certain cases or the evacuation of an obviously softened gland.

7. Save in exceptional cases, such operative treatment should not involve extensive incision.

8. Operative treatment should not be regarded as radical.

9. Tuberculous involvement of the lymphatic system can be effectively combated by continuous vaccine therapy.

SOME LOCAL RESULTS OF DENTAL INFECTION.*

BY

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I PROPOSE in this lecture to refer to various cases which have come under my notice during the year just past, in which local complications had been set up by infection arising in connexion with the teeth.

It will become evident to you that I have been greatly indebted to the teaching of the late Sir Henry Butlin, particularly concerning the way in which cancer of the tongue may be prevented, and also to that of Dr. William Hunter, consulting physician to Charing Cross Hospital, as to the manifold harm resulting from oral sepsis. The importance of Dr. Hunter's observations is shown by the number of communications which have appeared of late on the chronic general infections set up by oral sepsis—osteo-arthritis, gastric and intestinal complications, septic anaemia, etc. Such chronic general infections are much more frequent and of greater importance than the local complications which I am about to mention, but these latter are at least troublesome, and may be dangerous, whilst I hope to show how they may be prevented.

Irritation by Tooth Plates.—Patients complain of stinging pain and tenderness along the sides of the tongue; there may be no apparent alteration of the surface epithelium, or merely this, that some papillae have become unduly prominent, in particular the line of papillae running forwards from the junction of the anterior pillar of the fauces, in the rabbit called the foliate papillae, may be a little swollen. Close inspection may discover dental defects, and lead to explanation that there has been delay in carrying out what a dental surgeon had advised. But in many it is impossible to find anything wrong with the remaining teeth. I have had continual opportunities of confirming the note by Butlin on p. 126 of the second edition of *Diseases of the Tongue*, 1900, which refers to tooth plates made of irritating materials. The note commences:

"For some reason which I am not able to explain red vulcanite appears to me to act as a very decided irritant, and exciter of chronic superficial glossitis."

In the middle of the note occurs this sentence:

"But the dental surgeons are by no means generally of my opinion."

No year has passed since that date but that patients have consulted me, and the persistent irritation has disappeared when the vulcanized rubber composition of the tooth plate has been replaced by metal. The black composition seems less often than the brown a cause of irritation. I do not know whether the irritant is a purely chemical one, such as a larger amount of sulphur used in vulcanizing, or whether a growth of micro-organisms occurs on the roughened surfaces, which cannot happen on smooth metal.

Herpetic eruptions are very painful when the corneous layer becomes detached and the persistent recurrence is very troublesome. It is quite useless to treat the middle-aged women, who are commonly the sufferers, for dyspepsia, neuralgia, and anaemia, unless all causes of dental irritation are removed first of all. Generally the outstanding dental treatment over which difficulty arises is that for the relief of pyorrhoea alveolaris affecting the lower incisor teeth; anything short of extraction may be unsatisfactory.

Precancerous Lesions.

Causes of patches of leucoplakia, papillomas, fissures, and chronic ulcers on the tongue and inside of the cheeks have of late years diminished. The clay pipe has become almost obsolete; tobacco, whether smoked in pipes, cigarettes or cigars, seems to give rise to much less irritation than was

the case formerly, and most people, when any irritation is experienced, are wise enough to stop smoking, or to change the kind of tobacco. Only in the East, where tobacco is mixed with caustic lime and betel nut, and held in the mouth as a quid, is there any regular sequence of cancer. Of course this refers to tobacco when there is no other lesion present, for, although it is a matter on which it is difficult to speak with precision, smoking indefinitely increases the general effects of oral sepsis arising from the teeth.

Syphilis as an antecedent to cancer of the tongue has been influenced of late by the arsenical treatment; early superficial glossitis is quickly removed, and is thus prevented from going on to a definite leucoplakia, which neither mercury nor arsenic can remove. Against the improvement by the more rapid removal of early secondary manifestations is the uncertainty how far an advance has been made in the actual curing of syphilis. The effect of salvarsan and its substitutes in causing the rapid disappearance of the primary and secondary manifestations of syphilis may prove misleading, and prevent the carrying out of a prolonged course of treatment by mercury.

