



4-1-1981

Joseph Smith's Boyhood Operation: An 1813 Surgical Success

LeRoy S. Wirthlin

Follow this and additional works at: <https://scholarsarchive.byu.edu/byusq>

Recommended Citation

Wirthlin, LeRoy S. (1981) "Joseph Smith's Boyhood Operation: An 1813 Surgical Success," *BYU Studies Quarterly*: Vol. 21 : Iss. 2 , Article 2.

Available at: <https://scholarsarchive.byu.edu/byusq/vol21/iss2/2>

This Article is brought to you for free and open access by the Journals at BYU ScholarsArchive. It has been accepted for inclusion in *BYU Studies Quarterly* by an authorized editor of BYU ScholarsArchive. For more information, please contact scholarsarchive@byu.edu, ellen_amatangelo@byu.edu.

Joseph Smith's Boyhood Operation: An 1813 Surgical Success

LeRoy S. Wirthlin

In 1813, in America, surgery was not a medical specialty. There were no surgeons as we know them today. Physicians operated out of necessity, but none claimed surgery as a specialty. Moreover, only a few who practiced medicine had ever attended medical school.

These were primitive days. Before the horse-and-buggy days of medicine, physicians rode horseback over the rough country roads. There was considerable riding as there was not a single institution in New England in 1813 that might be called a hospital.

These were also the pre-Listerian days of surgery before appreciation of bacterial infection, before antiseptic dressings, before the surgical rituals of gown, mask, gloves, and sterile instruments.¹ Infection of the surgical wound accompanied most operations; and, therefore, the scope of surgery was very limited. There was no surgery in any body cavity; operations were performed to drain infection, occasionally to repair hernias, to set fractures, and to amputate limbs.

In addition to the problems of infection, the absence of anesthetics limited the number of operations. Before anesthesia was

LeRoy S. Wirthlin, M.D., formerly an assistant professor of surgery at Harvard Medical School, is a vascular surgeon in Detroit.

This article was delivered as a paper on 26 January 1980 at a history symposium at Brigham Young University. It was published in the proceedings of the symposium: LeRoy S. Wirthlin, "Joseph Smith's Boyhood Operation: An 1813 Surgical Success," *The Eighth Annual Sidney B. Sperry Symposium: A Sesquicentennial Look at Church History, January 26, 1980* (Provo, Utah: Brigham Young University Religious Instruction and the Seminaries and Institutes of Religion, The Church of Jesus Christ of Latter-day Saints, 1980), pp. 328-47.

¹Surgery in the rural areas had not improved even by 1870. Surgical practice in the rural midwest was remembered as follows:

Operations in rural districts even for the simplest of lesions were practically unknown. In those days all wounds suppurated. . . . In the first operation I witnessed, the surgeon threaded the needles with silk and then stuck them in his lapel of his coat so as to have them readily accessible when needed. He held the knife in his teeth when not in actual use. . . . It is therefore, easy to understand why all wounds suppurated. Injuries which today seem comparatively trivial were treated by amputation. . . . The reason for such radical measures was that because of suppuration the surgeon, usually called from a distance, found amputation the most practical measure. (Arthur E. Hertzler, *The Horse and Buggy Doctor* [Garden City, N. Y.: Blue Ribbon Books, 1938], pp. 6-7.)

demonstrated in 1846,² surgery was an ordeal for the patient and surgeon as well. Later with the construction of hospitals in America and with the use of anesthesia, the scope of surgery expanded so that medical centers emerged where surgeons demonstrated their skills in large operating amphitheatres.³

In 1813, surgery was carried out under the most humble circumstances, whether in Boston or in a rural area. Yet at that time there were two physicians in New England whose surgical abilities were remembered; one was John Warren of Harvard Medical School, and the other was Nathan Smith of Dartmouth Medical School in New Hampshire.⁴

With the identification of Nathan Smith as one of the principals in Joseph Smith's boyhood surgery,⁵ we have an opportunity to examine a surgical success of an unusual operation. In this case we have documentation from the patient⁶ as well as the independent report by the mother, Lucy Mack Smith.⁷ We also have interesting surgical documentation. Even though there were no individual patient records in those days, we have medical students' letters, their lecture notes, and we have the published work of Nathan Smith on his development of the surgical techniques that were to be applied in Joseph Smith's operation.⁸

Joseph's surgery has been described as "brutal" and "gruesome," but when seen through the eyes of the surgeon, there was a great sophistication in the operation performed. The purpose of this report is to examine Joseph Smith's illness and operation in its historical setting and to examine the surgical contributions of Nathan Smith as they relate to this episode.

²The general anesthetic effects of ether during surgery were demonstrated at the Massachusetts General Hospital in Boston, October 1846.

³Edward D. Churchill, *To Work in the Vineyard of Surgery; The Reminiscences of J. Collins Warren 1842-1927* (Cambridge: Harvard University Press, 1958), pp. 38-39.

⁴Gordon A. Donaldson, "The First All-New England Surgeon," *American Journal of Surgery* 135 (April 1978): 471-79.

⁵LeRoy S. Wirthlin, "Nathan Smith (1762-1828) Surgical Consultant to Joseph Smith," *Brigham Young University Studies* 17 (Spring 1977): 319-37.

⁶Joseph Smith, Manuscript History of the Church, Book A-1, note C, p. 131, Church Archives.

⁷Lucy Mack Smith, *History of Joseph Smith* (Salt Lake City: Bookcraft, 1958), pp. 51-58. A preliminary manuscript of the first draft of this biography is located in the Library-Archives, Historical Department of The Church of Jesus Christ of Latter-day Saints, Salt Lake City, Utah (hereafter referred to as Church Archives). This first draft was dictated by Lucy Mack Smith to her secretary, Martha Jane Knowlton Coray. Since the preliminary manuscript adds details omitted in later publications, the original draft will be quoted. A copy of the original draft was kindly supplied by Richard L. Anderson, professor of history and religion, Brigham Young University.

⁸Nathan Smith, "Observations on the Pathology and Treatment of Necrosis," *Philadelphia Monthly Journal of Medicine and Surgery* (1827), pp. 11-19, 66-75. Reprinted in Nathan Smith, *Medical and Surgical Memoirs* (Baltimore: William A. Francis, 1831), pp. 97-121 and *Medical Classics* 1 (April 1937): 820-38.

SURGICAL HISTORY

Nathan Smith had gained a wide reputation in New England as a successful surgeon based on his achieving good results under difficult, almost hopeless, conditions. Also, he carried out operations that few in his day dared, and he was successful with these unusual procedures. He was the second American surgeon to enter the abdominal cavity to remove a tumor of the ovary.⁹ He also carried out "couching," an ancient procedure for cataracts.¹⁰ Nathan Smith as the sole professor at Dartmouth Medical School (which he founded) became the court of last resort in northern New England, rendering final opinion and definitive surgery for the most difficult problems. His daybooks and Dartmouth students' letters attest that, in doing so, he traveled widely throughout northern New England. One of his students wrote:

I have been a journey of 95 miles up Connecticut River in which I saw four operations successfully employed, three of them were the removing a portion of the bones which perished in the limb, the other which was the most difficult one that I ever saw, was what I mentioned in my letter home. It took Doctor Smith above an hour to perform it. . . . I have been this moment ordered to Vershire, 8 miles in the rain.¹¹

Another student wrote:

I went to Concord with Doct Smith and upward of twenty of his students to see a limb taken off but when he got there he concluded that he could cure it without taking off the limb.¹²

These letters document the expanse of Nathan Smith's practice and also refer to an unusual surgical procedure. The operative removal of bone from a limb was not ordinary practice during that period. Nathan Smith had gained experience treating what was colloquially called "fever sore," or what we recognize now as osteomyelitis, the bacterial infection of bone. It was with the development of surgical techniques for this disease that he was to play a decisive role in Joseph Smith's boyhood illness.

⁹Donaldson, "First All-New England Surgeon," p. 476.

¹⁰Couching was an old procedure for the treatment of cataracts. One placed a needle through the side of the eye into the opacified lens and pushed it down out of the line of sight. Corrective glasses were fitted and sight was restored. There appeared to be little infection in Nathan Smith's hands. A student wrote: "Doct Smith has performed the operation of couching five times within these six weeks. They report to him from all parts of the country, one person from the vicinity of Boston came here completely blind and had both eyes operated upon three weeks since. She can now read tolerably well by the assistance of glasses. The more I become acquainted with Doct Smith the more I have reason to esteem him." (Alexander Boyd to William Boyd, Jr., 26 November 1810, Dartmouth College Library, Hanover, New Hampshire.)

