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## ORIGINAL COMMUNICATIONS.

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### RESULTS OBTAINED BY TONSILLECTOMY IN THE TREAT- MENT OF SYSTEMIC DISEASES.\*

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The most important work in medicine in the last decade is the elucidation of the relationship of focal infection, especially that of diseased tonsils, to systemic disease. That the tonsils play an important part in various infections was demonstrated years ago by laryngologists. In this connection I refer you to such men as Wood, Goodale, Wright, and others, whose research as far back as the nineties shows that the laryngologist must be recognized as the pioneer in this work. However, this early enlightenment of the individual worker in tonsillar infections did not, at first, engage the attention of general medical practitioners. But when, within the past few years, the real significance of tonsillar infection was demonstrated, through the bacteriological studies and experiments of laboratory workers, co-operating with clinicians, the medical world recognized a new and a very important factor in medicine. Rosenow's newer bacteriology, and the excellent work of men like Billings, Davis and Jackson, with their co-operators, who worked to better advantage than could separate individuals, awakened the general practitioner to the importance of this great subject. Davis made a careful bacteriologic study of the bacteria removed from the tonsils in various diseases. He reproduced many of these conditions in animals by the injection of the bacteria. His studies in-

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cluded patients with endocarditis, nephritis, arthritis, etc. Rosenow proved that many ulcers of the stomach are associated with tonsillar infections. He obtained streptococci from some of these ulcers, and after injecting cultures of these organisms into animals, was able to observe gastric ulcers in them.

To-day we are in the midst of a period in which tonsillectomy as a therapeutic measure in the treatment of systemic diseases is very popular. The laryngologist does not need compiled data to be told that the removal of diseased tonsils for systemic diseases is followed by improvement in the general health of the patient. Those who feel satisfied that the beneficial results are evident without enumeration of statistics are not heeding the claims, and even protests, that have appeared from time to time in both medical and lay papers; claims that the tonsil is held responsible for too many diseases, and that the beneficial effects do not justify the numerous enucleations. These articles have not dealt kindly with the surgical procedure of tonsillectomy. Even a few responsible and distinguished medical men pronounce such criticism as most timely.

It is incumbent upon us, therefore, to inform ourselves regarding this important subject; to ascertain whether or not the pendulum has swung too far, lest the medical profession at some later period declare that we have sacrificed tonsils unnecessarily in the treatment of systemic diseases.

Sufficient time has elapsed since tonsillectomy has been so freely advocated to enable us to study the general results. Is tonsillectomy doing for these clinical conditions all that the laryngologists and the internists expected? Has the measure a substantial scientific backing?

A few months ago, in order to obtain as accurate data as possible, I submitted an inquiry to many laryngologists and a few internists throughout the country, requesting information concerning this matter. The statistics herein compiled do not make any pretension to exactness, but the information therein contained ought to serve the purpose of showing us where we are. As someone has said: "The best way to get ahead is sometimes to stop short and see where we are."

The questionnaire submitted to laryngologists and internists requested information regarding the results obtained by tonsillar enucleation in cases of arthritic, cardiac, renal, and other systemic diseases. Only complete reports have been compiled; the cases reported in numbers were kept separate from those reported in percentages. Out of many responses to the query, ten reports giving

the number of cases furnished available material for statistics. The ten reports include 894 cases. The list of questions in the query and the compiled data are as follows:

1. In systemic diseases where the tonsils were considered the only source of infection, in what number or in what percentage of cases did tonsillectomy produce:

