RICHEY (S.O.)

RESTORATION

OF THE

Membrana Tympani.

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Extracted from the Transactions of the Illinois State Medical Society, Springfield, May, 1878.

CHICAGO:
H. Willson & Co., Printers. 170 Clark Street,
1878.

Restoration of the Membrana Tympani.

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In commenting upon chronic suppuration of the middle ear, under the head of prognosis Dr. D. B. St. John Roosa says: "The membrana tympani has a regenerative power second to no other membrane of the body. I have repeatedly seen it restored after all but a narrow rim had been entirely swept away. When the membrana tympani is entirely removed, and one or more of the ossicula lost, the prognosis is grave."

It was stated by Dr. Turnbull, in 1872, that "If more than half the membrane be destroyed, it rarely heals." Mr. Dalby, of London, in 1873, said: "To how great an extent large losses of substance in the tympanic membrane may, under favorable circumstances, be replaced by new tissue, seems uncertain; at any rate, to the extent of *half* the membrane."

According to the observation of the writer, the cases in which the perforation can not be healed are rare, if proper regard be had for cleanliness, and the patient is persistent in his efforts. I have moreover observed that in case of a large perforation of the membrane, the membranic tissue is more rapidly renewed at first than after the perforation has become so small as to render it difficult for the surgeon to make local applications to the middle ear. This stage of the process is the most trying to the surgeon and the patient, for when the perforation has become small and the discharge has ceased, the vital activity of the parts may have so much diminished as to again require stimulation. This excitation, though slight, may be rendered so severe by some unexpected circumstance,

as exposure to cold and dampness, as to renew the suppuration, which in turn keeps open the small perforation. This is one of the conditions which make the treatment tedious.

A perforation originally small is often not easily healed for the same reasons. Mr. Dalby has found "that a perforation of large or moderate size receives greater benefit from treatment than a very small one."

If we bear in mind that the middle ear is the part diseased, and that from it the vitality of the membrana is or the most part derived, it is a reasonable conclusion that the tympanum should be the part stimulated, and not the membrana tympani itself. When, therefore, the perforation is large, it seems rational treatment to give an impetus to the reparative action in the membrane before the new tissue interferes with the applications to the middle ear.

In these cases, nitrate of silver appears to be the best stimulant that can be used upon the diseased surface, and the first application of it should be very thorough. This will usually give considerable pain for several hours, and the excitement of the parts should not be allowed to get beyond control. Its subsequent use rarely gives much annoyance, as it seems to change the nature of the surface to which it is applied. The severity of the application should be governed by the previous duration of the affection, being stronger the greater the length of time the suppuration has lasted.

In regard to the method of using nitrate of silver, it is neither necessary nor justifiable to give into the hands of a patient a solution of it to be instilled into the ear, as staining of the face and clothes is an almost certain result. It is one of the applications which should be made by the surgeon himself, and even then, with usual care, the auricle and the outer portion of the meatus will at times become blackened. It may be used in any strength, from ten grains to an ounce of water to a saturated solution (℥ i. to f. ℥ i.), as the case may require, and should be applied by means of a cotton holder. In this manner the application can be made to any part to the exclusion of other parts. Where the membrane of the drum had

all sloughed away, in the cases observed by me, the process of reparation began in the upper and anterior segment, and extended downwards and backwards, the last of unrenewed tissue being in the post-inferior quadrant.

The patient should wash the ear frequently with warm water and a syringe; but this will not always remove the pus from the interior surface of the membrana tympani. This object can best be accomplished by means of a warm alkaline solution, forced through the eustachian catheter into the middle ear. This farther assists the purpose of keeping open the eustachian tube, for in many of these cases the non-suppurative form of inflammation has preceded the suppuration, and if, under these circumstances, the membrane is entirely restored while the eustachian tube remains diminished or closed, tinnitus and oppression at once result. This method has the advantage over forcing water from the external meatus through the tympanum and the eustachian tube, in that there is not the same danger to the internal ear or the brain; it does not produce a like faintness and dizziness, nor does it wash the pus from the middle ear into the throat. It forces the pus into the external meatus, whence it may be removed by the surgeon. In the case of an irritable child, for whom the catheter can be used only at disadvantage, if at all, the progress of repair is usually more protracted than in one whose middle ear is easily cleansed in this manner, thus proving the advantage of the procedure. In any event, a healthy state of the tympanum is a requisite to a satisfactory result, for though the suppuration may have ceased, and the perforation may be closed, yet if the tympanic mucous membrane continues irritable, a very slight exciting influence may at any time cause a return of the previous condition.

Dr. Roosa reports a case similar to those recorded below, in which the membrana tympani and the ossicula auditus had sloughed away. The left membrane was restored, with marked improvement in hearing, in the space of ten months. The patient was young, and the inflammation was recent.

Appended are the histories of two out of five cases of re-

storation of the membrana tympani. In one of the five cases there was necrosis and removal of the cochlea of the left side,* three of those referred to having lost but one membrane.

