rise to 101.5° or 102° continued. I saw him six weeks after the onset of the adenitis. On examination it was found that he had five or six molar and bicuspid teeth which had been filled for five years, and when asked if they had caused trouble, said "No, except that two of them became tender on the day of the operation." The teeth were examined by x rays and absorption of the roots of those which had caused pain at the time of the operation was found. The other teeth were indistinct and suggested absorption. All doubtful ones were extracted and the patient has improved steadily since. The diphtheria may have been a septic condition secondary to focal sepsis.

Cases with Visible Sepsis.

CASE IV.

Mr. F., aged 45, for three weeks in 1923 had felt very ill and unable to carry out his work as a baker, although he did not go to bed. His temperature was rising to 101° and 103° at night; he had incontinence twice, and on one occasion had a kind of fit. The mouth was very foul, the gums being inflamed and bleeding easily. Although seriously ill (it was felt that he was dying) all the teeth were extracted. He recovered after this and has been quite well since. He was said to have had a similar illness sixteen or seventeen years ago, from which he recovered. This I believe to have been a slighter attack arising from similar though less virulent dental sepsis.

CASE V.

Mrs. O., aged 67, had pneumonia in March, 1924; it was apparently lobar pneumonia of the left base. This cleared up very slowly and three months later she developed oedema of the left leg. The temperature had been normal for a few weeks, but began to rise again three weeks before I saw her the second time. The mouth was very foul with septic incisors and canines. She had not visited a dentist for twenty years. The teeth were dealt with as soon as possible and she gradually got back her usual health.

CASE VI.

Mr. J., aged 49, was seen in November, 1925. In July he had an attack of "influenza" with high temperature but with no physical signs. Since then he was constantly short of breath, which varied in degree, and he found all stairs trying. A few days before I saw him he had a similar attack of feverishness. His temperature rose to 102° in the evening; the spleen was palpable, the Widal test negative. A few moist sounds were heard over the bases of the lungs, especially the left lung. He had had a cough in recent winters. There were no teeth in the upper jaw, but eight or ten in the lower jaw were in a very septic state and he had pharyngitis. He was too ill to do anything, and he died in a few days of septic intoxication and bronchopneumonia.

CASE VII.

Mr. E., aged 47. This man's illness began with phlebitis and oedema in the left leg, which lasted ten days and was clearing up when the right leg became involved. I saw him at this time, and, looking for a cause, found a very offensive condition of the mouth, pus exuding from round all the teeth and stumps and spongy inflamed gums. The man was so ill that immediate treatment was thought necessary, and he was removed to hospital for it. He died, however, of septic pneumonia in thirty-six hours, and before the teeth could be dealt with.

CASE VIII.

Mr. K., aged 34, felt so debilitated that it was feared that he might have pulmonary tuberculosis, which was in the family. I could find no sign of organic disease anywhere. In the mouth he had five very fine specimens of crowned teeth which had been there for five years and had caused no trouble. X-ray examination showed seven teeth to be diseased at the roots. They were removed, and progress to usual health followed—slowly, as it does in most cases of dental sepsis.

CASE IX.

Mr. A., aged 54, complained of palpitation and shortness of breath on very slight effort and of easily getting tired. He was definitely anaemic and a blood count showed red blood cells nearly normal (4,700,000), colour index 0.6 only; no special changes in the white cells. He had some slight dilatation of the heart. His teeth looked very suspicious; there was a protrusion from the gums, but there was no marked pyorrhoea. X-ray examinations showed that there was a great deal of deep-seated sepsis. After necessary extractions by his dentist he began to feel better and soon got perfectly well.

CASE X.

Mr. M., aged 40, underwent operation for gall stones in November, 1925. Three weeks later double quinsy developed, with thirst, polyuria, and glycosuria; insulin was given. On December 7th bronchopneumonia affecting the bases of both lungs supervened, with pink sputum, a temperature rising to 103.5°, and an occasional rigor; he was very delirious at night. The teeth and gums were very septic; removal of the teeth was advised, and done the next day (December 12th), though he was extremely ill. Improvement followed almost at once, and recovery in a few weeks with no glycosuria.

I could give notes of other similar cases in private work and many from hospital practice.

