THE TREATMENT OF ACUTE OSTEOMYELITIS OF THE LONG BONES BY MEANS OF THE DENTAL ENGINE AND A LARGE BURR

PRELIMINARY REPORT

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The management of acute and chronic osteomyelitis of the long bones is anything but a source of pride to the science of surgery. The crude weapons of attack in the shape of the mallet and chisel really belong to the stone age of surgery. In the hands of the most expert they cause excessive trauma, frequently damage important structures and rarely eradicate all the dis-

Regeneration of bone in a case of acute osteomyelitis treated by means of the dental engine and a large burr.

eased tissue. The highly specialized structures of bone, namely, the haversian systems, compact and cancellous tissue and the peculiar arrangement of the blood-supply of the long bones, as demonstrated by Lexer, make the attainment of sterilization in an old infected bone cavity so hopeless a task that it is frequently surrendered as futile.

The advancement in the treatment of chronic infections in other tissues caused by the so-called pus-producing micro-organisms, by both local and systemic methods, should make us feel that sterilization of an osseous cavity is as much a possibility for the surgeon as is the attainment of asepsis in a carious tooth for the dentist. It must be acknowledged by all who have had experience in the treatment of fractures of the jaw that the exact methods and beautiful technic employed by the average dentist in the treatment of this condition frequently make the efforts of an otherwise skilful sur-

geon appear crude and bungling. The attainment of absolute asepsis in badly decayed and infected teeth is a matter of every-day occurrence to the dentist. Ought not then the sterilization of the medullary cavities of the long bones to be within the range of possibility, if the right technic were used?

With this idea in mind, I have treated a series of cases of chronic osteomyelitis of the long bones at Cook County Hospital by the following method: Preparation of skin by shaving and painting with a solution composed of glycerin, one part, iodine, two parts; long skin incision over shaft of bone; separation of soft tissues and periosteum overlying infected cavity; opening medulla by trephine, drill or chisel; enlargement of cavity. This may be done, either by chisel and mallet, or by the large burr attached to a dental engine driven by the regular electric current. With a large burr a considerable portion of the shaft of a long bone can be removed in a very short time. A stream of hot antiseptic solution should be played on the burr continuously, while it is in use, to clear the field of debris and to facilitate the action of the burr. The rapidly revolving burr is applied to the medullary surface of the bone and pressure made from within outward precisely as the dentist does in drilling out a tooth. This procedure should be continued until every portion of suspicious bone has been removed and the remaining surface is smooth and even, without any projecting spicules or ragged edges, such as usually remain after the use of the chisel.

The operator readily acquires the ability to decide when the burr is drilling out diseased or normal bone, because of the greater resistance offered by the healthy osseous tissue. Because of the ease with which the burr is manipulated, the operator may safely venture into areas which would be very dangerous if the chisel and mallet were used. The risk of fracturing the long bones is reduced to a minimum because the element of violent trauma has been removed. Thus, by the use of the burr, a hazardous, violent and crude procedure is transformed into a comparatively safe operation with a definite and precise technic.

Experimental work must determine what changes are produced on the drilled surface of the bone different from those produced by the chisel. Do the heat and friction generated by the rapidly revolving burr kill the pus-producing micro-organisms? It has been shown by cultures made from the inner surface of machinery belting that mechanical influence may produce an effective bactericidal action, as the cultures made from the belting of machinery in constant use were sterile.

The following case illustrates the results obtainable by the cleaning out of the medullary cavity of infected bone with the large burr.

