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EMPYEMA OF THE ANTRUM.

BY

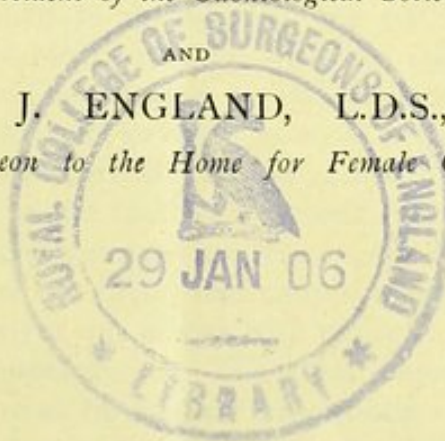
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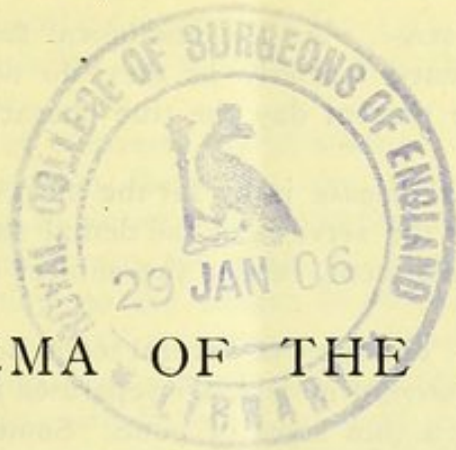
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EMPYEMA OF THE ANTRUM.

JUDGING from our experience, the subject of empyema of the antrum is of greater importance, if not of greater interest, to the medical than the dental practitioner, for though we have tapped the cavity in a number of cases, now very large, in comparatively few instances has a patient applied directly to us as dental surgeons. In those which have applied to us directly, the patients have usually complained only of trouble connected with the teeth.

In one case following an attack of influenza, the patient, after severe toothache in a bicuspid, gave a history of periodontitis, followed by suppuration and abscess, which had burst and discharged through the nose. On removal of the tooth, the antrum was found to contain pus. In another, in which there was not free escape for the pus through the ostium, distention of the cavity had caused absorption of its outer wall, and the patient sought our advice with regard to a soft fluctuating swelling over the first upper molar. The great majority of cases have, however, been brought to us by medical practitioners, by whom a diagnosis had been made; but in many of them the patients had suffered for months, some for years—often undergoing treatment wrongly directed—before the real nature of the malady had been made out.

Until comparatively late years, when the subject has been fully dealt with by Zuckerkandl, Ziem, Krause, Semon, and other writers, our knowledge of antral empyema has remained far from complete, and the existence of the disease does not appear even now to be fully recognized either among dental or medical practitioners. It is only within the last ten years that we have met with cases. The affection does not seem to have been clearly described by many older writers, although Allouel and Jourdain, in the last century, recognized the disease, and even effected cures by syringing through the ostium maxillare. Text books have, until recently, given no clear or adequate

round the mouth have rapidly disappeared on free drainage of the antrum being established.

The *diagnosis* of empyema of the antrum is not generally difficult. A patient presenting the principal symptoms just mentioned will, in all probability, prove to be a sufferer from this affection ; but it is not always safe to pronounce a positive diagnosis without thorough rhinoscopic examination. Mistakes have been made and recorded by very competent observers, and the antrum has been opened in several cases in which no antral trouble had been really present. The relative transparency of the cheeks on transillumination by means of a small electric lamp within the mouth is not always a reliable sign. Presence of pus is not invariably denoted by the opacity of one side. But the amount of light transmitted through the infra-orbital plate seems to afford a more certain sign.

Disease of the frontal sinuses, or of the ethmoidal cells, and presence of nasal polypi or adenoid growths, may give rise to symptoms closely simulating antral empyema.

The *treatment* consists in removing irritating causes, whether in the teeth or elsewhere, in providing free drainage, and in thorough daily irrigation of the cavity with antiseptic lotions. We are strongly of opinion that any tooth in a condition in which it may be only open to suspicion as the cause of empyema ought to be extracted. This opinion was formed by the experience of the first case which we assisted to treat, and the opinion has been strengthened by what we have learnt subsequently. In this first case disease of the antrum had been suspected, and frequent enquiry made into the condition of the teeth by surgical practitioners who had been consulted. They had, however, remained satisfied on the patient's assurance that his teeth were in good order, and had been pronounced free from disease by a leading dentist. At length a positive diagnosis of empyema was made by Dr. Semon, and he brought the patient to us to tap the antrum. The first molar of the affected side contained a large amalgam filling, evidently extending into the pulp cavity, and the pulp was dead. The tooth was free from pain ; not notably sensitive to percussion, and displayed no well-marked sign or symptom of internal or external inflammation. We had decided from the first that under any circumstances, even had we been obliged to sacrifice a sound tooth, we should tap the antrum through a tooth socket, and we therefore extracted this molar. On opening the tooth it was found that the pulp had been removed, and the tooth filled *secundum artem*, but the palatine root was extensively necrosed from the apex downwards, and its alveolus communicated with the antrum by an opening large enough to admit