The practice of applying caustic to sores on the tongue continues; I am quite sure that caustic determines the commencement of those changes by which a chronic inflammation passes over into cancer.

There is one way in which cancer of the tongue can be prevented—namely, by the patient, or the first doctor he consults, or both, taking into account any lesion on the tongue, and in the mouth, as seriously as if it were an acute disease, to be kept continuously under observation until it has entirely disappeared, or has been cut out. I have never seen a case of cancer of the tongue or mouth, in a patient over 30 years of age, in which there has not been a definite history of a preceding inflammatory stage, during which interval the lesion might have been made to disappear, or it might have been removed by a slight operation.

In some cases, no doubt, the failure as to this lies with the patient, but it is a regular feature of the history of cases of cancer of the tongue that the impression made on the patient by the first doctor consulted has been that the condition was both trivial and transient. The doctor, however, failed to make the patient understand that for the trouble to be trivial and transient the patch should entirely disappear in a few days. The doctor did not tell the patient that every inflammatory condition affecting the mouth and tongue should under treatment completely disappear within three weeks, and that, if it should not do so, it should be removed by a superficial excision, and the wound so made closed by suture.

Complete disappearance implies that not only is any breach of surface covered by healthy epithelium, along with cessation of all pain and tenderness, but there should persist no subepithelial induration. If such epithelial induration is examined under the microscope it will be seen that a chronic inflammation is continuing which affects the epithelium from below. Hence an epithelioma can be started from below whilst the epithelial surface is apparently intact, just as well as when the epithelial surface is continually irritated by a jagged tooth.

The excision of patches of leucoplakia, fissures, subepithelial induration, nodules, warts, scars, and chronic ulcerations, however caused, followed by suture, is a completely successful procedure. The operation is attended by no danger, and as the removal involves only the epithelium, there is no impairment of the movements of the tongue.

Where there is subepithelial induration it is difficult to distinguish chronic inflammation from early malignant disease. Therefore when a patch has been removed and submitted to a microscopical examination, if in addition to epithelial overgrowth and subepithelial infiltration by small round cells, there has already set in a downgrowth of epithelial columns, the lymphatic glands, together with the external part of the submaxillary salivary gland, should be at once dissected out from the corresponding anterior carotid triangle. In such cases the lymphatic glands will generally show an increase of small round cells in the lymph spaces of the gland and its capsule, but definite epitheliomatous cells may not be recognizable. Exceptionally, when the patch removed has been situated across the middle line, the dissection has to be done in both anterior carotid triangles. Such operations are safe as regards life; there is little trouble after the operation, and that for a few days only, after which the patient is freed from anxiety, immediate and prospective. The scar of the incision in the neck becomes less obvious than one after removal of tuberculous glands.

* The Second Hunterian Society Lecture, delivered on January 11th, 1922.

When leucoplakia has been insufficiently treated and has spread widely over the surface of the tongue, an exceptionally extensive removal of epithelium may entail some impairment of the movement of the tongue, which, however, in course of time tends to disappear. There are also a few cases in which leucoplakia reappears on previously sound areas of mucous membrane, but if the patient submits to a repetition of excision of affected epithelium he escapes cancer.

Salivary Gland Infection.

Oral sepsis may penetrate the sphincters which close the orifices of the ducts of the parotid and submaxillary salivary glands, and set up a chronic inflammation in the walls of the ducts and in the substance of the gland. Acute septic infection, which in former days was common in the parotid, and generally fatal, has now become rare because among the duties of the nurses attending exhausted medical and surgical patients is that of keeping the mouth and teeth as clean as possible. The cases of chronic septic infection from the mouth commence by an induration of the papilla marking the orifice of the parotid or submaxillary duct; the duct itself becomes a thickened and painful cord, and it dilates during secretion, with an increase of pain. In the submaxillary duct a concretion may form, either a stationary large one, of the shape of a date stone, or one or more small ones which move in the duct backwards and forwards. Wherever situated, the calculus is the seat of great tenderness. If the infection spreads to the gland there is pain and tenderness, increased during salivary secretion. The following cases have been observed recently:

CASE I.

