

cal histories of cases bearing on the subject, I must refrain from considering this matter any further at present, it being somewhat too far removed from my present theme. I hope, however, to be able to report on this very interesting chapter in cardiac pathology.

## Clinical Notes

### EXTENSIVE AVULSION OF SCALP.

REPORT OF A CASE TREATED BY PLASTIC REPAIR AND FOLLOWED BY TETANUS WITH RECOVERY.

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The case forming the text of the following communication illustrates certain points in the treatment of conditions which, while not frequently met, may and do occur in the practice of most surgeons, and, although no new principle is submitted here, the application of accepted ones deserves mention. Following so closely on the excellent summary<sup>1</sup> of the treatment of tetanus with serum by Jacobson of Syracuse and Pease of Albany, a discussion of greater length in this connection would burden unnecessarily the literature and serve no useful purpose. In looking over the cases forming the basis of Jacobson's and Pease's work, it would appear that they, like all of us who compile and deduce from the publications of others, were confronted with the fact that most important details are lacking in the reports of cases submitted by the various authors, and if this contribution seems somewhat protracted it must be ascribed to my desire to escape the fault of inaccuracy which may be the outcome of an effort to be brief.

*Patient.*—B. S., aged 7, was admitted to Harlem Hospital July 16, 1906.

*History.*—On the day of admission the patient had been knocked down by a trolley car, the fender of which pushed the lad along for a considerable distance, his head was ground along the rail and the scalp torn off from the left side of the skull.

*Examination.*—This disclosed a denuded area measuring about four by five inches. The wound was symmetrically egg-shaped and the periosteum corresponding to the surface indicated was also avulsed. The edges of the wound were deeply stained with the mixture of mud and grease which covered the street in the vicinity of the car rails. There were many contusions over the entire body, but at no place, other than the scalp, was the skin broken. There was considerable shock, but no evidence of cerebral involvement and no bones were broken. Reaction from shock was rapid and complete in a few hours.

*Operation.*—The wound was cleansed and dressed in the usual manner, and eight days after admission a plastic operation for repair of the scalp was made. The entire wound, fortunately, was within the hair area of the scalp, and permitted of the application of a flap-sliding method practiced by Volkmann and Messner. A study of the accompanying illustration will make the method employed sufficiently clear to render unnecessary further attempt at elucidation in the text. Mention may be properly made here, however, that early plastic operative effort, in injuries with considerable loss of substance, is a wise measure and should perhaps be more frequently performed than is usually done. More especially is this the case when ultimate cosmetic effect plays an important part in the problem presented. In this instance the flaps were all taken from portions of the hairy scalp, so that, when healing had taken place, there was no visible evidence of the

injury. In this case delay may have seemed permissible on the ground that necrosis of bone would be the result of the loss of periosteum. It is, however, to be remembered that the external table of the calvarium is supplied with nutrition by the diploë, and that extensive necrosis rarely follows even severe and extensive injuries to the scalp and periosteum. Indeed, this is what happened in our case, if the rapid repair of the injury is to be regarded as an indication of the absence of this complication. There were no disturbances of importance following the operation, and repair seemed to progress satisfactorily.

*Postoperative History.*—On August 3, nineteen days after receipt of the injury, the patient complained of pain in the throat and inability to open the mouth fully. Up to this time the rectal temperature had been about 99.5 F., and indeed showed no increase at this time, but the pulse rate, which had up to this been about 80 per minute, rose to 98. The latter symptom was regarded as indicative of the first expression of toxemia.

The following day the mouth was firmly closed, but could be opened sufficiently for the purpose of taking food. While protruding the tongue for inspection a spasm of the muscles of mastication caused the tongue to be bitten. The pulse rate remained near 100, but there was still no rise of temperature beyond that mentioned.