an ordinary dressing-case silver probe. Suppuration round this root had found free vent into the antrum, and hence tension within the socket, and symptoms referred to the tooth were absent. So much pain in this case had been suffered in the form of neuralgia and headache, that it would have been with difficulty localized by the patient, and ophthalmic symptoms from pressure beneath the floor of the orbit had existed, which further confused diagnosis. We have just remarked that we had formed the determination to puncture through the alveolus, and we are convinced that this is the best practice in every case. The only other opening worth considering is through the canine fossa, and that only when it is deemed advisable to scrape the antral membrane. The objection to this opening is that it takes a long time to close, and sometimes never does so. Almost all surgeons in England, at least, are performing the operation of opening through the alveolus, but elsewhere opening through the nose, as advised by Krause, is in many cases preferred. The various points through which openings can be made are: (1,) Inferior or middle meatus of the nose; (2,) Canine fossa; (3,) Zygomatic fossa; (4,) Alveolus (*Fig. 1*).

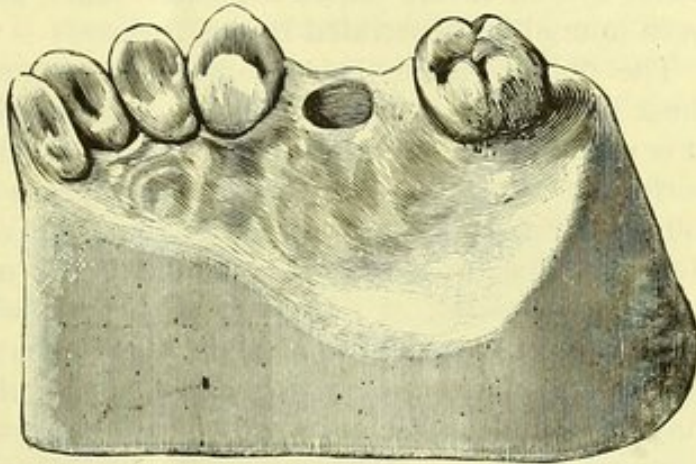


Fig. 1.—Cast of mouth, showing opening into antrum.

What is principally called for is free, constant drainage. This effected, the longest step towards a cure is achieved, and immediate relief to all urgent symptoms is in most cases afforded. Tapping may be performed through the alveolus of the first or second bicuspid, or first or second molar; when the latter, a buccal socket should be chosen, so as to avoid missing by accident the antrum and perforating the floor of the nose, and so as to leave the opening in the bone as vertical as possible. The opening should always be made at right angles to the plane of the alveolar border, else when making the drainage apparatus, presently to be described, it is almost impossible to secure the tube accurately in relation to the plate when removing it from the mouth before finally soldering these two parts together.



Fig. 2. two parts together.

For making the opening we employ the dental engine, with a spear-

headed drill, shown half actual size in *Fig. 2*, of about one eighth of an inch in diameter, and of sufficient length to penetrate the antrum, but not long enough to endanger the floor of the orbit. The nozzle of the hand-piece of the engine also acts as a stop in case of a sudden plunge on the part of the patient. The opening is then enlarged by a



Fig. 3.

trocar (*Fig. 3*, half-size), to allow the passage of a tube of at least one eighth of an inch in diameter, and the trocar is held so that the thumb acts as a stop to prevent it by accident penetrating too far. Cases are on record where the outer, inner, and posterior walls have been injured or penetrated by the trocar.

The dental engine is not absolutely necessary in the operation; those who prefer it may find small trocars sufficient for all purposes. It is useful to bear in mind the accidents which may occur during the performance of the operation of tapping the antrum. They are as follows: Failure to reach the antrum, the cavity varying at times slightly in position and size; and it being often difficult exactly to estimate the depth of the alveolus through which the perforation is made without careful probing and measurement. As before mentioned, the orbital plate may be wounded; any of the walls of the antrum may be wounded. Zeim records a case of retro-maxillary abscess and secondary abscess formation in the cheek following penetration of the posterior wall of the sinus. A branch of the infra-orbital artery has before now been wounded, and the writer quoted above records a case where ligation of the infra-orbital artery became necessary from a similar cause. The possibility of wounding the floor of the orbit must *always* be borne in mind, but this accident seems barely possible with exercise of proper care.