Patient.—J. M., aged 42, machinist, in February, 1913, complained of an ache in right forearm extending from elbow to wrist. Patient consulted physician, who treated him for chronic rheumatism. The forearm began to swell and the patient was referred to a surgeon, who made an incision over the ulna for about three-fourths of its length. Nothing was done to the bone. The swelling was enormous and the pain intense. The patient was told that nothing more could be done for him, and he applied for admission at Cook County Hospital. His temperature was 101°, pulse 120, leukocyte count 20,000. Roentgen ray showed entire destruction of the upper end of bone, including the olecranon process, together with involvement of the entire shaft of the bone. Quantities of thick, yellow pus were discharged from three sinuses leading down to the bone. Amputation seemed inevitable. As it was

the patient's right arm, however, an attempt was made to remove the necrotic and diseased tissue. With ether anesthesia the ulna was exposed throughout its whole extent. The soft tissues were retracted and the olecranon process and upper end of bone entirely removed subperiosteally. The remainder of the shaft was drilled out with a small dental burr, the larger ones not having been made at that time. All necrotic tissue was removed and a smooth, clean, hard bed of bone remained. This was filled with bone wax and the soft tissues sutured without drain.

The man now has good extension of his forearm, in spite of absence of the olecranon process, and a strong grip in his hand and is able to work.

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THREE CASES OF WIRING WITH ELECTROLYSIS FOR AORTIC ANEURYSM

ONE HERETOFORE IN PART REPORTED *

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I wish to report three additional cases of wiring with electrolysis for aneurysm of the thoracic aorta, in one of which (Case 2) the patient illustrates the beneficial effects of this procedure more than four years after the first operation and more than two years after the second wiring, which was resorted to because he had a return of very severe pain and a marked bulging near the site of the original sac.

Fig. 1.—Enormous aneurysm of ascending arch (Case 1) before wiring.

CASE 1.—A man, aged 55, had a large pulsating growth in the upper zone of the right chest, anteriorly, which extended from the second rib in the midclavicular line to the fifth rib (Figs. 1 and 2). The growth did not point, in the sense that it presented a spot which was elevated above the rest of the swelling, but in the center there was a spot where expansile pulsation was marked and the tissues very soft and tender on palpation. The chief symptoms consisted in severe pain and dyspnea.

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The record of the operation is as follows:

1:15 p. m., Feb. 22, 1912: 5 milliamperes.
1:19: 10 milliamperes.
1:23: 15 milliamperes.
1:27: 20 milliamperes.
1:28: Wire broke close to needle.
1:29: 5 milliamperes.
1:32: 10 milliamperes.
1:33: 15 milliamperes.
1:34: 20 milliamperes.
1:35: 25 milliamperes.

Fig. 2.—Same case of large aneurysm as that shown in Figure 1, wired Feb. 22, 1912; wire coiled in aneurysm, which is lessened in size one week after operation; the patient returned to work and was killed ten months later while walking on the railroad.

1:36: 30 milliamperes.
1:37: 35 milliamperes.
1:41: 40 milliamperes.
1:44: 45 milliamperes.
1:49: 50 milliamperes; maximum amperage, maintained for one minute.
2:00: 45 milliamperes.
2:00:30: 40 milliamperes.
2:01: 35 milliamperes.
2:01:30: 30 milliamperes.
2:02: 25 milliamperes.
2:02:30: 20 milliamperes.
2:03: 15 milliamperes.
2:03:30: 10 milliamperes.
2:04: 5 milliamperes.
2:05: Discontinued.

Insertion of needle at 1:01 p. m.

Insertion of wire begun at 1:03 p. m.

Current started at 1:15 p. m. and discontinued at 2:05 p. m.

Length of operation, one hour and four minutes.

The patient, notwithstanding the fact that his circulatory state was somewhat excited by the performance and interruption of the operation, whereby the pressure in the sac was increased, stated when the current had passed for twenty minutes that his chest felt more comfortable and that he had less pain. Twenty-four hours later he had great hoarseness so that he could speak only in a whisper and he developed signs of pulmonary congestion at the base of the right lung, which cleared up in forty-eight hours under the use of full doses of atropin. The hoarseness gradually decreased, and when he returned home four weeks later had almost disappeared. More than three months later the patient wrote that he was "getting along very well" and "feeling pretty well."