ICHOLAS André was born in Dijon, France on October 15, 1704. He began experimenting with surgery when only 16 years of age and graduated from the medical faculty at Montpellier. He was a surgeon at Saint-Cyr and, later, at La Charité in Versailles, where he became surgeon to the royal house of Versailles in 1729 (Fig. 1). He may have studied or worked with Marechal, who was personal physician and surgeon to Louis XIV. Little is known about André other than his publications that focused on remedies that he claimed aided digestion, urination, and healing of sores and abscesses (mostly related to venereal disease). His published works included: Dissertation sur les maladies de l'urèthre qui ont besoin de bougies (1751), Manière de faire usage des bougies ou des sondes antivénériennes, medicamenteuses & chirurgicales (1756), and Nouvelles observations des maladies de l'urèthre et de la vessie (1766). His important legacy to neurosurgery originates from an obscure 25-page section in his 1756 publication, Observations pratiques sur les maladies de l'urèthre et sur plusieurs faits convulsifs. (Fig. 2). This section, translated by one of the authors (C.C.), is the subject of this paper.

Description of Trigeminal Neuralgia: “Tic Douloureux”

André’s contemporaries considered him to be a charlatan. It was said that “he exhausted the press with the weight of his writings, which bore the stamp of ‘charlatanisme.’” Despite these accusations, André adopted a rational approach to the treatment of a painful malady of the head that mostly affected the face; this he named “tic douloureux.” He incorporated an understanding of disease etiology and surgical treatment that was far advanced for his time. In the section subtitled, “Remarques sur certains mouvemens convulsifs” [sic] within Observations pratiques sur les maladies de l’urèthre et sur plusieurs faits convulsifs, he discussed his treatment of five patients with tic douloureux. Three patients had pain clearly recognizable as trigeminal neuralgia, with the first case being of traumatic origin. Another patient had occipital neuralgia and the last case appears to have been facial postherpetic neuralgia. André described what he believed was . . . a cruel and obscure illness, which causes . . . in the face, some violent motions, some hideous grimaces which are an insurmountable obstacle to the reception of food, which put off sleep . . . make speech choppy or slurred . . . motions, vague and intermittent . . . nevertheless so frequent as to be felt several times in a day, in an hour, and give sometimes no respite but are renewed every minute. Finally when those who are attacked by this illness want to articulate a few words, or to move the affected part of the body, the morbid nerve contracts and removes the ability to act freely.

André’s Philosophy of Treatment for Tic Douloureux

André’s description of tic douloureux allowed him to
develop a rational treatment plan. He begins his discussion by summarizing contemporary efforts at treatment. These included jaw bandage; antivenereal, antiepileptic, and antispasmodic agents; ointments; a milk diet; anodynes, cauteries, and vesicatories; peripheral neurectomy; and even insertion of the diseased portion of the face into the cavity of a recently slaughtered animal. The last method of treatment is rather difficult to fathom, whereas the use of antiepileptic medications is teasingly futuristic. André coined the term “tic douloureux” to replace the accepted description of cynical spasm (“spasme cynique”) (Fig. 3). This is a “distortion” called “crooked mouth” that . . . borrow its name from its likeness to the one made by angry dogs about to bite. . . I will hasten to conclude that the convulsive movements could not be named cynical spasm and that the name of tic douloureux fits them much better, because these two words describe contortions and grimaces accompanied by acute and almost unbearable pain.  

Although André’s new term would survive him, his descriptions of the etiology of the disease and the cases on which he formulated his therapeutic approach have been largely ignored.

André’s Case Descriptions and Treatment of Tic Douloureux

Nicolas André’s first case was that of a woman whose injury occurred 34 years before publication of her history. She struck her maxilla on the edge of a small table. Her throbbing bruise became infected with subsequent abscess formation. This progressed to osteomyelitis and fistulous drainage. In three separate procedures, the woman had three teeth extracted. Only after extraction of the incisor tooth did she develop her pain. The pain was in the second division of the trigeminal nerve and could be triggered by touching her upper lip.

After completing the accepted modes of contemporary treatment, André consulted the King’s surgeon, Marechal, who attempted a peripheral neurectomy of the inferior orbital branch of the trigeminal nerve. This was quite literally a bloody failure and apparently led André to revise the surgical approach for such a pain:
My purpose was to reach the bone, to destroy the periosteum, and to cut the nerve branch I suspected of being vitiated and the sole cause of the tic douloureux.4

André outlined a circle centered over the infraorbital nerve with plaster. He filled the open center with a “cauterizing stone” and created an eschar. André remarks that within 3.5 hours he had reduced the intensity of the patient’s pain. André painted “mercury water” onto the eschar, which was made by the cauterizing stone, to deepen the wound. The next day he cut the central portion of the eschar with a scalpel. He covered the opening with repeated applications of “bourdonnet” dressings soaked in mercury water, dry dressings, and a “plumanceau” drenched in “basilicum” dissolved in “wart oil.” He believed that mercury water was the key ingredient, which acted as a caustic agent to wear down the deeper tissue slowly and expose the maxillary bone, although it caused swelling of facial tissues. To further soften the eschar, every 6 hours he applied ointments and an “anodyne poultice between two muslins.” Several days later the caustic solution exposed the maxillary bone. Before reaching this point, André had already considerably reduced the frequency of the tic shocks. The pain stopped completely on the 12th day of treatment and relief lasted for 18 months before recurring.

