THE TONSIL PROBLEM

By Professor Dr. OTTO KAHLER (Freiburg i/B)

It has given me great pleasure to accept the invitation of the Semon Lecture Board to give this lecture to-day, and I cannot but sincerely thank you for an invitation which I feel to be a great honour.

I look on it as being an appreciation of German laryngological science rather than of myself. As you know, the native town of laryngology is Vienna. There I won my spurs in the sphere of laryngology; there, too, I became acquainted with the founder of this lecture, Sir Felix Semon. His own lectures, full of spirit and attraction, produced a profound and lasting impression on me and, I am sure, upon all that attended them. It is, therefore, particularly gratifying to me to give this lecture, which bears the name of the man whose scientific importance is recognised all over the world, and whose eminent work in the sphere of laryngology is held in vivid remembrance up to this day.

The subject on which I have chosen to speak to-day is the tonsil problem. I chose it, because this problem in particular concerns general medicine as well.

There is scarcely another problem that has been written and spoken about as much as the tonsil problem. There are especially two questions that have been much discussed: the question of the physiological rôle of the tonsils and the question of the so-called "chronic tonsillitis", particularly in its relation to general affections. Solving the first problem seemed to be of special importance as, over and over again, some doubts have arisen as to whether we should completely remove an organ, the function of which we do not yet clearly understand. In the course of the last fifty years the views upon the suitability of tonsillectomy have changed several times. At the end of the last century, when the theory of infection came into vogue, and when the tonsils were thought to be a channel for the invasion by various pathogenic micro-organisms—whilst then it was, as it were, fashionable to have the tonsils of every child removed—there appeared later on, promoted by the theory of Brieger, who

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

considered the tonsils to be a protecting organ, a tendency which advised against proceeding too radically. Then followed Paessler with his theory of the chronic infection of the tonsillar crypts. In consequence of Paessler's publication the tonsils began to be completely removed. Tonsillectomy came into fashion. But, on the other hand, opinions were to be heard advising against this effective operation on account of the alleged physiological importance of the tonsils.

How does the question under discussion stand to-day? A great number of theories as to the function of the tonsils have been advanced, but none of them has been able to keep its ground.

A theory as to the functions of the tonsils must bear relation to the established anatomical facts. Now it must be stated as a fact that the tonsils belong to the lymphatic system. It is therefore certainly an error to consider the function of the tonsils separately from that of the other lymphatic glands. What we know for certain of the lymphatic system is that lymphocytes are produced in it. Moreover, it exercises filtering and resorbing functions. Now it is well known that the structure of the lymphatic system is not uniform. There are three groups: (1) the lymphatic glands, (2) the sub-epithelial lymphatic tissue, and (3) the lymphatic tissue in the spleen and in the marrow of the bones; and it is quite conceivable that the lymphatic organs have indeed one common function: namely, to produce lymphocytes, but each group has also a separate function of its own. The tonsils belong to the second group—to the lympho-epithelial system. It consists of a reticulo-endothelial supporting tissue in which lymphatic tissue with germ-centres is deposited, and of a lymphatic tissue without germ-centres, which is called lymphoid tissue. The lympho-epithelial system is particularly characterised by the close relations between the epithelium and the lymphocytes. Besides the adenoid pharyngeal ring, the whole lymphatic tissue distributed in the mucous membrane of the respiratory and the alimentary tracts, as Peyer's patches, the adenoid tissue of the appendix and the solitary follicles of the intestines, belong to this group. Mollier adds the thymus to these.

The researches by Schlemmer have helped to make the tonsillar problem more intelligible to us. His statement is well founded, that the tonsils are nothing else but an integral part, different in degree, but not in essence, of the total

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

mesopharyngeal mucous membrane, which must be considered to be one uniform organ, anatomo-histologically and physiologically coherent. The lymphatic tissue distributed in the rest of the pharyngeal and intestinal mucous membrane must perform the same function as the tonsillar tissue.

According to Stöhr, the tonsil is to be conceived as being a fold of the pharyngeal mucous membrane. This fold is laid in in the early embryonic stage, the adenoid tissue is laid in only later on. That it is indeed a fold and therefore only an enlargement of the pharyngeal mucous membrane, the structure of which is not essentially different from that of the rest of the mucous membrane, is perceptible in a transverse plane in this horizontal section. In Figure 1 you see the mesopharyngeal mucous membrane between the anterior and the posterior palatine arch laid in deep folds, which here and there extend up to the tonsillar capsule. In each fold of the mucous membrane, mainly in the middle of it, there extends a fasciculus of connective tissue, connected to the tonsillar capsule which holds the blood vessels and lymphatic ducts. Between the septa of the connective tissue and the epithelium there stretches the coherent layer of lymphatic tissue with the germ-centres, which are particularly numerous in childhood.

Now Schlemmer proved definitely by means of injections that neither the tonsils nor the remaining lymphatic pharyngeal tissue possess afferent lymphatic vessels. The lymph-stream flows exclusively in a centripetal direction. The lymphatic capillary network of the tonsils represents a canal-system which has no ends opening into the crypts, through which a centrifugal lymphatic stream might be made possible.

These researches put an end to the so-called theory of the lymphatic glands which, as is well known, was based on the clinical observation of the frequency of angina after endonasal operations and on the experimental researches of Lenartz and Henke who, after having injected soot into the nasal mucous membrane, was able to identify grains of soot in the tonsils. Amersbach, of my clinic, who revised the experimental studies of Henke, showed that an error had slipped in there in this research. What Henke had thought to be grains of soot in the tonsils, proved to be air-bubbles produced by the drying of the preparations. Thus the theory which considered the tonsils to be simple lymphatic glands may be said to be exploded. The Henke-theory was also contradicted by the clinical fact

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

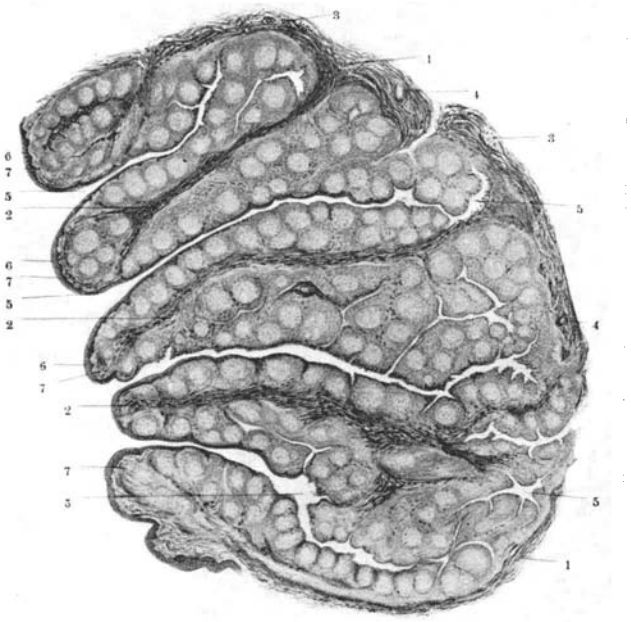


Fig. 1.



Fig. 2.

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

that metastases of malignant tumours of the surrounding parts had never been found in the tonsils.

