ORAL SEPSIS.¹

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It has now become recognised that a very large proportion of what are known as "diseases" is caused by poisons either introduced from outside, or elaborated within, the body itself. And even in the case of the latter it must be supposed that the cells and organs are induced to depart from normal function by outside influences in the first place. Malnutrition or starvation, of course, and physical injury, will interfere with normal function but otherwise we must look to one or more of the possible poisons or toxins to explain physiological action being exchanged for pathological behaviour, previously to the supervention of what is termed senile decay. To combat many of the adverse conditions acting upon the human organism much has been done by medical specialists in hygiene and sanitation. The study of bacteriology and pathological chemistry is also providing vastly improved methods of treating disease by discovering causes, assisting diagnosis, and providing antidotes. But as the forces arranged against the physician are so many and so varied it becomes advisable to discover and to recognise any possible line of attack and it is with this reason as an excuse, if one be needed, that I venture to ask for the consideration of the cavity of the mouth as a possible source of infection to the rest of the body. Placed at the very entrance to the alimentary canal it is open to direct inspection and manipulation and it requires no complicated instrument with which to make the examination. There is, then, no excuse for overlooking the teeth and gums, and the most convenient time for a systematic observation is, of course, when the time-honoured inspection of the tongue is made. The increasing demands made upon the student's time is, I am afraid, one of the reasons for the idea that teeth and gums may be left entirely to the dental surgeon, but the general practitioner should at all events be able to discover anything the matter, and know what it is, even if much of the treatment may be demanded at the dentist's hands, and I hope in the short time at our disposal to submit sufficient to indicate what to look for.

It has been a matter of general observation for many years in the dental departments of hospitals that patients who have their mouths cleared of septic teeth and stumps rapidly improve in health. This takes place before the supplementary artificial dentures are applied and shows that the improvement depends not so much upon the restoration of efficient mastication as upon the removal of the septic teeth. Since Dr. William Hunter in 1900 drew attention to the relation between "oral sepsis" and systemic disease a good deal of attention has been paid to the subject and the discussion in the Section of Dental Surgery at the meeting of the British Medical Association at Oxford did still more to emphasise the importance of the question. Dr. Hunter on that occasion showed an interesting collection of pathological specimens from cases which had come under his notice during the previous four years. These specimens illustrated infective conditions in the teeth, the jaws, and the air sinuses; in the stomach, the intestine, the colon, the appendix, and the rectum; and in the kidney and the heart. But when dealing with toxic effects of oral sepsis, as distinguished from pyogenic infection, Dr. Hunter, in default of specimens in bottles, described his clinical experiences. These constituted most valuable evidence in support of his contentions and other speakers added more. I now venture to submit condensed extracts which Dr. J. A. Ferrière was good enough to make from the notes of some of the cases which I treated whilst the patients were in University College Hospital under the care of physicians to whom I am indebted for permission to refer to them. (For the proper initials of the names I substitute the letters of the alphabet in their order.)

CASE 1.—A. B., a female, aged 53. Married. Admitted under Sir T. Barlow March 27th. Discharged July 4th. On admission, complained of pain and flatulence after food. "Bubbling" sensations in stomach. There was a history of progressive asthenia and increasing dyspepsia for the last 12 months. Tremor, giddiness, and various neurasthenic symptoms for the last two months. Has wasted

a good deal during the last two years. Present state: Patient very poorly nourished; face is very pale and worn—mucous membranes very pale. Teeth bad. Stomach dilated. Summary: This patient was admitted with symptoms of gastric disturbance and grave anæmia simulating pernicious anæmia. She was put on arsenic from April 3rd, but no great improvement took place until her teeth were attended to. The only other therapeutic measure from which the patient derived benefit was the faradic battery which relieved her of her flatulence.