André attempted to reproduce the pain before treating it. He found the infraorbital nerve sectioned in the middle of his eschar. He pinched the distal portion with tweezers, but noted no effect. He then pinched the proximal end with tweezers and recreated what he thought to be the tic pain. It is not clear that this was the typical pain of tic douloureux or simply the pain produced by irritation of the distal end of a sensory nerve. More important, however, was the fact that André had adopted a modern empirical diagnostic technique.

André tried to prolong the draining of the wound: “I was telling myself that the nerve ending was pinched inside the scar or the scar itself was a dam against the nerve fluid.” By keeping the wound open, André hoped to keep pressure on the nerve from recurring. His observation of the failure of Marechal’s surgical neurectomy led him to conclude that the blood clot formed after surgery continued to exert pressure on the nerve and prevented successful treatment. André’s philosophy of nerve function conformed to the galenic tradition of the time. It maintained that obstruction of a nerve, which was thought to be hollow, caused a pathological process. On the urging of his patient, André allowed the woman’s wound to heal without further infection. When the pain recurred, he reopened the wound and allowed it to drain “a vitiated nervous fluid that irritated the affected nerve and caused the painful fits that occurred near its retention.” This time André left the wound open afterward and the pain never recurred.

In ensuing cases, André refined his technique. His second patient had experienced pain for 15 years “with a main center in the lower left jaw, or rather in a nerve branch of the fifth pair called the maxillary inferior.” André’s description of this patient’s pain included remarks on the distribution of a trigeminal nerve branch. Once again, he had observed Marechal’s efforts at peripheral neurectomy and their failure associated with a postoperative hemorrhage 2 weeks later. The patient had pain relief that lasted only 2 months. André repeated his tedious and bloodless approach, once again reproducing pain by squeezing the proximal inferior maxillary nerve with tweezers. This time he enlarged the mental foramen and poured the caustic mercury water into the foramen, destroying the nerve. He pursued meticulous wound care, allowing the wound to drain for an additional 2 months before allowing its closure. Pain relief was complete for 11 months before the patient died of pneumonia.

For his third patient, a 70-year-old man, André applied the caustic agents until the nerve “was bare and all adhesions on the inferior maxillary nerve had been destroyed.” Clearly he was now making an effort to decompress the nerve carefully. Using the same principle, he treated his fourth patient, who experienced pain in the back of the neck, by incising the occiput, hoping to:
destroy along their way, at least in their distribution, some nerve branches of the ninth and 10th pair, but I was counting even more on the relaxation of the pericranium and the suppurations that had to ooze out of it.4

André believed that the best way to provide “peace” for the patient was to encourage wound drainage and, thus, prevent recurrence. He believed that, by decompressing the nerve, he would prevent recurrence. Soon after the wound healed, pain recurred. More likely, concurrent with the healing of the eschar, there was nerve regeneration. By keeping the patient’s wounds open, André prevented axonal regrowth. Nevertheless, his concept was twofold: injure the peripheral nerve that causes the pain and prevent adhesions or tissue-fluid accumulation from compressing the nerve.

The last patient most likely suffered from postherpetic neuralgia:

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The last patient most likely suffered from postherpetic neuralgia:

Often a kind of pimply or miliary erysipelas developed on the cheekbone. . . . Each of these little pustules was filled with a yellow and reddish serosity, which, as long as it flowed, left the patient in peace. But as soon as it stopped, the incidents reappeared with renewed strength and lasted longer.4

André noted that when the wound healed 5 months after treatment, the pain recurred. Reopening the wound and leaving it open provided the patient with “several years” of pain relief.

André summarized his theory of convulsive pain in the concluding section of his treatise:

The nerve is irritated by the morbid fluid that causes it to act up like a stretched violin string, which is set into vibration by the action of the bow. The convulsive pain consists, therefore, in the tension of the nerve threads, irritated and contracted because of a corrupt agent. The destruction of the combination and the creation of an exit for these fluids should be sufficient to relieve the pains. This convulsion was, therefore, in the domain of surgery because there was a local corruption that could be neither attacked nor defended by any medical means. The nerves are not inaccessible elements and they contain a fluid, carried along their cylinders, capable of being intercepted in the progress of its distribution.4

Eighteenth Century Medicine

Use of Mercury

Exposure to mercury was common in the 18th century not only in industry, but also as a therapy. Boerhaave5 speaks of the four “universal” remedies: water, fire, mercury, and opium.

