

TREATMENT OF WOUNDS INVOLVING THE MUCOUS MEMBRANE OF THE MOUTH AND NOSE.¹

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I SHOULD like, first of all, to express my grateful appreciation of the honour done me by the Medical Society of London in thus inviting me to take part in this discussion. It is proposed to bring to your notice some facts and illustrations bearing on the treatment of some wounds involving the mucous membrane of the mouth or nose. Lesions associated with injury to the mucous membrane of the cheek will be dealt with generally. Of nasal injuries only one type will be considered, as no attempt will be made to discuss the question of rhinoplasty. Allow me, as a preliminary, to re-state my views, voiced previously on several occasions, as to the dental and surgical treatment of injuries involving the mouth and jaws. I do not recognise them as separate or separable entities. The principles and plan of treatment should be from the very first evolved by the combined efforts and pooled knowledge of the surgeon and dental surgeon concerned. Treatment of these injuries should be viewed as a whole, administration being undertaken by this individual or that according to the lines along which the technical ability of the one or the other has been developed. I desire to associate with this contribution the name of my co-partner in treatment, Mr. C. H. Bubb, and make no apology for alluding, where necessary, to such technical matters as splints and the principles governing their use.

Cases in which Primary Suture is Inadvisable.

In the majority of cases a wound of the cheek involving the mucous membrane is complicated by fracture more or less extensive of the lower or upper jaw. The functional and cosmetic effect must both be considered, but it will, I think, be generally conceded that functional should precede merely cosmetic considerations. From the viewpoint of function the bony lesion is of more importance than the injury to the soft tissues, and its efficient treatment should consequently hold first place. Any method of treatment which ignores this cardinal fact cannot commend itself to our judgment. It is my contention that the primary suture of these wounds is in such a case, and for this reason cannot be considered a satisfactory procedure.

Were the fracture dealt with adequately and simultaneously all would be well. But it is not. To be of any service primary suture apparently must be done quickly, more quickly than will allow of the preparation of an effective splint. If primary suture rendered the adaptation of a splint more easy all would be well. But it does not. So far from this being the case the insertion of any form of splint has, in some instances, been impossible without resort to surgical measures. Such a case has recently come under my care. The cosmetic result, considering the extent and severity of the wound, is good. There was, however, an associated fracture of the lower jaw. No splint had been applied and no splint could be inserted owing to the fact that the patient's mouth was practically fixed in a closed position by the contracting scar. The functional outlook was hopeless unless measures were taken to retrieve the situation. The scar was freely incised throughout its extent. This left the patient in much the same condition as when wounded, and treatment was started *de novo*. From the pictorial aspect there is little to choose between his condition now and then. Pictorial illustrations are, and inevitably must be, fallacious in that no judgment can be formed as to the functional result. The change wrought in this patient's condition is purely functional; bony union has been determined in good position and the mouth can be freely opened. The details as to the methods employed will

be dealt with later. Several cases of a similar nature have come under my care. On each occasion it has been necessary to undo all that has been done. The conviction has been forced upon me that primary suture of such wounds should never be undertaken when complicated by an associated fracture unless the fracture can be dealt with at the same time.

Value of the Open-Bite Position.

