On the causes and treatment of closure and immobility of the jaws / by Christopher Heath.

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CAUSES AND TREATMENT

OF

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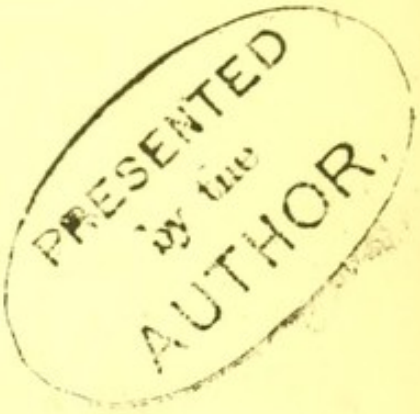
AND



IMMOBILITY OF THE JAWS.

BY

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CLOSURE AND IMMOBILITY OF THE JAWS.

Cases of permanent closure of the jaws from cicatrices within the mouth, &c., are not of very rare occurrence; but their description and treatment seem to have been very generally neglected by modern English authors. Erichsen, Pirrie, Druitt, and Skey make no mention of the affection; and Samuel Cooper, in the last edition of his *Surgical Dictionary* which he revised, merely refers to a case treated by Valentine Mott, who, in 1831, operated on a case of sloughing of the cheek, with subsequent closure of the jaws, by transplanting a piece of skin; but he enters no further into the treatment. In the *new* edition of *Cooper's Dictionary*, 1861, Vol. I. the only passage I can find, bearing on the question, is the following, under the head of "Cicatrization":—

"In the mouth, after sloughing of the cheek and gums from profuse salivation, the cicatrized surface is so rigid as scarcely to allow of the separation of the teeth, but it becomes more pliant in time." This latter statement, however, is not borne out by general experience.

Mr. Fergusson, in the last edition of his *Practical Surgery*, p. 602, says:—

"The lower jaw occasionally becomes so closely bound to the upper, that the teeth cannot be sufficiently separated to admit of solid food. This condition may arise from inflammation and

adhesion of the gums, more especially after necrosis of the alveolar processes; sometimes it is the result of chronic contraction of a muscle; occasionally it has been accompanied with anchylosis, both here and in other joints, of which there is a remarkable specimen in the possession of Mr. Dubreuil, of Montpelier, in which, however, a similar condition was not present in any other part of the same skeleton; and in certain examples it is difficult to say what is the cause. Some years ago I had a patient with the mouth thus contracted, and in whom there was a portion of the lower jaw in a state of caries; the disease was not in such a condition that I could, with propriety, attempt its entire removal. A portion of bone, however, was excised, but little benefit resulted, and what there was might probably be attributed more to the use of a screw-dilator than to the partial removal of what I considered a source of irritation. Mott has succeeded, in two instances, in relieving such permanent adstrictions; and in the first volume of *The Provincial Medical and Surgical Journal*, there is a case recorded wherein I was fortunate enough to produce a similar effect, by dividing the masseter on one side with a narrow knife, passed from the mouth between that muscle and the skin. If anchylosis be the cause of closure, it is doubtful if the surgeon would be justified in interfering. In the course of my experience I have seen many instances of the kind above referred to, but feel bound to state that most of my attempts at improvement have utterly failed."

By far the most complete account of this affection, however, is given by Dr. Samuel Gross, of Philadelphia, in his large work on surgery, from which I take the following quotation:—

"*Anchylosis or Immobility of the Jaw.*—This distressing affection, which may be produced in a variety of ways, may exist in such a degree as to render the patient entirely unable to open his mouth, or to masticate his food.

"The most common cause, according to my observation, is profuse ptyalism, followed by gangrene of the cheeks, lips and jaw, and the formation of firm, dense, unyielding, inodular tissue, by which the lower jaw is closely and tightly pressed against the upper. Such an occurrence used to be extremely frequent in our south-western states during the prevalence of the calomel practice, as it was termed, but is now, fortunately, rapidly diminishing.

"Children of a delicate, strumous constitution, worn out by the conjoint influence of mercury and scarlatina, measles, or typhoid

fever, are its most common victims; but I have also seen many cases of it in adults and elderly subjects. In the worst cases there is always extensive perforation of the cheeks, permitting a constant escape of the saliva, and inducing the most disgusting disfigurement.

"Secondly, the affection may depend upon anchylosis of the temporo-maxillary joints, in consequence of injury, as a severe sprain or concussion, or arthritic inflammation, leading to a deposition of plastic matter, and the conversion of this substance into cellulo-fibrous, cartilaginous, or osseous tissue. I have met with quite a number of such cases, several in very young subjects.

