so far back as in the previous case.

The replaced bone is firm and strongly in position. The right half of the occipito-frontalis is paralyzed, as also the corrugator supercilii. The anterior extremity of the omega incision is hyperæsthetic.

There are no trophic changes in the anæsthetic area. Muscles of mastication paralyzed.

The difference between heat and cold is not recognized in the anæsthetic territory. Taste within the mouth the patient

says is the same as always, but the difference between salt and sugar when applied on the tongue held beyond the lips is not recognized.

The conjunctiva of the right eye is slightly anæsthetic. The right nostril is not so sensitive as the left to the pungency of aq. ammon.

While the method pursued in all of my cases was not entirely that indicated by Hartley, it varied from it so little as properly to be classed as instances of his operation.

The skin incision has been as his; the division of the skull I have made with chisel, also using strong forceps. I have not found that the bone always broke as low down as I would wish it, and so have not hesitated to remove additional bone with forceps. Whether the bone is replaced or not, does not affect the healing of the wound. In two of the four cases the middle meningeal artery was torn while making the bone flap, and was tied by passing a single silk ligature through the dura proximal to the tear by means of a curved needle.

I have noted that when first opening the head, the brain seemed to fill the cavity and the dura appeared tense; this is due to the presence of cerebro-spinal fluid, as well demonstrated in the two last cases.

In the last case I did not, therefore, hesitate to punctuate the dura and evacuate the fluid, after which, the patient being on the opposite side, the brain was found to lie quite away from the field of operation, and the dura mater rested wrinkled on the surface of the brain, as a sheet loosely thrown over a bed. Thus ample room was afforded for uncovering the nerves and exposing the ganglion. This observation was to me extremely interesting.

In uncovering the nerves, I begin with the second division. Having uncovered it, I pass a ligature around it with a long aneurism needle having a short curve; then strip the dura from it backwards, reaching the third division and the ganglion. With the same needle, I pass a ligature around the third division. Making gentle traction on the ligatures, with a long, sharp curette, I am able to separate the nerves

and take away the adjacent portion of the ganglion, and then make my section of the nerves at the round and oval holes. In this way, I do not attempt to take away all the ganglion. I exposed and recognized the first division, but left it alone, for there was no reason why it should be disturbed. In certain cases, hitherto reported trouble with the eye, ptosis, etc., has been reported. In none of my cases has any disturbance of nutrition or function of the eye been apparent. I attribute this to the method already referred to for isolating the nerves and the ganglion and confining the operation exclusively to them.

The operations have been long, but recovery in every instance has been rapid and complete. In all cases, the wounds healed at once, except the fourth, where the patient scratched the recent wound and infected it.

It is worthy of note, very suggestive for the future, that in the case of the patient upon whom operation was performed fourteen months ago, there is less anæsthesia and more perverted sensation than in the other cases. Sensation seems to have returned somewhat, and it is interesting to speculate as to whether sensation will ever completely return, and if so by what route.

Preservation of the sense of taste after division of the second and third divisions is to be noted.

That the power to recognize heat and cold exists in a region rendered devoid of ordinary sensation by nerve section, is of much interest, and recalls an observation made some time since that a conjunctiva insensitive from the local application of cocaine still appreciates the difference between heat and cold.

When dividing the third division of the nerve in case 4, I believe that I isolated and recognized the motor branch before dividing it. Not having provided myself with a sufficiently long and fine electrode, I could not prove the accuracy of my opinion by electric stimulation, and therefore divided everything.

By leaving intact the motor branch, the patient would not have food collect in the cheek of the paralyzed side, and in the future operations an effort should be made towards this end.



and take away the whole portion of the ganglion, the thin  
tissue reaction is the only one of the round and oval bodies  
in this way. I do not attempt to take away all the ganglion  
I try and separate the rest of the ganglion, but in a few  
cases, for instance, why it should be situated in  
certain cases, but in reported trouble with the ganglion  
the ganglion reported in none of my cases has any  
evidence of nutrition or function of the ganglion reported  
I attribute this to the method of my removal of the ganglion  
the process and the ganglion and removing the ganglion  
closely to them.

The ganglion has been long but recently in every  
instance has been found and reported. In all cases the  
ganglion failed at one end of the ganglion, but the patient  
noticed the rest of the ganglion and noticed it.

It is worthy of note very suggestive for the future, that in  
the case of the patient upon whom operation was performed  
noticed in the ganglion, there is a small ganglion and now  
noticed in the ganglion in the other case. The ganglion seems  
to have retained somewhat and it is interesting to note  
the fact that the ganglion with even completely, when  
and it is by what is.

The ganglion in the case of the ganglion of the  
second and third divisions is to be noted.  
This is the case in the case of the ganglion and still exists in a  
ganglion and found in another ganglion, but in  
that is of course, but in the case of the ganglion  
there has been a complete separation from the local  
ganglion of the ganglion and the distance between  
ganglion and the ganglion.

It is also the third division of the ganglion case. I  
believe that I pointed and separated the motor branch  
before the ganglion, but having provided myself with a sub-  
stantially good and that is, I could not give the  
accuracy of my opinion by either, however, and further  
evidence existing.  
The ganglion in the motor branch, the patient would not  
noticed in the case of the ganglion and the ganglion  
in the ganglion and the ganglion.