The method of primary suture being thus rejected, it is better to wait until all sepsis has disappeared and the wound is soundly healed before undertaking the necessary operative measures. Cicatrisation with inevitable contraction will occur, and this whether a fracture is present or not. It is a process determined by the behaviour of the soft parts. The presence of a fracture in this regard is incidental and not causative; the absence has no influence on the principles of treatment. Here, as in other parts of the body, this cicatricial contraction must be controlled and limited as far as possible, and the waiting time can be utilised to this end. Cicatricial contraction, wherever it occurs, is relatively unimportant as a cosmetic factor. Its importance is assessed in direct proportion to its crippling effect on movement. Treatment is rightly directed, first to the prevention, and secondly to the rectification of such limiting effects. In the case of a cicatrising wound threatening the movements of any particular joint it is the surgeon's endeavour to maintain the joint in that position which will most effectually conserve the movement whose limitation is threatened. The movement, which will assuredly be either considerably limited or rendered totally impossible by cicatricial contraction occurring in a wound of the nature herein discussed, will be that of opening the mouth. It is, I submit, not only logical but incumbent on the surgeon, and dental surgeon, to prevent such limitation by maintaining the jaws in a position of open bite. The difference as between uncontrolled and controlled contraction in a cicatrising wound will best be illustrated by two concrete instances. In the one the partly healed wound had to be freely incised before an impression could be taken. In the other a widely open bite was maintained from the beginning. The necessary plastic operation was thereby reduced to a mere readjustment of the existing tissues, with the result illustrated in Plate 1. The advisability of maintaining the open-bite position in this type of case is so obvious that to labour the point would appear unnecessary were it not that it is the obvious that is so often overlooked. The open-bite position has other claims to favour, but I desire for the purposes of this discussion to limit my advocacy of it to the particular class of case under survey. In association with, and attached to, the open-bite splint, we are accustomed to use a smooth adjustable shield. (Fig. 13A.) This has an important rôle. It prevents prolapse of the lips of the wound, preserves contour both before and after operation, and is an important factor in the preservation of the buccal sulcus. The surest way of maintaining the buccal sulcus is never to lose it. A policy of prevention as regards this important point would go far to render obsolete the many ingenious devices that have been evolved to deal with it.

Three Basic Considerations.

Preliminary treatment completed, the patient is ready for operation. The type of operation best suited to this class of case is a matter in which individual opinions will no doubt differ. I propose to place before you the results of my own experience, in the hope that it may possibly be helpful.

There are three basic considerations which determine behaviour in this region: 1. The progressive tendency of a singly epithelialised flap to shrink. 2. For practical purposes the cheek may be regarded as consisting of two layers—an outer skin layer and an inner mucous membrane layer. The elasticity and distensibility of the cheek are dependent on the laxity and suppleness of both. Tension in one will vitiate function, however lax may be the other. Functional incapacity will be in direct ratio to the tension present in either layer. 3. The fundamental difference between real and potential loss of tissue.

The real loss can best be estimated by a careful study of the wound immediately or soon after its infliction. As the wound heals the additional factor of scar formation is introduced. The effect of radiating lines of scar tissue

¹ A paper read before the Medical Society of London on Dec. 3rd, 1917. [In THE LANCET of Dec. 8th we published cases with illustrations which were alluded to by Major H. D. Gillies in introducing the debate on facial injuries at the Society. In our report of the proceedings of the Society we inadvertently described these cases as a full account of Major Gillies's opening address.—ED. L.]

will be to limit the elasticity and flexibility of the surrounding tissues, and so render it impossible to obtain a satisfactory result by adopting the surgical measures applicable in the case of a freshly made, clean cut gap of equal extent. This cicatricial factor it is which more often than not renders direct borrowing impracticable and makes necessary the introduction of new tissue. "The measure of new tissue necessary constitutes the potential or operative loss." As a general rule, operative loss is always equal to, and usually much greater than, real loss. Scar formation will be directly proportional to the extent and irregularity of the original wound, and therefore, pictorially at any rate, its configura-

tion is a more accurate guide to the surgical measures necessary and the result achieved than is the residual deformity, which may appear relatively slight.

A consideration of these factors leads, then, to the conclusion that the introduction of fresh tissue is frequently called for, and that the use of doubly epithelialised flaps is indicated. Skin flaps may be epithelialised on the mouth aspect by mucous membrane flaps. This method, however, can only be employed where direct borrowing is possible. Direct borrowing is less applicable to the inner cheek layer than to the outer owing to the more limited area present on which to draw.



PLATE 1.—Illustrating the value of the open-bite position in the healing of large cicatrising wounds of the face. After natural healing had taken place the necessary plastic operation was reduced to a mere readjustment of the existing tissues.