DENTAL CONDITIONS LIKELY TO FORM SOURCES OF INFECTION.*

BY

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WHEN discussing dental disease as a factor in the causation of general disease, it is difficult for a dentist to be definite in his statements. He frequently sees a patient who has been under medical treatment for an ailment for some time without sufficiently good results following, and he finds a condition of oral sepsis present. He treats this, the patient begins to improve, and he rather naturally is inclined to conclude that the removal of the oral sepsis has been the dominating factor in the successful treatment of the case. He also wonders if the oral condition was not also the dominating factor in the causation of the disease. As the patient in all these cases has been receiving medical treatment at the same time, he can only wonder—he cannot definitely claim that the treatment of the oral condition cured the general condition. But when he sees this happen time after time he necessarily concludes that there must be a probability that oral sepsis is a common predisposing cause of many ailments.

As I am therefore not able to make any definite statements as to the relationship between oral sepsis and the many diseases which may be influenced by it, I will confine myself to a description of the dental conditions which are most likely to influence the general health, and will indicate how x-ray examination of the teeth helps in the estimation of the likelihood of the teeth, in individual cases, forming foci of infection.

It appears to me that there are three broad classes of oral conditions which may result in general septic infection. In the recent discussion at Bath there seemed to be a disposition to regard only two classes—an open and a closed form; the open form being harmful from the effect of the swallowing of the organisms and their toxins, and the closed form from the absorption of the toxins through the blood stream via the bone. To me this seems a little misleading, as the condition of pyorrhoea is almost surely a combination of the two forms; hence my description of three types.

The first type is that in which sepsis is solely the result of neglect and lack of use of the teeth, where the teeth, at their gingival margins, are covered with deposits of salivary tartar and debris. There is generally a gingivitis present resulting entirely from the presence of these deposits, but the gums do not present, except just at the gingival margins, the congested appearance which is characteristic of pyorrhoea. This condition can generally be rapidly cleared up by careful attention to scaling and cleaning of the teeth. In this class of case, although there may be a certain amount of infection through the capillaries from the gingivitis, the chief ill effect is caused by the constant swallowing, both in the saliva and in the contaminated food, of the organisms and their products. The appearance of the mouth (in this type of unhealthy mouth) is often more striking than that of either of the other two types, but the condition is not nearly so harmful as regards infection.

The second type is that in which there are non-vital teeth present—that is, teeth whose pulps have been destroyed either in the process of preservation of the teeth, or through the progress of caries. Although very many teeth are successfully treated by devitalization of the pulp, with its subsequent removal and replacement by filling material, there are unfortunately many teeth whose pulp canals are beyond the skill of the average dentist to fill completely. In these latter cases, and in cases where the pulp has become necrotic as the result of caries extending to the pulp chamber, there is a possibility of the sepsis present extending through the foramen in the apex of the root, and causing an area of necrosis to develop in the vicinity. These areas are shown in x-ray films of the teeth as dark shadows round the apices of the roots of the

* A contribution to a discussion on focal sepsis at the Manchester Pathological Society, December 9th, 1925.

teeth, due to the presence of the resulting cavity in the bone of the jaw. The character of the walls of the cavity as shown in the film quite frequently gives an indication of the rate of progress of the bone destruction. Any toxins which may be formed in these areas are necessarily conveyed directly into the lymphatic system, as the region is completely shut off from the mouth.

The third type is that in which the condition commonly known as pyorrhoea is present. The subject of pyorrhoea, or chronic general periodontitis, is so large a one that I am not now in any way attempting to deal with it. Its symptoms are well known. After a preliminary gingivitis the gums become puffy and congested in appearance. The periodontal membrane begins to ulcerate and to break down, and then the edges of the bone become necrotic. The gum margins readily bleed and pus can generally be expressed from the edges.

There is a condition of acute gingivitis, very similar to the trench mouth condition seen so much during the war, which one sees frequently nowadays, and which is commonly incorrectly diagnosed as pyorrhoea; it is a condition which is amenable to treatment, but the slowly progressive general periodontitis, the true pyorrhoea, is generally so firmly established when it is first seen that the bone is already well infected, and nothing short of the loss of the teeth and the resulting absorption of the alveolus will cure the disease. I am pretty firmly convinced that only in its earliest stages is real chronic general periodontitis curable without loss of the teeth.

Having thus briefly described the three types of dental conditions which are likely to form sources of infection, I would like to emphasize the reason why such a source may be so injurious as it probably is. To do this I would point out that the most serious infection from the mouth takes place through the periodontal membrane and its surrounding tissues. It has been demonstrated, quite conclusively I think, that there is a very complete network of lymph capillaries extending through the slender papillae at the margins of the gums which accompany the blood vessels and nerves through the connective tissues into the spaces in the bone. This being so, it is easy to see how toxic substances are conveyed from the infected gums to the lymph glands and thence to the blood stream.