The researches of Schlemmer refuted still another idea of the function of the tonsils, namely the defence-theory of Brieger and Görke, which up to now has frequently been upheld. It is based on the fact, proved by Stöhr, that leucocytes and lymphocytes continually migrate through the epithelium of the crypts. Supposing the lymphocytes to have no mobility of their own, which recent researches have proved to be incorrect, Brieger assumed that a continual lymph-stream flows through the tonsils from within outwards, transporting the lymphocytes to the surface. This lymph-current was supposed to prevent pathogenic micro-organisms from invading the tonsils. According to Brieger the tonsils might be considered to be protecting organs which, as outer forts, had the function of preventing invasion by pathogenic organisms.

Schlemmer having proved that there cannot be a centrifugal lymph-current, we must to-day decline to believe in the protective function of the tonsils. Another theory has got adherents. It is based on the recent researches into the so-called germ-centres or secondary nodules. At the present time many authors disbelieve the old supposition of Flemming who thought the germ-centres to be the origin of the lymphocytes. Hellman, Heiberg and others take the view that the secondary nodules are centres of reaction against stimulants, bacteria, and toxins which penetrate into the lymphoid tissue. There occurs a neutralisation of damaged lymphocytes and substances are brought to the organism which the latter will endeavour to destroy in self defence. Heiberg considers that the numerous products of disintegration infiltrated in the macrophagi, and explained by him as the nucleus of lymphocytes, to be a support of this theory. They are the so-called " stainable bodies " (tingible Körperchen) of Flemming, and explained by him as products of metabolism. So the germ-centres must not be considered as a source of lymphocytes but as a reaction centre against invading toxins.

This view is supported by the fact that the germ-centres develop only after birth. If their only task were to produce lymphocytes, they would have to be developed before birth ; otherwise no lymphocytes could exist before birth. The research work of Waldapfel of the Viennese clinic makes one think also. By infecting rabbits with bacteria he succeeded

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

in two cases in producing prematurely (namely in about half the time of normal development) secondary follicles with germ-centres, which normally appear only at a later age. Undoubtedly these experiments ought to be continued, as they are not yet numerous enough to allow of definite conclusions.

I cannot to-day go into the particulars of the intricate problem of the germ-centres, but I might mention that I share the middle point of view, that of Aschoff, who considers that besides the reticulo-endothelial apparatus, the germ-centres may be considered as reaction-centres against invading toxins, but that this fact does not prevent them from producing lymphocytes in case of need.

From the above-mentioned views of the rôle of germ-centres Bergren and Hellman conclude that the tonsils must be considered as protective organs which, particularly during childhood, have the important function of keeping the body ready for defence, and to this we may agree without more ado. But as this function must be the same for the whole lymphoid tissue of the body, as far as it contains germ-centres, the loss of the tonsils, as an extremely small part of the lymphoid tissue of the body, must not be overvalued.

If you take for granted the reaction of the tonsils against invading toxins, it is quite conceivable that the tonsils produce antigens, which function is indeed attributed to them by several authors. Here might be mentioned the theories attributing to the tonsils a rôle in producing immune bodies. Prasch und Zuk found in the tonsils efficient bactericidal substances of lipoid character and therefore considered the tonsils to be antigen-laboratories. Digby compares the crypts to test-tubes for cultures of bacteria. The cultures developing therein absorb exactly the quantity of toxins that the organism wants for producing antibodies against the bacteria-toxins. Viggo Schmidt's mechanical reaction of the tonsils also requires to be tested further. After kneading the tonsils he could demonstrate leucopænia in the cutaneous vessels, and he assumes it to have been called forth by an immune substance coming from the tonsils. He also succeeded in producing from animal tonsils a substance which he would class with the hormones. The injection of this calls forth a leucopænia-effect.

If we admit these new views of the rôle of the germ-centres, we are, therefore, justified in considering the tonsils to be protective organs. Besides this protective function of the

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

reaction against invading toxins, which is common to the whole lymphatic apparatus as far as it contains germ-centres, the tonsils may be said to be of importance as a part of the lympho-epithelial system. Let us remember its rôle in digestion. We are acquainted with the fact of the mass-migration of the lymphocytes through the epithelium. It is supposed that the salivary corpuscles originate from the lymphocytes. The fact that lymphocytes migrate from all those regions in which chemical transformations take place, in the oral cavity as well as in the intestinal canal and in the mucous respiratory tracts, may indicate a fermentative function. It would be part of the function of the whole mucous membrane as suggested by Schlemmer. The research work of Sabatari, too, seems to be in favour of the tonsils being concerned in digestion. Sabatari stated that after each absorption of food, changes were demonstrable in the tonsils and in the intestinal lymphatic apparatus, proceeding from a decrease or an increase of migration of lymphocytes.

Let me say some words about the problem of the function of the tonsils in internal secretion. I may remind you of the researches of Fleischmann, who has been able to demonstrate in the tonsils by means of the Goldsolreaction, reducing substances, which are delivered partly to the blood channels, and partly to the saliva of the oral cavity. He therefore thinks it possible that the tonsils are endocrine glands. Amersbach and Königsfeld of my clinic examined and refuted this theory. The reducing substances demonstrated by Fleischmann in the tonsils are to be found in nearly all organs and therefore cannot prove that there is an internal secretion of the tonsils. Nor does the fact that after injection of tonsillar extract the blood-pressure diminishes, make it probable that hormones are produced in the tonsils. Weinand and Bischoff of my clinic succeeded in preparing chemically from the tonsils the substance which causes the blood-pressure to diminish. It is the acetylcholin, which is a regular constituent of many organs. We cannot therefore consider the tonsil to be a gland with internal secretion solely on the ground that the blood-pressure diminishing acetylcholin is traceable in the tonsils.

In the experimental studies made by Voss very remarkable observations were made. Having observed that children very often thrive remarkably after removal of the tonsils, he made feeding experiments upon tadpoles. The animals fed with

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

tonsillar substance were behindhand in growth compared with the control-animals. Hence he concludes that the tonsils tend towards arresting development. Control-experiments made by Griebel upon fowls, dogs, and lupins had the same result. Moveover calf muscle, gelatine, and laminaria tents did not swell in the test-tube if tonsillar extract had been added to Ringer's fluid. It is a pity that, simultaneously with Voss's work, Slobotnik published a notice to the effect that, after having fed mice and rats with tonsils, he observed an acceleration of development, and Brüda could not confirm the arrest of swelling observed by Griebel.

But even if the theory of the tonsils arresting development would hold good, the researches of Voss seem to me little or no evidence, as the arrest of development might be explained as being caused by the toxins and bacteria in the tonsils.

To this day it has not yet been possible to prove that the tonsillar tissue affects internal secretion ; but simply to discard this theory without more ado, is likewise impossible. I do not wish to advance a new hypothesis without being able to prove it, but I would once more point out the fact that the tonsils belong to the lympho-epithelial system. The thymus and the appendix, being of similar structure to the tonsils, are classed with them in the same system. The results obtained by Gundernatsch's feeding experiments made it very probable that the thymus produces the effect of promoting development ; perhaps the tonsils do the same, which would account for the involution of the organs at the beginning of adolescence.

It is a pity that up to the present we know nothing about adolescent involution. It might help us to solve the tonsillar problem.

