too much opposition to the interni. Yet, balance tests may be normal or nearly so. Again, in the use of prisms for constant wear, if they are to do good, there must be deficient or excessive power somewhere. The duccion test tells you.

Dr. Hill is right when he says that refraction correction often cures muscular imbalance. If, for instance, an individual has a hyperopia and has been compelled to use less convergence than accommodation he has established a bad eye habit. Correct that and by the re-establishment of the right relation, the muscular error will very often disappear. The same is true in myopic refraction. If a young myope has normal vision and good fundus, I do not hesitate to give the total correction, provided it is not over 8 or 10 diopters. We may produce a temporary accommodation defect, but it soon wears off. The ciliary muscle acquires power.

Dr. Stucky alludes to another class of cases. There is weakness of a muscle associated with refraction error. You can always bring out the former with the phorometer, but the patient is comfortable without its correction. Is its correction desirable? Neither refraction error nor muscular imbalance necessarily produces asthenopia. Either may, and it is a question of diagnosis. If the cause is ametropia, its correction cures, and we need go no further no matter what the imbalance is. About the neurotic patient: of course we must allow for neurasthenia, psychasthenia and hysteria. But every year I become more and more doubtful of my own correctness when I accept neurasthenia or hysteria as the diagnosis. I sometimes have to; but when I arrive at that conclusion, I get a good internist to help me out. We oculists should not dismiss a patient with that diagnosis. Look for some hidden focus of infection, especially the teeth; study blood pressure, metabolism, home habit; look a little more carefully with your ophthalmoscope for vascular changes. Take the field of vision and see if there is not something outside the eyes disorganizing eye function.

TWO CASES OF EYE INFLAMMATION DUE TO INFECTED TEETH*

BY CLIFTON M. MILLER, M.D., F.A.C.S.,
Associate Professor Otology and Rhinology,
Medical College of Va., Ophthalmologist
and Oto-Laryngologist,
Stuart Circle and Memorial
Hospitals,
Richmond, Virginia.

The question of focal infection has received much attention in the past few years, and much substantial progress has been made in studying the pathologic con-

dition that infected foci may produce. But in my opinion we are only upon the threshold of the subject and the constant hammering and working together of the clinicians in every department of medicine, and the various laboratory workers will bring out much that is valuable and beneficial to suffering humanity.

Fashionable uric acid diathesis as a cause of various more or less obscure conditions is already much less in vogue than it was a few years ago, and we search for the infected focus when formerly the patient would have been put upon a strict diet and treated with eliminants, etc. I do not in the foregoing statement mean to underestimate the value of treatment by diet and eliminants, for they seem as valuable now as they ever were in the active stage of any condition brought about by the presence of a focus of infection; but they do not prevent the recurrence of acute symptoms. This we are trying to do by eliminating the focus, and the success attending these effects has seemed more lasting. Ophthalmology has benefited most richly by the advances in this field. A hunt for the infected focus and the elimination of it is attended with most brilliant results. The focus may be anywhere in the body, but it must be found. No tissue of the eye is exempt from attack and the type of inflammation varies from the most violently acute to the chronic.

In my own practice inflammation of the episclera, sclera, iris and ciliary body have been most acute while those of the conjunctive, cornea choroid and retina have been more chronic in their course. This is not made as a sweeping statement of what invariably occurs, but simply my own experience of what is more usually the case, for any study of a series of cases due to infected foci will bring forward exceptions to the above. I wonder if it has been the experience of this Section, as it has been mine, that the so-called chronic idiopathic serous iritis or irido-cyclitis with deposits on Decemet's membrane (keratitis punctata) has almost disappeared from practice. These cases with their slow course non-response to treatment and an end result of gradual softening of the globe with resultant shrinkage have caused many an ophthalmologist to lose valuable sleep and put an additional sprinkling of

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snowy locks into a head which should receive such gifts from Father Time alone. I wish that I could say that the end of such cases was in sight. We are not yet far enough forward to venture such a prophecy though they seem to be growing fewer and the means for their subjugation may be at hand.

Several cases have come under my observation that lead me to think that cataract, senile in type, may be induced by focal infections. The first of these cases were in adults around thirty who, without any history of acute eye disease at any time, had partial or complete cataract of the senile type. This observation is made not because any definite connection has been worked out but to bespeak the cooperation of this Section in observing this and trying whether it may be false or true, and if true, to what extent will removal of the focus retard the advance or permit the clearing up of an incipient cataract. One man sees scarcely enough cataracts to make his observation of great importance but the study of all the cases that members of this Section come into contact with may lead us to conclusions of much value.