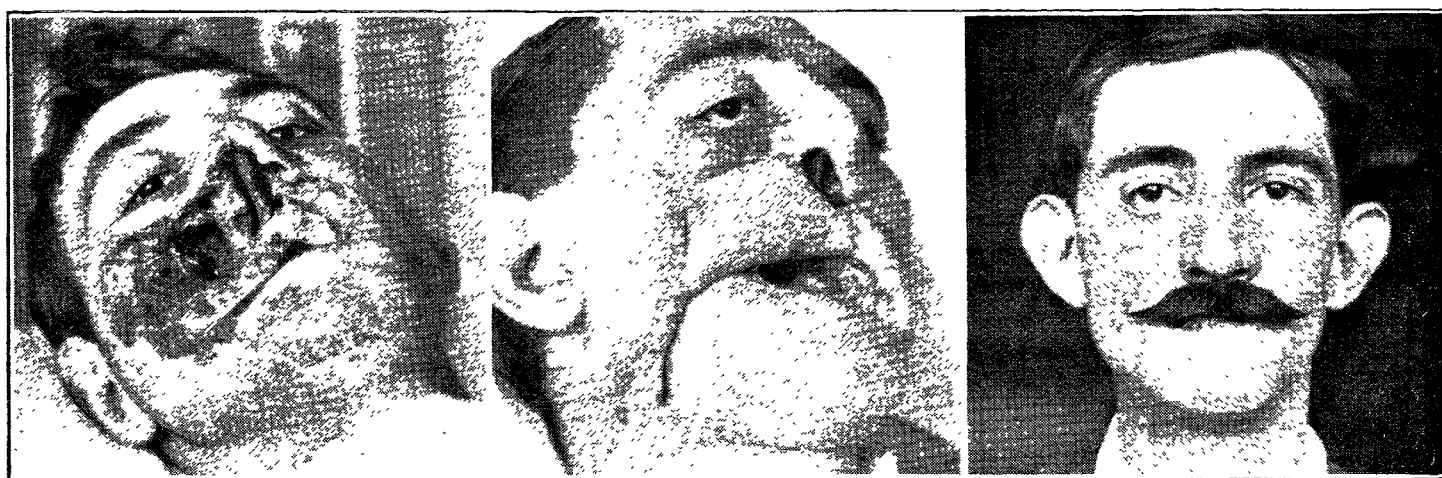
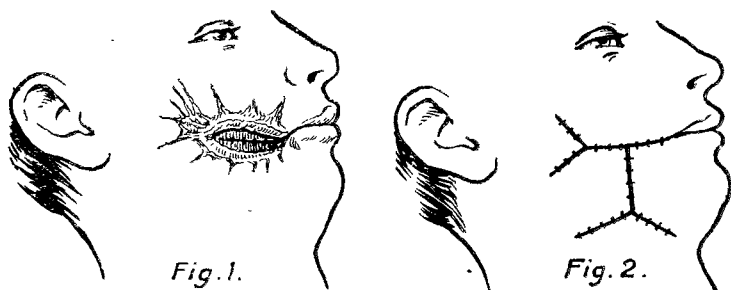


PLATE 2.—Illustrating the replacement of extensive loss of soft parts by two pedicled and doubly epithelialised flaps (compare Figs. 22-25). An artificial nose and moustache finishes the cosmetic effect.

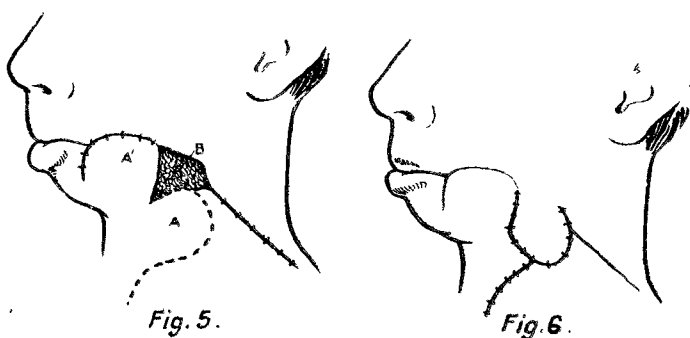
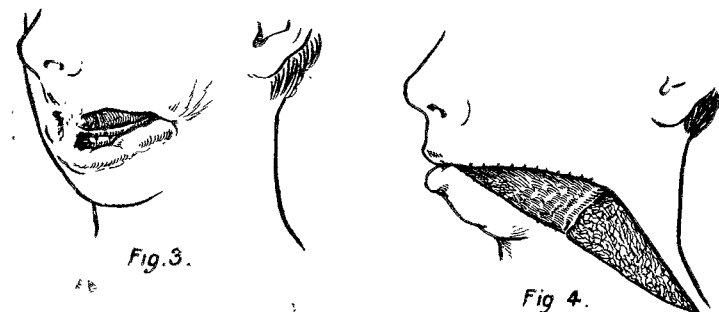