The supporters of the protective and defence theory explain the involution as being a consequence of the immunity acquired in adolescence. Perhaps we shall be able to explain it one day, when we shall have known for certain the physiological importance of the lymphocytes, for the one thing we know for certain in tonsillar physiology is the production of lymphocytes in the tonsillar tissue.

You see that we really know very little about the function of the tonsil. But the mere fact that the tonsils form but a very small part of the lymphadenoid tissue of the oral cavity and of the pharynx and that by tonsillectomy we remove only an insignificant part of the mucous membrane, makes it

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

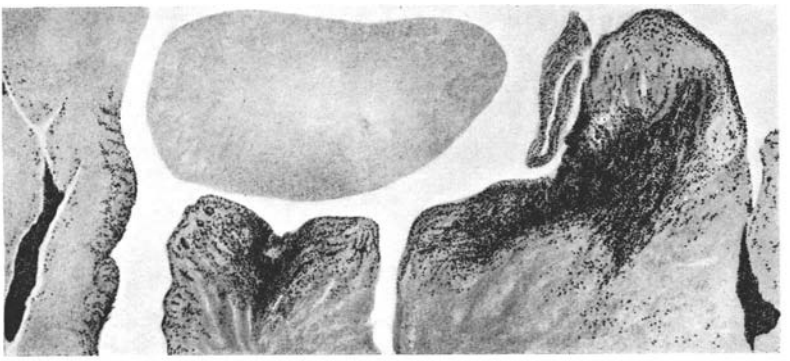


Fig. 3.

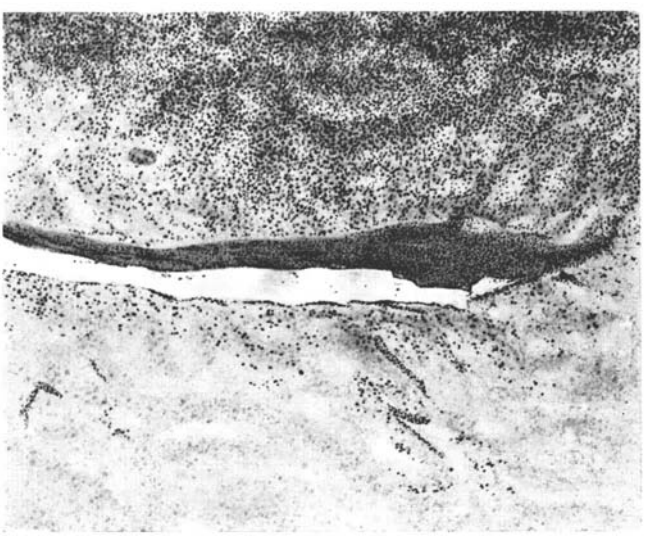


Fig. 4.

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

probable that the complete removal of the tonsils can do no harm. And this is certainly confirmed by clinical experience. Among thousands of tonsillectomies not one case has been known that has proved particularly harmful. Nor does one observe after the removal of the tonsils any true compensatory hypertrophy of the remaining adenoid tissue, which probably would happen if the tonsils had any important function to fulfil. It is true that now and then the adenoid tissue at the base of the tongue grows into the fossa of the tonsil, but I believe that in such cases we have to do with an inflammatory hypertrophy of the lingual tonsil caused by infection from the wound of the operation. At least I have observed on some patients that the adenoid tissue which had grown into the tonsillar fossa decreased after a little time.

I have mentioned before, when speaking about the function of the tonsils, that it is not feasible to consider the palatine tonsils separately from the rest of the lymphadenoid tissue, —Waldeyer's pharyngeal ring. It is different if you consider the pathological conditions of the palatine tonsils. In this respect the palatine tonsils are, on account of anatomical circumstances, in a special position. It is not so much because of the deep crypts which extend, often in a corkscrew manner, down to the tonsillar capsule. There are crypts also in the rest of the adenoid pharyngeal ring. This is seen especially in the relation of the mucous glands to the crypts. In contra-distinction to the other tonsils you will observe that in the palatine tonsil the excretory duct of a mucous gland practically never opens into a crypt, whereas this is a regular occurrence in the other tonsils. According to Schäfer the palatine tonsils push aside the numerous mucous glands.

Now, whilst the crypts of the other tonsils are, as it were, washed out by the mucus, the crypts of the palatine tonsil are not. The crypts are indeed cleansed to some extent during the act of swallowing, which exerts pressure on the tonsils, but apparently they are not cleansed well enough, since in the palatine tonsil the well-known formation of plugs is extremely frequent. On this frequency of the formation of plugs is based the above-mentioned theory of Paesler. And now I come to the second part of my lecture, to the part that deals with chronic tonsillitis.

I need not stress the fact that Paesler's theory went too far, when he suggested that more than forty-five different diseases

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

could be traced to focal infection of the tonsils or of other foci. But it is rather generally recognised nowadays that rheumatic diseases, endocarditis, septic diseases and nephritis are often connected with the tonsils. I mentioned before that Paesler's publications contributed greatly to the radical removal of the tonsils. Whilst formerly it was said that large tonsils ought to be removed, it was now said that it was the small tonsils with deep crypts and plugs that were especially harmful and that, therefore, it was they that ought to be removed.

Now, are the plugs really the cause of general diseases? Are they a symptom of a chronic tonsillitis, of a focal disease? Kümmel is right when he says that it is not easy to separate believing from knowing when the relation of chronic tonsillitis to the diseases of other organs is in question.

It is only on pathological-anatomical foundations that belief can be changed to knowledge and it is strange that the theory of chronic tonsillitis should maintain itself for such a long time without any closer pathological-anatomical researches being made. The first to point out that the clinical notion of chronic tonsillitis had not yet been cleared up was the Viennese laryngologist, Fein. He stated that tonsillar plugs were to be found in nearly every individual, even in people that had never suffered from sore throat. Thus the plugs are not to be considered as a symptom of chronic tonsillitis. But Fein decidedly went too far in declaring that the tonsillar plugs were quite harmless things. He declined altogether to consider the rôle of the tonsils in regard to general affections and advanced a new theory, that of anginosis. In his opinion the tonsillar diseases, as well as the possible accompanying symptoms such as articular and muscular pains, rheumatism, cardiac and renal complications, are secondary symptoms of one and the same primary infection of unknown origin. His theory cannot be accepted. Even his principal argument was wrong, for it is not true that, as he said, with every angina the whole lymphatic apparatus is affected sympathetically; we frequently observe that the inflammation is localised even to a single tonsil; and there is no doubt that isolated diseases of the pharyngeal tonsils occur.

Fein's publications, however, had the good effect of turning a good deal of attention to the pathological-anatomical research upon chronic tonsillitis. Since the publication of the research work of Maclachan, confirmed by Dietrich and Aschoff, we

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

have become well acquainted with acute tonsillitis. We no longer doubt that infections may start from the surface of the tonsils. In acute tonsillitis, as similarly in appendicitis, there is a primary infection, that is a more or less considerable defect of the epithelium from which the bacteria start to attack the tonsillar tissue. It is more difficult to explain the pathological-anatomical findings in chronic tonsillitis, and pathologists are not by any means unanimous for the simple reason that nearly all of them have their own creed as to inflammation.