¹¹Ezekiel Dodge Cushing to Mehetibal Cushing, undated, Oughterson Collection, Yale Medical Library, New Haven, Connecticut.

¹²Alexander Boyd to William Boyd, Jr., 26 November 1810.



Figure 1. The end stage of osteomyelitis was well know. Shown is a pathological specimen of chronic osteomyelitis of the femur. The sequestrum (center) has been removed.

(Table I, J. P. Weidman, *De Necrosi Ossium* [Frankfurt am Main, 1793], National Library of Medicine, Bethesda, Md.)

Surgical cures for osteomyelitis were unheard of at that time. With an absence of specific treatment and before antibiotics, this illness took great toll of many youth in both morbidity and mortality. If those affected survived the acute phase, they were left with ulcers and chronic purulent drainage.

Even in this century in the immediate pre-antibiotic era, surgical cures were difficult to come by. The overall mortality was still high and varied from 1.5 to 26 percent, with an average of 12 percent.¹³ Of the survivors, only 50 percent were cured by surgery.¹⁴ The experience to 1937 was summed up by one reviewer: "The survey of the literature on acute hematogenous osteomyelitis from January, 1932, to June, 1937, establishes clearly one fact, and it is the only fact established clearly, namely the disease has a poor prognosis."¹⁵

If the disease had a poor prognosis in 1937, prognosis was almost hopeless for centuries before. Although the late pathology of the condition was known (see Figure 1), nothing was done. It had long been recognized that in the more chronic stages, pieces of bone might work to the surface and protrude through the skin (see Figure 2). These pieces were simply plucked away, but this was not surgery. If there were fever and sickness with the chronic stage, the limb was amputated. Amputation continued to be the treatment during the Civil War, the Crimean War, and even into the First World War.

Following the First World War, more conservative methods were employed.¹⁶ Although useful in treating osteomyelitis associated with gunshot wounds and compound fractures, the conservative means were not successful in treating acute hematogenous osteomyelitis. Only after direct surgery on the diseased bones could one begin to speak of cures. Successful management was accomplished by the early drainage of bony abscesses and by aggressive removal of dead fragments. Starr, Lexer, and Wilensky are usually given credit by modern writers for these contributions;¹⁷ these men carried out their work in the early twentieth century.

¹³Abraham Wilensky, *Osteomyelitis: Its Pathogenesis, Symptomatology and Treatment* (New York: Macmillan Co., 1934), p. 237.

¹⁴Ibid., p. 245.

¹⁵E. T. Crossan, "Hematogenous Osteomyelitis: Collective Review of the Literature from 1932 to 1937," *International Abstract of Surgery: Supplementary to Surgery, Gynecology and Obstetrics* 66 (1938): 176.

¹⁶William Orr, following his experience in the First World War, decided that much of the persistent infection in cases of osteomyelitis was due to the repeated redressing of wounds with exposed bone. His treatment which was popular for years consisted of debridement of the wound, packing with vaseline gauze, and immobilizing the limb in a plaster of Paris cast. The gauze dressing and cast were changed only when the odor was severe or the drainage softened the cast. (William Orr, *Osteomyelitis and Compound Fractures and Other Infected Wounds* [Saint Louis: Mosby, 1929].)

¹⁷Edgar M. Bick, *Source Book of Orthopedics* (New York: Hafner, 1968), p. 227.



Figure 2. A late state in which the sequestrum (almost the entire length of the previous shaft) worked through the surface. This was usually completely separated and could be plucked out, a practice dating to Hippocrates.

(Table IX, Weidman, *De Necrosi Ossium*.)

However, Nathan Smith, who published a classic work on surgery for osteomyelitis as early as 1827,¹⁸ predated these same contributions by about a hundred years. As his paper is the clearest and most comprehensive treatise to have appeared, it will be quoted so that we can see the disease through the eyes of this early nineteenth-century surgeon. Nathan Smith correctly recognized the pathology of the disorder and the basic principle of care.

Necrosis [osteomyelitis] commences with an acute inflammation, either in the bone itself or its investing membrane, accompanied with an acute pain. . . .

Almost with the first commencement of the pain there occurs severe symptomatic fever of the inflammatory character. The local affection generally terminates in suppuration, frequently as soon as the fourth or fifth day. . . . The matter is at first deposited between the external periosteum and the bone. When the shafts of the long bones are the seats of the disease, about the same time that matter is deposited between the external periosteum, there is formed a corresponding collection between the internal surface of the bone and the membrane surrounding the medullary substance, so that there then exist two collections of matter bathing the opposite sides of the walls of the bone. This fact, which I deem of great importance, as being essential to the correct treatment of the disease . . . namely, the trepanning of the bone.¹⁹

Who had the disease in the early 1800s?

Necrosis is almost exclusively confined to young subjects. I have very rarely seen it in persons under five, or over twenty-two.²⁰

Which bones were involved?

In regard to the locality of necrosis, although, perhaps, every portion of the bony fabric is liable to its attacks, yet it occurs in some bones much more frequent than in others. . . . My own experience would determine the tibia to be the most frequent seat of disease; next to this, the femur, and then the humerus.²¹

¹⁸Nathan Smith, "Necrosis," *Medical and Surgical Memoirs*, pp. 97–121. An early report on surgery for osteomyelitis appeared in the *New England Journal of Medicine* and related details of technique similar to those taught by Nathan Smith. Nathan Smith may have been scooped by a former student, John R. Martin (Dartmouth Medical School class 1810), who published on two successful cases of sequestrectomy in Bangor, Maine. (See John R. Martin, "Two Cases of Necrosis," *The New England Journal of Medicine and Surgery and the Collateral Branches of Science* 1 [1812]: 162–69.)

¹⁹Nathan Smith, "Necrosis," *Medical and Surgical Memoirs*, pp. 98–99. Trepanning of bone referred to the removal of a disc of bone with a trephine.

²⁰*Ibid.*, p. 101.

²¹*Ibid.*, p. 102.

He comments as to the general outcome of the disease:

In regard to the general prognosis of the disease, I have observed that a very great majority of patients survive its attack, though often with long confinement, protracted suffering, and great emaciation. In a few cases, however, the disease proves fatal, and when it does so, it frequently happens at an early period of its progress.²²

Nathan Smith began operating directly on osteomyelitis in 1798 when he realized that bony abscesses might be drained.²³ With success on the first attempt, he began to operate more frequently. He came to recognize three stages of the disease, each with a different surgical approach.

If the surgeon has the good fortune to be called on the first attack of pain . . . as soon as the disease, by swelling and tenderness of the part, has sufficiently marked the seat of the inflammation, an incision should be made, in a longitudinal direction, through all the soft parts down to the bone, and through the periosteum. . . . I have not been fortunate enough to be called in till matter is formed, and therefore have not had it in my power to test this mode of treatment.²⁴

This operation, for the first stage, was a simple incision through the inflamed tissues over infected bone without actual drainage of the bone. Although Nathan Smith thought this incision might work, he never had the opportunity to test it.

There was an intermediate stage that could be treated by the drilling of bone (see Figure 3). By astute observation alone, Nathan Smith was able to localize the abscess in the bone and drain it.

The second stage of this disease, when the matter has formed between the periosteum and the bone, still admits of a cure without any loss of bone. If, in this stage of the disease, an incision is made through the soft parts, and the periosteum be divided as far as it is separated from the bone, and a portion of the bone be cut out with a saw, or several perforations be made in the bone . . . down to the medullary substance, so as to allow the matter collected between that substance and the walls of the bone to escape, the necrosis or death of the bone will be prevented. . . . If this mode of treatment be put in practice early enough, and the perforations be made in the bone sufficient to afford a free exit to the matter, it will always succeed. The best instrument for perforating the bone is a small trephine that cuts out a piece about the size of a nine-penny-bit.²⁵