Two cases of marked inflammation of some of the structures of the eye have recently come under my care which had some points of interest.

Case 1.—Mr. C. W., white, male, age 40, was led into my office Dec. 9, 1918. He had always been healthy as a boy and man. He lost the left eye in boyhood as a result of accident. Several years ago, I operated upon his right eye for cataract by needling. Following this operation his vision was 20/20 with correcting lens. He has worked regularly since then at his occupation of hauling and had no sickness.

When I saw him Dec. 9, he had had photophobia and excruciating pain in the right eye with profuse lachrymation for the past two days. Examination of the eye showed redness of the entire bulbar conjunctiva, the iris contracted, thickened and immovable, the media cloudy. The vision was reduced to light perception. The Wassermann was negative. Examination of the mouth showed pus being poured into it from around the roots of several of his teeth.

The digestive condition was in a surprisingly healthy condition, considering the state of the mouth. He was ordered to the dentist at once with instructions to have every tooth with any vestige of trouble removed. The first dentist whom he consulted was, in my opinion, a little too slow in clearing up his mouth, so he was directed to consult another who worked more promptly and the eye symptoms immediately became amenable to treatment; the iris responded

to the use of atropin, and the pain became much less, all of the symptoms showing a decided change for the better. Of course, he had from the first been upon a treatment of rest and elimination with hot compresses to the eye and atropin instillations. He remained under treatment till May 5 when I considered it safe to prescribe a new glass and finally dismiss him. At this time his vision with correcting lens was 20/25 and with reading lens he could read perfectly J-1 at 14 inches. He has remained perfectly well and expresses himself as feeling fine, with his vision tending toward improvement.

Case 2.—Mrs. H. W. H., white, age 50, housewife, consulted me May 19, 1919. Her previous history was of no significance. She noticed that her eye was red and beginning to cause pain several days previously. May 18 the pain was constant and she had slept but little during the night. The pain was now intense; there was photophobia and lachrymation. Examination showed injection of the bulbar conjunctiva, most marked in the upper temporal quadrant, a violet-colored injection at the sclero-corneal junction, and no irregularity in the outline of the globe. The tension was normal. The eye was tender on pressure. The iris was thickened and congested. The pupil was somewhat contracted, but responded sluggishly both to light and accommodation. The media was fairly clear.

The patient had nothing in her history to suggest syphilis, so a Wassermann was not ordered at that time. Response to treatment later showed it to be unnecessary. Her physician reported the kidneys and cardio-vascular system in good condition. Her digestive organs were normal. Examination of the nose and throat revealed nothing pathological. In examining the mouth several dead teeth were found as well as two irregular roots, whose crowns had been broken off. The gums were red and irritated-looking.

She was put on a 1% solution of atropin, to be dropped in the eye every four hours, and hot compresses for ten minutes every two hours. A saline purgative by mouth was ordered. She was instructed to go to the dentist for x-ray and general examination of the teeth.

May 20, the dentist reported two abscesses at the roots of the teeth with infected spots at two other places. He was requested to extract all infected teeth, which he did on that day. The patient reported that she was feeling better, but aside from the fact that the eye responded fairly well to the use of atropin, with iris semi-dilated and immovable, the appearance of the eye was worse. There had appeared in the upper temporal quadrant, where on her first visit the injection was most marked, a decided rounded elevation showing an episcleritis. This elevated area was exquisitely tender to the gentlest touch.

May 21, the patient's gums were tender and irritable, but in as good condition as could be expected shortly after multiple extraction of teeth. The eye no longer caused pain, but was still very tender to the touch. The iris was almost fully dilated. The area of episcleritis showed but little change.

May 26, the patient was greatly improved in

all ways. The conjunctival injection was clearing up. The area of episcleritis was less elevated, and the tenderness on pressure much less. She felt little or no pain and slept well. From this date her improvement was uninterrupted to the time of her discharge on July 19, at which time the eye looked entirely normal.