Dietrich has thoroughly investigated this problem. He says expressly that it is often difficult to state that the disease of a tonsil is chronic. According to Aschoff's inflammation-theory it is necessary, when considering chronically diseased tonsils from the pathological-anatomical point of view, to distinguish between a condition of irritation that has nearly subsided, and the terminal symptoms of acute inflammation which are directed towards restitution or mending and removal of the diseased products. Chronic inflammation arises when neither a restitution nor definite reparation take place, but when the characteristics of the inflammation, that is alteration, exudation and proliferation continue. There remains a state of irritation which calls forth a continual defence.

As symptoms of such an irritation we see parakeratoses of the crypt-epithelium, infiltration by leucocytes, exudation, reticulation of the epithelium, that is complete destruction of the epithelial tissue in the trabeculae of which lymphocytes, plasma cells and leucocytes are laid down, and there is moreover, an abnormally long persistence of the reparative granulation tissue.

This state of chronic irritation may progress and become relapsing tonsillitis. According to Dietrich the diagnosis of chronic tonsillitis is not based upon a single morphological phenomenon, but we can form an opinion only if we consider the sum of all the changes, including the clinical conditions. In cases of rheumatism, endocarditis and nephritis Dietrich did not find any specific changes in the tonsils.

Bergren and Hellmann, who consider the tonsil to be a struggling organ, are not satisfied with this delimitation of the question of chronic tonsillitis. The changes described by Dietrich may occur also in the course of the physiological activity of the tonsil. They judge the degree of chronic tonsillitis from the capacity of function of the tonsils, which

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

they estimate by the number and the size of the germ centres (secondary knots) and they distinguish accordingly tonsils with bad, medium and good function.

Saltykow, to whom every active reaction of the tissue to irritation means inflammation, diagnoses tonsillitis on observing the slightest changes in the tonsils. It will not be easy to attain unanimity on this question amongst the pathological anatomists.

The clinician is interested in this question only in so far as the pathological-anatomical findings justify his clinical action, that is, the tonsillectomy. And thus Bergren and Hellman, who see the tonsillitis from the biological point of view, find it expedient to class, from their own material, with the clinical notion of chronic tonsillitis, tonsils that are physiologically active but which, in consequence of previous injury, border on the pathological and are liable to be reduced to a pathological state by slight attacks of normal irritations ; but the authors concede that with their mode of examination they have perhaps not noticed certain pathological changes.

Before Dietrich's research work was published, I had already occupied myself with the histology of chronic tonsillitis and had been especially interested in the question whether, in the tonsils of patients that the internist sent to us for the purpose of tonsillectomy, on account of the supposed connection of their diseases with the tonsils, there could be made findings justifying tonsillectomy.

There were cases of sepsis, articular rheumatism, endocarditis, nephritis, so-called cryptogenetic fever, which were cured by the operation. Oxydase reaction at once shows you the inflammatory changes in the tonsil. Now I regularly found —in many cases it is true only after a great deal of searching— focal diseases, leucocytic infiltration of the tonsillar tissue and, especially, extremely dense leucocytic infiltration of the cryptal epithelium, and in the crypts plugs that consisted only of leucocytes, and a great many bacteria.

Such focal diseases have also been observed by O. Mayer. He found that plugs containing bacteria, when enclosed in a crypt, produce an inflammatory reaction of the surrounding tissue.

I would show you first three sections from tonsils which on inspection seemed to be quite normal, nor were any plugs to be squeezed out. The first (Fig. 2) is the case of a patient,

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

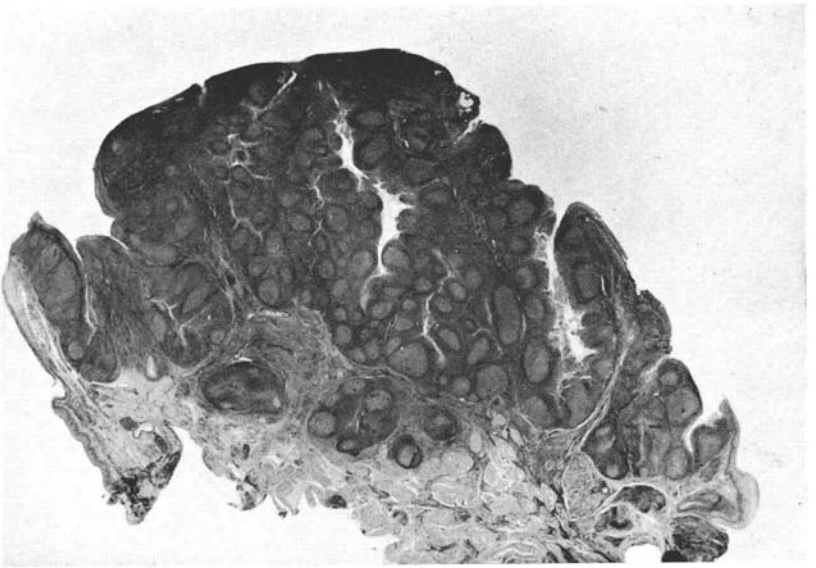


Fig. 7.



Fig. 6.

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press



Fig. 7a.

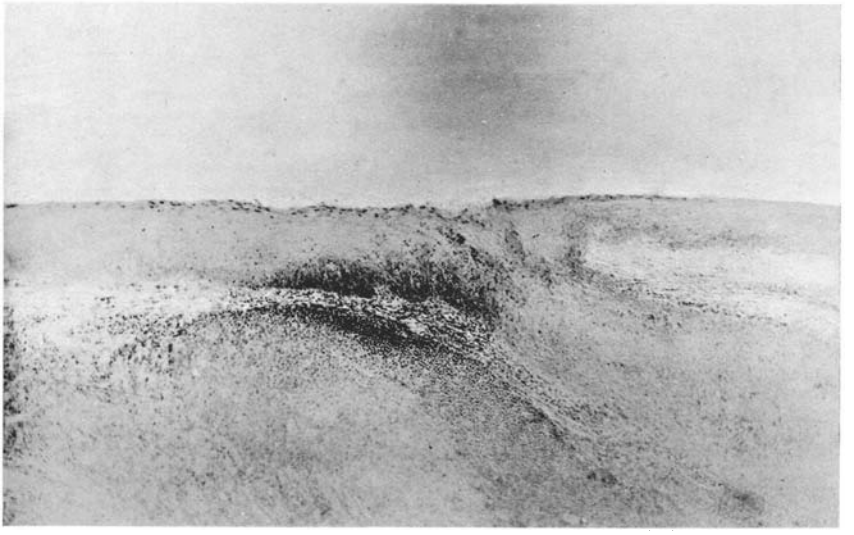


Fig. 7b.

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

thirty years old, suffering from septic temperatures, and having had during four weeks evening rises of temperature up to one hundred and four degrees. Immediately after the tonsillectomy the fever diminished. You see the foci of leucocytes in the tonsil, especially in the crypts and in the germ-centres. That it is a new infectious inflammation is proved by phagocytosis of bacteria.

The second case (Fig. 3) is a similar one; it is that of a patient who had been sent to a sanatorium because slight rises of temperature had raised the suspicion that it might be caused by pulmonary phthisis. The patient was immediately cured after tonsillectomy. You see here the foci of leucocytes in the crypts and in the tonsillar tissue also.

A third picture (Fig. 4) is that of a patient who was cured of articular rheumatism after tonsillectomy. There you see a crypt with a plug formed by leucocytes and an extremely dense leucocytic infiltration of the tonsillar tissue.

