THE OBLITERATION OF THE MASTOID EXCAVATION BY THE IMPLANTATION OF A TISSUE-FLAP TAKEN FROM THE TEMPORAL MUSCLE.*

DR. SAMUEL IGLAUER, CINCINNATI.

The prolonged after-treatment and the uncertain cosmetic results constitute two great drawbacks to the simple mastoid operation as ordinarily performed. Under the accepted method of after-treatment, by packing and granulation, it usually requires weeks and not infrequently months for the mastoid excavation to become obliterated, and this often proves an ordeal for both patient and physician.

From time to time various methods have been proposed to shorten the duration of the after-treatment and to improve the cosmetic results of the simple mastoid operation.

Macewen¹ was the first to suggest that the healing process might be hastened by increasing the exposed surface of the soft parts through the removal of a portion of the posterior meatal wall. Plummer and Germain,² and Hopkins³ advocated a somewhat similar procedure. Kuester⁴ reported excellent results from the reposition of an osteo-plastic flap formed from the periosteum and cortex of the mastoid process. Blake,⁵ Sprague,⁶ Riek⁷ and Bryant,⁸ and more recently Holmes⁹ have enthusiastically advocated the blood-clot dressing; while Low¹⁰ recommended the introduction of animal serum into the mastoid excavation.

According to Barr¹¹ the closure may be hastened by filling the mastoid gap with a Moorhoff iodoform-wax plug introduced the second week after operation. Beck¹² advocates the use of a bismuth-paste dressing. Leland¹³ introduces a large periosteal flap into the mastoid wound in order to close off the aditus and hasten the healing process. Mosher after removing the posterior meatal wall inserts a pedunculated flap formed from the post-auricular soft parts.

In April, 1910, I reported a case illustrating a new operation for the primary closure of the mastoid wound by means of a flap taken from the temporal muscle.^{14 15} Dr. Neumann informs me that he has employed a similar plastic for the secondary closure of a persistent retro-auricular fistula, and that mention of this case ap-

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The operation which I have devised consists in the exposure of the posterior portion of the temporal muscle from which a pedunculated flap is formed. This flap is then rotated downward and backward, and is tucked into the mastoid gap, which is thereby completely filled with viable tissue. Drainage is provided by a rubber tube extending from the mastoid antrum to the lower angle of the mastoid incision.

The close topographical relation of the mastoid process and the temporal muscle together with the abundant blood-supply of the

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Figure I. Mastoid exenteration completed. Incision carried into scalp, exposing temporal muscle, from which a flap (1, 2, 3) is formed. Scalp (4) drawn forward.

latter render it especially available for a plastic operation of this kind.

Technic: The scalp is shaven somewhat higher than for the usual operation and the field is sterilized with tincture of iodine. The simple (Schwartz) operation is performed in the usual manner, the mastoid cavity is thoroughly excavated and repeatedly cleansed with sponges saturated with hydrogen peroxid.

The operator now re-sterilizes his hands (fresh gloves), and with instruments not previously used, prolongs the original mastoid

incision upward and forward into the hairy scalp. This incision (Figure III) lies immediately anterior to the posterior border of the temporal muscle, is concave forward and about one and a half to two inches in length. The scalp (Figure I,⁴ is now dissected downward and forward exposing the underlying glistening temporal fascia. The posterior portion of the temporal muscle and fascia are now freed from the pericranium and a triangular flap (Figure I,^{1 2 3}) with its apex downward is formed by splitting off the exposed muscle in the line of its fibers, the pedicle being formed of the fibers passing under the zygomatic arch and contains branches of the temporal arteries. The flap is now rotated downward and

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Figure II. Muscle flap (1, 2, 3) turned downward and backward, and tucked into mastoid cavity. (2) Pedicle of flap. (4) Scalp. (5) Drain.

backward into the mastoid cavity (Figure II,^{1 2 3}). If the temporal ridge be prominent it should be chiselled away with the underlying bone to provide a groove for the pedicle. At times the latter may be too short or too thick but it can readily be elongated by cutting obliquely across some of its anterior fibers. The flap is anchored by a few catgut sutures fastened to the periosteum at the lower angle of the mastoid wound. A small rubber drainage tube is introduced under the flap and extends from the antrum to the lower angle of the incision. A small puncture is now (or previously) made through the scalp immediately over the dead space left

by the removal of the muscle flap, and a gauze wick is drawn through at this point (Figure III) to provide exit for any blood which may accumulate.

Sutures are now introduced into the scalp incision, the upper strands are knotted but the lower ones are left untied to provide for drainage (of blood). The latter sutures are drawn taut on the first or second day after operation. (Figure III, ^{1 2}). The mastoid incision is closed by interrupted sutures.

