was only nineteen seconds. These numbers are probably too small to draw any certain conclusion, but they appear to point to a certain amount of hyper-sensibility of the vestibular apparatus in the late stages of otosclerosis, or at least to an alteration in the labyrinthine fluid favouring the production of vestibular nystagmus.

THE TREATMENT OF OTOSCLEROSIS.[1]

By G. J. Jenkins, M.B., C.M.Edin., F.R.C.S.Eng.,
Assistant Aural Surgeon, King's College Hospital, etc.

The difficulties in the way of a satisfactory treatment of otosclerosis must be great until the problems of the pathology of the condition have been solved. Otologists have for many years, in spite of or because of this ignorance of the pathology, been trying various remedies for the alleviation of the symptoms of the disease.

When first recognised as a clinical entity otosclerosis was regarded as a middle-ear affection, and treatment was largely directed to the middle-ear tract.

At this period the treatment was various—inflation of the tympanic cavity with air, hot and cold, oxygen and medicated atmospheres, and the administration of drugs supposed to influence chronic inflammatory processes. Repeated blistering of the mastoid region and even the complete post-aural operation were tried.

As treatment after treatment failed, others were thought of and tried with indifferent results.

Later it was found that certain bone changes occur in the region of the foramen ovale, and that the condition was, therefore, not purely of the middle ear.

Many, believing these changes resultant on a middle-ear inflammation, continued to treat otosclerosis as before by local and general medication that might be expected to influence a local inflammatory condition.

The known tendency to the fixation of the stapes led to a thorough trial of massage, galvanism, ionisation, fibrolysin, etc. It has been the endeavour of some to influence these local changes by means of radium and X-rays.

Since then there has been a further advance in our knowledge of the pathology. It has been found that the bone changes in otosclerosis may be found in isolated patches at some distance from the foramen ovale, indeed in any part of the bony otitic capsule.

[1] Read at the meeting of the British Medical Association at Aberdeen, July, 1914.

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At the International Congress of Medicine, 1913, I ventured to state, and I still believe, that clinical and experimental evidence tend to prove that there must be a change in the labyrinthine fluid.

We now understand that in considering treatment we have to deal with an affection of a region that includes the greater part of the terminal auditory apparatus.

In natural sequence to this belief we find that trial treatment has become of a more general nature. Siebennmann gives phosphorus, Dinker also phosphorus; many give potassium iodide, Brühl thyroid gland; Ferreri a diplococcal serum, and so on.

It is suggested that pituitary, ovarian and testicular extracts and other gland extracts should be tried.

The subject of internal secretions is so complicated, however, that we must go ahead but very slowly. We cannot explain the pigmentation of the nipple at pregnancy, no more can we begin to explain the relationship of otosclerosis to pregnancy.

I have, personally, tried most of the above suggested treatments and cannot say that I have found one that has been of the least value. Phosphorus seems to do good in some cases, but I am very doubtful that there is any real benefit.

I am convinced that certain so-called treatments are harmful in some cases. I believe that massage and treatments by sounds, musical or otherwise, do harm in true otosclerosis, more especially if internal ear deafness is a decided clinical feature.

So far I have dealt with treatment in so far as it is directed toward cure or the delaying of the progress of the disease.

Can anything be done for advanced cases? Knowing that fixation of the stapes is so often present, you can understand that otologists would be likely to try to produce a new oval window. This has been done by plucking out the stapes and by making a new window in the promontory. The results of these operative procedures have been bad. Usually the patient has been worse in hearing after the operation.

Thinking that the labyrinthine fluid might be at fault I tried to alter the physics of this fluid by opening the perilymphatic space of the external semi-circular canal. The immediate result was astonishing. The hearing improved very considerably, but in two or three months the condition of the patient was almost as bad as before. Bárány did a similar operation on the posterior canal on a different deduction and obtained a similar result.

All operative procedures have been unsatisfactory and are likely to be so.

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It is my experience, and it seems to be that of most, that we cannot effect any improvement in true otosclerosis by any known means. We may improve an associated condition that may be present; and we must be careful not to mistake this as an improvement in the otosclerosis.

Prophylactic treatment must be considered from the standpoint of heredity and the influence of pregnancy on the progress of the disease.

The General Management and Treatment.

In my opinion the patient should be told the nature of his deafness, and we should be careful not to raise hope of improvement by operation in the nose, inflation of the ear, etc. These operative procedures should not be made unless there is danger of Eustachian deafness being added.

The patient is usually pleased to hear that progress is commonly very slow, that the condition may remain stationary at any period, and that the great majority of cases do not become "stone deaf."

I advise my patients to avoid noisy surroundings. There is no doubt that noises, especially high pitched, increases the symptoms in otosclerosis.

Two intelligent doctors, who have otosclerosis, have influenced me very much in coming to this conclusion. They insist they are much worse after being in London for a time. They are conscious that a noise makes the hearing and the tinnitus worse. They are certain that after a few days in quietness they are better. One of these men attempted a study of X-rays work, and he was convinced that the cracking noise of the apparatus did him harm.

These observations lead one to study the effect of noise on other patients, and the conclusion I came to was that noise—especially machinery noise—has a marked damaging effect in otosclerosis.

This conclusion suggested to me the idea of giving the ear as near as possible absolute quietness and rest by means of a clay, fibre or other plugs in the external auditory meatus. It is, however, difficult to persuade a patient to submit to a prolonged treatment of this kind.

Therefore I strongly advise, more especially in the early stages, that, if possible, these patients should live in quiet surroundings.

Nervous exhaustion and extreme cold have a bad effect.

Diet seems to have no effect one way or the other. I am not satisfied that alcohol or tobacco have a marked influence on the disease, except in so far that when used in excess they tend to

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cause a general deterioration. On this subject I should like to have the opinion of the meeting.

It would be well to warn patients against the trying of advertised remedies as aids to hearing. Some of them, I believe, do harm. The patient should, whether better or worse, see an aural surgeon from time to time, and also should see a competent man if there is an obvious increase in deafness at any time, as this may be due to the addition of another form of deafness that might be relieved.

It is in such conditions that the irregular practitioners sometimes gain a client and a nucleus of practice, as most of these men have sufficient knowledge to be able to recognise the additional deafness that can be relieved. It is for this reason I would advise the above course rather than to send the patient away out of reach and often into the hands of an irregular practitioner.

Instrumental Aids.

In the early stages when the deafness is slight the patient is better without instrumental aid.

If the deafness has reached such a degree that the patient cannot hear a speaker in a hall but can still carry on an ordinary conversation, the use of a "trumpet" in one of its many forms may give considerable assistance and pleasure.

When the hearing power is diminished so much that the patient can hear ordinary conversation only two or three feet, instrumental aid may be of great value. Many by the time this stage is reached can manage ordinary conversation with the aid of lip reading, but most patients welcome some form of instrumental aid. Electrical instruments are sometimes of great value at this stage, but the instrument must be carefully selected. Many derive the greatest assistance from well-fitting "auricles." This instrument is, of course, most suitable for females, as it can be so readily hidden. I am inclined to think we are rather neglecting the "auricle" since electrical instruments have been so much advocated. Indeed, I believe that the auricle properly made in many cases gives much better results than the electrical instrument, even when the latter is definitely of some help. The electrical instrument is less helpful when there is marked internal-ear deafness, whereas the "auricle" is more generally useful.

When the hearing is very much diminished so that only raised conversational voice close to the pinna can be heard, most assistance is obtained by means of the "trumpet"-shaped instruments and the speaking tube.

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