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## IMPROVED METHOD FOR TOTAL ENUCLEATION OF EYEBALL.

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The operation here described aims at preserving the relations of the recti tendon with Tenon's capsule.

The operation of simple enucleation of the eyeball has been always considered an easy one, and frequently assigned to the resident. The general surgeon has felt that it was within his field of action. The result is usually a permanent deformity to the individual thus operated. To overcome this deformity, the operation has been modified by implantations of foreign bodies in Tenon's capsule or sclera, in various ways. A very ingenious method is that recently suggested by Dimitry. (A.J.O. v. 2, p. 653.)

The modifications that I now present were suggested by the fact that in ordinary tenotomy, we will say, of the internal rectus, if a free incision is made in Tenon's capsule after the separation of the internal rectus from the sclera, the result will be almost complete abolition of the movement inward of that eye.

The same thing is done to all the eye muscles and Tenon's capsule in the ordinary method of enucleation. This can be overcome by using catgut sutures thru the lateral muscles, attaching it to the Tenon's capsule of the opposite side, thus completely closing the space formerly occupied by the eyeball. Secondly: Tenon's capsule can be carefully separated so that practically none of Tenon's capsule is sacrificed, and consequently there is no tension, but quick healing. To do this it is necessary that the conjunctiva be primarily dissected loose from Ten-

on's capsule into the fornix. After the wound in Tenon's capsule is closed, the conjunctival wound is closed with catgut sutures at right angles to the opening in Tenon's capsule.

This allows the conjunctiva to seek its correct adhesion on the mobile Tenon's capsule, which latter is filled with a blood clot which probably organizes, and forms at least a temporary filling of Tenon's space, replacing the fat, tendon, glass or gold ball of implantation operations.

The advantages are:

1st. The full vitality and strength of the muscles of the eyeball are retained, giving movable socket with a minimum of retraction, or falling of the upper lid.

2nd. In addition to the excellent stump obtained, there is no violent reaction following this operation, as there often is in the gold ball implantation in the sclera.

3rd. There is no danger of extrusion or sympathetic ophthalmia, as there is at times in the implantation of a foreign body in Tenon's capsule.

4th. There is no after bleeding or secretion, and a welcome absence of the catarrh that so frequently follows an enucleation.

The improvements that I suggest are in the method of application of the catgut sutures to the recti and Tenon's capsule,—in the care to preserve entirely Tenon's capsule by separate dissection,—finally covering the same

with a separately detached conjunctiva.

I realize that it is difficult to suggest anything absolutely new in ophthalmic surgery, and others may have used this method of operating. The result is such a remarkable improvement that I beg to have you try it.

that the hook is perfectly free in that position.

A catgut thread 0 size (not chromicized), is threaded with three needles. The first needle is passed under the muscle to the opposite side, the second needle is passed thru the center of

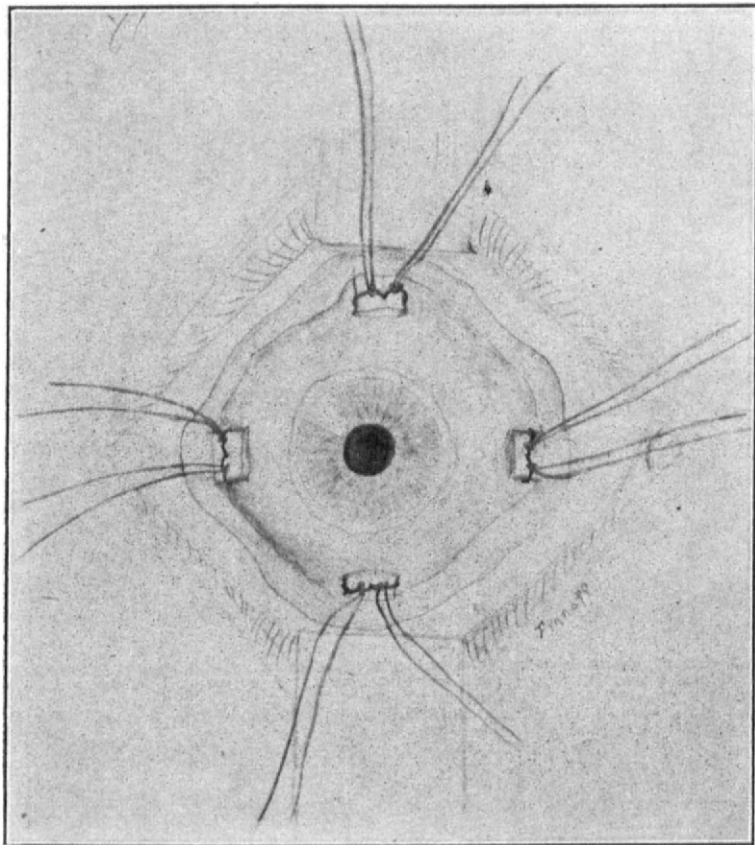


Fig. 1. Conjunctiva dissected from Tenon's capsule. Sutures placed in recti tendons and tendons divided.