PLATE 3.—Illustrating the closing of a lateral nasal defect by a pedicled scalp flap (compare Fig. 28) from which the hairs were removed later by depilation by radiations

To meet the larger demands it is necessary to employ a substitute, the extent of which is practically unlimited. That substitute is skin, and admirably it serves the purpose. Before illustrating the methods whereby skin has been utilised to replace lost mucous membrane. I should like to



bring to your notice a case which convinced me at a very early stage of the futility of what is known as "bringing the parts together." In this case the mucous membrane edges were freshened and united (Fig. 1), an open-bite splint with buccal flange being present at the time of operation. The skin edges were also freshened, and by means of extensive undercutting and sliding the outer aspect of the defect was closed. (Fig. 2.) The patient developed a keloid scar and a salivary fistula which persisted for several weeks. Captain Robert Knox was good enough to take the



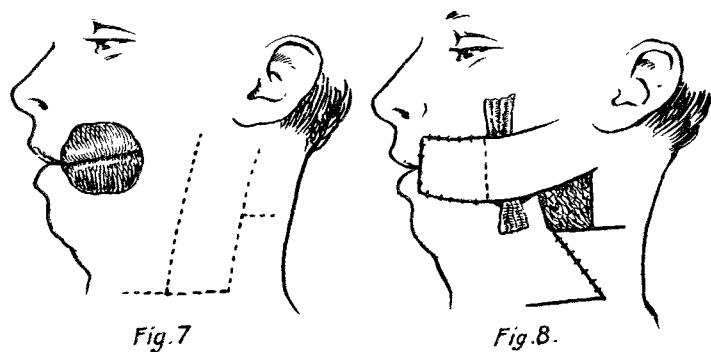
patient in hand and, by means of radiation treatment, improved the appearance of the scar and healed the fistula. The cosmetic result is moderately satisfactory, but functionally I regard it as by no means a success. That it is not functionally a total failure is entirely due to the method of splinting adopted. The case forcibly illustrates my contention as to the essential difference between real and operative loss of tissue. Had the loss of tissue, depicted in the photograph, been fresh and cleanly cut, the measures adopted would have given a perfect functional result. The experience thus gained led to the employment of other and better methods in the treatment of similar lesions.

Description of Methods.

The next case of a similar type was dealt with as depicted in the diagrams. In Fig. 3 is illustrated the residual deformity—an open-bite splint is in position. A musculo-cutaneous flap was reflected up from the neck and united to the freshened mucous membrane margins of the gap, the lip line being first restored from the existing mucous membrane. (Fig. 4.) The skin surface of this flap was inwards, its raw surface lay outwards and was exposed. A sliding flap A was then fashioned from the lateral aspect of the neck and rotated to occupy a new position A', its raw surface thus being contacted with that of the first pedicled flap, the redundant part of which is seen exposed