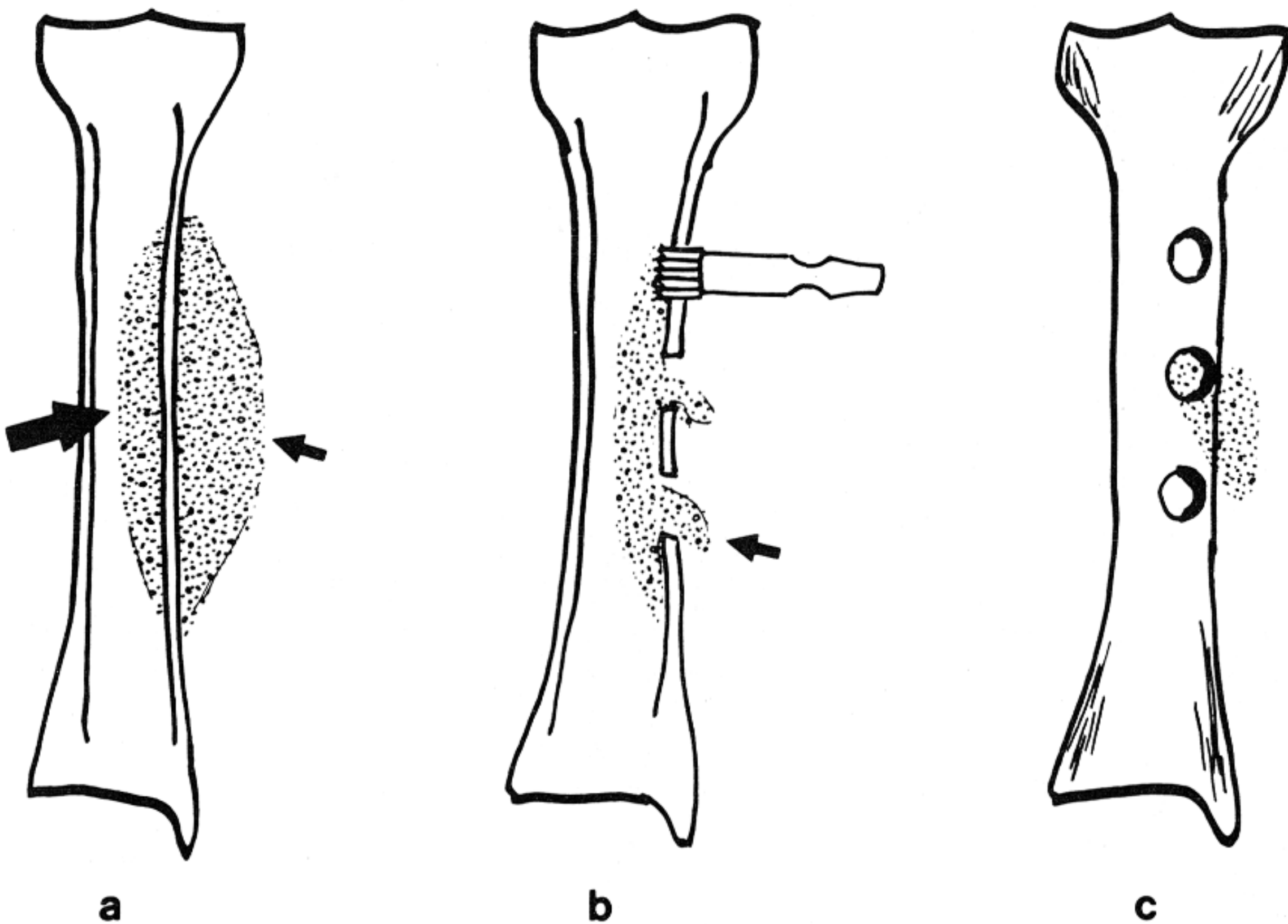
²²Ibid., pp. 103–104.

²³Ibid., pp. 109–11.

²⁴Ibid., pp. 111–12.

²⁵Ibid., pp. 113–14.

Figure 3. The second stage of the disease. There is a collection of purulent material on the external surface (small arrow) and also in the medullary cavity of the bone (large arrow). This is drained by removing small discs of bone with a trephine, allowing egress to the purulent material (b, c).



In the chronic stage of the disease when death of the shaft of the bone occurs, necessary surgery became more radical (see figures 4 through 8 on pp. 140–42).

In the third stage of the disease, the matter has made its escape through the periosteum, and obtained a lodgement in the soft parts. . . . The treatment, in this stage, is precisely the same as in the second stage, but the favourable result is not so certain, as a portion of the bone may have been deprived of its circulation too long, or may be perfectly dead, and the separation between the living and dead bone may have commenced. In that case, the operation cannot save the bone entire; a portion must necessarily be cast off. . . . The bone should then be perforated and a portion sawed out, so as to give free vent to the matter contained within it. . . . If a portion of bone should be cast off, the perforation will enable the operator . . . to break it the more easily, which is often a necessary part of the operation in removing large sequestra.²⁶

This operation became known as sequestrectomy. It was heroic surgery for the early 1800s.

²⁶Ibid., pp. 114–15.

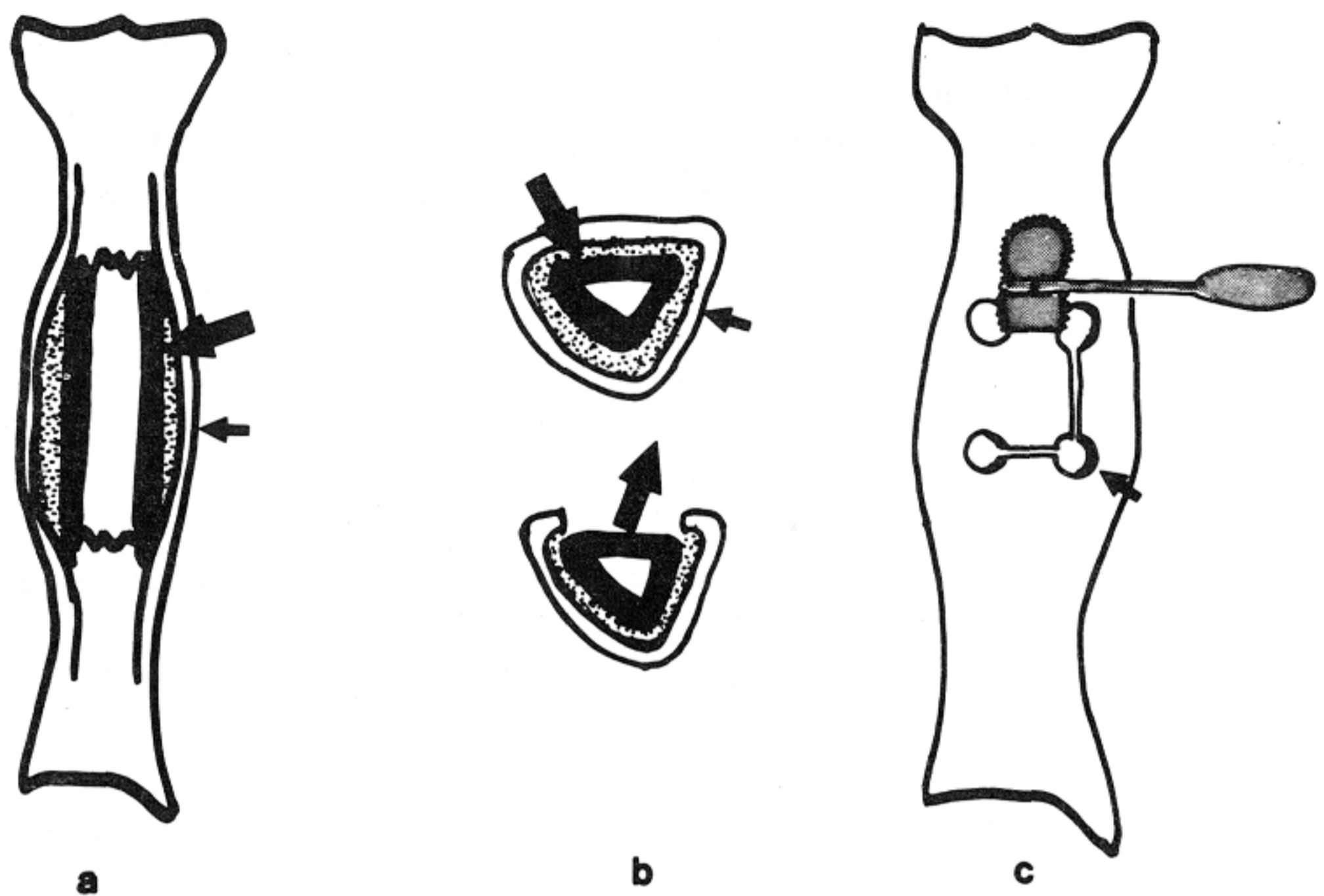


Figure 4. Nathan Smith's third stage of the disease. In (a), the dead bone (large arrow) is encased in a cylinder of new bone (small arrow). In (b), a cross section of the bone shows the dead portion (large arrow) within the outer casing of new bone (small arrow) and surrounded by purulent material. If a window were created in the new bone (involucrum), the sequestrum could be removed. This was done by making several small perforations with a trephine (c) and connecting these holes by cuts made with a small Heys saw.

