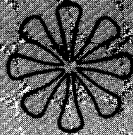


Gray '16  
Bush

34

# Foley's Footnotes



*One of the most readable and fertile American diaries is that of George Templeton Strong. Over the years from 1835 to 1875, Strong kept a faithful record of his observations and experiences. The massive four-volume Diary was published by the Macmillan Co. in 1952, under the scholarly direction of Allan Nevins and Milton Thomas. A prominent New Yorker, Strong had varied interests in business, education, and politics, with a special activity in the affairs of the sanitary commission during the Civil War. The Diary contains five diurnal accounts of particular interest to the dentist reader.*

On June 29, 1837, Strong wrote of a personal misfortune that dramatizes the home locale as the scene of many dental accidents:

Last evening as I was exercising a little with a pair of dumbbells just before getting into bed and was employing them pugilist-wise, I brought one of them in some strange way in contact with one of my front teeth, and though the stroke was a very slight one, it knocked a piece off, laying bare the nerve, and disabling me from eating anything warm or cold—and using my front teeth at all. Moreover, so much enamel is detached that the tooth will inevitably decay, so here for toothaches, dentists, wrenches, files, saws, false teeth and so forth—comfortable prospect. Well, what's done can't be helped.

On Jan 3, 1838, he reports a visit to Columbia to see the sophomores engage in the popular pastime of inhaling nitrous oxide. "I should have liked dearly to have tried it myself, but I didn't care to make a fool of myself before half the freshmen and all the sophomores." On Dec 11, 1844, Horace Wells was to discover the anesthetic property of the "laughing gas" used by the Columbia students as an entertainment device.

On March 5, 1839, Strong recorded a remarkable note about an uncle who had been for many years "a martyr to the *douloureux*."

Uncle Thomas arrived from Long Island almost frantic with the agony of that disease. The Hercules that finally vanquished the Hydra was the preparation of rather questionable origin, an ointment prepared by rubbing down five grains of acornflour with five drachms of olive oil, and applying it twice a day on the end of the finger along the track of the diseased nerve and rubbing the surface slightly with it. It effected an immediate cure—after one hundred and fifty other expedients had failed. The pain now and then recurs slightly, but a slight application instantly destroys it.

In his entry for Nov 25, 1843, Strong notes his attempt to relieve a toothache by resorting, as millions had done before him, to philosophic thinking.

Heard a good sermon this morning from Mr. Nighboe and did not hear a good one this afternoon from Dr. Wainwright, for I had a toothache fit a canker molar that nearly drove me out of church. Tried to reflect on and take comfort at Carlyle's "What difference does it make whether thou art happy or not?" but couldn't convince myself of the indifferent nature of the point.

The culturally complex Strong cites in his journal for Aug 31, 1847 an extraction and mentions the name of the dentist Dr. Nathan C. Keep is one of the leading figures in American dental history. A charter member of the American Society of Dental Surgeons and the first dean of the Harvard Dental School (1868), Dr. Keep gained a notable place in the records of forensic dentistry by presenting the evidence that led to the conviction of Professor Webster for the murder of Dr. Parkman. He also achieved fame in the field of anesthesiology by administering ether to Mrs. Henry W. Longfellow, the first such use in obstetrical cases.

I had two big grinders dug out in three pieces by Dr. Keep while I was under the influence of ether. The operation was so pleasant that I'd be glad to have it repeated.

Gardner P. H. Foley



# Surgical repair of tusk injury (pulpectomy) in an adult male forest elephant (*Loxodonta cyclotis*)

A 15-year-old male forest elephant housed in a zoo sustained a fracture of the right tusk that was 10 cm inside the cheek pouch, thus exposing the tusk canal. Treatment of the canal by grinding, topical application of antibiotics, and administration of various antiseptic preparations failed; however, the infection was resolved. To treat the infected, growing tusk's root canal or pulp chamber, a procedure comparable to a pulpectomy in man was performed with successful results.

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In zoological collections where elephants are housed in close quarters, it is not uncommon for tusk injuries to occur as a result of sparring. The injuries usually result in jagged or complete fractures of the tusks that may or may not require attention. This treatment may only entail grinding off sharp edges to reshape the tusk. Occasionally, fractures may occur within the cheek pouch involving the "pulp" of the tusk. Secondary infection of the pulp may necessitate tusk removal.<sup>1</sup> This article describes the prolonged (two years, four months), unsuccessful medical

treatment and the successful surgical treatment required to successfully resolve the infection of the tusk in a 15-year-old forest elephant (two years, four months).