August 5, about forty-eight hours after the first manifestations, the temperature rose to 103 F., and several convulsions of moderate severity occurred in rather rapid succession; the rigidity extended to the entire body and the pulse rate rose to 128 per minute. There was no disturbance of cerebration. The wound, which up to this time had been healthy, lost its bright red color; the granulations looked flabby and there was some secretion, but no pus, discharged from the raw surfaces. The line of union of the flaps remained firm, however, and did not at any subsequent period break down. I concluded that this was a clear case of tetanus, which, because of the long period of incubation (nineteen days), its gradual development and rather moderate expression, would probably run a rather favorable course. On this day the house surgeon administered antitoxin in two injections of 7 c.c. each into the buttock and one injection of 10 c.c. into the spinal canal. In the latter instance about an equal amount of spinal fluid was previously withdrawn. During the night an injection of 20 c.c. into the spinal canal was made.

August 6 the rectal temperature was about 103 F., and the other symptoms about the same. There was rigidity and occasional a slight general muscular spasm, but the mouth could be opened for nourishment. Twenty c.c. of the antitoxin were injected into the spinal canal.

August 7 Dr. S. J. Meltzer saw the case with me. The temperature was still about 103 F., and the pulse rate 138 per minute. There was rigidity of all the muscles, but no distinct opisthotonos. The mind was clear; there were some sordes on the lips and the cornea was dull. The patient at this time had received 14 c.c. of the antitoxin injected into the buttock and 50 c.c. injected into the spinal canal, in four days. I had Dr. Meltzer see the case with the view of determining the advisability of making injections of magnesium sulphate solution into the spinal canal.

Following the publication of Meltzer's experimentation with magnesium sulphate injections into the spinal canal for the purpose of producing anesthesia and my own observations on human beings, Blake of New York City had used the salt in tetanus and found that spasm was controlled as the result for from twenty-nine to thirty-seven hours.

After examining our case, it was concluded that there was no special indication for the use of the magnesium sulphate, as spasm was not a marked symptom, and that if any unfavorable outcome was to be anticipated, it was probably more as a result of a general enfeebling toxemia, which seriously interfered with metabolism, and not as the outcome of a specific effect on the central nervous system. It is this conclusion which perhaps makes the report of this case valuable. All of us are inclined to look at our cases from the standpoint of what generally happens, and may thus be led to employ a measure which has a distinctly important office in most cases

1. Ann. of Surg., September, 1903.

of a certain kind, when in a particular instance the special indication lies in another direction.

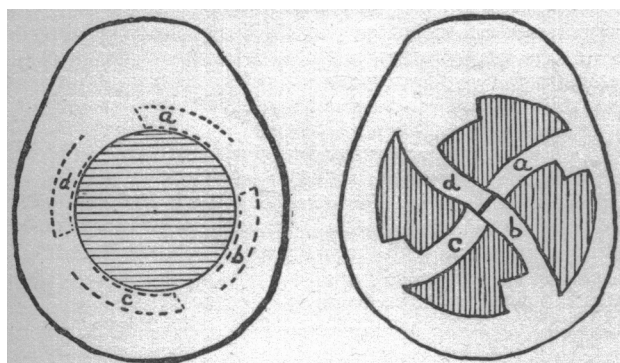
Dr. Meltzer suggested giving one intravenous injection of 200 c.c. of antitoxin on the theory that it was through the circulation that we should attack the disease. At the same time it was borne in mind that the blood already contained an antitoxin of its own creation, and that this rather heroic dose should not be repeated hastily, for fear of poisoning the patient with antitoxin. Accordingly, the patient was placed under chloroform narcosis; the median cephalic vein was exposed and 200 c.c. of the antitoxin slowly and carefully injected into the circulating fluid. That evening the rectal temperature had fallen to 99 F. and the pulse was 96 per minute. The next day the patient had no spasm and the muscular system was less rigid.

August 9, forty-eight hours after the intravenous injection, a slight convulsion occurred and the jaw became very rigid again. The symptoms, however, were not alarming.

August 10, three days after the intravenous injection, there was considerable rigidity and a more severe spasm. Twenty c.c. of antitoxin were injected into the spinal canal; the general condition was about the same.

August 11 the wound was dressed and appeared healthy. The patient had been very quiet, but when disturbed had a distinct opisthotonos. Twenty c.c. of antitoxin were injected into the spinal canal.

By August 14 there was still some rigidity, but no spasm for forty-eight hours. Trismus still persisted, but the general condition was favorable; the pulse was between 90 and 100 per minute and the patient took nourishment by mouth.