The patient complained of intermittent pain and swelling in the right parotid gland and along the line of the duct. The orifice of the duct formed a tender indurated nodule; a cord was felt along the line of the duct, at one point about the socia parotidis there was a cystic swelling. A canaliculus probe-pointed director was with difficulty passed up the line of the duct, and the duct slit up into the mouth as far as the anterior border of the masseter.

CASE II.

A patient had a parotid fistula over the position of the socia parotidis, the indurated papilla in the mouth had become impermeable to a probe passed from that direction. Therefore the probe-pointed director was passed from the fistula on the cheek down the duct into the mouth, and guided by it a second probe-pointed director could then be passed up the duct to a point beyond the fistulous opening. Thus guided the parotid duct was slit up into the mouth to a point nearer the gland than the fistulous orifice. The margins of the fistula having been then pared, and closed by clips, healing of the cheek occurred by first intention.

CASE III.

There was intense pain and tenderness at times along the line of the right submaxillary duct, which prevented the use of a lower tooth plate. The special point of tenderness shifted, at one time being just in front of the anterior pillar of the fauces, at another time right over the canine tooth. This sign was recognized as caused by a minute concretion moving its position in the duct; it could not escape because the papilla had become indurated and the orifice stenosed. The probe-pointed canaliculus director was passed with difficulty into and along the duct, which was then slit up as far as the intrabuccal portion of the submaxillary salivary gland. When seen a month later the saliva was being discharged directly from the gland into the mouth; the tenderness of the external portion of the submaxillary gland had been relieved; there was still some swelling and tenderness in the sublingual gland situated underneath the slit-up duct.

CASE IV.

When the septic inflammation has extended to the extrabuccal portion of the submaxillary salivary gland, and this has not been relieved by slitting up the duct and subsequent massage to the gland, it has been necessary to remove the submaxillary salivary gland through an external incision. Glands so removed show chronic interalveolar fibrosis with dilatation of alveoli and of smaller ducts, many of which contain inspissated mucus in which calcareous material is deposited. A severe case of oral sepsis was started years ago, especially by pyorrhoea alveolaris affecting the lower incisor teeth. Both submaxillary salivary glands and the ducts were infected and also there was excited gastro-duodenal ulceration. The patient has had to undergo a series of operations on different occasions, the excision through the mouth of one, and then of the other thickened and dilated Wharton's duct, as far back as the gland; later the excision of the submaxillary gland on each side through an external incision; finally, gastro-jejunostomy to remove the gastric trouble. In addition all the teeth were removed and dentures fitted with considerable difficulty.

Acute Suppuration following Extraction of Teeth.

It may be described as the common procedure to extract one or more carious teeth, although there are present additional causes of oral sepsis. Any septic complication is so rare as to be negligible.

In the four cases I mention the extraction of two or three molars with all ordinary care was followed by acute suppuration. I believe that an acute septic infection of the raw surfaces of the gum and of the bare alveoli which followed the extraction in these cases was derived from the lower incisor teeth already affected by some degree of pyorrhoea. The character of the suppuration corresponded with that set up by virulent streptococci, mixed with staphylococci.

CASE I.