	1. Reported in number of cases:	2. Reported in percentage of cases— average:
(a) <i>Real cures of the systemic diseases?</i>		
Arthritic .....	262	68%
Cardiovascular .....	3	36%
Renal.....	21	81%
Other conditions .....	.....	.....
Rheumatic group (neuralgia, lumbago, perineuritis, myositis, etc.).....	220	.....
Chorea .....	3	.....
Cervical adenitis (simple).....	57	.....
Chronic toxemia .....	.....	.....
(b) <i>Considerable improvement of the systemic disease?</i>		
Arthritic.....	184	20%
Cardiovascular .....	25	18%
Renal.....	12	5%
Other conditions .....	.....	.....
Rheumatic group .....	.....	.....
Chorea .....	17	.....
Cervical adenitis (simple or tuberculosis) 51 .....	51	.....
Hyperthyroidism (goitre) .....	13	.....
(c) <i>No improvement of the systemic disease?</i>		
Arthritic.....	14	12%
Cardiovascular .....	3	46%
Renal.....	4	14%
Other conditions .....	.....	.....
Rheumatic group .....	3	.....
Goitre.....	1	.....
Cervical adenities (tuberculous?).....	12	.....

2. Following tonsillectomy, what percentage of cases developed:

(a) Acute exacerbation of the systemic dis- ease, arthritic .....	10	10%
Goitre .....	1	10%
(b) A post-operative low grade infection.....	9	3%
(c) Co-existent infection as causative factors of the systemic diseases.....	.....	28%
(d) Nasal sinuses .....	49	.....

The answers to the questionnaire, confirmed by the above figures, show that tonsillectomy in the treatment of systemic diseases, when based on rational and well founded relation of cause and effect, and when performed under the most favorable conditions, has given exceedingly satisfactory results.

The percentage as presented, especially in the arthritic class, compares favorably with statistics of other observers.

The following table shows the number of cases in some of the conditions as reported above in column 1, and the cases recently reported in the Johns Hopkins Hospital Bulletin, both reduced to percentages, along with the percentages as already reported in column 2:

	1. Above column reduced to percentages:	2. Same as column 2:	3. Johns Hopkins Hospital Bul. percentages:
(a) <i>Real cures of the Sys- temic Diseases?</i>			
Arthritic .....	58%	68%	Infectious Arthritis 77½% Acute Rheumatic Fever 80 %
Renal .....	56%	81%	72½%
Cervical Adenitis ....	49%	.....	33⅓%
(b) <i>Considerable Improve- ment of Systemic Diseases?</i>			
Arthritic .....	40%	20%	Infectious Arthritis 13 ⅓% Acute Rheumatic Fever 12 %
Cardio Vascular ....	82%	18%	
Renal .....	32½%	5%	
Cervical Adenitis ....	41½%		51 %
(c) <i>No Improvement of the Systemic Disease?</i>			
Arthritic .....	2%	12%	Infectious Arthritis 9½% Acute Rheumatic Fever 8 %
Cardio Vascular ....	9%	46%	
Renal .....	11%	14%	27½%
Cervical Adenitis ....	9%		15 %

Every laryngologist and those interested in the subject should be conversant with the excellent report on "The Relation of Tonsillar and Naso-pharyngeal Infection to General Disorders," that appeared in the January, 1917, *Bulletin of John Hopkins Hospital*. The report states that "only in very exceptional circumstances should anyone subject a patient with rheumatoid arthritis to an operation for the removal of the tonsils." A composite statement deduced from the general reports and comments which I received would read that tonsil enucleation alone does not have a beneficial effect on well established conditions, viz., definite arthritic changes and deposits, as ankylosis and fixation, chronic arthritic disease or chronic heart and blood vessel disease, etc.

The very favorable results in the arthritic class, as reported in numbers, show that the operators were either most careful in the selection of cases, or else that the general health of the patients was afterwards so much better that the operators took it for granted that the arthritic conditions were also improved. The 12 per cent

reported in the "no improvement" arthritic cases is, in my opinion, a fairer statement of the results in the arthritic group. If 12 per cent show "no improvement," what explanation can be given for the lack of improvement in this number of arthritic cases?

One observer said that real cures in these cases followed only after a post-operative use of the autogenous vaccine and local treatment. Dr. Jas. J. King, of New York City, takes a step further in the use of vaccines. He advocates taking cultures from the crypts of the tonsils before removal and making a vaccine to be given until the bacterial activity is stopped or reduced. The tonsils are then enucleated, and if necessary the vaccine is continued after operation. He recommends this method of procedure as most satisfactory, and reports a series of cases. It may be that such a course of treatment in many arthritic cases will reduce the number that show no improvement and lessen the chances of the development of an acute exacerbation of the arthritic disease after tonsillectomy.