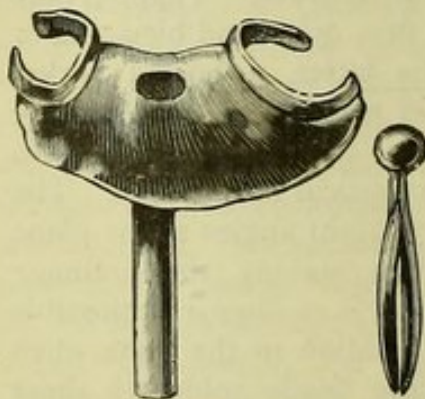


Fig. 4.—Gold plate with tube; and split-pin for closing tube.

Large experience has proved in our hands that the best apparatus for keeping the opening patent, preventing growth of granulations, and facilitating drainage and syringing, consists of a plate such as is usually made to carry an artificial tooth, but fitted with a gold tube to pass within the antrum (*Fig. 4*). The plate being made and found perfect, a hole is cut corresponding to the opening into the antrum;

and the tube fixed in position with modelling composition is tried in, so as to secure accuracy of adaptation. The main point is to ensure easy passage of the tube, and to guard against irritation from pressure upon the bony passages or walls. During trials it is necessary to secure the tube by means of a ligature passed through a hole drilled in its lower extremity, lest the tube slip and pass within the antrum. The tube having been carefully withdrawn in position is soldered to the plate in the usual way. If the patient be wearing artificial teeth, the tube may sometimes be adapted to the denture. The tube has a rounded open end above, and opens below by a funnel-shaped orifice, which may be kept when necessary, as during meals, plugged with a gold split pin. It is well for the first few days not to close the tube at all. The total length of the tube is usually three quarters of an inch or more. The depth of alveoli varies greatly, and it is necessary for the tube to project well into the antrum, as otherwise the mucous membrane may close over the opening.

if the end of the tube is only just level with the antral floor, and block the opening, and thus the patient will be unable to syringe properly. The plate should be removed frequently for cleansing. It will be found that pus escapes freely by the sides of the tube when plugged, and it

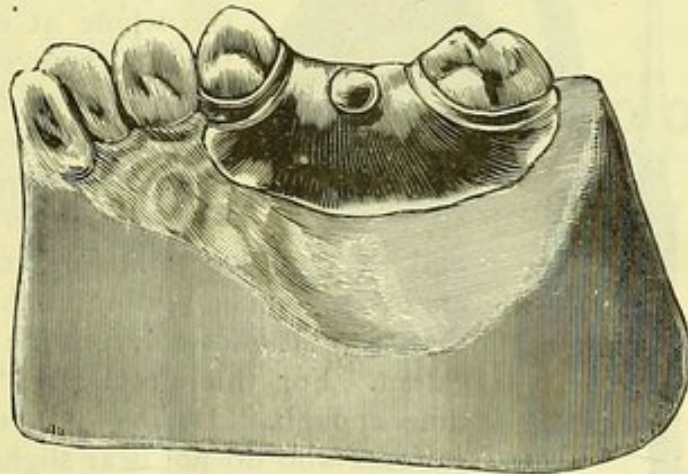


Fig. 5.—Cast of mouth, showing *in situ* plate with tube closed by split-pin.

is not necessary to perforate it with holes (Fig. 5).

Drainage being thus provided for, the antrum, after being freed by syringing from inspissated pus, must be thoroughly irrigated twice a day with an antiseptic lotion, such as **Perchloride of Mercury**, 1 in 2000, or 5 to 15 grains of **Chloride of Zinc** to the ounce of water, and one teaspoonful of this solution to be added to half a pint of luke-warm water. In chronic cases considerable benefit often results from occasional changing of the antiseptic.

The syringing apparatus devised by Mr. Christopher Heath (Fig. 6), with the addition of a bayonet joint to fix the cannula to the nozzle, answers best. It is provided with a long thin nozzle to pass well up the tube, and worked by an elastic ball action. It is capable of

throwing a continuous stream of just the right strength through the cavity. Half a pint of lotion may be used at each sitting. The lotion should make its exit through the nose, the patient's head being inclined forward. The tube may be withdrawn during syringing, if the patient finds it more convenient. This treatment is continued until a cure is accomplished, when the tube is discarded, and the opening allowed to close.