A female had become anaemic, for which there was no other evident cause than the state of her teeth. Three left lower molars were extracted, leaving eight teeth affected by pyorrhoea, and some by caries. An acute septicaemia supervened at once, the temperature rising to 105° F. and the pulse to 130. There appeared an acute brawny oedema extending from the jaw to the clavicle on the side of the extraction. Under the presumption that the most dangerous part of the infection was due to streptococci, a 20 c.cm. dose of an antistreptococcic serum was administered every six hours for four doses. Meanwhile the exceedingly foul condition of the mouth was reduced by repeated cleaning and irrigation. The spread of the inflammation was arrested and suppuration supervened, fortunately superficial to the deep fascia. Under a general anaesthetic all the remaining teeth were removed by first wiping out the gum pockets around the teeth with iodine, and after extraction applying iodine to the alveolus. Then a long incision over the anterior carotid triangle laid open the suppuration. Healing followed without any reaction subsequent to the operation.

CASE II.

A female, after extraction, had acute inflammation below the jaw, which became circumscribed to the submental gland and to the gland over the bifurcation of the carotid on the corresponding side. All the rest of the teeth were sound except the lower incisors, which presented pyorrhoea alveolaris. The removal of these incisors and the opening of the abscesses had the same result as in the previous case.

CASE III.

A male, aged 50, had had oral sepsis for a long while. He was markedly thin and anaemic, for which there was no other evident cause. A couple of lower molars were extracted, following upon which he was attacked by septicaemia, attended by pain, sleeplessness, loss of appetite, and weakness. Suppuration started in the alveoli from which the teeth had been removed; internally pus spread forwards under the gum, externally there was inflammatory induration limited to the line of the horizontal ramus of the mandible. There was marked pyorrhoea alveolaris affecting the lower incisor teeth. Incisions were made through the gum from within the mouth, and suppurating cavities repeatedly syringed out. Later the incisor teeth were removed; the necrosis remained limited to the alveoli, and there was no extension to the neck. Convalescence was slow.

CASE IV.

This case ended fatally. A male, aged 40, had had some oral sepsis for probably ten years, and two or three carious teeth had been previously extracted without complications following. Then three molar teeth were removed from the lower jaw on the left side, and the patient went straight back to his office to work. Acute septicaemia followed, and three days after the extraction he was sitting up in bed with laryngeal stridor, the voice almost lost, swallowing with difficulty, temperature 105°, pulse 116, respiration normal in rate. The mouth was excessively foul; there was brawny oedema from the lower jaw to the clavicle on the left side. Injections of antistreptococcic serum were followed by relief to the laryngeal stridor, but signs of purulent bronchitis continued. Four days after extraction the foulness of the mouth had not been reduced in spite of the cleaning by the nurses. The brawny oedema of the neck had gone on to suppuration under the deep fascia. There was a limited necrosis of the jaw around the site of the extraction.

Under a general anaesthetic the remaining teeth, ten in number, were extracted whilst applying iodine as described above. Every tooth stank, more especially the lower incisors. Four incisions were made in the neck and tubes inserted; foul pus escaped. The result was an immediate improvement in the condition of the mouth; the necrosis of the jaw did not extend; foul pus and sloughs of fascia were discharged from the incision in the neck, but the purulent bronchitis increased. Ten days after the original extraction, and four days after the removal of the rest of the teeth, a little bright blood appeared with the pus and sloughs, so the drainage tubes were removed. Signs of a left-sided pleurisy being confirmed in consultation with a physician, on the eleventh day 15 oz. of turbid fluid were aspirated from the left pleura and found to be swarming with streptococci. Later, on the same day, the left pleura having again filled and the breathing and pulse becoming impaired, he was being carried into the operating theatre when suddenly the mouth was filled with blood and blood escaped from the neck. This was checked by thrusting a finger into a submaxillary incision and another through the mouth into the necrosing area around the jaw. An enlargement of the incision in the neck exposed facial blood vessels in the midst of foul granulations. The haemorrhage was apparently derived from both an artery and vein and was controlled by clamps. After this the fluid was let out from the pleura. The patient died ten minutes after his return to bed.