"Thirdly, the immobility is occasioned by a kind of osseous bridge, extending from the lower to the upper jaw, or from the lower jaw to the temporal bone; such an occurrence, however, is not common, and is chiefly met with in persons who have suffered from chronic articular arthritis.

"Finally, immobility of the jaw may be caused by the pressure of a neighbouring tumour, especially if it occupies the parotid region, so as to make a direct impression upon the temporo-maxillary joint.

"However induced, the effect is not only inconvenient, seriously interfering with mastication and articulation, but it is often followed, especially if it occur early in life, by a stunted development of the jaw, exhibiting itself in marked shortening of the chin and in an oblique direction of the front teeth.

"When complicated with perforation of the cheek and destruction of the lips, the patient has little or no control over his saliva, and is so terribly deformed as to render him an object, at once, of the deepest disgust and the warmest sympathy.

"The treatment of this affection must depend upon the nature and situation of the exciting cause. When the difficulty is in the joint, occasioned by the formation of cellulo-fibrous adhesions, the only thing that can be done is to break up the adhesions, upon the same principle as in anchylosis of any other joints. For that purpose—the patient being thoroughly under the influence of chloroform—the jaw is forcibly depressed, either by a wedge made of cedar-wood or by an instrument constructed on the lever-and-screw principle, and figured by Scultetus in his *Armamentarium Chirurgicum*.

"When the immobility depends upon the presence of inodular tissue, the proper remedy is excision of the offending substance, an operation which is both tedious, painful, and bloody, and unfortunately, not often followed by any but the most transient relief,

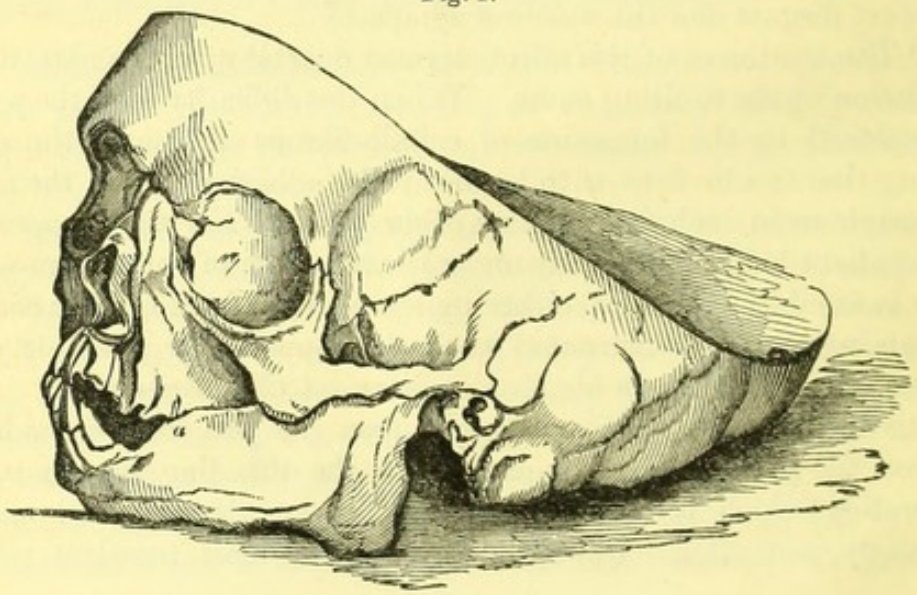
owing to the tendency in the parts to reproduce the adhesions, however carefully and thoroughly they may have been removed. There is the same remarkable disposition in these cases to the contraction and regeneration of the inodular tissue as in the case of burns and scalds.

"During my residence in Kentucky I had a large share of such cases; and, although I never failed to make the most thorough work—not unfrequently repeating the operation several times, at intervals of a few months—it is my duty to state, that few of them were permanently relieved. After the excision is effected the patient must make constant use of the wedge, wearing it for months and years so as to counteract the tendency to re-closure.

"Immobility of the jaw, caused by the formation of an osseous bridge, might possibly be remedied by the removal of the adventitious substance by means of the saw and pliers. The great difficulty, however, in such an event, is the obscurity of the diagnosis."