These cases are reported not alone for their clinical interest, but to enter a plea for a more searching examination of the teeth and a more frequent referring of a patient to a competent dentist. Many of us here are laryngologists as well as ophthalmologists, and in our former role we will spot a diseased tonsil as far as we can see it. It is surprising, however, how frequently we, while looking at the tonsils, fail to examine the teeth that are in front of them, around which teeth we may find the nidus of infection which is responsible for the infected crypts that we see in the tonsils. The time is here when we must be not only better ophthalmologists and laryngologists but better doctors, searching broadly through the human body for the causes of disease in those organs in which we are most interested, and we must take frequent counsel with men skilled in all departments of medicine and study our cases with their aid.

3 West Grace St.

DISCUSSION

Dr. J. W. Jervey, Greenville, S. C.—Hardly a week passes that I do not see one or two cases of eye inflammation that can be traced directly to the teeth, and I have made it an habitual rule in all except the very simplest inflammatory conditions of the eyes to have the teeth x-rayed. It has astonished me to find the enormous number of infected teeth in persons who never suspected anything wrong. I will speak of only one case which is interesting from the fact that the condition was evidently due to abnormalities of the dental structures, but could not be distinctly traced to the infection, although possibly it did exist. It was that of a young girl of perhaps thirteen or fourteen years of age who had an utterly intractable low grade iritis for several weeks treated by the family practitioner and by a specialist and ophthalmologist in a neighboring city. Nothing seemed to be of any avail. The routine procedures were carried out. Frankly I did not suspect a tooth infection in the case. It looked like a very simple inflammation that would clear up under the ordinary procedures. At least so far in my experience tooth infections are not usually found in children. They are more apt to be adult cases and usually adults of more than adolescence, from twenty-five to thirty years of age. But after the young lady had been under my care ten days or two weeks she was x-rayed. No abscess was found

at the apices of any of the teeth, but she had two large, unerupted, impacted third molars. The dentist who inspected the pictures with me said these three molars were in unusually high position, almost reaching up to the floor of the orbit. The tooth on the offending side was extracted; no evidence of pus was found, and in three or four days the eye was well. It brought to my mind the fact that not all of these cases may be due directly to infection. Part of them, at least, may be due not to the toxins of the infection that exists in the abscess cavity, but simply to pressure.

Dr. Hiram Woods, Baltimore, Md.—I believe in ocular infection and irritation from bad teeth, but I am convinced that we want to do some careful thinking before we accept this diagnosis. Let me first take up these two points in Dr. Miller's paper. He says that he has seen less irido-cyclitis in the last few years than formerly. That has not been my experience. I think I have seen more in the last eighteen months than in the past four or five years, and the cause has not always been apparent. Usually they have been very stubborn. His suggestion in regard to the possible infectious etiology of early cataract is worthy of consideration. We know comparatively little of cataract etiology. We see many people with one eye cataractous and the other good. We may well suspect defective nutrition produced by uveal infection. This, of course, takes us back to the extra-ocular causes of uveal defect.

We should make a careful distinction between dead and infected teeth. There are plenty of people carrying dead teeth and they are in perfect health. When teeth are gone they are gone, and you have deprived a person of something of real physiological use. The roentgenologist can tell us whether a dead tooth is a possible source of infection. When you have this information, what then? Dental disease may be associated with tonsillar, gastro-intestinal disorders, defects in metabolism, etc. You have a lot of differential diagnosis to make before you can be reasonably sure; and, at best, it is the therapeutic test which decides. Sometimes it proves we were mistaken. It does no harm to take out the tonsils, but to sacrifice useful teeth is a different matter. I saw recently a lady who had had one tooth extracted after another on the diagnosis of a roentgenologist until all were gone. It was done for obstinate pain in the eyes. She was no better. These things are not creditable to our diagnostic powers. Dental irritation is a frequent cause of ocular pains and ciliary irritation. In cases of failure to relieve by refraction correction or adjustment of muscular imbalance, the teeth should be studied. Sometimes an eye resists the influence of cycloplegia for days. I have seen cases where I thought this was due to diseased teeth. At any rate, the eye discomfort disappeared after the treatment of inflamed dental nerves.