You will probably ask me whether such infiltration of leucocytes does not normally occur. No doubt it is difficult to judge of diseased tonsils, because only in a very few cases do we see a really normal tonsil. But in the tonsils of new-born children there are next to no leucocytes. Nor are they to be found in hypertrophic tonsils that have been removed on account of their size.

Further researches enabled us to confirm and to complete Dietrich's findings. Ruf, of my clinic, found for the localisation

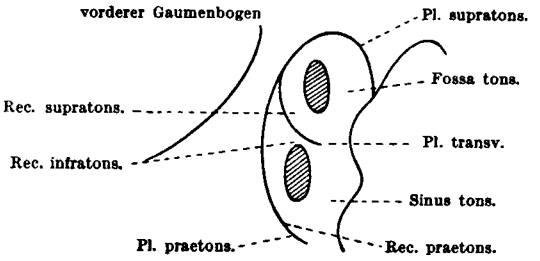


FIG. 5.

of chronic foci of inflammation, in the sense of Dietrich, predilection points, mostly identical with the recesses caused by morphological variants, and in a few cases identical with the crypts. According to Grünwald the tonsil develops in two parts, the upper tonsil and the lower tonsil, separated from each

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

other by a fold of connective tissue called the transverse bar. One of them by turns, or rarely both of them, gets perfectly developed. As the development progresses there are formed paratonsillar and intratonsillar recesses, as you see them on a schematic drawing (Fig. 5). You see the two parts of the tonsils, the tonsillar fossa or supratonsillar fossa, as it is also called, the prætonsillar recessus, and the transverse bar; above it the supratonsillar recessus, under it the infratonsillar recessus. It has been known for a long time that infections frequently start from the tonsillar fossa, especially peritonsillar abscesses. Ruf was the first to point out the frequent disease of the other recessus. Dennis Browne has also drawn attention on anatomical grounds to the occurence of such recessus-formation.

I will now show you some more pictures demonstrating the characteristic findings in chronic tonsillitis, and the localisation of the centres of infection.

Fig. 6 shows the tonsil of a girl patient, sixteen years old, with relapsing angina and peritonsillar abscesses; pressure on the tonsils expressed pus from the tonsillar fossa and from the prætonsillar recess. You see a tonsil with rather symmetrical development of both parts of the embryonic tonsil, the upper part and the lower part of the tonsil, the transverse bar, and, distinctly developed, the infratonsillar recessus. The lower part of the tonsil stretches down to the prætonsillar recessus.

In oxydase reaction you see at the two poles leucocyte infiltrations; at the upper pole remains of previous infections, cicatrised tissue, at the lower pole granulation tissue which is a sign of the reparation stage.

We may say that in this case infection started partly from the tonsillar fossa—old cicatrised tissue—partly from the prætonsillar fossa—new granulation tissue.

Fig. 7. This tonsil is that of a patient seventeen years old, who suffered from relapsing angina and polyarthritis. As a sign of the previous inflammation you see a slight parakeratosis, subepithelial cicatrices and thickened vessels. But here the main focus of infection seems to be in the infratonsillar recessus, from which probably the infection mainly started. There are also new primary infections.

Fig. *7a* shows the infratonsillar recessus more magnified. It is filled with leucocytes and crowds of bacteria; in the

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

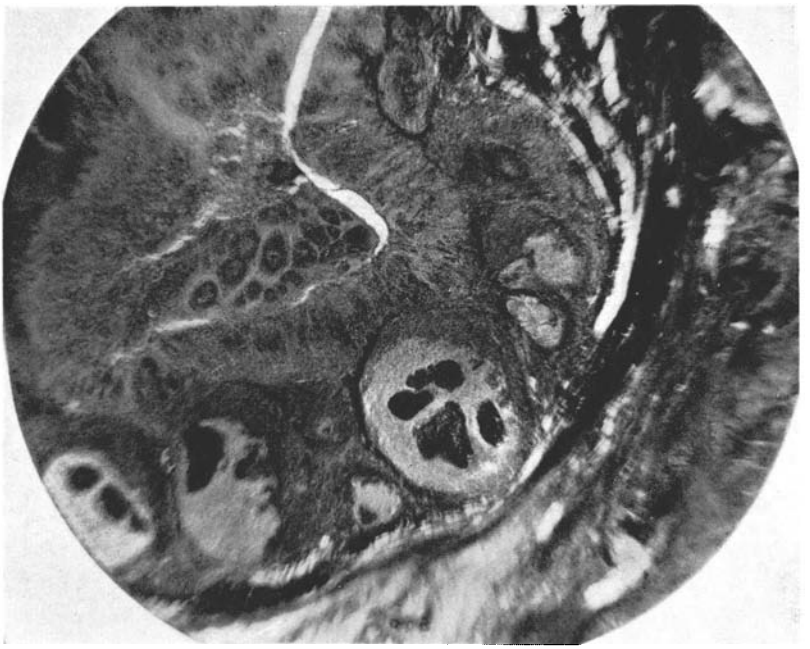


Fig. 8A.



Fig. 8

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

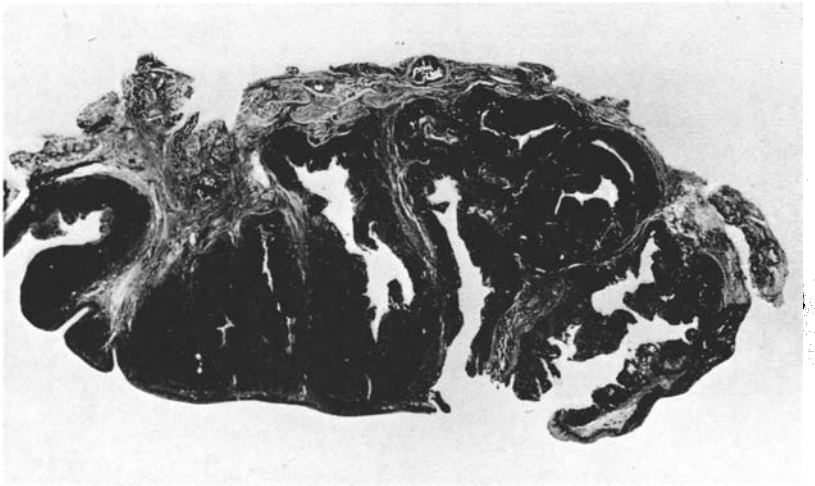


Fig. 10.

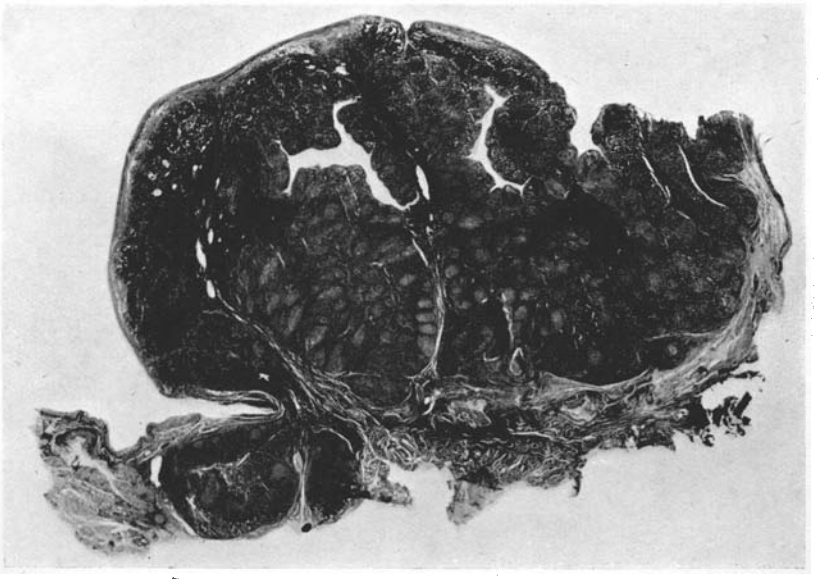


Fig. 9.