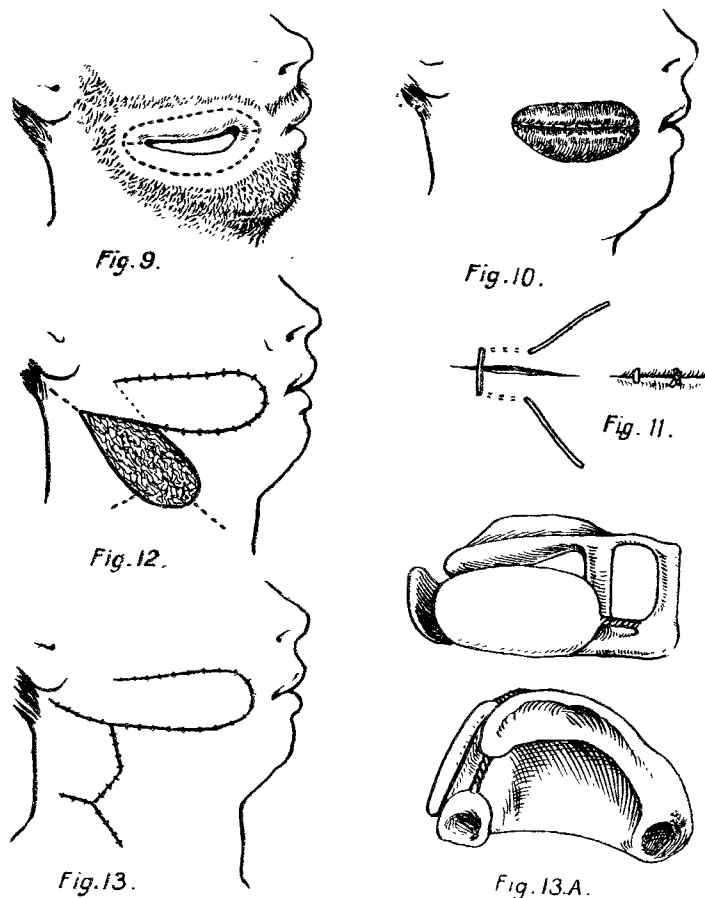
at B. (Fig. 5) A fistulous communication with the mouth necessarily existed under cover of B. This was closed at the same time as the redundant portion of the flap was turned back into the neck, the final result being shown in Fig. 6.

In another method the mucous membrane is replaced by skin obtained from the neighbourhood of the gap, the flap being hinged and pedicled on its margins. This stage is shown in Fig. 7, together with the lines of incision for a pedicled flap and extensions to render easy the closure of the raw surface left by its reflection. In Fig. 8 the pedicled transferred flap has been swung into position and the lower part of the raw surface in the neck has been closed. In the final stage the pedicle has been divided and the redundant portion turned back to fill the place whence it was taken. This patient had sustained a very severe comminuted fracture



which involved practically the whole body of the jaw. The functional result is perfect. This operation is one of two stages.

When the gap occurs farther back the operation may be completed in one sitting by utilising a transposed flap instead of a transferred flap with a free pedicle. In Fig. 9 is shown diagrammatically the condition of the patient previously referred to, after the primarily sutured wound had been



incised to allow access to the fracture. Presenting in the gap is the flange attached to the open-bite splint. (Fig. 13A.) This man was very hairy, and therefore, as a preliminary to operation, Captain Knox kindly undertook to depilate by radiations the area around the gap outlined in dots. This area was then inverted as shown in

Fig. 10, the stitch used being illustrated in Fig. 11. The raw surface thus exposed was at once covered by a superimposed transposed flap (Fig. 12) and the raw surface in the neck obliterated by undercutting aided by extended incisions. (Fig. 13.) Other cases have been treated on similar lines with equal success. It is, I believe, the first time that the depilating powers of radiations have been thus utilised by the plastic surgeon.

In some cases, however, owing to the size and situation of the gap, such methods as those described are not applicable. For these cases I have employed a doubly epithelialised flap,

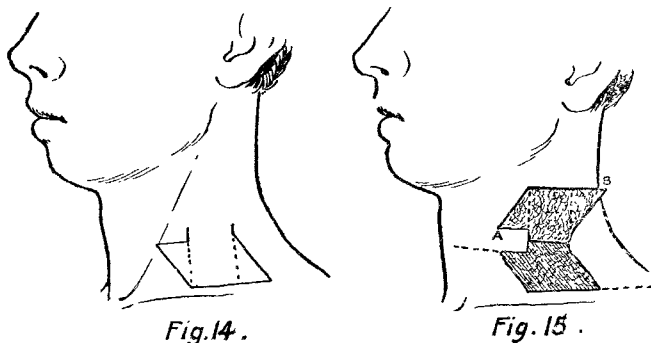


Fig. 14.

Fig. 15.

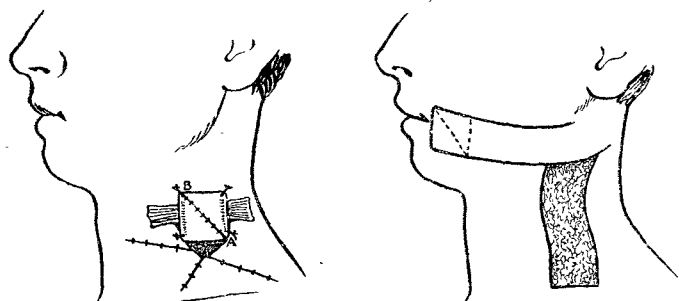


Fig. 16.