Some individual comments taken from the responses of physicians, who answered in a general way, are mentioned here, as they add information of interest. One observer reports a large series of thyroid enlargements with pronounced tachycardia as markedly benefited by tonsillectomy. Letters from prominent surgeons, who do a great deal of thyroid surgery, show that there is a decided uniformity of opinion regarding the relationship between tonsillar infection and the enlargement of the thyroid and hyperthyroidism. All of them advise tonsillectomy in goitre cases that give a history of tonsillar infection, but they do not depend on the procedure as a curative measure. They differ in their views as to the time of performing tonsillectomy; some advocating it before, and others after the thyroid operation. Dr. Crile, of Cleveland, and Dr. Halsted, of Baltimore, prefer to operate on the thyroid first, especially where the symptoms of hyperthyroidism are well marked, because tonsillectomy is a trying operation for these patients. Dr. Bloodgood, of Baltimore, writes: "The tonsil infection or co-existent infection should be taken care of before attacking the thyroid, and there should be an interval of at least two or three weeks before the tonsillectomy and the operation upon the thyroid." He also states that, in 50 per cent of the cases of toxic goitre, he has found either infected tonsils or an infected nasal cavity. At the Mayo Clinic they do the thyroidectomy to relieve the symptoms, and the tonsillectomy to prevent, if possible, recurrence of hyperthyroidism in the remaining lobe.

Regarding co-existent infections, one laryngologist states: "According to my experience, some co-existent focal infection, such as nasal sinus disease or some diseased condition of the gall bladder, bronchial glands, appendix, gastro-intestinal tract, lymph nodes, teeth, etc., was present in practically all cases that showed no improvement after enucleation of demonstrable diseased tonsils." Another observer stated that diseased teeth were found in a large percentage of ward cases. He wrote: "It is our practice now to have a dental surgeon scrubbed up at the operation (the resident dentist at the hospital) who has previously examined all cases and decided which teeth should be removed."

As a result of the experiences of many surgeons now collated, we have reached certain tentative conclusions which may be helpful towards securing better results when tonsillectomy for systemic diseases is contemplated.

Tonsillectomy should not be performed closely following convalescence from an acute purulent infection, such as middle ear, nasal sinus or upper respiratory tract, or acute exacerbation of some systemic disease. Reports show that such cases have developed septicemia. In these cases it is better not only to wait for a considerable time to elapse before proceeding with tonsillectomy, but to take a preliminary culture and cleanse the tonsil crypts by suction and antiseptic applications. In some, the use of vaccines may be a valuable adjunct. If these acute infections have been treated in a hospital, the patient should be discharged temporarily before undergoing the operation. Some patients need prolonged treatment with a view of establishing sufficient resistance to enable them to bear such a surgical procedure as tonsillectomy.

Hospital internes and nurses, especially in recent active service with septic cases, should be given a temporary leave of absence before undergoing tonsil enucleation. Cases of arthritic, cardiac, renal and other systemic conditions must not be allowed to leave the bed too soon after tonsillectomy. This precaution is not observed closely enough by many operators.

The possibility of acidosis occurring in many conditions, especially in the case of children, or of those suffering from any form of exhaustion, must be reckoned with by laryngologists. When this is suspected, a proper and continued examination of the urine for its by-products (diacetic acid or acetone) should be made before operating and, if found, the proper treatment for acidosis given. Some operators advocate a pre-operative treatment of acidosis in all cases. The post-operative symptoms of uremia, even

when albumin is found, may mislead one in recognizing the true condition, i. e., acidosis.