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

covering epithelium there are patches of ulceration, and leucocytic infiltration starting from these.

Fig. 7*b* shows one of the primary infections more magnified. You see a small ulcer in the covering epithelium, the leucocyte-infiltration extending into the inner parts, and this is distinctly to be seen especially in the region of the nearest secondary follicle.

Fig. 8 shows the tonsil of a patient seventeen years old, who has had several anginas and often suffers from rheumatic pains. The upper part of the tonsil is distinctly perceptible, under it the supratonsillar recessus and the transverse bar are just indicated. Pressure expressed from the supratonsillar recessus pus containing leucocytes and diplococci.

Fig. 8*a* shows the supratonsillar recessus more magnified. Here you see a crowd of leucocytes with diplococci, formation of parakeratosis in the epithelium of the crypts, as a sign of previous inflammation. New batches of hystiocytes peri-follicularly arranged. In the follicles there are foci of leuco-cytes. Here the only centre of inflammation was found to be in the supratonsillar recessus.

Fig. 9. The tonsil is that of a patient thirty-one years old, with relapsing anginas and articular rheumatism. The lower part of the tonsil is fully developed. The upper part is only indicated, so that the tonsillar fossa is almost laid open. The upper pole of the lower part extends up to the tonsillar fossa, from which it was possible to express by pressure, pus that was abounding in leucocytes. There are large callosities at the upper pole of the lower part of the tonsil, without reproduction of the elastic fibres, which is a sign that in this case there is certainly no question of involution.

In the depth of the tonsillar fossa, between the lower part and the undeveloped upper part of the tonsil, you can see ulceration of the covering epithelium. In the depth of the crypts in the hidden upper part of the tonsil, there are signs of a new inflammation, infiltration of leucocytes, secretion of fibrin, reticulation and destruction of the covering epithelium. In this case it would have been possible, when performing the tonsillectomy, to overlook, that is not to notice the upper part of the tonsil, the main centre of the disease. Tonsillotomy would, of course, have been ineffective.

Fig. 10 shows all the changes as described by Dietrich. It is the case of a female patient, thirty-five years old, who had suffered for years from relapsing anginas, and, six months ago,

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

from polyarthritis and endocarditis rheumatica. From the lower pole pus abundant in leucocytes could be squeezed out. The lower part of the tonsil is imperfectly developed, so that the prætonsillar recessus and the infratonsillar recessus are close together. Both show extensive ulceration with infiltration of leucocytes and bacteria. New granulation tissue. There is not yet any real cicatrisation. On the other hand the parenchyma of the upper pole is replaced by large callosities which, as may be recognised in graduated sections, completely separate a piece of crypt containing leucocytes. In this region there are large capsular callosities and callous enlargements of the intramuscular septa. At the upper pole bacterial infiltration of the covering epithelium is seen.

Fig. 11. The tonsil is that of a patient thirteen years old, with frequent relapsing anginas, temperature often subfebrile. The palatine tonsils are enlarged, plugs cannot be squeezed out. The covering epithelium of the upper pole corresponding to the tonsillar fossa is infiltrated by leucocytes and bacteria. On the surface of the tonsil, beginning in the sub-epithelium, you see a large cicatrisation of the parenchyma. The crypts at the base show in alternating density a cicatrisation and granulation tissue pericryptically arranged. At one spot one can clearly see how this new granulation and cicatrisation tissue is completely separating the end-piece of a crypt.

Fig. 11*a* shows the same spot more magnified. You see the end-piece of the crypt filled with leucocytes and bacteria. This end-piece is gradually being separated by the advancing granulation and cicatrisation tissue. This state readily accounts for the subfebrile temperatures.

Fig. 12. The tonsil of a female patient twenty years old, with frequently relapsing anginas. Tonsillotomy was performed a year ago. After the operation frequent slitting and cauterising. In spite of all this there was frequent relapsing tonsillitis with febrile temperatures. In consequence tonsillectomy was performed. Sub-epithelial callosities passing on to new reparation tissue. Then follows a broad cicatrisation and, in the deeper parts, adenoid tissue with crypts.

In oxydase reaction, you see in the region of the reparation tissue some leucocytes ; a crypt extending down to the base of the tonsil is filled with leucocytes.

Fig. 12*b* shows the same crypt more magnified. There is not only a crowd of leucocytes in the crypts, but the tonsillar

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press



Fig. 11A.

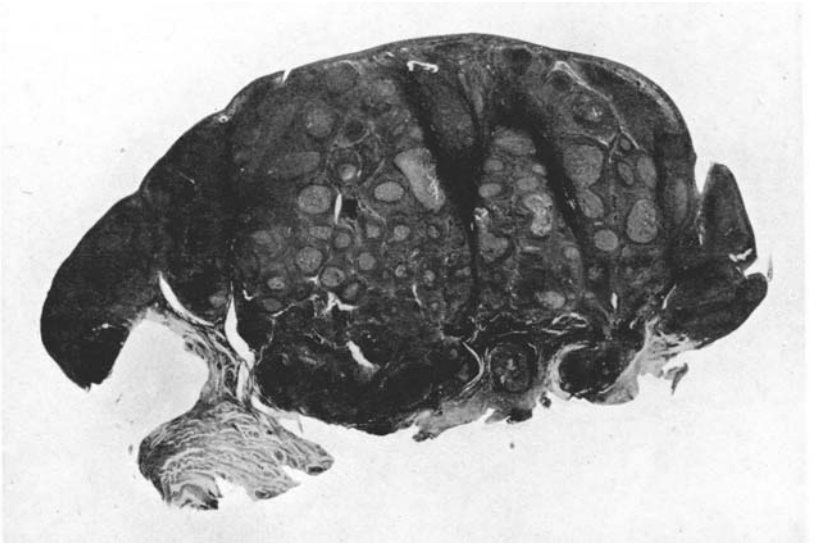


Fig. 11.