Omitting any further allusion to the second variety of anchylosis here referred to by Dr. Gross, viz., anchylosis of the temporo-maxillary articulation (of which there is a very perfect specimen in the Museum of Guy's Hospital, No. 1070), I will pass to the rigidity caused by cicatrix, or by a bridge of bone, good examples of both of which affections have lately been under treatment at the Westminster Hospital—one by Mr. Barnard Holt, and two by myself. And I am also enabled, by the kindness of Mr. J. G. French, to refer to an excellent example of anchylosis produced by a bridge of bone (Fig. 1.) which occurred

Fig. 1.



under that gentleman's care, at the St. James's Infirmary, and which he reported in the *Medical Gazette* (July 4th, 1845). The patient was 22 at the time of his death, and the closure of the jaws dated from infancy; and he was fed through an aperture made by the removal of the incisors on the left side. At the age of 14 an operation for his benefit had been undertaken by an eminent surgeon, and incisions in the mouth had been made with this object, but without any good result. On *post mortem* examination, the jaws were perfectly united on the left side, and only the smallest degree of motion was possible on the right; the soft parts were removed, and the base of the skull was macerated, when anchylosis was discovered to exist between the lower and upper jaw on the left side, the ramus of the inferior maxilla immediately internal to the mental foramen extending upwards by a broad thin plate, and uniting with a corresponding plate of the superior maxilla—a cartilaginous material forming the bond of union. The articulation of the jaws was normal.

Before giving the details of the more recent cases, however, I must refer to an essay by Dr. Frederic Esmarch, Professor of Surgery in the University of Kiel, on *The Treatment of Closure of the Jaws from Cicatrices*,[a] in which he investigates the pathology of the affection, and describes an operation for its relief, by the formation of an artificial joint in the lower jaw—an operation which gave most satisfactory results in one of the cases under my own treatment.

Professor Esmarch says:—

"Injuries to the mucous membrane of the cheek damage the mobility of the lower jaw in a greater or less degree by their cicatrization, as is well known.

"The cause of this anchylosis of the lower jaw is often thought to be a growing together of the inner surface of the cheek with the bones or gums; this is not a correct view, however, and has, in many cases, led to improper treatment. In order to clear up this error it is necessary to examine the conditions which, in health, make movements of the lower jaw within the mouth possible. The cavity of the mouth is divided by the alveoli and teeth into an inner and outer space; the latter is closed in front by the cheeks and lips, which form an elastic dilatable sac; within this the rows of teeth

[a] Die Behandlung der narbigen Kieferklemme durch Bildung eines künstlichen Gelenkes um Unterkiefer. Kiel, 1860.

can be separated from each other, even with the lips shut, and much farther when the mouth is opened. The inner surface of this sac is covered by a mucous membrane which is also very dilatable and elastic, and which forms a duplicature at the upper and lower boundaries of the outer cavity of the mouth, where it is reflected on to the outer surface of the bone, and ends on the edges of the alveolus as gum. This membrane is so elastic that when the mouth is open to its widest extent it is still by no means put on the stretch; whilst, when the mouth is closed, it presents no folds.

"It is clear that as soon as this dilatable sac shrinks together, loses its elasticity, or is replaced by a rigid substance, the mobility of the jaw must either be injured or entirely cease. This happens most frequently through the formation of cicatrices which follow ulceration or sloughing of the mucous membrane of the mouth, as from mercurial stomatitis or noma.

"The occurrence of what we call secondary cicatrix atrophy, or cicatrix contraction, is sufficiently well known. As soon as the cure commences, the movable parts of the neighbourhood, so far as they can be, are drawn by the shrinking of the newly-formed tissue towards the cicatrizing spot; slowly, it is true, but with almost irresistable power.

"If there are no parts in the neighbourhood which can be drawn together to repair the loss of substance, there necessarily follows a cicatrization of the surface; but the cicatrix remains thin, tender, and stretched to a great extent for some time at least after its formation; it is only after it has existed for a long time that it assumes a more ductile condition, so as to become something more like the natural skin or mucous membrane.

"If, therefore, the mucous membrane of the cheek be completely destroyed from one alveolus to the other, on both, or merely on one side, the resulting cicatrix must necessarily tend to press the jaws more and more closely against one another, the depressor muscles of the lower jaw being quite incapable, as experience has shown, of preventing the contraction of the cicatrix. When cicatrization is complete the elastic ductile mucous sac of the cheek is found to have disappeared, and instead of it the cicatrix tissue stretches so tightly from one alveolar edge to the other that it is scarcely possible to put the finger between it and the rows of teeth; and the teeth themselves can be separated only a little, if at all, or only shifted from side to side very slightly

"Just the same immobility of the lower jaw follows cicatrization after sloughing involving the whole thickness of the cheek, although here the opening of the mouth is widened as far as the anterior edge of the masseter muscle, or still farther; and in this case, too, the cheek sac is entirely destroyed. In these cases it is the *quasi* lip or posterior margin of the gap which stretches tightly from one jaw to the other. If, in such cases, one is successful in covering the loss of substance by dividing the skin or by transplantation of a flap, the cicatrization of the inner surface of the flap (being uncovered by mucous membrane) necessarily has the effect of increasing the immobility of the lower jaw.