Figure III. Incisions closed. Sutures 1 and 2 left untied. Drains in situ.

Several layers of gauze are packed over the dead space left by the removal of the flap and a very firm pressure-bandage is applied.

The wound should be dressed on the first or second day after the operation and any blood which may have accumulated under the scalp should be expressed. At the same time the drainage tube from the antrum should be removed and a fresh one introduced if necessary.

Results of the Operation: I have now performed this operation upon ten cases, too small a number for statistical purposes. The results of these operations may be summarized as follows: Among the disadvantages of the procedure it should be stated that in several cases difficulty was encountered in the dead space immediately

overlying the zygomatic arch, where a hematoma formed and in some instances suppurated. However, this accumulation when present was readily pressed out and the case then proceeded towards recovery. The more recent methods which I have adopted, namely, leaving some of the sutures untied, should in a large measure obviate this difficulty. Transient edema of the forehead and eyelids on the operated side was noted several times and was due either to the formation of a hematoma or the interference with the lymph flow from the affected region.

Figure IV. Showing cosmetic result eighteen days after operation. Patient practically recovered although site of emergence of drainage tube is still evident.

Among the advantages of the operation were the following: The transplanted muscle in nearly every case survived and became adherent in its new location and filling out the mastoid excavation. In one case requiring a secondary operation (for causes unrelated to the flap) six months after the transplantation some of the tissue was removed and examined histologically. The report of Dr. Mombach is as follows: "Examination shows a large amount of healthy muscle tissue, the transverse striations which are marked, also a number of transversely cut muscle bundles. In part the section

shows muscle undergoing cloudy swelling. Other parts of the section show a considerable amount of fibrous connective tissues. Throughout the section one finds blood-vessels which are intact. In another instance a specimen removed about three weeks after operation from a case in which the wound was of necessity left open because of a torn sigmoid sinus, the flap which had been exposed to the air failed to reveal any intact muscle fibers, but showed connective tissue fibers and round cells infiltration. (Report of Dr. W. E. Lucas).

The incisions, excepting at the points of emergence of drainage tubes, usually closed by primary union. Free drainage from the mastoid wound and antrum took place through the conduit under the transplanted muscle and the discharge usually ceased in about ten days or two weeks. The drainage opening showed but little tendency to close until the discharge had ceased. In some cases the discharge from the auditory canal persisted a few days longer than from the mastoid. (Poltzerization hastened resolution in the tympanum.) In from two to four weeks, in most cases, the patients were practically well, that is, the discharge from the wound had ceased, but a few granulating areas in the scalp or mastoid incision remained. These cases demand very little attention and did not require the care of persons especially trained. The cosmetic results (Figure IV) were very good since the extra-incisions in the scalp were concealed by the hair and the mastoid depression was obliterated. The position of the auricle remained excellent and no disturbance in the function of the temporal muscle was noted in any case.

Indications and Contra-Indications: This myoplastic operation may be generally employed for the closure of the simple excavation in uncomplicated cases of mastoiditis. It can, in all probability, be employed in selected radical cases. It is contra-indicated in debilitated persons, in cases of severe infection, and whenever the maintenance of prolonged drainage is especially desired.

Conclusions: 1. The plastic closure of the mastoid gap by the implantation of a portion of the temporal muscle is readily accomplished. 2. Some transient difficulty may be encountered with the dead space under the scalp. 3. Drainage, the prime object of mastoidectomy is provided for, despite the fact that the mastoid excavation is almost completely obliterated by the implanted tissue. 4. The duration and difficulties of the after-treatment are greatly reduced by the implantation operation. 5. The cosmetic results of the operation are very good.

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22 West Seventh Avenue.

New Principle in Esophagoscopy and Gastroscopy. RICHARD LEWISOHN. *Ann. of Surg.*, Jan., 1913.

The author considers first the reasons why esophagoscopy is not more generally adopted by surgeons, pointing out the discomforts, difficulties and dangers attendant upon the use of the esophagoscope. The following are the three main requirements of a satisfactory esophagoscope: 1. The introduction must be possible in the manual position of the head. 2. The instrument must be so constructed that it actually passes in the longitudinal axis of the esophagus and not at an angle of this axis. 3. The esophagoscope should only be passed downward along the esophagus under guidance of the eye to avoid perforation.

Based upon these considerations, he has constructed an esophagoscope consisting of two portions,—a horizontal which lies in the mouth of the patient, and a vertical consisting of a telescope composed of six separate tubes which may be pushed down the esophagus. He uses illumination from the proximal ends, and the rays converged down the tube by means of a condenser which concentrates them on a mirror, from which they are thrown on another mirror at the junction of the horizontal and vertical tubes, which throws the rays down the tube. He appends the report of ten cases in which he has used his esophagoscope with excellent results.

PACKARD.