#### OPERATION.

The patient is prepared in the routine way for ether operation. The local field is prepared to produce aseptic results according to custom.

After introduction of the eye speculum, the conjunctiva is carefully dissected from close to the cornea back into the fornix until it is entirely free from Tenon's capsule.

The internal rectus is caught upon a hook, Tenon's capsule slit parallel to the tendon close to its insertion, so

the muscle. The loop thus formed is cut close to this second needle. The ends are then tied over the upper and lower half of the muscle respectively, the end of the catgut being retained.

This preparation is similar to that usually taken in advancement operations of the muscles of the eye. The tendon is then cut close to the eyeball and the ends of the catgut caught by a hemostat, and placed out of the way. The recti muscles are all treated in the

same way, giving the result shown in Fig. 1.

The capsule of Tenon is still intact if care has been taken to dissect only the conjunctiva as advised. The capsule is then carefully separated from the eyeball by introduction of a curved

site side and tied, thus closing in the central part of Tenon's space containing the blood clot. The somewhat triangular spaces above and below these sutures are closed by the superior and inferior recti sutures, in the following manner:—The one catgut holding the

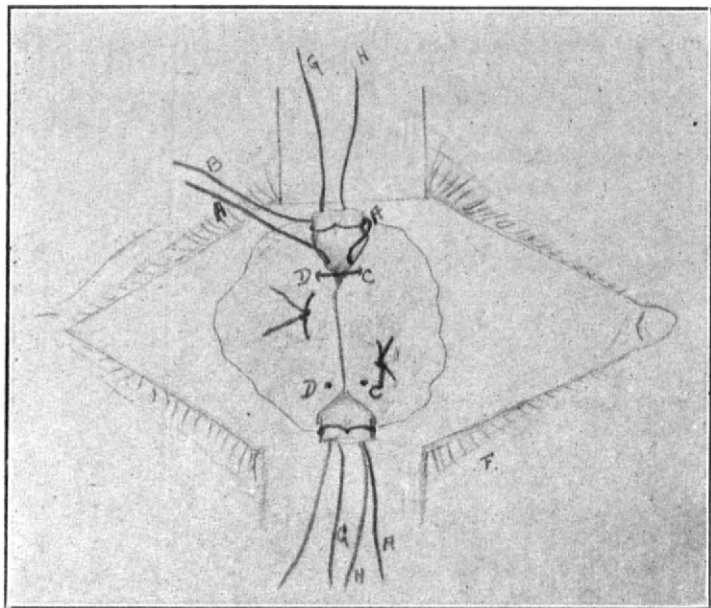


Fig. 2. After enucleation sutures from internus pass thru Tenon's capsule to temporal side and tied; sutures of externus pass thru Tenon's capsule to nasal side and tied. One thread from superior rectus starting at A is carried thru capsule from within outward at C, then, from without inward at D, and finally tied to B, after G and H are cut short, burying the end of this tendon. The inferior rectus tendon is to be treated the same way, the suture A to be carried beneath the capsule brought out at C, introduced again at D and brought from beneath the capsule to be tied to B.

pair of scissors, beginning at the insertion of the internal rectus, hugging the eyeball. After complete separation, the eyeball can be enucleated in the usual manner by cutting of the optic nerve.

After primary bleeding has ceased, under pressure, the Tenon's capsule is filled with a blood clot, and is readily outlined by tension on the sutures introduced thru the muscles. The wound is then sutured as follows: The catgut sutures of the internal rectus are passed thru the Tenon's capsule of the opposite side directly below the insertion of the externus and tied. The sutures of the externus are then passed thru the Tenon's capsule of the oppo-

superior rectus tendon is passed thru the neighboring capsule from within, out—then thru the capsule on the opposite side of this triangular space, and tied to another thread still attached to the superior rectus.

This forms a sort of purse string suture, completely closing the upper opening in Tenon's capsule. The same thing is done to close the lower opening. We then have a closed Tenon's capsule with the muscles in as nearly normal position as possible. The internus is given the preference in the attachment to Tenon's capsule as it is the strongest and has the most motion.