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

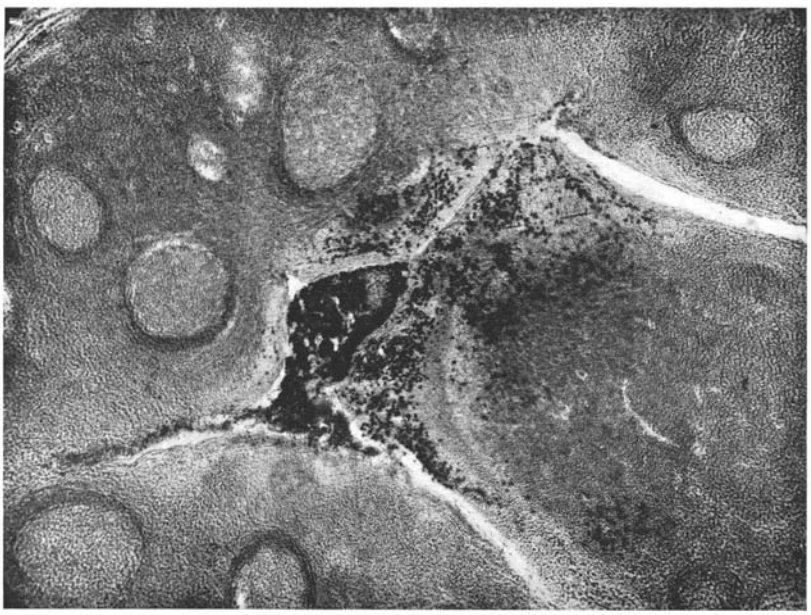


FIG. 12b.

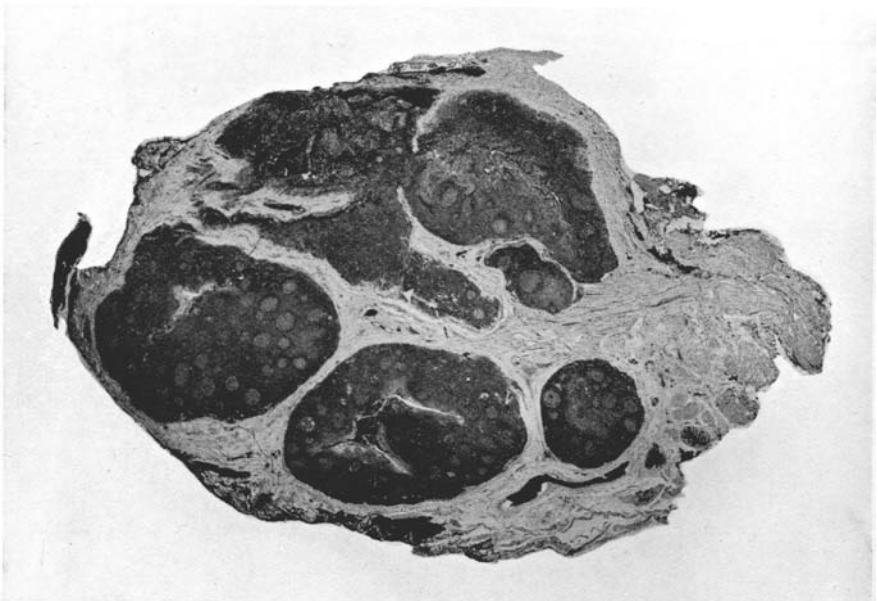


FIG. 12.

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

tissue, too, is infiltrated by leucocytes. This case is suitable for demonstrating the uselessness, nay the harmfulness, of tonsillotomy.

Fig. 13 shows you another section, which clearly demonstrates the disadvantages of tonsillotomy. A patient thirty years old who, when a child, underwent tonsillotomy. In the last years she often had subfebrile temperatures. One year before peritonsillitis. Nothing to be seen when inspecting the tonsil. The upper part of the tonsil was perfectly hidden by a cicatrisation of the supratonsillar fold. You see the transverse bar distinctly, over it the upper part of the tonsil, under it the remainder of the lower part of the tonsil, on which tonsillotomy was performed. The upper part of the tonsil distinctly shows signs of a state of chronic inflammation, which accounts for the anginas, and this, in spite of tonsillotomy, relapsed over and over again. At the inspection only the remainder of the tonsillotomised lower part of the tonsil was to be seen. The operation showed that a large upper part of the tonsil was still existing.

The pathological-anatomical researches thus confirm the clinical experience that general illness may result from chronic diseases of the tonsils, for in nearly all cases we found infectious focal diseases, and that there existed a connection between the infectious foci and the general symptoms is proved by the fact that the patients were cured and remained in health when the tonsillectomy had been performed. Our belief in the connection between chronic tonsillitis and general diseases has thereby turned to knowledge. Only in a very small number of cases there were but mere reparative changes or no changes at all to be found in the tonsils. In these cases we must suppose that either the focus was not noticed at the examination or that the disease was not caused by a true chronic tonsillitis, but by a chronically relapsing tonsillitis.

The practitioner is not so much interested in the histological findings as in the question: How can we discern chronic tonsillitis clinically? What are the characteristics that show us that a tonsil has caused a general disease? The pathological-anatomical researches, I am sorry to say, did not give the results I had hoped for. One cannot make an exploratory excision and then say: "the tonsil must be removed."

Formerly the enlargement, the appearance of the crypts of the tonsils, and the formation of plugs were the main clinical symptoms of chronic tonsillitis.

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

Professor Dr. Otto Kahler

The enlargement of the tonsils is no sure symptom of chronic tonsillitis, for constitutional conditions very often co-operate in hypertrophy of the tonsils. I would not deny that it may be caused also by inflammation; but I think that inflammation takes only a secondary part in causing hypertrophy, since we sometimes observe tonsillar hypertrophy in children and adults that have never suffered from sore throat, nor from angina, nor from general diseases.

Nor must the diagnosis of chronic tonsillitis be based on the crypts of the tonsils. The development of the tonsil forms the crypts. The supratonsillar recessus or the infratonsillar recessus may be developed. I think that involution also helps to account for the tonsillar surface.

There is a better chance of determining tonsillar disease from the kind of plugs in the crypts and in the recesses. The plugs consist of detritus, of lymphocytes and leucocytes which have migrated from the epithelium of the crypts, of exfoliated epithelium and bacteria. Fein appropriately compares them to the accumulations under the fingernails. These consist likewise of exfoliated cells and partly of dust, dirt and bacteria which have got there from outside. Certainly these plugs are often innocuous and are not necessarily a symptom of chronic tonsillitis. But no doubt there are different kinds of plugs. There are solid, hard, white plugs, plugs which protrude from the crypts and which are adherent and which consist principally of cornified epithelial cells. We see them in cases of so-called pharyngitis keratosa punctata, which affection was formerly considered to be due to a leptotrix infection and was therefore also called pharyngo-mycosis. These plugs have no pathological importance. We also recognise solid but crumbling plugs, which often contain calcareous concretions, the so-called tonsillar calculus, which on slight pressure spring from the tonsils. Moreover we often observe pulpy or fluid contents issuing from the crypts.