## History and treatment

The male elephant was housed in a cage with a larger male African elephant (*Loxodonta cyclotis*). On several occasions, fights between the two had resulted in skin abrasions, but not tusk fractures. On June 2, 1975, the elephant sustained a fracture of the right tusk 10 cm inside the cheek pouch, thus exposing the tusk canal. The cavity was packed to prevent hemorrhage, but the elephant was unable to remove the pack with his trunk. The cavity





was treated with a series of antibiotics and antiseptics. The granulation tissue was removed and the central canal was irrigated with a 5% povidone-iodine solution. The tusk was then covered with a sterile dressing and the elephant was returned to its enclosure. However, the infection did not respond to medical treatment. In general, the sharp edges of the tusk were smoothed, thus stimulating granulation tissue. This was surgically removed twice in the first 6 months. The procedure was comparable to the gingival curettage that is done on a mammoth tusk. Although the infection did not respond to medical treatment, the hollow central core (that is, the pulp) or pulp remained infected and drained a foul-smelling exudate from which multiple organisms were cultured, predominant among them being *Staphylococcus aureus* and *Pseudomonas aeruginosa*.

Surgery corrected the granulation tissue overgrowth, but the infected, draining central canal of the tusk remained a problem. Flushing and packing continued with the use of a variety of antibiotics and antiseptics, but with no improvement. The tusk canal was occluded with non-vital stactites of dentin (ivory) with a fetid exudate and maggots. The canal was partly cleared by gently removing some of the devitalized dentin with use of a chisel, followed again by flushing and packing, but this was unsuccessful. Debridement as well as medical management was performed under trainer control of the elephant.

With the uniform failure of medical treatment and the developing intractability of the elephant, it was decided that a major excavation of the tusk canal was required to salvage the tusk and control the infection. Presurgical preparation con-

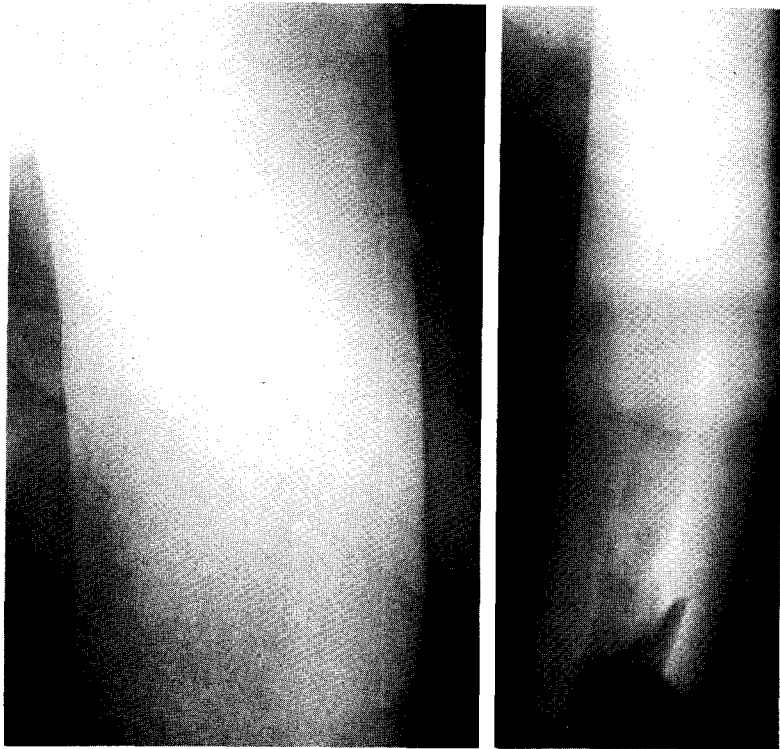


Fig 1 ■ Left, radiograph of normal left tusk showing homogeneity of tusk. Right, radiograph of infected right tusk showing jagged edges and central hollow canal that extends past skinfold deep into central canal.

sisted of radiographs to determine the extent of the canal (Fig 1), and the exudate was again cultured to determine any change in antibiotic sensitivity. *Pseudomonas* and *Proteus* organisms were again cultured. Chloramphenicol succinate (Chloromycetin) proved to be the only effective agent against both organisms.

■ **Anesthesia:** The elephant was given 8 mg of Etorphine (M99) via hand syringe. This dose was inadequate and 50 minutes later an additional 3 mg was injected by projectile dart delivered by a powder-charged rifle.\* Immobilization occurred eight minutes after the second injection.

■ **Surgery:** Surgical instruments included a variable speed one-half-inch power drill and craniotomy burs to which extension rods had been welded (Fig 2). Steel rods were sharpened and curved to produce a variety of chisels and hoe-shaped curets (Fig 2).

The segment of tusk protruding 17 cm beyond the cheek pouch (Fig 3) was cut off, thus increasing access to the tusk canal. The canal was cleaned of debris and flushed with surgical soap.