Volkmann's Plastic Repair of Scalp. (From Tillmann's Surgery.)

August 15 (the twelfth day of the disease) the patient had a convulsion and his temperature rose to 104 F., with the pulse 124. An intraspinal injection of 20 c.c. of antitoxin was given, and during the night the temperature dropped to normal.

From that time on the patient's condition gradually improved, although there was some trismus which persisted for several weeks after he was up and about. No more antitoxin was given.

Throughout the treatment the patient received 14 c.c. of antitoxin into the muscles; 100 c.c. into the spinal canal and 200 c.c. into the venous circulation.

The wound of the scalp healed completely, without untoward symptoms, beyond the unhealthy appearance alluded to, which occurred when the toxemia was perhaps at its height. This is probably ascribable to the modification of nutritive processes which occur during a toxemia.

The case may be regarded as teaching us that early plastic repair in extensive loss of substance is a wise measure; that, when muscular spasm is not a marked symptom, magnesium sulphate need not be administered and that in a certain class of cases, such as is represented in this instance, the toxin of the disease may be counteracted by the introduction of a considerable quantity of antitoxin directly into the blood current.

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## MODIFIED CRILE ARTERY CLAMP,

PERMITTING BOTH SCREW AND DIRECT PRESSURE  
ADJUSTMENT.

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The fact that the temporary closure of blood vessels by means of instrumental compression requires careful regulation of the pressure employed is fully recognized in the idea embodied in the Crile artery clamp. In this instrument the pressure brought to bear on the vessel is regulated by means of a small thumb screw acting against a spring resistance. In order either to apply or to remove this clamp the thumb-screw must be turned several times, the number depending on the size of the vessel and the thickness of its wall. This is the antithesis of the non-adjustable spring clamp commonly used in experimental work which may be instantly applied or

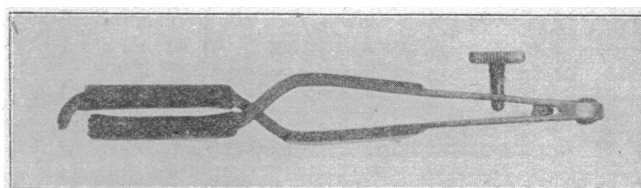


Fig. 1.—Showing position of the jaws with the thumb-screw loosened.

removed by compressing it with the thumb and forefinger, but which always has the same pressure whether too strong or too weak, and which is, therefore, entirely unsuited to clinical work.

As a result of clinical observation and of work on transfusion of blood done in Dr. Crile's laboratory, it occurred to me that it might be possible to construct a clamp which would combine the screw adjustment of the Crile clamp with the more rapid adjustment of the laboratory clamp. The illustrations show such a clamp as made from my model by the J. C. Ulmer Company of this city.

When the thumb-screw is loose there is lack of approximation of the jaws and hence no pressure is exerted

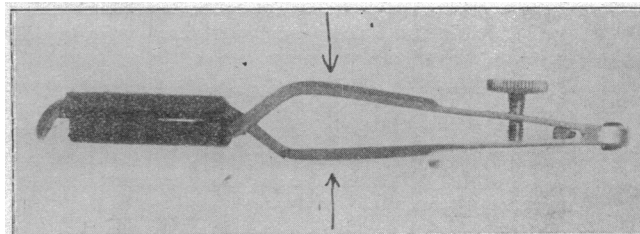


Fig. 2.—Showing the thumb-screw tightened and the jaws pressed together. The arrows indicate where the pressure is applied by thumb and forefinger to release the jaws.

(Fig. 1). Then if the thumb-screw be tightened pressure will be exerted by the jaws on a vessel lying between them which will vary with the extent to which the screw is made to impinge on the opposite jaw (Fig. 2). Finally, when this degree of pressure is obtained, the clamp can be instantly released and removed, *without loosening the screw*, by pressing the jaws together with the thumb and forefinger at a point between the screw and the blood vessel.

When the clamp is once adjusted to a given vessel so as to exert force enough to prevent the flow of blood through it without injuring the vessel wall, it is permanently adjusted to that vessel, and may be removed and