Mercury is fourteen times heavier than the common and so penetrating as to enter passages which Water can never reach whence it is of all things most admirably disposed to dissolve and attenuate the several Humours throughout the whole arterial and nervous System.5

Mercury was used for all sorts of ulcers and “scabby Disorders.”5 Boerhaave wrote that one physician who was well disposed to use mercury acquired so much fame for his cures of ulcers, presumably of the skin, that “he was said to be assisted by the Devil.”5

Mercury nitrate was used in the manufacture of fur felt for hats. Workers became subject to “hatter’s shakes”: tremors affecting the tongue, hands, and legs. “Erethysm” was the term used to describe the accompanying florid personality changes (fatigue, irritability, emotional instability, and depression).13 This is the origin of the term “mad as a hatter,” exemplified by Lewis Carroll’s well-known afternoon tea party host. Rats exposed to methylmercury compounds display widespread accumulation in the dorsal ganglia and degeneration of peripheral nerves. Infants suffering from mercury poisoning, known as “acrodynia,” have hypotonia and reflex loss consistent with peripheral neuropathy. Pathologically, there is polynu- ritis, myelin degeneration, and central chromatolysis in the trigeminal ganglion, presumably a retrograde response to peripheral injury. André thus happened on a chemical treatment for his wound eschar that concurrently caused specific peripheral injury to the trigeminal nerve and to the ganglion. Although much more destructive, André’s chemical treatment with mercury is similar in principle to modern chemical rhizolysis.

Anatomy of the Fifth Pair of Nerves and Nerve Function

In his 1733 anatomy text, which was translated from the French, Winslow,14 a contemporary of André, illustrates the then-current understanding of the neuroanatomy of the cranial nerves. Using the terminology for cranial nerves in use at the time, Winslow’s illustrations identify the three branches of the “fifth pair” of nerves, the two portions of the nervi auditorii, the origin of the “eighth pair,” and the chorda tympani.
and the chorda tympani separately (Fig. 4). Charles Bell would later describe facial nerve function by cutting the facial nerve on one side and the trigeminal nerve on the other, thus distinguishing motor and sensory functions.12

André held to the galenic theory that obstruction of a nerve, which was hollow, interrupted flow of some humor or energy and, thus, caused disease. However, André’s use of a technique that attempts to reproduce symptomatic pain, such as pinching the nerve with tweezers, was novel to the 18th century. Knowingly or not, André put into surgical practice the more progressive theories of nervous sensibility and irritability that Albrecht Haller (1708–1777), a favorite pupil of Boerhaave (1668–1738), had adopted from Francis Glisson (1598/99–1677) and elaborated.6–11 When Haller read his classic De partibus corporis humani sensibilibus et irritabilibus6 before the Royal Society of Sciences of Gottingen in 1752, anatomy became an experimental science. For André to attempt to reproduce pain using such a technique shows application of dynamic principles to solve physiological problems. Although André did not reference Haller, who advanced the theory that nerves are wholly responsible for the state of sensitivity, he must have known of Haller’s work or independently held similar beliefs about the concepts of sensibility and irritability.

André’s technique of experimentally reproducing pain implies actual use of novel theories, either his own unespoused theories or new theories such as Haller’s. André may have been the first to use such theories in the practical surgical approach to neurological disease or, at least, a disease he held to be directly caused by a problem with a nerve. This is significant because, apart from the introduction of the doctrine of sensibility and irritability posited by Haller, as late as the 18th century knowledge concerning nerve action had not greatly progressed beyond that of Galen (circa 130–200 AD). Moreover, there had been little or no application of theories of nerve action toward surgical problems.

Conclusions

André believed that the pain of tic douloureux arose from compression of sensory peripheral nerves. He used empirical methods of scientific observation and experimentation to confirm this hypothesis by compressing the proximal end of the involved nerve with tweezers in an effort to reproduce the pain. He treated the pain by taking care to remove what he thought to be scarred adhesions from the nerve with a caustic solution of mercury water. In fact, he was simply injuring the nerve by burning it, although he believed that he could prevent recompression by ensuring long-term open drainage of the wound. He observed recurrence of pain concurrent with closure of the wound and he hypothesized recompression as the cause. This was not likely the case, as we now know, because peripheral compression is not the cause of trigeminal neuralgia. André’s surgical technique of using progressive application of cauterizing stones ensured that there was none of the blood loss seen by the traditional use of the scalpel blade and none of the danger of rebleeding and recpression of the nerve by an accumulated blood clot. Included in his case reports were clinical details of benefici