"As far as is known there are few or no means available to check the shrinking of cicatrices. It is one of Diffenbach's great services to surgery that he gave this theory its full value; it was he who first taught us to place a proper value upon this action of nature, and showed how to make it available for operative procedures under certain circumstances. Thus, he first taught how to cure the closure of the mouth by covering the margin with mucous membrane; to form eyelids which do not adhere to the globe or roll inwards after cicatrization; and many other methods which we now consider self-evident in plastic surgery.

"Also, for the treatment of the worst cases of cicatrized contracted jaw, Diffenbach has given the most rational advice when he suggests, after the separation of the cicatrix from the bones, to lay over the surface of the wound a sound flap of mucous membrane. Unfortunately, in most cases, this cannot be done, because, just in the neighbourhood of the cicatrix it is impossible to find more healthy mucous membrane. Instead of the mucous membrane one can undoubtedly do as Jaesche did (*Med. Zeitung Russlands*, 27, 1858), viz., make use of a flap of skin for a lining; still it is difficult in many cases to get such a flap from the immediate neighbourhood. I would not hesitate, however, in desperate cases—as, for instance, where there is a great deficiency on both sides, to take a flap from the skin of the arm.

"All the hitherto received methods, such as the freeing or cutting through of the cicatrix from the mouth—the separation of the whole cheek, in order to accomplish this perfectly—the extirpation of the mass of cicatrix—the application of mechanical apparatus, in order to drag the jaws asunder by degrees, &c., &c., can only be of avail in those cases where, in some angle or other, there is found a remnant of mucous membrane. If one succeeds, after separation of the

cicatrix, in preventing, by the application of mechanical means, for a long time, the cicatrization in the undesirable direction, the contraction will take place in another direction, and by degrees will drag the remnant of mucous membrane up to the skin. In every case it takes years before such methods can be properly estimated; for, as far as is known, the secondary shrinking of a cicatrix takes place very late, even after complete or sufficient healing over has occurred. Putting aside the more favourable cases, there still remain a number of patients of this kind, in whom the usual methods produce no lasting cure, just because there is no more old mucous membrane left; and for these cases I recommend the formation of an artificial joint in *front* of the contraction, in order to give, at least, the other half of the jaw some, although a limited motion, and so to lessen considerably the sufferings of those unfortunate patients.

"The formation of an artificial joint in the ramus of the jaw has already been recommended and tried by Diffenbach (*Operative Chirurgie*, I., 435), but *behind* the contraction, and naturally without any good result, since the impediment to motion lies more forward, and thus is not removed. Von Brüns has also operated in this manner without success."

This proposal of Professor Esmarch's to form a false joint in front of the cicatrix was suggested to him by a case which came under his care in 1854, in which considerable destruction of the cheek and contraction of the cicatrix had occurred, together with immobility of the lower jaw and necrosis of a portion of it. The necrosed portion was fortunately in front of the cicatrix. The bone having been removed, it was found that mobility was restored, and a useful amount of movement obtained. Professor Esmarch thereupon suggested, at the Congress at Göttingen, in 1855, the removal of a piece of bone in cases of contracted cicatrix; but did not happen to meet with a case suitable for the operation until after it had been successfully performed by Dr. Wilms, of Berlin, in 1858, shortly after which he himself operated upon a case at Kiel, and with the best results. The operation was subsequently performed by Dittl, of Vienna (*Oest. Zeitschrift für praktike Heilkunde. Vienna*, 1859. Vol. V., p. 43), and by Wagner, of Königsberg (*Annali di Medecina di Koenigsberg*, 1859, Vol. II., p. 100).

Shortly after this proposal of Esmarch's, it would appear that Professor Rizzoli, of Bologna, quite independently conceived a

somewhat similar idea, but modified the proceeding by merely cutting through the jaw, without removing any portion of bone. He operated in this way first in 1857, and subsequently had three other successful cases. In Rizzoli's cases no external incision appears to have been made, but the section was accomplished from the mouth with powerful forceps. This proceeding has been followed by Professor Esterle, from whose essay in the *Annali Universali di Medicina* (*Omodei*, Vol. CLXXVI.) I have extracted these particulars.