Fig. 17.

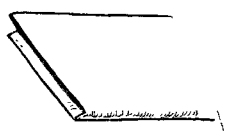


Fig. 18.

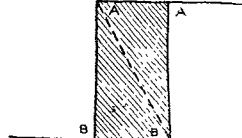


Fig. 19.

fashioned as shown in Figs. 14-18. The incisions in the neck are sketched in Fig. 14, the dotted lines indicating the ultimate area of the doubly epithelialised portion. The flap is detached and thrown upwards, as in Fig. 15, and additional incisions, shown by dotted lines, are made to facilitate obliteration of the raw surface thus left. The triangular areas lateral to the dotted lines are folded over and united to each other, the line of union being diagonal. (Fig. 16.) In this illustration the flap is shown stitched out on the skin of the neck with a small gauze pad inserted beneath it.

The closure of the raw surface is also depicted. When union of the skin on the exposed surface of the flap has taken place the pedicle is extended upwards to the necessary extent. (Fig. 17.) The free margins of the doubly

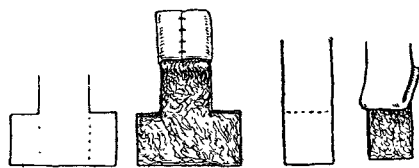


Fig. 20.

Fig. 21.

epithelialised portion of the flap are then trimmed as in Fig. 18, thus defining two skin strata with raw edges. The margins of the gap are freshened, skin and mucous membrane being separately demonstrated. The deep skin margins of the flap are then united to mucous membrane and the superficial skin margins to the skin of the face. At a later date the pedicle is cut and the redundant portion replaced in the neck. A convenient method of closing any rectangular gap in the neck is illustrated in Fig. 19. Other methods of shaping doubly epithelialised flaps are shown in Figs. 20 and 21. I have utilised them all, but prefer that depicted in Fig. 14.

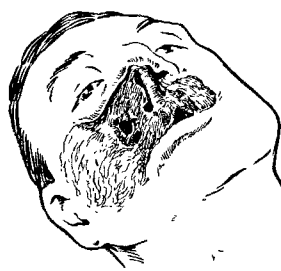


Fig. 22.

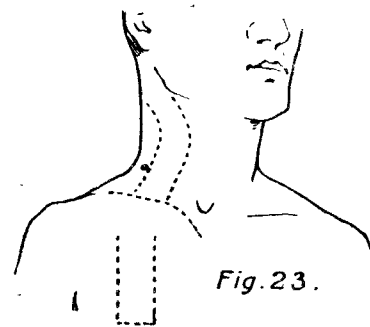


Fig. 23.

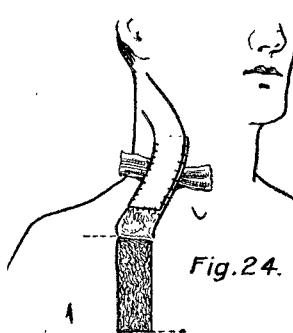


Fig. 24.

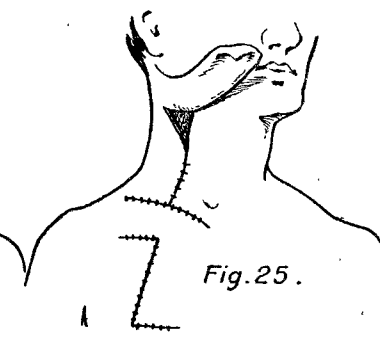


Fig. 25.

In cases associated with extensive loss of the soft parts it may be impossible conveniently to obtain sufficient tissue by utilising one pedicle. In a case of this type (Fig. 22) that came under my care two pedicled flaps were reflected and dealt with, as shown diagrammatically in Figs. 23-25. The large doubly epithelialised flap is shown in position in the photograph. The first time it was sutured it broke away owing to its weight and the small area available for attach-

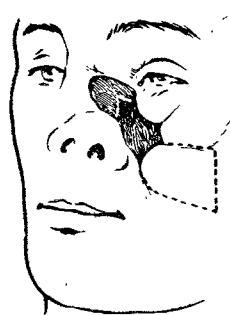


Fig. 26.