Dr. J. A. Stucky, Lexington, Ky.—The important point brought out in the essay of Dr. Miller emphasizes the necessity of looking for other foci of infection. Tonsils and teeth now have the right-of-way and we are in danger of losing

sight of the fact that there are other foci, oftentimes several, making a chain or vicious circle, and one organ receives the blunt of the injury caused by the absorbed septic poisoning. This emphasizes the necessity of thorough examination of the entire body. An old error of refraction with lowered power of body resistance caused by eye strain will produce serious trouble in the eye from intestinal auto-toxemia, faulty elimination or absorption of pus from ear, nose, tonsils or teeth. My observation is that too much blame is put on infection from a tooth and too many teeth are sacrificed without giving the relief expected. In the majority of cases oral and abdominal house-cleaning must be done simultaneously. The etiology of opacity of crystalline lens, glaucoma, irido-cyclitis and trachoma are still in doubt and must be solved by scientific team work directed and aided by the ophthalmologist. The problem of metabolism or body chemistry and the food problem today are the greatest confronting the medical scientists, and we must not lose sight of the fact that pus in the root of teeth, tonsils or accessories sinuses may be a culmination of another condition which is systemic. This I have demonstrated in hundreds of cases seen in my clinics in the mountains of eastern Kentucky.

Dr. J. A. Gorman, New Orleans, La.—I am surprised at the number of people who are walking in New Orleans with diseased teeth. The teeth play an important part in different conditions in both the nose and throat as well as clinically. Do not stop at just examining the teeth, but make x-rays of them and get rid of the diseased teeth. Some one spoke about the difference in bad teeth and disease. A devitalized tooth properly filled or filled as nearly as possible, to the x-ray shows no rarefaction. I would consider that tooth not in a dangerous condition. But where you find rarefaction get rid of it regardless of what shall be put in later on. One diseased tooth will do more harm in the mouth than the value of saving it. These teeth are dynamo's generating pus every day. It is found in the joints as far down as the toes. I have seen numbers of them. As for the eye, many of the eye men have referred cases to me, all due from one or two abscessed teeth. In regard to impacted teeth it is a fact that impacted third molars or bicuspids will cause the neuralgic pain. Do not recommend to the dentist to have these teeth extracted—be kind to the dentist; suggest to him that he remove the diseased teeth. So many physicians look in the patient's mouth and say "You ought to have these teeth out," which rubs the fire the wrong way. The dentist and the physician should work together here.

Dr. H. H. Martin, Savannah, Ga.—I did not hear Dr. Miller's paper, but had the pleasure of reading a copy of it before coming to Asheville. The lesions showing in the eye as a result of a remote focal infection are extremely interesting and as manifold as the phenomena of life itself. The speaker has contributed some unusual case reports on this subject. The extreme vascularity of the structures of the eye and the abundant supply of sensory nerves render it peculiarly vulnerable to various toxemias. I have reached the conclusion that focal infections (usually of the teeth) are responsible for fully 50 per cent. of all inflammatory disorders of the eye. Dr. Miller's suggestion that cataract might be traced to focal infections is entirely new and I do not feel capable of discussing it.

Dr. Miller (closing).—I approached a large subject from a narrow angle, only reporting the cases from the teeth. I am not under any misapprehension about gastro-intestinal conditions or any other focal infections. The recent paper of George Huston Bell, read before the Ophthalmological Section of the American Medical Association, has gone fully into the whole subject, and for those who have not read it, it is well worth reading. Dr. Jervey spoke of impacted molars with no evidence of infection. Toxin may not always be the cause. We do not know yet whether irritation or pressure and changed condition of circulation may actually cause toxins, which may be absorbed. You have lowered resistance by pressure and toxin may be incident to that. We have got to work that out, and it is going to take years and thousands of cases to do it. We can not do it alone.

I think Dr. Woods misunderstood me. I said the low grade was called serous iritis. The patient comes back years afterwards and says, "Doctor, you told me I had 'serious' iritis." These are the things I have seen so much fewer of. The violent puffed up irides I have seen more of lately. All of us have lost sleep and patients and done a little bit of cussing either externally or internally about this non-response to cycloplegics. They are beautiful when they come around.

I have always used the dentist as an adviser. I do not tell them what to do. Sometimes when they are not working fast enough I call for another adviser and we get along better. I hope you will bear in mind what this study of focal infections is going to mean to us and that cataract may be due to it. Anything that upsets the nutrition of the lens, that gives a chronic congestion there that may not be manifest to us in any way except slow response to cycloplegic action, if it stays there for years, may upset the nutrition of the lens and produce a cataract.