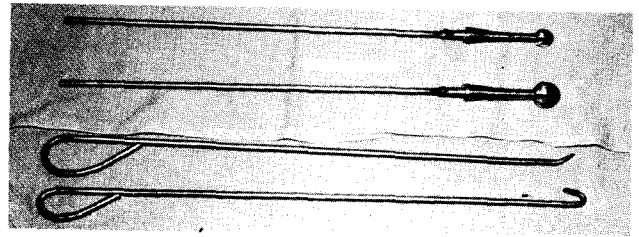


Fig 2 ■ Modified dental instruments (length, approximately 15½ inches) that included craniotomy burs on extension rods (above), and chisels and curets (below) were designed and made for surgery.

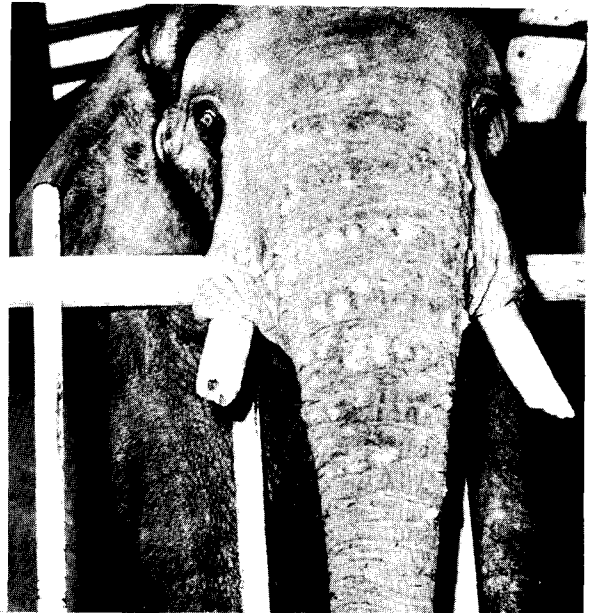


Fig 3 ■ Male forest elephant with jagged tusks as result of sparring. Right tusk has grown (17 cm) from cheek pouch in spite of infected pulp canal.

The craniotomy bur was used on the power drill to widen and deepen the canal from an initial 1.9- to 3.6-cm diameter and from a 10.5- to 22.5-cm depth. The final depth was established by reaching vital, bleeding, firm tissue. The chisel and hoe-shaped curets were used to remove remaining devitalized ivory within the canal. The cavity was flushed several times using hydrogen peroxide followed by tamed iodine (Betadine) and was packed with iodoform gauze† soaked with chloramphenicol. The canal was then sealed with a rubber cork to prevent contamination.

After surgery, the elephant was given 90 ml of long-acting penicillin (Bicillin) intramuscularly. Anesthesia was reversed by the administration of 22 mg of Diprenorphine (M50-50) via the tarsal vein one hour and 15 minutes after immobilization. The elephant was ambulatory and eating five minutes after the injection of the antagonist.

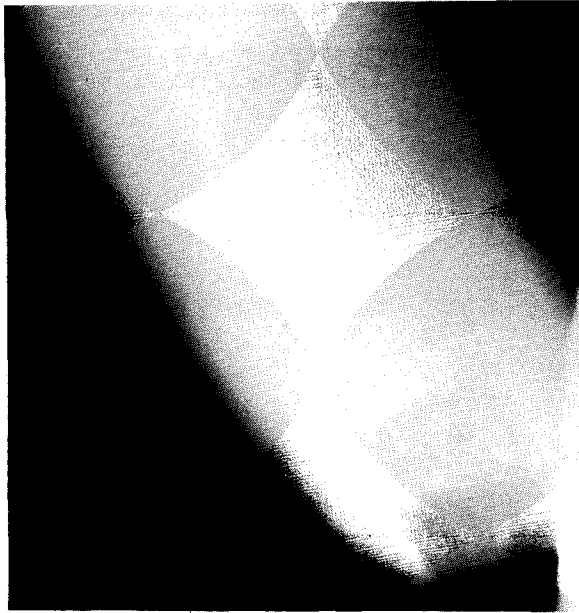


Fig 4 ■ Radiograph of right tusk 22 months after "pulpectomy" showing surgically widened central canal and uniform density proximally of normally growing dentin.

Postoperatively, only a slight swelling was noted on the right side of the face for two days, but the elephant continued to eat and act normally. Twenty-two months after surgery, the tusk had grown without problems to 14.4 cm and a radiograph was taken (Fig 4). The packing and cork remained in place.