There are two ways of regarding these four cases. They may be considered exceptional occurrences, and many objec-

tions may be raised to the removal of the lower incisor teeth. On the other hand, when affected by only a slight degree of pyorrhoea, the lower incisors may become the source of a virulent infective agent, independent of the quantity of pus discharged, in particular as the focus from which a streptococcal infection may arise. Granted this, it may be best to extract these teeth first, and after the oral sepsis has been reduced remove the more deeply rooted teeth.

I have many times removed a number of teeth at one operation without noting shock or inflammatory reaction, but rather an immediate relief of the oral sepsis. The cases have, however, been treated like others undergoing major operations, including preliminary preparations, a general anaesthetic, disinfection, and extraction of a tooth at a time, and after-treatment in bed.

FEBRICULA AND INFLUENZA.

BY

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In every great boarding-school there occur from time to time—and usually no term is quite exempt—a certain number of cases of a complaint popularly spoken of as “a chill” or “the flu,” or, if much more severe, “influenza,” and characterized in its simplest form by sudden onset, usually a shivering attack, and pains in the head, back, and limbs. Sometimes there is slight sore throat and a mild adenitis, with nothing but a little redness of the fauces to be seen, and the patients have perhaps only recently got rid of a slight cold and cough; but there is rarely much catarrh when they seek advice, nor, apart from the pyrexia and slight rise of pulse rate, is there any physical sign to account for the condition. After a few days in bed, the administration of a purge, gargle, and ammoniated quinine or some simple diaphoretic, the temperature drops either suddenly or by a descending zigzag to normal, and the attack is over. Such is the disease in its simplest form.

My object is to describe this disease and its varieties, and to establish its relation to certain allied conditions—namely, coryza, febrile catarrh, and influenza—and to consider the etiology, pathology, complications, and some points in the treatment of patients in whom they occur.

Sir William Osler, in his *Principles and Practice of Medicine*, describes febricula as “fever of slight duration, probably depending upon a variety of causes.” A febrile paroxysm lasting twenty-four hours and disappearing completely is spoken of as “ephemeral fever.” If it persists for three, four, or more days without local affection it is referred to as “febricula.”

In the first place, it is obvious that the disease, which should be spoken of as febricula, is an infection, and may occur in mild or severe form; it has certain definite types and complications, depending, no doubt, partly on the strain and virulence of the micro-organisms concerned in any particular epidemic, and partly on the admixture of the micro-organisms and the introduction of new strains, and possibly also new species. Climatic conditions are also a factor in determining the prevailing manifestations of the disease.

There are four main types commonly seen:

In the commonest the onset is sudden, and the symptoms which have already been described very soon yield to treatment. The temperature chart is characteristic of the descending see-saw type, with about 1 to 2 degrees between the evening and morning records, normal being reached on the fourth, fifth, or sixth day; then follows a short period of subnormal morning temperatures with normal, or slightly above normal, evening records, then a continuous normal or subnormal temperature till convalescence is attained.

In the second type the temperature chart is more like that of a lobar pneumonia of three to five days' duration, with a sudden drop resembling the crisis in pneumonia, and often followed by a post-critical rise.

In the third type the temperature is far more irregular, beginning like a mild attack of the second type, then, after two or three days' normal temperature, relapsing and repeating the phenomena of the early period on a modified and milder scale. There may be several such relapses, or “exacerbations,” the chart reminding one of a short attack of trench fever.

In the fourth type the chart resembles that of a mild enteric infection with high evening and much lower morning temperatures, but usually a steady rocking, descending swing, the steps becoming smaller and smaller until the normal or subnormal is reached in from ten to fourteen days.

The striking peculiarities of the disease are the absence of acute symptoms after the first few days, the cleanliness of the tongue, the keenness of appetite, and the rapid recovery. In schoolboys very few seem to be much debilitated by a moderate attack, and they find their legs again with striking rapidity, and need considerable supervision and restraint to prevent them returning to full exercise sooner than is safe. In spite of this they lose weight rapidly, but gain it as quickly under favourable conditions.