Case 1.—Feb'y 1st, 1877, Henry Blass, aged 51 years, claimed that he had been afflicted with purulent discharge from both ears for twenty years, and that during the whole time his hearing had been no better than I found it to be upon examination. The watch could not be heard when pressed upon either ear. Words spoken slowly and distinctly, and in a raised voice, could scarcely be comprehended. The vibrations of the tuning-fork were heard when it was placed upon the vertex, or upon either mastoid process. Each external meatus contained a quantity of green pus, the removal of which by syringing the ear exposed a raw and ulcerated surface in the tympanum of the right side. Enlarged blood vessels could be seen passing over the promontory of the left middle ear, which contained numerous polypoid granulations. The membrana tympani were both destroyed, nothing remaining except the annulus tendinosus. A small knuckle of bone, the short process of the incus, clung to the upper and anterior portion of the tympanum. The malleus was gone. Cleansing the ears and inflating them with air did not improve the hearing. Frequent syringing and an astringent lotion were prescribed.

He complained at subsequent visits that syringing his ears gave much pain. Nitrate of silver was used topically.

By June 28, 1877, the suppuration had ceased in the left middle ear, and the membrane of the drum of this side was entire. The right membrane did not at the time show any disposition to follow the course of its fellow, and there was still suppuration from the right middle ear. H. D. R. E.— $\frac{0}{\text{watch, 12 ft.}}$; H. D. L. E.— $\frac{2 \text{ inch}}{\text{watch, 12 ft.}}$.

September 15, 1877, suppuration from the right middle ear had stopped, and the right membrana tympani was restored,

*Reported in the Chicago *Medical Journal and Examiner* for April, 1878

except a small perforation, such as could be made by a pin, in the post-inferior quadrant. H. D. R. E.—$\frac{2 \text{ inch.}}{\text{watch, } 12 \text{ ft.}}$; L. E.—$\frac{10 \text{ inch.}}{\text{watch, } 12 \text{ ft.}}$. The right membrane occupies nearly the normal position of the membrana tympani, though unsupported by the manubrium mallei. The left membrane is attached to the annulus tendinosus anteriorly; posteriorly, it adheres to the inner wall of the tympanum. The annulus may be seen external to the new membrane posteriorly. The left membrane reflects from a spot in its post-inferior quadrant. The patient has had tinnitus aurium in the left ear since the restoration of the membrane, which was relieved by the treatment usual in the non-suppurative form of inflammation of this organ.

Case 2.—Henry Foesch, of Chicago, aged 21 years, was first seen Nov. 6, 1877, and then stated that when 18 months old he had measles, followed by suppuration of both ears, which continued for sixteen years. Three years ago he "had another attack of inflammation, which pained so much that he did not sleep for two weeks."

An examination showed about the same structural condition as in the former case. Both membranæ tympani had been destroyed, leaving only the annulus tendinosus; the malleus was absent from each ear, and the other ossicles seemed bound to the roof of the tympanum by adhesions. The tympanic blood-vessels were very large, and the posterior and inferior part of the inner wall of the left middle ear was covered with granulations. The patient had no pain in either ear. He could hear the sound of the voice readily, but could not distinguish words without an effort. H. D. R. E.—$\frac{4 \text{ inch.}}{\text{watch, } 12 \text{ ft.}}$; L. E.—$\frac{\text{C.}}{\text{watch, } 12 \text{ ft.}}$

FIG. 1.—The inside white ring, the annulus tendinosus. The process of the incus, and the cartilaginous socket of the malleus head in front and above; the black space was occupied by the membrane which is lost.

December 20th, about six weeks later, the membranes were nearly restored, the perforations being very small, and situated in the post-inferior quadrants of the new membranes, which were convex externally, the convexity increasing towards the perforation.

Fig. 2 represents the appearance of both membranes at that time.

Fig. 2.

Two weeks later he had acute inflammation of the right middle ear, with suppuration, which enlarged the perforation of the right membrane, which then appeared as in Fig. 3. The left membrane had more vitality, and the perforation then very small, but gradually increasing.

Fig. 3.

Jan. 10, 1878, there was very little discharge from the right middle ear, and the perforation of the right membrane resembled that seen in Fig. 4. The left membrane was entire. H. D. R. E.—$\frac{6 \text{ inch.}}{\text{watch, } 12 \text{ ft.}}$; L. E.—$\frac{10 \text{ inch.}}{\text{watch, } 12 \text{ ft.}}$.

Fig. 4.

March 21st: H. D. R. E.—$\frac{25 \text{ inch.}}{\text{watch, } 12 \text{ ft.}}$; L. E.—$\frac{34 \text{ inch.}}{\text{watch, } 12 \text{ ft.}}$.

April 30th: H. D. R. E.—$\frac{34 \text{ inch.}}{\text{watch, } 12 \text{ ft.}}$; L. E.—$\frac{44 \text{ inch.}}{\text{watch, } 12 \text{ ft.}}$.

The eustachian tubes were free; there was no tinnitus, no suppuration from either ear, and his hearing was sufficient for ordinary purposes, conversation in the usual tone being readily heard and understood.

Though the progress in the first case was essentially the same, yet it was not so rapid as in this one. This fact may be attributed to the difference in the ages of the two patients, as the inflammation had existed for a like time in each, and the structural changes were virtually the same. In each case the left membrana tympani grew more rapidly than the right, and the hearing distance is proportionately greater in the left ear.

ERRATA.—Page 4, 18th line, first word, for "membrana" read "membranæ." Page 5, 2nd line, for "watch, 13 ft." read "watch, 12 ft."