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### **Discussion**

The successful outcome of this surgical procedure was the result of a multidisciplinary ap-

proach through the collaboration of a dentist and a veterinarian. By viewing the tusk as a large modified tooth, it was possible to formulate an effective surgical treatment. The comparable surgical procedure in humans would be called a pulpectomy. The decision to leave the packing material and cork in place was made because of the previous work,<sup>2</sup> thus demonstrating the ability of the tusk to wall off foreign bodies. These remained within the ivory as inclusions and grew out with the tusk. The postoperative radiograph shows the area of the surgically widened tusk canal with an area of viable dentin posteriorly.

We think that this surgical procedure is indicated in similar tusk injuries, and in retrospect, we think it should have been performed months before.

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\*Cap-Chur-Gun, Palmer Chemical and Equipment Co., Douglasville, Ga 30134.

†Nu Gauze, Johnson & Johnson, New Brunswick, NJ 08901.

1. Stringer, B.G. The removal of a tusk in an African elephant: a case report. *Am AssocZooVet AnnProc* 1972-1973, p 271.

2. Miles, A.E. Healed injuries of elephant tusks. *Br Dent J* 133: 395 Nov 1972.

# REPORTS OF COUNCILS AND BUREAUS

## Accredited dental schools

### Commission on Accreditation, Council on Dental Education

Dental schools that have approval, conditional approval, or provisional approval status are listed below. All programs have approval status except those designated with a cross (+) or an asterisk (\*). A cross (+) indicates that the program has conditional approval status. An asterisk (\*) indicates that the program has provisional approval status. The year following the name of each institution indicates the next regularly scheduled evaluation visit on a seven-year review cycle. It does not preclude the Commission from recommending that an evaluation be conducted prior to the designated year. Information about new programs is included at the end of the list. Definitions of accreditation classifications appear in the addendum to this listing.

#### *Alabama*

School of Dentistry, University of Alabama (1979)  
1919 Seventh Ave S, Birmingham, 35294  
Dean: Dr. Charles A. McCallum, Jr.

#### *California*

School of Dentistry, Loma Linda University (1979)  
Loma Linda, 92354  
Dean: Dr. Judson Klooster

School of Dentistry, University of California at Los Angeles (1981)  
Center for the Health Sciences, Los Angeles, 90024  
Dean: Dr. Andrew D. Dixon

School of Dentistry, University of Southern California (1977)  
925 W 34th St, Los Angeles, 90007  
Dean: Dr. Richard C. Oliver

\*School of Dentistry, University of California, San Francisco (1982)  
San Francisco, 94143  
Dean: Dr. Ben W. Pavone

School of Dentistry, University of the Pacific (1976)  
2155 Webster St, San Francisco, 94115  
Dean: Dr. Dale F. Redig

#### *Connecticut*

+School of Dental Medicine, The University of Connecticut (1978)  
Health Center, 263 Farmington Ave, Farmington, 06032  
Dean: Dr. Harald Loe

#### *District of Columbia*

School of Dentistry, Georgetown University (1982)  
3900 Reservoir Rd NW, Washington, 20007  
Dean: Dr. Charles B. Murto

College of Dentistry, Howard University (1977)  
600 W St NW, Washington, 20001  
Dean: Dr. Jeanne C. Sinkford

#### *Florida*

College of Dentistry, University of Florida (1976)  
J. Hillis Miller Health Center, Gainesville, 32601  
Dean: Dr. Don L. Allen

#### *Georgia*

School of Dentistry, Emory University (1977)  
Atlanta, 30322  
Dean: Dr. George H. Moulton

School of Dentistry, Medical College of Georgia (1980)  
Augusta, 30904  
Dean: Dr. Judson C. Hickey

#### *Illinois*

College of Dentistry, University of Illinois (1982)  
801 S Paulina St, Chicago, 60612  
Dean: Dr. Seymour H. Yale

School of Dental Medicine, Southern Illinois University (1982)  
Edwardsville, 62025  
Dean: Dr. Stanley P. Hazen

Northwestern University Dental School (1982)  
211 E Chicago Ave, Chicago, 60611  
Dean: Dr. Norman H. Olsen

School of Dentistry, Loyola University of Chicago (1976)  
2160 S First Ave, Maywood, 60153  
Dean: Dr. Raffaele Suriano

#### *Indiana*

School of Dentistry, Indiana University (1976)  
1121 W Michigan St, Indianapolis, 46202  
Dean: Dr. Ralph McDonald

#### *Iowa*

College of Dentistry, University of Iowa (1980)  
Dental Bldg, Iowa City, 52240  
Dean: Dr. James H. McLeran

#### *Kentucky*

College of Dentistry, University of Kentucky (1980)  
Medical Center, Lexington, 40506  
Dean: Dr. Merrill W. Packer