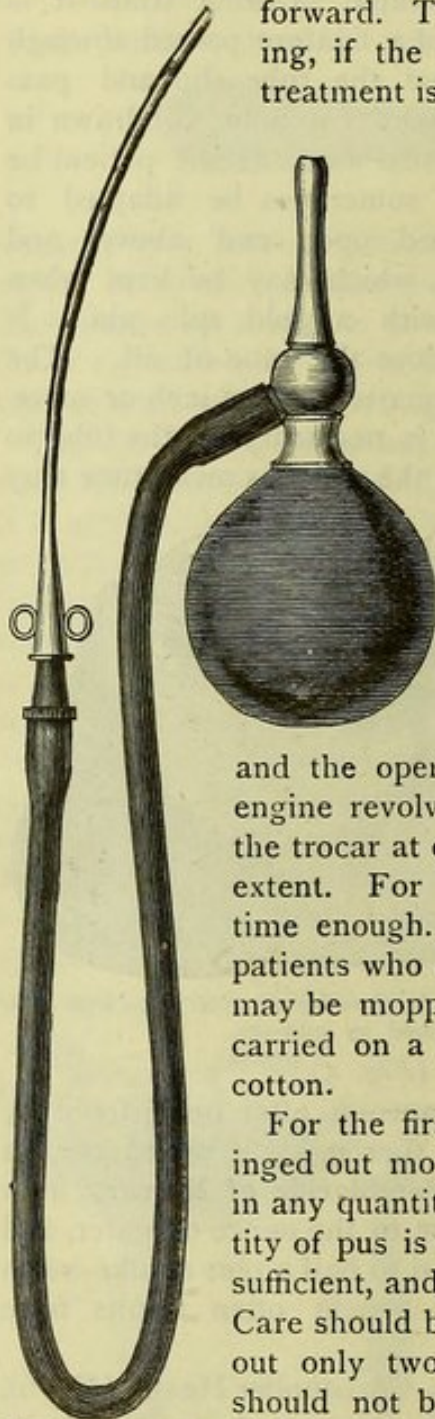
In cases where the opening is large, it is sometimes well to cut off the tube, solder up the orifice, and let the plate be worn until the opening has healed.

We prefer nitrous oxide as an anæsthetic in these cases, and when a tooth has to be drawn, divide the operation into two parts; but usually performing the whole at one sitting. First the tooth is removed, and the patient having recovered, an examination is made, and it is decided through which socket the antral opening may best be made.

The patient is now again narcotized, and the operator, standing ready, drill in hand, and engine revolving, perforates the cavity, and then with the trocar at once enlarges the opening to the desired extent. For this procedure "gas" narcosis affords time enough. During subsequent manipulations in patients who do not bear slight pain well, the passage may be mopped with a saturated solution of cocaine carried on a fine wire probe bound with absorbent cotton.

For the first week or so the cavity should be syringed out morning and evening as long as pus exists in any quantity. Afterwards, when only a small quantity of pus is secreted, washing out once a day will be sufficient, and as pus decreases, every other day only. Care should be taken when no pus appears to syringe out only two or three times weekly. The opening should not be allowed to close until at least six or eight weeks after the last appearance of pus.

Fig. 6.—Apparatus for syringing the antrum.



In all cases it is absolutely necessary that the injections shall pass from the alveolar opening through the ostium and flow

out from the nose. In cases where it does not, either the adjustment of the tube may be at fault, or the opening may be blocked with inspissated pus. In the latter case, blowing the nose violently, and carefully syringing, will usually clear the way. The ostium may be blocked with hypertrophied membrane, in which case it must be removed by the surgeon.

Cases of empyema are often extremely chronic, and they usually resist treatment for periods proportionate to the time the disease has lasted. Recurrence after apparent cure is not common, but we have seen cases, especially after influenza, which tend to show that relapse may occur. We have also seen cases in which both antra have contained pus, but they call for no special remark, either as regards etiology or treatment.

Whilst care must be taken to ensure thorough drainage, the danger of keeping up irritation by too much syringing, and the use of unsuitable lotions, must not be overlooked.

It is, perhaps, desirable to add, finally, that we consider the treatment of empyema of the antrum, as a whole, does not fall within the province of a dental surgeon. We have always restricted ourselves to the operation of tapping the cavity, and construction of the drainage apparatus, leaving all other matters to be dealt with by the surgeon originally in charge of the case.