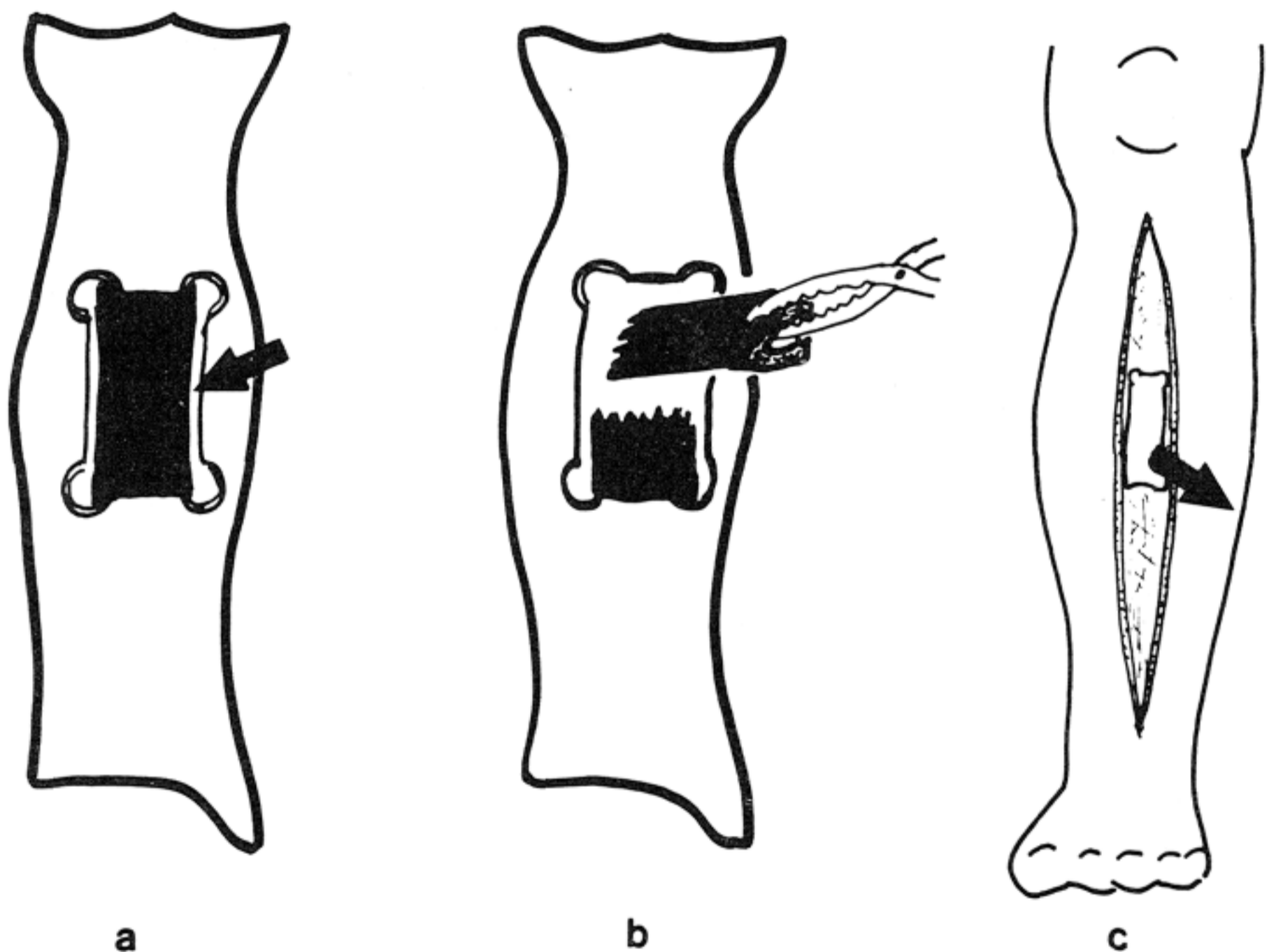


Figure 5. With the window of the outer bone removed (a), the surgeon had access to the sequestrum (arrow), which could be broken up and removed (b). The resultant wound consisted of an incision with windowed bone at the base, allowing further egress of infection or small boney spicules.

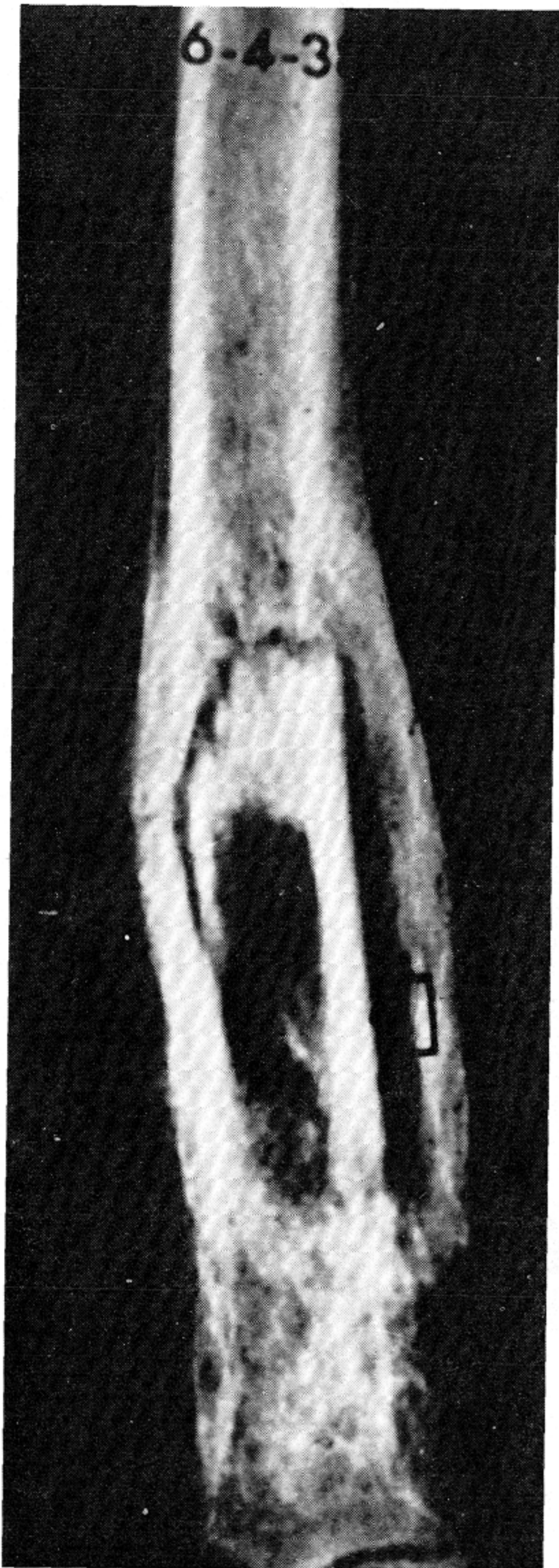


Figure 6. A 1938 x-ray of a long bone with chronic osteomyelitis showing the sequestrum within the involucrum. With the introduction of the x-ray tube at the turn of the century, localization of diseased bone became easier, and greater enthusiasm for surgical drainage resulted.

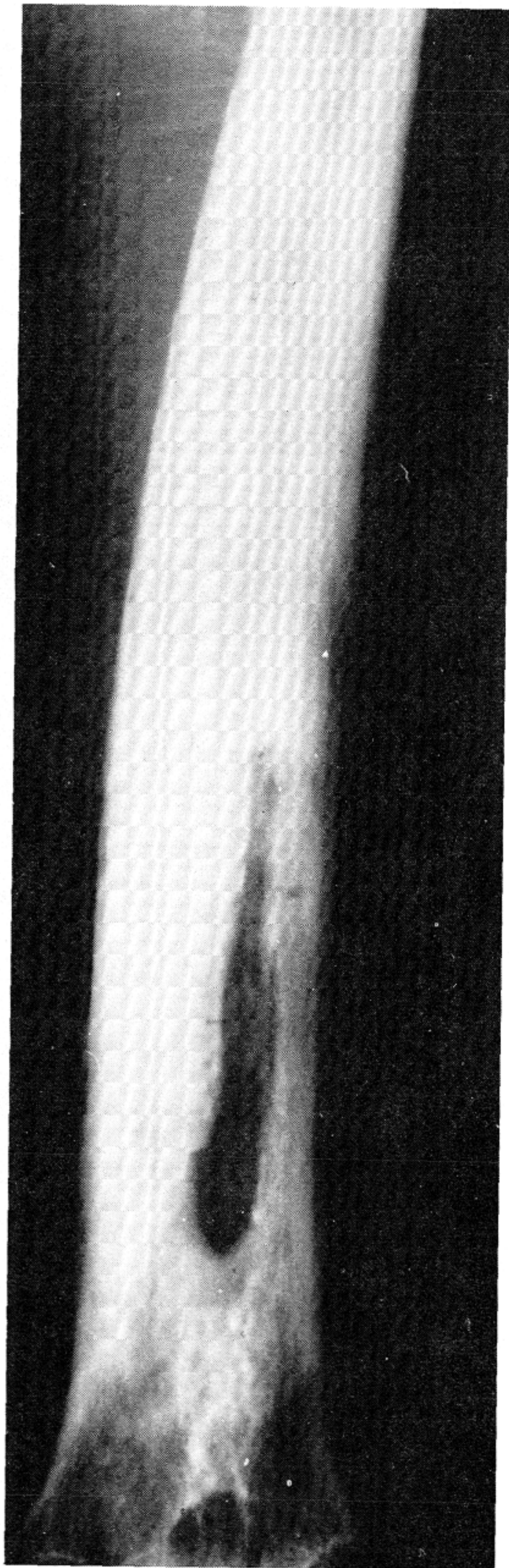


Figure 7. An x-ray of a healed femur in which a window had been removed for drainage.