CASE 2.—C. D., a male, aged 35. Admitted under Dr. Sidney Martin April 14th. Discharged April 30th. Complained of wasting and weakness. History: Losing a great deal of flesh for last few months. So weak and wasted that Addison's disease and malignant disease had apparently been thought of. Patient had lost all energy and interest in life. Appetite good; no sickness, vomiting, or diarrhoea. Present state: Teeth decayed and very foul. The only other physical signs were a rare râles at the left apex and a peculiar click heard only at the end of the act of coughing. The note over right apex was slightly impaired and the vocal resonance somewhat increased. Result: The bad teeth were removed and patient improved very much. Weights: April 17th, 7 stones 10 pounds; April 30th, 8 stones 2 pounds 1 ounce.

CASE 3.—E. F., aged 18, single. Admitted under Dr. Bradford, June 2nd, 1902. Discharged July 13th. Complained of attacks of pain and sickness after food for the last three months. Amenorrhœa two months. No history of hæmatemesis. Is getting worse; pain after food very severe. Present state: The teeth are badly decayed in both jaws, many stumps; the breath is very foul. Result: The attacks of pain and sickness continued and there was no marked improvement until attention was directed to the teeth. Eight teeth were extracted on July 4th and the patient rapidly improved. July 13th, all symptoms gone.

CASE 4.—G. H., aged 35, male. Admitted as a case of pernicious anæmia under Dr. Roberts, May 11th. Discharged June 15th, 1904. Complained of weakness, palpitation, and shortness of breath; pain in stomach after exertion. Present state: Patient markedly anæmic; yellow tinged complexion and skin. Edema of legs and over sacrum. Heart enlarged, presystolic and systolic murmurs at apex. Teeth bad. May 26th: Two teeth, one abscessed, removed from lower jaw. June 8th; 12 stumps extracted. June 16th: Patient went out much improved. July 14th: Said he had been perfectly well since his discharge.

CASE 5.—I. J., aged 24, female. Admitted under the late Dr. G. V. Poore, April 2nd. Discharged April 16th. Complained of pain after food; difficulty of swallowing; loss of flesh. Present state: Patient in a condition of very pronounced emaciation; teeth very bad. The pain and difficulty of swallowing are due to imperfect mastication. Result: After the teeth had been attended to the patient improved and gained 4 pounds. Symptoms relieved.

CASE 6.—K. L., a female. Admitted under Dr. Poore, July 1st, 1900; discharged August 3rd. Complained of vomiting after food, pain and tenderness in abdomen. History: she vomited some brown material six months ago and motions have occasionally been black. Present state: The teeth are in a very bad condition. Patient at first refused to remove an upper denture which had been in the mouth many months. Several loose teeth were extracted on July 29th. On the 31st the mouth and general condition were much improved and the patient was discharged much relieved.

CASE 7.—M. N., aged 27. Female. Admitted under Sir T. Barlow, May 10th, 1904. Discharged May 28th. Complained of pain over heart and in left side. Headache. Cough and spitting of blood; has also vomited blood. Lost weight during last two months. Present state: The patient is a pale and anæmic woman. "The first thing noticeable about her is the almost unbearable odour from her mouth." An artificial denture covers the stumps of the upper teeth. The lower incisors are loose and extremely foul pus is welling up around the teeth of the lower jaw which are covered with tartar. Appetite poor. Patient has to be forced to feed. No other findings on physical examination. Upper stumps removed, lower teeth scaled and treated with H₂O₂ on May 13th. Patient almost well on May 26th.

It is not only the physicians who pay attention now to the existence of a septic mouth. The surgeons who undertake abdominal operations prefer, if time permits, to have the mouth put into good order first. One case which I was fortunate enough to see has been recorded with others by Mr. R. J. Godlee in the Transactions of the Royal Medical and Chirurgical Society. A young woman was sent to him with the object of having a portion of rib resected to drain a supposed abscess of the lung which an exploratory puncture had failed to reach. The patient was in a low, miserable state of health. Mr. Godlee failed to find the physical signs justifying an opening of the chest, but discovered on examining the expectoration that the cast off epithelial cells had come from the mouth and not from the respiratory tract. Further examination then revealed infected pockets between all the teeth. The expectoration occurred chiefly at night and it seemed probable that during sleep a discharge collected at the back of the mouth in sufficient quantity to cause the patient to "cough" it up. The gums bled readily and by means of an unconscious "sucking" the patient aspirated sufficient to tinge the discharge. The teeth were carefully scaled and syringed with peroxide of hydrogen for ten days, after which the expectoration almost stopped and was quite free from blood. It lost its offensive smell and the patient was better in every way. Her sister told me not long ago that she was in good health but was obliged from time to time to resume the syringing.