The extent of the periodontal membrane is not always appreciated. If the membrane is stripped off, say, the central incisor tooth and is flattened out, it will form a triangle whose sides will measure roughly three-quarters of an inch. If this triangle is multiplied even twenty times, allowing for the previous loss of a dozen teeth, a surface as large as the palm of the hand will be covered. An ulcerating surface of this size is quite a serious matter, especially when it is remembered that the ulceration is taking place in an area from which there is little external drainage.

By means of x-ray films it is possible to form a good idea of the probability of the existence of infection from the teeth and the alveolar margins. In the normal mouth the gingival trough, which is the small depression which surrounds each tooth at the margin of the gum, is covered completely with a layer of epithelium which shuts off entirely the periodontal membrane from any contamination from the fluids of the mouth. If, from any cause, this epithelial covering is destroyed, there is no longer any protection for the periodontal membrane from the action of the organisms present in the mouth. The membrane has very little power of resistance, and the organisms soon spread deeply into the tissues, including the bone, which gradually break down. Any cause of chronic irritation may account for the destruction of the epithelium of the gingival trough, especially any cause which results in a food stagnation area being formed. Such an area may result from irregularities of the teeth, the edges of overlapping fillings or crowns, improper diet, insufficient cleaning, etc.

Dental x-ray films show quite clearly when the cortical layer of the bone of the tooth socket is beginning to break down, and the extent of the bone destruction in any individual case can be readily seen. The films also show quite clearly when there are areas of necrosis around the apices of the roots of the teeth.

In cases of general illness, where a physician or surgeon has decided that the disease is probably one of infective origin, or is one which is being maintained on account of the presence of some septic focus, if dental x-ray examination shows a probability of the presence of bone destruction, either from infection of the periodontal membrane or from the presence of non-vital teeth causing necrotic areas in the bone, then the question of the advisability of removing the teeth affected has to be considered, and the question which perplexes is, How big a sacrifice in the way of removal of the teeth is justifiable in the hope that a good general result will follow?

There is no doubt that frequently all the teeth are removed for a patient and he finds that little, if any, improvement in his general health follows; but my own experience leads me to think that very much more frequently a big improvement follows.

When discussing the subject with the patient my practice is to point out that while treatment of the dental condition might be too late to overcome the harmful effects which have been accruing for years, it might reduce them to some extent, and would almost surely check the progress of the general disease. In order to avoid subsequent disappointment the patient is at the same time made to understand that artificial dentures are at the best only poor substitutes for a natural dentition, but that they can in most instances be made sufficiently efficient to deal with a selected diet. The extent of the dental extraction operation is too big a subject to deal with in a few words, but one fact is certain—if dentures have to be worn, no teeth must be allowed to remain which are not soundly implanted in healthy bone and surrounded by firm and healthy soft tissues. The wearing of an artificial denture on gums which are at all likely to suffer from gingivitis will speedily set up the condition.

OBSTRUCTION OF SMALL INTESTINE BY GALL STONES.

A SERIES OF THREE CASES WITHOUT MORTALITY.

BY

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THE discussion on intestinal obstruction at the last Annual Meeting of the British Medical Association¹ brought out, among other interesting matters, some remarkable facts and statistics concerning obstruction due to gall-stone impaction.

The number of such cases tabulated compared with the total number of cases due to all causes is insignificant: 28 to 3,064, an astonishing proportion. These 28 cases, moreover, occurred over a period of years in the practice of seven large hospitals. The incidence works out at less than one per annum per hospital. The condition must, therefore, be regarded as extremely rare, especially in the experience of any single individual. Not less remarkable than the rarity is the high mortality: of the 28 cases no fewer than 14 died.

In connexion with the discussion the cases reported below have peculiar interest. All three passed through my hands within the space of eight years, and, contrary to probabilities from the statistics above, all recovered. I have endeavoured to bring out the main points of the cases in accordance with the analysis used in the discussion at the Annual Meeting.

CASE I.

A married woman, aged 68, on May 8th, 1925, was admitted to ward 31 (Mr. G. H. Edington's department), Western Infirmary, Glasgow, suffering from abdominal pain and vomiting of forty-eight hours' duration. The vomit was doubtfully faecal. There had been no movement of the bowel for three days. Signs of acute intestinal obstruction were unmistakable. For three years this patient had suffered periodically from pain after food, and flatulence, but there had never been jaundice.

I operated about two hours after her admission, and extracted a gall stone from the ileum twenty inches proximal to the ileo-caecal valve. The patient made a good recovery.

The stone was roughly spherical, 1 inch in diameter, and the dry weight was 140 grains.