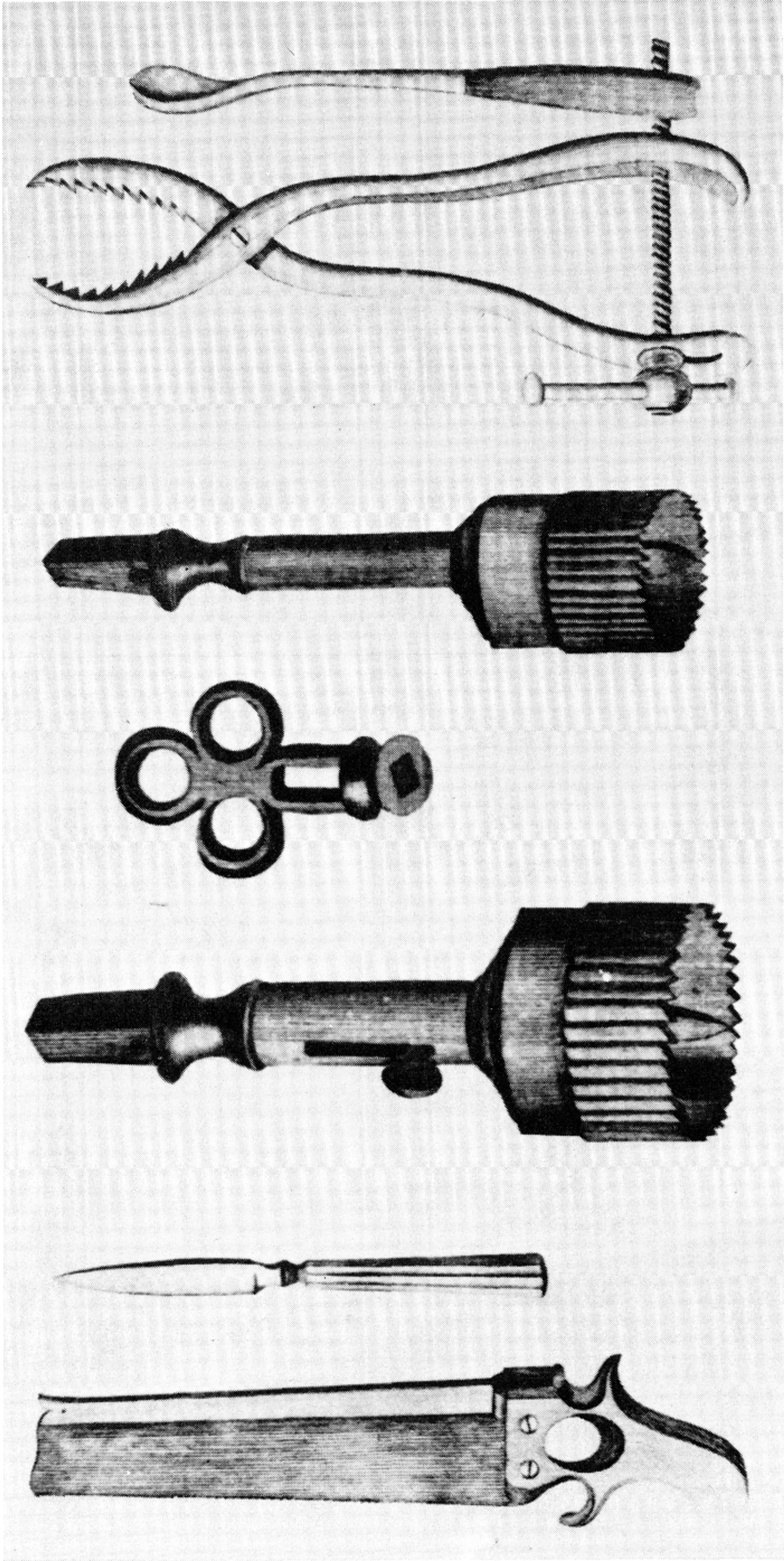


Figure 8. Eighteenth-century surgical instruments. On the left is an amputation saw and a scalpel. The third and fourth instruments are trephines, used to remove a disc of bone. The trephines that Nathan Smith used were of smaller diameter. The sixth instrument is a bone-grasping forcep.

(Benjamin Bell, *A General System of Surgery* (1718), National Library of Medicine, Bethesda, Md.)

But doing the operation is only half the battle; the wound must heal cleanly thereafter. The wound left by such an operation would be considered complex even today. There was an open incision with exposed bone through which there was a window to its central cavity. The medical literature on caring for such wounds is vast. After the First World War, extremities with exposed bone were placed in plaster casts which were changed only when the stench or soilage became unbearable. Wounds were irrigated several times a day with strong chemical disinfectants; some wounds were scraped. Finally, there was a period between 1920 and 1930 when maggots were placed into the wounds to help with the debridement of dead and purulent material.²⁷ It was not until after the Second World War that the care of a wound with exposed bone became standardized as we know it today.

Nathan Smith wrote little about the care of wounds when bone was exposed. It was perhaps so simple and ordinary that little comment was found necessary.

After the incision, the treatment, both general and topical, should be such as we recommend in cases of simple incised wounds . . . excepting that we should not try to approximate the edges of the incision by adhesive plaisters, but dress them with simple applications, such as lint.²⁸

After the operation has been performed, in either stage of the disease, nothing more need be attempted, and no instrument, not even a probe, should be thrust into the wound.²⁹

In some cases, in which the discharge has been very copious, I have checked it by throwing in a solution of corrosive sublimate, of the strength of 10 grains to a pint of water, to be repeated once in four or five days.³⁰

It was remarkable that the wounds did not become secondarily contaminated and require amputation for control of infection. Several factors may have contributed to this success. Patients were cared for in their homes which may have been cleaner than later hospitals. Hospitals tended to concentrate infection, and before antiseptic treatment was accepted, there was a significant mortality from

²⁷Bick, *Source Book of Orthopedics*, pp. 226–27.

²⁸Nathan Smith, "Necrosis," *Medical and Surgical Memoirs*, p. 112. A medical student recorded further detail: "Treat it as in other respects as you would any common wound only that you do not attempt to unite it by first intention, as it will continue to discharge matter for some time" (James S. Goodwin, "Extracts from Lectures Delivered at Dartmouth Medical Theatre by Nathan Smith, M.D.C.S.M.S. Lond" 1812–1813, p. 90, Dartmouth College Library).

²⁹Nathan Smith, "Necrosis," *Medical and Surgical Memoirs*, p. 116.

³⁰Ibid. Corrosive sublimate was mercury bichloride, a powerful and sometimes toxic disinfectant.

simply going to the hospital. In the late 1800s, the mortality associated with amputations in hospitals was four times as great as those performed in homes.³¹ In a home, fewer persons handled the wound and there was no cross contamination from wounds of other patients. Also Nathan Smith warned against subsequent probing or manipulation of the bone, thus reducing the chance of secondary infection. He controlled purulent discharge with a periodic irrigation of a strong disinfectant. In addition, and perhaps most important, there was no great hurry to have the wound close. Nathan Smith seemed to have an unusual appreciation for the natural reparative process. If drained and treated simply, the wound would heal and multiple reoperations, characteristic of the twentieth century, were unnecessary. Nathan Smith comments on his success:

When I first began to perform operations of this kind, I was under the apprehension lest so much bruising and handling of the soft parts, as is sometimes necessary, to dislodge a large sequestra unfavorably situated, might be followed with bad consequences, and some of these operations have been most laborious and tedious, both to myself and the patient, which I have ever performed, yet I have never known any untoward circumstances to follow such operations, of which I have performed a great many.³²

Nathan Smith apparently enjoyed success with this approach as subsequent amputation is not mentioned. He learned that if the joint was involved the leg was lost. But neither in student notes nor in his paper does he discuss amputation following sequestrectomy.