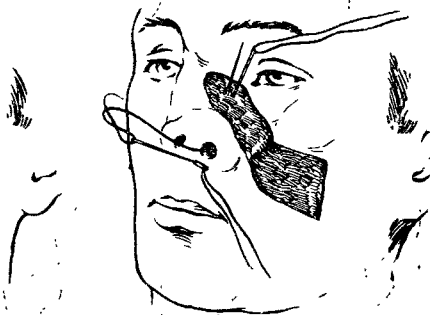


Fig. 27.

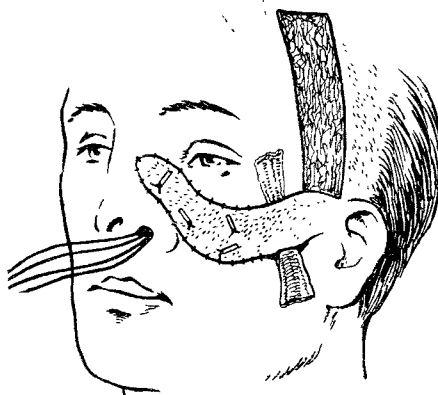


Fig. 28.

ment. It was sutured in position a second time and supported by metal arms let into a forehead frame. When transferred to my care the patient's mouth was absolutely closed owing to the restricting effect of uncontrolled scar formation. He is now functional in every respect, as is shown

in Plate 2. The final result owes its cosmetic finish to the presence of an artificial nose and moustache. The patient has refused further operative treatment, as, in his own terms, "he can do anything."

Lateral Nasal Defects.

Two cases of lateral nasal defects have been dealt with, as shown in Figs. 26-28. The nasal mucous membrane was replaced by rotating into the gap a hinged skin flap taken from the cheek. (Figs. 26 and 27.) The raw surface thus exposed was immediately covered by a pedicled scalp flap. (Fig. 28.) The two flaps, to prevent separation by fluid

exuded from the raw surfaces, were united by mattress silkworm-gut sutures. Sites were chosen on the cheek flap before this was fixed to the deep margins of the gap. A threaded needle was passed from the raw surface and out through the nasal orifice where it picked up a small piece of rubber tubing to which was attached a long piece of thread. It was then passed back through the nasal orifice and through the flap, entering this from the skin surface. (Fig. 27.) The second half of the suture was completed by passing each end through the scalp flap and tying them over a piece of drainage tube on its skin surface. (Fig. 28.) The long threads hanging from the nasal orifice served to retrieve the pieces of drainage tube lying on the deep surface of the united flaps when these mattress sutures were cut on the fourth day. Hair grew profusely on this flap, and I therefore sent him to Captain Knox for depilation, the various stages being shown in Plate 3.

It is to be noted that the gap is not filled in, but merely bridged, thus exactly reproducing the normal state. The advantages of this method, aided by depilation, are obvious. It permits a hair-bearing scalp flap to be used to occupy a hairless area of the face. The scar area of the flap is completely hidden by growth of neighbouring hair with resulting absence of disfigurement.

Summary.

Finally, may I be allowed to sum up the points that appear to me to need emphasis?

1. That the result in any given case is largely influenced by the initial treatment adopted.
2. That the whole plan of treatment should be the joint evolution of surgeon and dentist working in concert to attain a common aim.
3. That open-bite splints should invariably be used in the type of case considered.
4. That the method known as "bringing the parts together" should frankly be recognised as unsatisfactory and be abandoned.
5. That skin is an admirable substitute for mucous membrane in that its texture is suitable and its extent unlimited.
6. That radiations may render the plastic surgeon such valuable assistance that facilities for treatment by this method should be provided in the case of any jaw centre or hospital.

ENTAMOEBA HISTOLYTICA INFECTIONS:

THEIR PREVALENCE AMONG BRITISH TROOPS IN
INDIA AND MESOPOTAMIA, WITH SPECIAL
REFERENCE TO THE QUESTION
OF "CLEARING."