Finally the conjunctival wound is

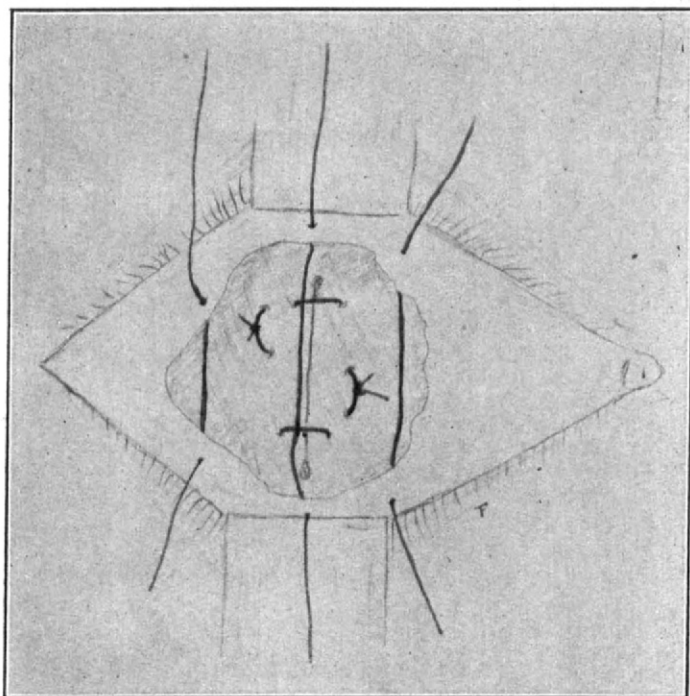


Fig. 3. Shows sutures tied, closing the capsule, and others placed for closing the conjunctiva.

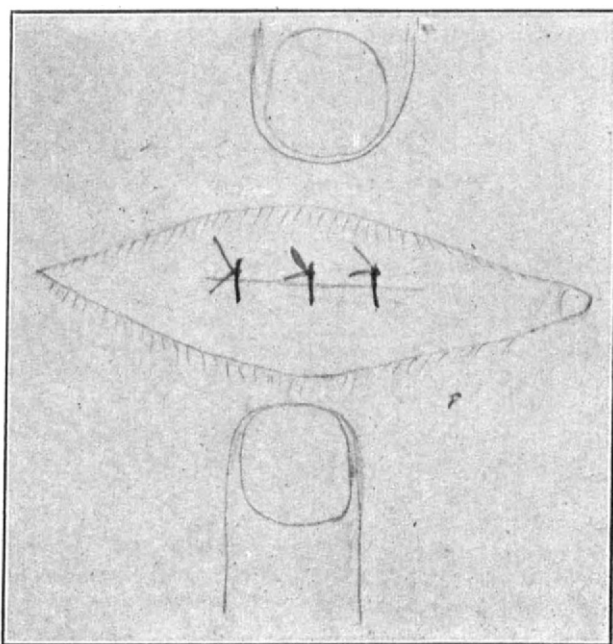


Fig. 4. The conjunctival sutures tied, completing the operation.

closed horizontally, burying Tenon's capsule. Both eyes are kept bandaged for forty-eight hours, as a precautionary measure.

The appearance of the socket after

this operation presents a clean surface with no granulating areas and no bleeding. Healing is by first intention with perfect motility, due to the normal attachments of the muscles.

## EFFECT OF NOSE AND THROAT INFECTIONS UPON OCULAR FUNCTIONS OF AVIATORS.

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This report from the Medical Research Laboratory of the Third Aviation Instruction Center, A. E. F., deals with cases under the care of both the otological and the ophthalmological departments, showing the conditions encountered and the details of individual cases. Authority to publish granted by the office of the Surgeon-General.

In studying the results of operative interference in nose and throat infections, of thirty-eight (38) pilots at the 3rd Aviation Instruction Centre, A. E. F., it was found that many of the men who required operation by the Otological Department were diagnosed temporarily unfit to fly by the Ophthalmological Department. Therefore the eye records were examined to see if it were possible to answer the following questions:

1. How many pilots requiring operation by the Otological Department were under observation in the Ophthalmological Department? And what were the diagnoses in that department?

2. What relation existed between the nose and throat infections and the blind spots? If any change in blind spots was noted, what were the results of treatment?

3. Was vision affected and if so how was it influenced by treatment?

4. What was the effect of these infections upon the extra, and intraocular muscles? What results were obtained by treatment?

5. What did the history and physical examination of these pilots reveal?

Situated as we are, it has been impossible to refer to the literature, with the exception of part of the literature of aviation medicine; which, to our knowledge, does not deal with this subject.

The number of cases presented is small and the time of observation of necessity was short, but the apparent lack of literature on this subject in aviation medicine made us feel that a statement of our findings was justified.

1. In answer to the first question the following data were found:

Records of thirty-eight pilots treated by the Otological Department were found in the Ophthalmological Department. Nineteen or 50 per cent showed some ocular trouble, which possibly had infection of the nose and throat as the underlying cause. Search was made, by means of X-ray and laboratory examination in addition to physical examination, for other foci of infection. The ophthalmologic diagnoses were as follows:

Retrobulbar neuritis, six or 15.80%.

Convergence weakness, nine or 23.63%.

Divergence excess with convergence insufficiency, one or 2.63%.

Acute catarrhal conjunctivitis, one or 2.63%.

Marginal blepharitis one, or 2.63%.

Photophobia and lacrimation one, or 2.63%.

(Blind spots not examined in last case.)

2. Our second question is given the following answer:

Six, 15.80 per cent of the thirty-eight pilots showed definite enlargement of