Now it is often said that it is only these fluid purulent plugs that are of pathological importance. I think that this is not true. You can often squeeze out, especially if you press firmly, fluid contents from the tonsillar lacunae of people that have never suffered from sore throat. In these cases the thin epithelium of the crypts is torn, and tissue-lymph and lymphocytes come through. [Microscopic examination of the plugs is an important means of deciding the question whether the

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

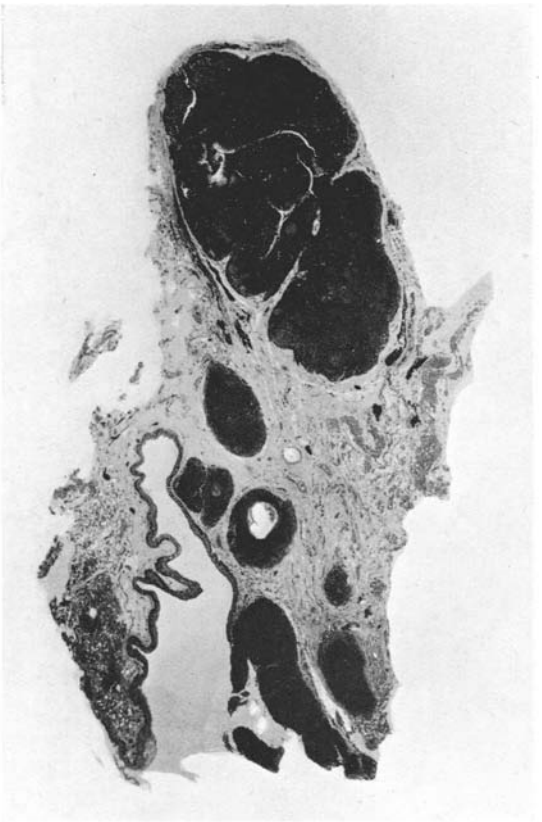


Fig. 13.

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

tonsils are diseased and may have caused a general illness.] In a large number of cases we have examined the contents of the crypts and we have found that with individuals suffering from diseases caused by the tonsils, such as articular rheumatism, endocarditis, nephritis, and so on, as well as with patients suffering from relapsing angina, the plugs, fluid or solid, are extremely rich in leucocytes. One often finds pure leucocytic pus. These findings were present in eighty per cent of the cases, whereas in twenty per cent there were only a few leucocytes to be found. In people who do not suffer from the throat you will by no means find plugs less frequently, but the percentage proportion is just reversed. In eighty per cent of the cases we found the plugs were free from leucocytes and in twenty per cent of the cases they were rich in leucocytes.

But even the examination of the plugs does not allow us to make a certain diagnosis, nor more particularly to answer the question whether a general illness be connected with the tonsil, because a plug may cause an exclusively local inflammation—the latent cryptal tonsillitis—as it is called by Thiessbürger.

Moreover the very important inflammatory processes in the deep-seated, shut in crypts will escape notice in clinical observation. Thus the anamnesis is the one means of making a certain diagnosis. If there are frequently relapsing anginas or peritonsillar abscesses, if there are general diseases that are caused by a focal infection and for which no other focus is to be found, the tonsils must be removed, the more so as—I think in this all of us agree—the tonsillectomy can do no harm. In spite of all attempts to prove the contrary, this fact has been confirmed by clinical experience. It is an error to think that tonsillectomised patients suffer more frequently from colds or infections. Certainly these illnesses cannot be entirely prevented by the tonsillectomy; for they are diseases of the mucous membrane and they are often due to the constitutional inferiority of the mucous membrane. The apparently more frequent occurrence of colds which some patients complain of, is easily to be explained by the fact that after tonsillectomy has been performed, the diseases of the mucous membrane are paid more attention to, whilst before the operation the grave symptoms of the tonsillar disease claimed chief attention.

But do not let me be misunderstood. I am by no means speaking in favour of indiscriminate tonsillectomy. To

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

examine the indications most thoroughly must be our first duty, as long as the physiological function of the tonsil is not quite clear. If, however, I begin to treat the tonsillitis, I see but one way, namely radically to remove the tonsils by tonsillectomy. Up to the present time there have been opinions in favour of the so-called conservative treatment of the chronic tonsillitis, that is slitting the crypts, removal of the upper pole, tonsillotomy.

All these methods are to be condemned as they may even be dangerous. Nor does X-ray treatment seem to be able to take its place. For X-ray treatment causes the adenoid tissue to shrink, but it does not destroy the crypts with their infectious contents. O. Mayer found, in tonsils that had been intensely treated with rays, deep crypts filled with pus, micro-organisms and detritus.

We must also remember, that in performing tonsillectomy we remove only a part of the pharyngeal adenoid tissue, the diseased part, whilst X-ray treatment can destroy also the other adenoid tissue that is not diseased, and this cannot be a matter of indifference as long as we do not clearly know its physiological function.

I could show you on the pictures that the foci of infection are very often deeply hidden ; you have seen that treatment which is not radical leaves cicatrixes behind, which are liable to narrow or to shut the crypts, thus producing unavoidable relapses or aggravations of the disease. We have, therefore, but one choice left as to therapeutic proceeding, there is but one remedy and that is tonsillectomy.

I have to-day only been able to throw some light on parts of the tonsillar problem. Much work remains to be done to solve the whole problem definitely. But there is nothing more effective in helping towards a solution of a problem than international collaboration. Therefore it affords me a peculiar satisfaction to have had the opportunity to give to-day's lecture. It shows me, as did the visits my English colleagues paid us in Freiburg last year, that international scientific collaboration has been resumed to full extent in our profession as well. And that is highly gratifying. Far more than any conference science makes nations approach one another and medical science in particular is instrumental in the reconciliation of nations, for it has but one object in view, namely the welfare and happiness of humanity.

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press

The Tonsil Problem

In dieser Arbeit bespricht der Verfasser das Tonsillenproblem von 2 Gesichtspunkten aus : die Frage der physiologischen Rolle der Tonsillen und diejenige der sogenannten chronischen Tonsillitis, insbesondere ihre Beziehung zu allgemeinen Erkrankungen.

Er bespricht die Anatomie und Physiologie der Tonsillen und zeigt, dass die Mandeln einen integrierenden Bestandteil der Rachenschleimhaut darstellen. Er behandelt die Schutz- und Abwehrtheorien, kommt aber zur Schlussfolgerung, dass wir eigentlich sehr wenig über die wirkliche Funktion der Tonsillen wissen. Da sie aber nur einen kleinen Bestandteil der Schleimhaut ausmachen, glaubt er dass ihre vollständige Entfernung ohne Nachteil ist.

Er bespricht ferner die Histologie der chronischen Tonsillitis und bemüht sich den Zusammenhang dieses Zustandes mit andern Erkrankungen wie Gelenkrheumatismus, Endocarditis, Nephritis usw. zu zeigen.

Seine Feststellungen werden durch Lichtbilder ergänzt. Er begründet seine Bevorzugung der vollständigen Enukleation der Tonsillen gegenüber den andern Methoden.

. . . .

Dans cet article l'auteur traite de la question des amygdales au double points de vue du rôle physiologique des amygdales et de l'amygdalite chronique, en particulier dans ses rapports avec les affections générales. Il discute l'anatomie et la physiologie des amygdales et montre que celles-ci sont une partie intégrante de la muqueuse du mésopharynx. Il traite des théories de protection et de défense de cet organe et conclut que nos connaissances sur sa véritable fonction sont très réduites ; comme cependant les amygdales sont seulement une partie insignifiante de la muqueuse, il considère que leur ablation complète est inoffensive.

Il discute alors, l'histologie de l'amygdalite chronique et essaye de trouver un rapport entre cette affection et d'autres maladies, telles que rheumatisme articulaire, endocardite, néphrite etc.

Ses observations sont accompagnées d'une série de clichés. Il expose ses raisons de préférer l'énucléation de l'amygdale aux autres méthodes de traitement.

https://doi.org/10.1017/S0022215100038226 Published online by Cambridge University Press