Even though Nathan Smith himself was successful, his ideas did not become popular. There may have been few brave enough to attempt such radical surgery. There was also minimal opportunity to promulgate a new treatment outside of his classrooms. His work was published twice but seemed to attract little attention. T. Morven Smith, one of Nathan's four physician sons, published a paper in 1838 on his experience with four cases of osteomyelitis. His work followed the teaching of his father:

The following cases are designed to illustrate and justify pathological views, and mode of treatment suggested some years since by my father, the late Professor N. Smith of Yale college, in his surgical memoirs . . . Case I . . . July 27th, early in the morning I visited again my patient, found he passed a bad night. . . . I now concluded to

³¹Astley P. C. Ashhurst, "The Centenary of Lister (1827-1927): A Tale of Sepsis and Antisepsis," *Annals of Medical History* 9 (Fall 1927): 205-21.

³²Nathan Smith, "Necrosis," *Medical and Surgical Memoirs*, pp. 120-21.

operate according to the plan of my father . . . to cut down upon the bone, and if I found matter under the periosteum, also to perforate the bone.³³

His report described his results with four patients and did not go unnoticed. The report was cited in a French medical publication with the following comment:

The heroic measure proposed by the American surgeon consists in trephining the bone. He states that he had witnessed the success of this in the hands of his father, and that he resorted to it in four cases with success. . . . Notwithstanding the facts detailed in the above paper, many surgeons will hesitate before they trephine a bone . . . fearing that they might not find an abcess within, or that they might give rise to the very condition which they propose to remove. We must leave this question, therefore, undecided, and wait until time and further observations shall aid in its solution.³⁴

The fears of carrying out radical bone debridement and drilling were well expressed in the French citation: an inability to localize the abcess and fear of causing more harm. The technique did not become popular.³⁵ Professor Samuel Gross of Philadelphia, in his 1876 summary of the first century of American surgery, mentioned Nathan Smith's work and the report by his son, T. Morven Smith. Professor Gross thought the work sound but added:

Of the nature of this mode of treatment in this class of affectations it is impossible to form too high an estimate. Unfortunately it is seldom resorted to; or, if employed, the operation is performed too late to be productive of much benefit.³⁶

³³T. Morven Smith, "Cases of Necrosis Illustrating the Practice of Exposing and Perforating the Diseased Bone at an Early Period in the Progress of the Malady," *American Journal of the Medical Sciences* 40 (November 1838): 93-96.

³⁴Cited and translated in George C. Blackman, "On Certain Points Connected with the Pathology and Treatment of Abcess in Bone," *American Journal of the Medical Sciences* 57 (October 1869): 378-91.

³⁵There was another early report, published in 1828, one year after Nathan Smith's paper, on experience with surgery of osteomyelitis on eight cases. This was reported by a Dr. Benjamin Simon of South Carolina who trephined bone for the drainage of abcess. Six of the reports concerned work on slaves:

Joe, the property of Dr. Richardson, had an ulcer on the tibia. . . . An operation was determined on. An incision was made along the tibia on its anterior portion. The integuments were dissected back, and three circles (of bone) removed with the trephine. The intervening space of the circles, and the diseased portions of the cancellated structure were likewise removed with a chisel. . . . His wound was dressed with dry lint, exfoliations took place, healthy granulations ensued, . . . in a few months he recovered. (See Blackman, "On Certain Points Connected with the Pathology and Treatment of Abcess in Bone," pp. 378-91.)

Nathan Smith began his work earlier and had greater experience. In the two student letters cited in the present report we find evidence of four cases alone and his paper spanned a twenty-nine year experience with the disease.

³⁶Edward H. Clarke, Henry J. Bigelow, Samuel D. Gross, T. Gailand, and J. S. Billings, *A Century of American Medicine 1776-1876* (Brinklow: Old Hickory Bookshop, 1876), pp. 160-61.

In summary, Nathan Smith preceded modern workers in his understanding and treatment of osteomyelitis by one hundred years. Early drainage of infection, complete removal of sequestra, and the simple, patient treatment of a complex wound were the ingredients of his success.

JOSEPH SMITH'S ILLNESS

With an appreciation for the surgical details, we can examine more closely the accounts of Joseph Smith's illness and surgery. The Smith family moved to Lebanon, New Hampshire, in 1811 and had lived there two years when an epidemic of typhoid fever struck.

In 1813 the typhus fever came into Lebanon and raged there horribly among the rest who were seized with this complaint were my oldest daughter Sophronia, who was sick 4 weeks next Hyrum came from Hanover sick with the same disease then Alvin my oldest and so till there was not one of my family left well save Mr Smith and myself.³⁷

Although the 1813 date was not mentioned in later accounts, it is probably accurate. Joseph Smith remembered his age as about "5 years old or thereabouts," which would not have placed the family in Lebanon.³⁸ We know there was a smaller epidemic in Hanover, New Hampshire, in the fall of 1812. Nathan Smith and his partner, Cyrus Perkins, treated over fifty patients in the vicinity of Hanover, many of whom were Dartmouth students.³⁹ A medical student wrote a report concerning the 1812 typhoid fever epidemic, detailing the symptoms and treatment. He observed:

Nothing remarkable took place until the month of July when (Hanover) was seized with the Typhus Fever. . . . It was observable that it first appeared among the students of College and more particularly among those of the Freshman Class. For several weeks it was confined to young Gentlemen: it then became less common with them and appeared among Young Ladies. It was likewise observable that it appeared principally among those who resided but a short time.⁴⁰

In the spring of 1813, a highly fatal respiratory disease was rampant in New England and touched Nathan Smith's family and further accounted for his remaining in Hanover until the fall of 1813.⁴¹

³⁷Lucy Mack Smith, Preliminary Manuscript, "History of Joseph Smith." In the original draft the sentence, "We had lived in this place for the space of two years . . ." was crossed out and replaced by the date 1813.

³⁸Joseph Smith, Manuscript History of the Church, A-1, p. 131.

³⁹Nathan Smith, *Practical Essay on Typhous Fever* (New York: E. Bliss and E. White, 1824), p. 53.

⁴⁰Samuel Farnsworth, "Account of the Typhous Fever which prevailed in this place, beginning the first of the month [July 1812]," Dartmouth College Library.

⁴¹"Account of a Disease in New York and New England in 1812-13," *New England Journal of Medicine and Surgery and the Collateral Branches of Science* (1813), pp. 241-52.

Nathan Smith had planned to visit Yale College to organize his move to New Haven. He had been recruited to be their first professor of surgery and medicine in the newly founded medical school; however, the 1813 epidemic interfered with his leaving Hanover. In explaining his delay in meeting with the officers of Yale College, he wrote Professor Benjamin Silliman:

Dear Sir . . . According to my promise to Dr. Cogswell, I intended to have visited you at New Haven last January, but before I was ready to set off on my journey, we were visited by a very fatal epidemic and instances of sickness and mortality became so frequent . . . I believe this country has never before been visited by sickness which has carried off so great a number of adult persons in so short a time. In some towns of this vicinity which contain perhaps from 1000 to 1500 inhabitants they have buried over fifty persons since the first of last January. The disease has not yet much abated either in its violence or frequency of attack.⁴²

As there were repeated episodes of typhoid fever in New England over the years, Nathan Smith developed expertise with treating this disease. His paper on the disease is considered a classic. He recognized that typhoid was contagious, that it would run its course, and that there was little one could do to alter the course or duration. He stressed that one should omit treatment that would make the patient worse. This was in contrast to the current practice in America, for in 1813 bleeding was a major treatment for most inflammatory conditions. Bleeding had been popularized and stressed by Benjamin Rush of Philadelphia. In the accounts we have of the Joseph Smith family encounter with typhoid fever, there was no mention of bleeding, reflecting the influence of Nathan Smith on local practice.

All the children in the Joseph Smith family contracted the disease; only the parents were spared. Joseph's older sister, Sophronia, was severely affected but recovered. Joseph Smith, seven years old, was also sick and in addition suffered several later complications requiring four surgical procedures.