There appears, then, reason to think that a mouth with broken-down teeth and septic pulp chambers may be the place in which infective material may be cultivated and that, whereas in a healthy mouth pathogenic organisms may meet

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with a peaceful end, in the diseased mouth propagation is provided for and a larger dose is prepared for entrance to the body by the lungs, the stomach, or the lymphatics. Then a "vicious circle" may become established; oral sepsis leading to systemic disturbance will tend to lower the resistance locally and to encourage the continuance of infection and absorption. There seem to be two dangers which may arise in connexion with a septic mouth—first, infection, sometimes by direct extension, as in angina Ludovici; and, secondly, systemic poisoning by absorption and auto-intoxication.

A septic condition of the mouth may be due to any of the following causes. 1. Neglect to clean the teeth and to remove food débris and cultures of micro-organisms. This collection may be favoured by irregular position of the teeth themselves, preventing proper mastication and leading to the production of angles and recesses which it is difficult to keep clean. Artificial crowns, dentures, and "bridges," unless well attended to, favour accumulation. 2. Cavities in teeth caused by dental caries constitute receptacles for decomposing food and organisms. When the tooth pulp is finally exposed and dies a fresh element is added to keep up the supply of undesirable material. A decomposing pulp may provide ptomaines, and when some of the peculiarly ill-smelling and irritable substance is forced through the apex of the root it cannot be a matter of surprise that an abscess is the result. 3. Alveolar abscess. As long as any of the decomposing pulp is allowed to remain the discharge of pus into the mouth is kept up unless the fistulous opening occurs upon the face. A "gum-boil" may close up temporarily but is practically never cured without treatment. It may shut off the rest of the body by its granulation tissue but fistulous openings may occur in various directions. 4. The difficult eruption of a lower wisdom tooth may result in a very septic condition due to ulceration and infection of the gum, pus eventually burrowing into the cheek, under the jaw, or down the neck. 5. Deposition of tartar from the saliva, in addition to favouring the retention of organisms and food particles, separates the gum margin from the necks of the teeth. The irritation and congestion of gum increase as the tartar accumulates and the separation results in the formation of a "pocket" which is finally enlarged at the expense of the periodontal membrane lining the tooth socket. When the pocket becomes infected and pus escapes one form of the so-called "pyorrhœa alveolaris" is established. 6. It is quite clear that such chronic periodontitis must render the mouth septic and when at a later stage the bone of the socket becomes affected the danger is increased and the pyorrhœa is less amenable to treatment short of extraction. Another form of pyorrhœa is recognised, having apparently a systemic origin. Certain constitutional states are thought to cause the deposit of another variety of tartar, in this instance not from the saliva but from the blood. This deposition occurs deep down in the socket and consists of what is called "serumal" tartar. It also results in periodontitis, osteitis, pyorrhœa, and loosening and loss of the tooth. The condition is found in cases of gout, rheumatism, diabetes, syphilis, and other constitutional states. I must not stay too long to discuss the various explanations which have been offered to account for the way in which this form of pyorrhœa originates. But we may remember that the periodontal membrane is at the periphery of the circulation and subject as such to the deposition of uric acid and other salts. It has been suggested that the result may be obtained when blood plasma, holding by its carbonic acid a certain quantity of lime salts lightly in solution, is extravasated in an inflamed region. The carbon dioxide is disengaged and the earthy phosphates are liberated. Chronic suppurative periodontitis is generally only found in persons at or above middle age and arterio-sclerosis has also been suggested as a possible factor. It may occur in younger people and in some such cases there is a specific history. In these the gums and periodontal membrane may have had their resistance reduced by mercury. In many persons approaching middle age with fairly healthy mouths there may be noticed recession of gum and wasting of the alveoli without pyorrhœa.