Such are the main types of this disease; one may almost predict from the first few cases which occur in a school in a given term to which of the types the outbreak is likely to conform. Once it has started it spreads with more or less rapidity by boarding-houses chiefly (because the infection is mainly a dormitory or study infection), then by forms and classes. The rate with which it spreads depends on several factors, chief of which are: (1) The number of individuals who are partially or completely immune owing to a recent attack, or to prophylactic vaccination; (2) the severity of the weather and the precautions taken to ensure against overcrowding and unnecessary exposure to wet, cold, and overexertion.

Complications.

There are certain phenomena which occur in the course of epidemics of febricula which hardly deserve the title of complications, being rather a part of the disease.

The chief are as follows:

Epistaxis.—Of very common occurrence, especially in the early stages.

Pharyngitis.—Is very common; the appearance of the tonsils is that of raw meat, the soft palate is scarlet, and “sore throat” is complained of.

Tonsillitis.—Is not often severe. In some epidemics cases of true follicular tonsillitis occur, but this is not the rule; occasionally quinsies develop, but not as a rule except in individuals predisposed to their occurrence.

Ear complications are unfortunately far from uncommon; there are two main forms:

1. Those beginning with Eustachian catarrh, and then developing otitis media with acute earache of a most distressing kind, accompanied by severe constitutional symptoms and high temperature. This may subside without perforation of the drum, but frequently relief occurs when otorrhoea appears with a discharge often serous for a short time, but usually becoming purulent within thirty-six hours. The pus contains the micro-organisms which are probably the cause of the disease, reference to which will be made later on, and it is likely that futile attempts to blow a completely blocked nose lead to the infection of the middle ear.

2. Those beginning without Eustachian catarrh, the first symptoms being earache, the drum becoming oedematous, with redness and loss of the usual landmarks. In some cases a blister forms on the outside of the drum, bursts, and discharges a pale thin watery fluid, and the attack is over in two or three days without further discharge. In such cases the walls of the auditory meatus often share in the inflammation, and the middle ear seems to escape.

Conjunctivitis is not at all uncommon, infection taking place through the nasal ducts. In some cases this conjunctivitis is most persistent and only cured by syringing out the ducts and douching the nose, in addition to treatment of the eyes with boracic lotion and protargol, or silver nitrate drops.

Adenitis in a slight degree is common; in cases where the throat is more than usually inflamed it is generally more severe. In individuals whose glands are usually somewhat enlarged, possibly owing to a tuberculous tendency, adenitis is much more marked.

Abdominal Complications.—Constipation is the rule whilst the temperature is high. Vomiting is rare, but occurs. In some epidemics the stomachic symptoms are much more marked than in others, hence the term “abdominal influenza.” Jaundice is by no means an uncommon complication, occurring either as a late phenomenon or quite early. In certain epidemics of febricula small outbreaks of jaundice occur, and I cannot but think that they are not remotely allied in origin.

Cardiac complications are rare. Endocarditis very seldom occurs. A muscular weakness of the heart muscle, giving rise to a soft systolic murmur in the dorsal position, is quite common and lasts long into convalescence. Occasionally cardiac dilatation and hypertrophy persist, and require prolonged and persistent care. Rapidity and irregularity of the pulse not uncommonly persist even after convalescence seems to be established. Convalescents should return to exercise very gradually; in a mild attack not for at least three weeks from the onset of the disease.

Pulmonary complications are common in some epidemics, rare in others. Whilst lobar pneumonia is rare, bronchopneumonia and bronchitis are not at all uncommon. Pleural effusions are comparatively rare, but occur. In severe cases empyema may follow. In many cases there is a localized congestion at the base of one lung without any dullness or solidification; it is accompanied by cough, but no dyspnoea, and the symptoms are not those of bronchopneumonia, there being neither distress nor cyanosis nor great rapidity of respiration. A dry pleurisy sometimes occurs. In patients liable to asthma, an attack of asthma may supervene.