I was attacked with the Typhus Fever, and at one time, during my sickness, my father dispaired [*sic*] of my life. The doctors broke the fever, after which it settled under my shoulder, & . . . Dr. Parker caled [*sic*] it a sprained shoulder . . . when it proved to be a swelling under the arm which was opened, & discharged freely.⁴³

⁴²Nathan Smith to Professor Benjamin Silliman, 31 March 1813, as cited in Emily A. Smith, *The Life and Letters of Nathan Smith, M.R.M.D.* (New Haven, Conn.: Yale University Press, 1914), pp. 85–86.

⁴³Joseph Smith, Manuscript History of the Church, A-1, p. 131. The identity of Dr. Parker is unclear. There was a Dr. Parkhurst who practiced in Lebanon. His name appears in Nathan Smith's daybook for making a house call together: "Oct 13, Elijah Gould (Lebanon) to visit with Dr. Parkhurst \$2.00." I am not sure whether Parker was indeed Parkhurst.

The first complication was an abcess under the arm (axillary abcess) which was missed by Dr. Parker. When called to reevaluate the problem after two weeks, he made the proper diagnosis.

Sent immediately for the Doctor who said he was of the opinion it was a sprain. . . . The Physician insisted on the truth of his first opinion and anointed [the] shou[lder] with bone linament but the pain remmained [*sic*] as severe as ever for 2 weeks when the Doctor made a close examination and found that a very large fever sore had gathered . . . which when it was lanced discharged a full quart of Matter.⁴⁴

The stage was now set for the most serious complication. With Joseph debilitated by typhoid fever and suffering from an undrained abcess of considerable size, bacteria from the abcess spread by way of the bloodstream into the tibia of his left leg. The pain in the leg was acute, unrelenting and severe.

As soon as this sore had discharged itself the pain left it shooting like lightening as he said into the marrow of his leg on the same side. The boy was almost in total despair Oh Father said he the pain is so severe how can I bear it His leg began to swell and continued in the most excruciating pain for two weeks.⁴⁵

When the pain and swelling continued for three weeks, a physician finally was called and young Joseph underwent the first of three operations on his leg.

At the end of 3 weeks he became so bad that we sent again for the surgeon who, when he came cut an incision of eight inches on the front side of the leg between the knee and the ancle [*sic*] . . . and by continual dressing his leg was somewhat relieved.⁴⁶

This comment by Lucy Smith describing the length and position of the incision identifies the bone involved to be the tibia. The operation might seem peculiar if we were not familiar with Nathan Smith's surgical instruction. A simple incision to the bone was the procedure recommended for what he called the first stage of the disease. Nathan Smith's statement that he never actually tried this operation suggests that Joseph's first operation was performed by someone other than Nathan Smith, but perhaps by a physician acquainted with Professor Smith's techniques.

The first incision relieved the pain from swelling of the soft tissues but did little to drain or contain the infection in the bone. The

⁴⁴Lucy Mack Smith, Preliminary Manuscript, "History of Joseph Smith." A quart of pus would have been a huge abcess in a seven-year-old boy.

⁴⁵Ibid.

⁴⁶Ibid.

wound was dressed and allowed to heal. The healing of this first wound would have taken from two to three weeks, and with its healing, pain and swelling returned.

And by continual dressing his leg was somewhat relieved [*sic*] untill [*sic*] the wound commenced healing when the pain became as violent as ever the surgeon again renewed the wound by cutting to the bone the second time shortly it commenced healing the second time and as the healing progressed the swelling rose at last a council [*sic*] of surgeons was called it was decided that there was no remedy but amputation.⁴⁷

This operation was a repeat of the first without the drainage of bone suggesting again that Nathan Smith was not involved with the second procedure. The infection remained unchecked for at least two months. The surgeon who carried out the previous operations, discouraged with the progress of the disease, recommended amputation. A "council of surgeons" or a second opinion was sought. This came in the form of Nathan Smith, his partner Cyrus Perkins, and the usual entourage of medical students in addition to a Dr. Stone.

I endured the most acute suffering for a long time under the care of Drs Smith, Stone and Perkins of Hanover. At one time eleven Doctors came from the Dartmouth Medical College, at Hanover New Hampshire, for the purpose of amputation.⁴⁸

Lucy Smith also commented on the size of the group in her preliminary manuscript:

. . . when they rode up to the door & invited them into another room.
. . . Now I said gentlemen (for there were 7 of them) what can you do to save my boys leg They answered we can do nothing we have cut it open to the bone and find the bone so affected that it is incurable.⁴⁹

Why was amputation mentioned? We know that Nathan Smith taught amputation was unnecessary and had indeed taught that to

⁴⁷Ibid.

⁴⁸Joseph Smith, Manuscript History of the Church, A-1, p. 131. The identity of Dr. Stone is also a mystery. He was mentioned in both accounts, and in Joseph's he was listed with those coming from Dartmouth Medical School. He was not on the faculty, as only Smith and Perkins represented the total medical school faculty in 1813. We do not have evidence that he was ever a student at Dartmouth. There are Stones mentioned in the 1940 *General Catalog of Dartmouth College* and in G. T. Chapman's *Sketches of the Dartmouth College* (Cambridge: n.p., 1867), but these men were not physicians. There are no Stones in the records of other New England schools including Vermont Medical College at Woodstock; Castleton Medical College, Castleton, Vermont; University of Vermont Medical School; and the Medical School of Maine (personal communication, Kenneth C. Cramer, archivist, Dartmouth College Library to LeRoy S. Wirthlin, 9 April 1980). The latter medical schools started after 1812, but in many cases, physicians would practice and then go to medical school. It is possible and likely that Dr. Stone had no medical school background but knew of Nathan Smith's work.

⁴⁹Lucy Mack Smith, Preliminary Manuscript, "History of Joseph Smith."

the current Dartmouth Medical School class of 1812–1813.⁵⁰ However, amputation was the procedure for treating this condition in America and England at the time, and any other operation would have been a departure from accepted practice. Moreover, medical litigation was not unknown in early America. Nathan Smith had appeared in malpractice trials in defense of other physicians and gave lectures in medical jurisprudence later at Yale.⁵¹ In this case, Nathan Smith recommended a surgical treatment for osteomyelitis that had no precedence in practice or the medical literature.⁵² Even though he had enjoyed good results, if there were to be problems with the surgery, there would be no medical defense as the operation was not thought worthwhile until after the turn of the century. Amputation would be the ultimate solution, but when faced with this, the response of a family is totally predictable, “Isn’t there anything else that you can do?”

I appealed to the principle Surgeon present said I Doctor Stone can you not try once more cutting round the bone and taking out the affected part there may be a part of the bone that is sound which will heal over and thus you may save the leg.⁵³

The immediate reply is not remembered, but if practice were anything like it is today, the response on the part of the surgeon might have included, “Yes we have been doing that operation, but it is something we have been trying out in desperate cases. We cannot guarantee a favorable result. The operation is experimental, but it would be worth trying with your consent.” Although this response is speculation, the same approach is used today when presenting a risky

⁵⁰“In the beginning, I mentioned Necrosis [osteomyelitis] as a disease which frequently was the cause of amputation; true it is a lamentable fact: this is the cause of many limbs being taken off. When in all these cases there is hardly need of a single operation of this kind. When the surgeon understands the use of medicine. When a piece of bone is dead or matter is within the bone I have described what is to be done in a previous lecture.” (Goodwin, “Extracts from Lectures,” p. 71.)

⁵¹In a set of student notes taken at Yale Medical School in 1826, we find a lecture given by Nathan Smith on “Medical Jurisprudence.” This remarkable instruction contains sage advice on the deportment and responsibility of physicians when called to testify in court on medical evidence. In a day when virtually nothing was written on the subject, Nathan Smith gave detailed instruction in cases of “Wounds and contusions, Malpractice, Broken bones, Infanticide, Pregnancy, Abortion or Concealed birth, Rape, Insanity, Divorce for want of Conjugal Connexion, and Poisoning.” (Notes by A[very] J. S[kilton], “Medical Jurisprudence” by Nathan Smith M.D.C.S.M.S. Lond, in Notes by Eli Ives, Yale Medical College, 1826, pp. 137–44, National Library of Medicine, Bethesda, Maryland. For a discussion of Nathan Smith’s appearance in court, see Oliver S. Hayward, “A Search for the Real Nathan Smith,” *Journal of the History of Medicine and Allied Sciences* 25 [July 1960]: 268–81.)

⁵²William Heys in England had recommended enlarging an established fistula to remove diseased bone which is not the same as the procedure described by Nathan Smith (William Heys, “Abscess in the Tibia with Caries,” in *Practical Observations in Surgery* [Philadelphia: James Humphreys, 1805], pp. 22–25).