With regard to the infection of the "pockets" it does not appear possible to charge any particular organism with the invasion. Goadby, who has done a great deal to investigate the matter, has found both cocci and bacilli. The staphylococci are common and are able to produce extremely chronic

forms of suppuration, as well as remaining quiescent for considerable periods, only resuming their activity at long intervals. Goadby has also pointed out in this connexion what a marked influence a small local suppurative area effects upon the blood. Given, then, a septic mouth with broken-down teeth containing putrid pulps or with chronic suppurative periodontitis it seems that we have the necessary elements for what Sir Victor Horsley has described as a katalytic mycosis. The patient swallows quantities of putrid stuff which is absorbed by the lymphatics of the stomach and intestines and a chronic sapræmia results.

Treatment.—It is probably impossible to obtain a sterile mouth even if that were desirable, but in view of what happens in neglected mouths an ideal form of preventive medicine will consist in securing an avoidance of accumulations of organisms and food débris. Thorough mastication will assist in this but is probably not carried out by the majority of people. Our ancient forefathers, who left the well-ground-down teeth we find in such skulls as come to light, were not in a hurry to get to school or to catch trains. The food was hard and tough and the necessary mastication resulted in a large flow of saliva, not only beneficial for gastric digestion but for the teeth, which were bathed in this alkaline mouth wash. All carious and tender teeth should be made effective or removed. The removal of tartar by instruments, such as I now show you, will do much to protect the gum margins from the injury already alluded to. A regular and systematic use of a moderately stiff tooth-brush must still be regarded as one of the most important things. The brush should at least be used after the last meal of the day, for it is probable that most of the decomposing and fermentative action will go on during the night when accumulations are undisturbed. The question as to the necessity of tooth powders and mouth washes does not appear so urgent as the proper use of the brush. This should be applied with a vertical rotatory movement rather than in a horizontal direction in order to sweep the interstices between teeth instead of merely passing over convex surfaces. In cleansing the mouth with antiseptic mouth washes it is possible that some protective micro-organisms may be slain. Thus it is generally considered that lactic acid is one of the principal factors in the decalcification of dental caries. But according to Metchnikoff, "lactic acid microbes produce large quantities of acid and so hinder the multiplication of the organisms of putrefaction. Putrefaction takes place rapidly in spite of the presence of the lactic acid microbes, if there be added soda to macerations of meat or milk." But in spite of the views of some who now condemn antiseptic mouth washes the difficulty experienced in keeping the mouth clean seems to warrant their occasional use in helping to get rid of all decomposing matters and in preventing acidity in the mouth. In the treatment of pyorrhœa much importance is attached to the careful and thorough removal of all calcareous deposits and then an attempt should be made to disinfect the "pockets." Many drugs have been employed for this purpose but a very useful application with which at all events to commence is the peroxide of hydrogen introduced with a small syringe. In some cases where the gums are very redundant it may be wise to abolish the pocket by removing the loosened gum with the electric cautery, as practised by Goadby. He, too, has recently treated patients by injecting vaccines prepared from the micro-organisms found in the particular case. These produce an increase in the opsonic power and an amelioration of the general and local symptoms results. It must always be remembered that upon extraction of the affected tooth or teeth an absolute cure results. Many cases call for a well-balanced judgment to decide whether the danger to the patient due to possible recurrence or from a feeble response to treatment does not warrant the removal of teeth. Instances are not uncommon where death results from septic teeth. Occasionally a charge is brought against an operator where a patient has died from pyæmia after an extraction, but the infection has been probably due to a septic mouth rather than to dirty instruments. Pyorrhœa is thought to be far more common than formerly and in this connexion a word of warning may be based upon the views held by some who have considered the matter. There appears reason to think that the infection may be communicated by domestic animals. It is well known that they suffer from pyorrhœa and the lovers of dogs and cats would do well to examine their pets' mouths before allowing themselves to demonstrate their affection in too intimate a manner.