Albuminuria following the removal of the tonsils has been attributed to ether narcosis, the ether supposedly acting as an irritant to the kidneys. This theory cannot be held tenable in view of the bacteriological and chemical findings in the examination of the urine in many cases of tonsillectomy. A recent report by Dr. Ruddel, anaesthetist at St. Vincent's Hospital, Indianapolis, co-operating with Dr. Scott Edwards, shows that practically as many cases of albuminuria followed tonsillectomy where a local anaesthetic was used. They attributed the condition to the fact that a certain amount, perhaps a considerable amount of infective material, is squeezed out of the tonsils during the course of the operation and is injected into the circulation. That ether seemed to be a negligible contributory cause of albumin was shown in the study of several hundred other surgical conditions. They also observed that, where albumin was found prior to the operation, it cleared up in a great number of cases after a few days' rest in bed before tonsil enucleation, and that the kidney disturbance after the operation was less severe. This I also observed in a few of my cases. Rest in bed for from one week to ten days, and a restricted diet should be the proper procedure in all cases of albuminuria found prior to the operation.

Conservatism in tonsil enucleation in early childhood has been the practice of most laryngologists. The position of many laryngologists, in this respect, has been adopted and maintained, no doubt, because of the general belief that the tonsil should be respected as a functioning organ, especially in early childhood development. The reports of competent pediatricians, and of medical men connected with contagious disease hospitals, after years of clinical experience, show that the tonsil is a greater menace to health, in early childhood, than is generally recognized. In answer to a letter of inquiry regarding this phase of the tonsil problem, I received a number of replies from competent pediatricians. The following letter from Dr. La Fetra, of New York City, is typical of the attitude of all concerning the tonsil question:

"In answer to the inquiry in your letter of March 27, I write to say, that I have never been able to notice any abnormality in growth or development in those boys and girls whose tonsils were removed in early childhood. Whatever advantage the tonsils may have physiologically, it would seem that nature has provided sufficient other tissue of the same sort to take up vicariously the work

of the tonsils when these are removed. As regards their susceptibility to disease, I would say that children, whose tonsils have been removed, are much less susceptible to respiratory and gastrointestinal disturbances of all sorts. Moreover, when they have measles, scarlet fever or whooping cough, the disease is much less severe than it would have been had their diseased tonsils been present."

Dr. Henry Hall Forbes' paper, "The Removal of the Tonsils as a Prophylactic Measure," presented last year before the Medical Society of the State of New York, was timely. It showed the attitude of the pediatrician, health officer and other medical men regarding the tonsil question, concerning which there has been a divergence of opinion among members of the medical profession. The present investigation confirms the information Dr. Forbes has given us in that excellent paper. Dr. Forbes shows, from the reports of health officers, that from eighty to one hundred per cent of the contagious disease cases have tonsils; also that tonsils were nearly always present in the cases which developed complications. Dr. Henry L. Lynah, New York, writes: "In our Contagious Disease Hospitals the percentage of admissions in whom tonsillectomy has been performed is from two to four per cent. The other ninety-six to ninety-eight per cent have tonsils in various degrees of size."

Regarding the association of the tonsils and dentition, one occasionally reads in medical literature that one of the functions of the tonsils is an association with dentition, as the tonsils become swollen and inflamed with the eruption of the teeth, and when the tonsils are removed in infancy and childhood, there follows a deleterious effect on dentition. This question was submitted to twelve of the best orthodontists and oral surgeons in America, and they denied, without exception, that early removal of the tonsils had any effect whatever on the development of dentition. The answer to this question, from Dr. Frederick B. Noyes, of Chicago, is as follows: "I have never seen any indication that the early removal of tonsils had any effect whatever on the development of dentition, and I know of no evidence that tonsils, under normal conditions, are in any way connected with the development."

In view of these reports and the attitude of the most prominent pediatricians and health officers in the country, should we not seriously consider the removal of the tonsils as a wise prophylactic measure in early childhood in many more cases than formerly?



Surely this will be an advance in preventive medicine and will thereby lessen the number of tonsillectomies that have to be performed in adolescence and adult life in the treatment of well established systemic diseases.

The author wishes to express his appreciation for the valuable responses from many members of this society and others which made this paper possible.

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