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THE following observations are based on the results of an inquiry based on the protozoological examination of the stools of over 2000 men, mostly of the Mesopotamian Field Force, who had been invalided for various ailments to a general hospital stationed in India. A full statistical report with tables will shortly be published in the *Journal of the Royal Army Medical Corps*. We have, however, deemed a summary of our work worthy of separate publication in view of an analysis of our findings pointing to the very marked prevalence of *histolytica* infections among troops not considered to be suffering from any intestinal affection; while certain of our observations appear to us to have an important bearing on the question of the practical value of making a series of protozoological examinations of the stools of men convalescing from amoebic dysentery for the purpose of declaring them "cleared" of their infection.

Scope and General Results of Investigation.

The records on which our observations are based have been obtained from the investigation of the faeces of men whose condition ranged from good general health to one associated with acute and chronic intestinal disturbances. All the stools examined have been those that have followed the

administration of a saline purgative. This routine has been followed because it was found that the examination of material from a constipated motion was unsatisfactory, the percentage of positive findings being considerably greater in a series of liquid or unformed specimens. All stools have been examined both in normal saline and in double Gram iodine solution, at least two specimens from each stool being microscopically examined. In our interpretation of the types of cysts we have followed the teaching of Wenyon. Practically all the *Ent. histolytica* figures are based on our cystic findings, no free form of amoeba having been accepted as *Ent. histolytica* unless it showed ingested red cells.

As regards the prevalence of *histolytica* infection in 1165 cases admitted to the dysentery wards of the hospital we have no intention of stating our findings in any detail. No statistical deductions can be made because the stools examined have come from very different types of cases, both as regards certainty of diagnosis, stage of disease, and previous treatment received, while no features of very special interest have been noted. 10.1 per cent. of these 1165 men were found to be infected with *Ent. histolytica*, and 4.9 per cent. of 3623 examinations carried out on those patients revealed the presence of *Ent. histolytica* cysts. The results of these examinations are here mentioned because they appear to us to act as a control over our differentiation and interpretation of the various types of cysts met with.

It is to be noted that our figures do not show an unusually high percentage of positives for convalescent dysenteries, and are in striking contrast to our findings in the case of men with presumably normal alimentary canals, for the results of the protozoological examination of the stools of 946 men of this latter class have brought to light certain features of considerable interest and importance. This number includes chiefly men who had been recently invalided from Mesopotamia for an affection other than an intestinal one, and who in many instances had suffered from an intestinal disturbance at some more or less remote period.

The incidence of *histolytica* infection among such cases has been especially high, while the general protozoal findings in the stools have been more numerous than the records of Wenyon¹ and of Dobell² show to exist among the troops from the Eastern Mediterranean War Area who have been invalided to England. Only a single examination of each man's faeces has been carried out. This we recognise to be quite inadequate to give any accurate idea of the prevalence of *histolytica* infection among the troops generally, but during the first month of the inquiry the percentage of positive results obtained was so high that we decided that for practical purposes a single examination would be sufficient to supply what, in our opinion, is conclusive evidence of the very large percentage of "healthy" *histolytica* carriers present among the troops who have been in Mesopotamia, and consequently of the futility of attempting to "clear" only those cases of amoebic infection which have suffered from so marked an intestinal disturbance as to result in their reporting sick, and so receiving hospital treatment.

Our results appear to us to reveal features of considerable interest on the three following aspects of the carrier problem.

(a) The incidence of *histolytica* infection among troops invalided from active service in Mesopotamia, apart from cases of acute and convalescent dysentery.

(b) The practical value of attempting to declare convalescent patients, who have suffered from amoebic dysentery, "cleared" of their infection, by the inability to detect the presence of *histolytica* cysts in the stools after a given number of protozoological examinations.

(c) A consideration of some of the factors that enter into any efficient method of "clearing" convalescent dysentery patients—that is, if it be assumed that such "clearing" is of sufficient practical value. These same factors will naturally have to be considered in tests of the therapeutic value of drugs for the "curing" of *histolytica* carriers.

Incidence of *Histolytica* Infection.

The prevalence of *histolytica* infections among the troops formed the main object of our investigation, which was begun because it was found that on examining the stools of the patients in several of the surgical wards a considerably higher percentage of these revealed the presence of *histolytica* cysts than did the cases which were being "cleared" in