⁵³Lucy Mack Smith, Preliminary Manuscript, “History of Joseph Smith.”

procedure to a patient facing amputation for other causes.⁵⁴ If understood in the context of obtaining informed consent to perform a more heroic operation, the comment of Joseph Smith becomes clear:

But, young as I was, I utterly refused to give my assent to the operation [amputation], but I consented to their Trying an experiment by removing a ~~great~~ large portion of the bone from my left leg, which they did.⁵⁵

Even years later, Joseph remembered this as experimental surgery. The procedure, however, was not unknown in the area around Hanover and Lebanon. Lucy Smith most likely would have been aware of other good results and therefore could suggest it.

They agreed to this after a short consultation; then went to the invalid:—the Doctor said, my poor boy, we have come again. “Yes,” said Joseph, “I see you have; but you have not come to take off my leg, have you sir?” No, said the surgeon, “it is your Mothers request, that we should make one more effort; and that is what we have now come for.”⁵⁶

Once consent was obtained, the scene changed and the surgeons prepared for the operation. “The surgeons immediately ordered cords to be brought, to bind him fast to the bedstead.”⁵⁷

Nathan Smith wrote little about using anesthesia for his surgeries because there was none. He used opium preparations after surgery, but nothing other than alcohol was given prior to operating. There were no great preparations made save that of restraining the patient. Lucy Smith vividly describes the current surgical practice of that day:

When the doctor insisted that he must be confined he said decidedly: “No, Doctor, I will not be bound. I can bear the process better unconfined.” . . . “will you drink some brandy.” “No,” said the child, “not one drop.” Then said the Dr, “will you take some wine? You must take something, or you can never endure the severe operation to which you must be subjected.” “No,” answered the boy, “I will not touch one particle of liquor; neither will I be tied down: but I will tell you what I will do, I will have my Father sit on the bed close by me; and then I will do whatever is necessary to be done, in order to have the bone taken out. But Mother, I want you to leave the room.”⁵⁸

⁵⁴This conversation is repeated in a generally similar way today. A patient comes into my office with gangrene of the toes, and after an examination, arterial occlusion is diagnosed. The patient is instructed that he has gangrene and an amputation may be in order. The response is the same: “Oh no! Can’t you do something else?” “Well perhaps if we can restore circulation, the level of amputation can be lowered.” In some instances, because of the unusual properties of the graft used in the arterial bypass, the procedure might be considered experimental.

⁵⁵Joseph Smith, Manuscript History of the Church, A-1, p. 131.

⁵⁶Lucy Mack Smith, Preliminary Manuscript, “History of Joseph Smith.” This consultation would have been short as it would have been Nathan Smith’s intent to carry out the less radical but more heroic sequestrectomy operation.

⁵⁷Ibid.

⁵⁸Ibid.

Nathan Smith taught that there was little pain in handling the exposed bone and little discomfort in drilling the cortex.⁵⁹ The pain came when the fragments of dead bone were broken up or removed. If separation of the dead bone from living tissue was incomplete, its dislodgement would produce a sharp sudden pain. Although Joseph was required to endure the pain of the operation, he was spared a primitively administered anesthetic characteristic of a later period.⁶⁰

The operation was underway. The mother was not allowed to watch, yet her recording of the procedure is highly accurate and parallels the description found in notes by Dartmouth medical students of the 1812–1813 class.⁶¹

So after bringing a number of folded sheets to lay under his leg, I left him. . . . The surgeons began boring into the bone, first on one side of the affected part, then on the other after which, they broke it loose with a pair of forceps or pincers: thus they took away, 3 large pieces of the Bone. When they broke off the first piece, he screamed so loud with the pain of his leg, that I could not repress my desire of going to him but as soon as I entered the room he cried out "Oh! Mother! go back! go back! I do not want you to come in I will tough it if you will go."'⁶²

With this description of the operation, we know that Nathan Smith was on the scene, for this was his procedure recommended for the third or chronic stage of osteomyelitis (see figures 4 and 5, p. 140). The surgeons continued the work of removing fragments of dead bone. With the removal of the third fragment, Lucy Smith came into the bedroom operating room but was excused and detained from further interrupting the procedure.

I was forced from the room and detained till they finished the operation after placing him upon a clean bed with fresh clothing clearing the room

⁵⁹See n. 62; see also Wirthlin, "Nathan Smith," p. 335, n. 58.

⁶⁰John Collins Warren remembered giving ether anesthesia in the early days at the Massachusetts General Hospital:

I have still a vivid recollection of my efforts as a student and as house pupil at the Hospital (1865–6) to etherize these patients. Going under ether in those days was no trifling ordeal and often was suggestive of the scrimmage of a football team rather than the quiet decorum which should surround the operating table. No preliminary treatment was thought necessary. . . . Patients came practically as they were to the operating table and had to take their chances. They were usually etherized at the top of the staircase on a little chair outside the operating theatre, as there was no room existing for this purpose at the time. In the struggle which ensued, I can recall often being forced against the bannisters with nothing but a thin rail to protect me from a fall down an area of three flights. But however powerful the patient might be, the man with the sponge came out victorious and the panting subject was carried triumphantly into the operating room. (Churchill, *To Work in the Vineyard of Surgery*, p. 35.)

⁶¹Goodwin, "Extracts from Lectures," p. 58; see also Wirthlin, "Nathan Smith," pp. 330–31.

⁶²Lucy Mack Smith, Preliminary Manuscript, "History of Joseph Smith."

from every appearance of blood and any apparatus used in the extraction I was permitted to enter he now began to recover . . . for he soon became strong and healthy.⁶³

With the proper operation, the bone drained, and the dead fragments removed, Joseph Smith's long ordeal with osteomyelitis rapidly approached an end. He regained strength and recovered. There was additional drainage of bone, for Joseph recalls fourteen pieces of bone worked their way to the surface before the wound closed.⁶⁴ As nothing was mentioned about the healing of the wound, we assume it was straightforward. Joseph used crutches for three years following the surgery and was known to walk with a slight limp in later life. He led a most robust and vigorous life and seemed not to have been bothered with any effects or complications of his boyhood illness.⁶⁵

CONCLUSION

A study of the two accounts of Joseph Smith's boyhood surgery has resulted in the identification of the principal physician, Nathan Smith. An examination of Nathan Smith's published work on his operation and techniques developed for the treatment of chronic osteomyelitis provides historical perspective in understanding the unusual conditions of Joseph Smith's surgery and the factors which led to the successful outcome. The study of Nathan Smith's surgical techniques corroborates details mentioned in both Joseph Smith's and Lucy Mack Smith's accounts of the procedure; indeed we can appreciate that Lucy Mack Smith's detailed reporting was highly accurate.

The procedure described by Lucy Smith was a standard operation for Nathan Smith and his students in northern New England. When Nathan Smith entered the Joseph Smith home, he brought with him a fifteen-year experience with his technique of sequestrectomy and drainage. He had more experience with osteomyelitis than anyone had previously recorded in the medical literature in the English

⁶³Ibid.

⁶⁴Joseph Smith, *Manuscript History of the Church*, A-1, p. 131.

⁶⁵In 1928, the remains of Joseph, Hyrum, and Emma Smith were transferred to their present gravesite. In the process of the transfer, some of the boney structures were described but no particular mention of the bones of the leg was made. A photograph of the three coffins with their contents was taken at a distance. I was allowed to study this photograph but because of the distance and the partial drapings with silk, I could not make conclusions regarding the presence or absence of changes consistent with healed osteomyelitis. (See W. O. Hands, "Report of W. O. Hands on the Discovery of the Exact Location of the Martyrs Located," F 81, p. 19; this report and the photograph are located in the Library-Archives, Reorganized Church of Jesus Christ of Latter Day Saints, Auditorium, Independence, Missouri. See also Frederick Madison Smith, "Bodies of the Martyrs Located," editorial, *Saints Herald* 75 [25 January 1928]: 89-90.)

language. Although he enjoyed good results, his work and results were not repeated until the early twentieth century.

The Joseph Smith account also describes a Nathan Smith success with sequestrectomy from the perspective of the patient. Since there were no records, this represents one of his few well-documented total successes with the operation.

In 1813, the paths of two unusual individuals crossed: Nathan Smith—American medical pioneer in the prime of his surgical career—and Joseph Smith—a seven-year-old boy from a humble family, struggling for health, yet to make his mark in the world. The contribution of Nathan Smith to the recovery of young Joseph Smith should be remembered and listed with his other accomplishments.