Esmarch's operation appears to me to possess a decided advantage over that of Rizzoli, in the fact that a piece of bone is removed, by which the formation of a false joint is facilitated, as we know by experience in cases of resection of the elbow, &c.; and the external incision can never be a matter of any importance, whilst it admits of the application of the saw, and so avoids risk of splintering the bone.

Mr. Mitchell Henry was, I believe, the first surgeon to put Esmarch's operation into practice in this country, he having performed it a few weeks before myself. The patient was a female, on whom a variety of operations had been performed, and, among others, division of the masseter, and whom I had had under my own care at the St. George's and St. James's Dispensary, two years before, when I divided the cicatrices freely and screwed the mouth open, but without permanent benefit. Mr. Henry employed the chain saw, and removed about half-an-inch of bone. The patient, unfortunately, sank a few days afterwards, apparently from pyemia and exhaustion. In my own case I used an ordinary Hey's saw, in preference to the chain, and was enabled to remove sufficient bone to give free movement, through a small incision along the edge of the jaw. I quote the details of the case from my hospital case-book:—

Barton B., aged 15, admitted, July 1st, 1862, into Luke ward of the Westminster Hospital, with closure of the jaws. In the winter of 1855, the boy, whilst living in Cosham, Hants, suffered from extensive necrosis of the upper and lower jaws; but whether the direct result of a blow, or the consequence of fever, is doubtful. He came under the notice of Mr. Martin, of Portsmouth, in the beginning of 1856; and that gentleman removed several pieces of bone, including the first permanent molar and undeveloped bicuspids of the upper, and two temporary molars of the lower jaws of the

right side, besides several smaller pieces. Contraction of the cicatrices within the mouth supervened, and he was unable to unclose the jaws. In this state he was sent up to Mr. Fergusson, at King's College Hospital, in July, 1856, and that gentleman divided the cicatrices within the cheek, and screwed the mouth open, but without permanent benefit; for, in a fortnight, his condition was nearly as bad as before, and he has, for the last six years, imbibed the whole of his nourishment between his teeth, or by putting soft food through an aperture between two teeth on the right side.

On admission, the mouth was firmly closed, the upper teeth overlapping those of the lower jaw. There was a cicatrix at the right angle of the mouth, and a dense band could be felt within the mouth on the same side. The boy was feeble, and complained of not being able to fill his stomach with food.

Fig. 2.

Fig. 2 shows his condition at this time, when it was only by drawing the lip down with the finger that the teeth could be brought into view, the lower incisors being partially hidden by the upper, which were closed firmly upon them. On the 8th of July, the boy having been placed under the influence of chloroform, Mr. Heath made an incision, two inches long, at the lower margin of the jaw, on the right side, in front of the masseter. The facial artery was divided, and a ligature at once applied; after which the

tissues were dissected up, and the jaw exposed. The cicatrix of the lip having been divided, so as to give more room, a narrow saw, with a movable back, was passed through the first incision, and up under the cheek, and a cut made in front of the rigid band of cicatrix and molar teeth. Mr. Heath soon found that he was cutting against a tooth imbedded in the jaw, and therefore at once removed it with the elevator, after which the section was rapidly completed. The mouth was now opened, and it was found that the jaw, in front of the section, was devoid of teeth for half an inch; the saw was therefore applied again, immediately behind the canine tooth, and a wedge-shaped piece of bone removed.

The hemorrhage from the dental artery was free for a moment; but was arrested by pressure with the finger. The piece of bone included the entire thickness of the jaw, and measured rather more than a quarter of an inch along the upper, and half an inch along the lower border. It contained the mental foramen, and the end of the fifth nerve. The wound was plugged with lint, a bandage applied, and the patient carried to bed. In the evening there was a little hemorrhage, which was controlled by removing the plug of lint, and replacing it with a dry piece. The boy was comfortable, and able to take fluid nourishment. He was ordered 12 ounces of wine, and a morphia draught at night.

July 9th.—Has had a good night. The face and jaw are tender and a little swollen. The plug of lint was removed from the mouth, as it produced pain.

10th.—Wound healthy. Ordered myrrh lotion to wash out the mouth with.

14th.—Takes bread, arrowroot and beef tea. Is able to masticate readily. Ordered middle diet and extra bread. Can open the mouth to the extent of about an inch. The wound is granulating healthily, and the ligature has come away.

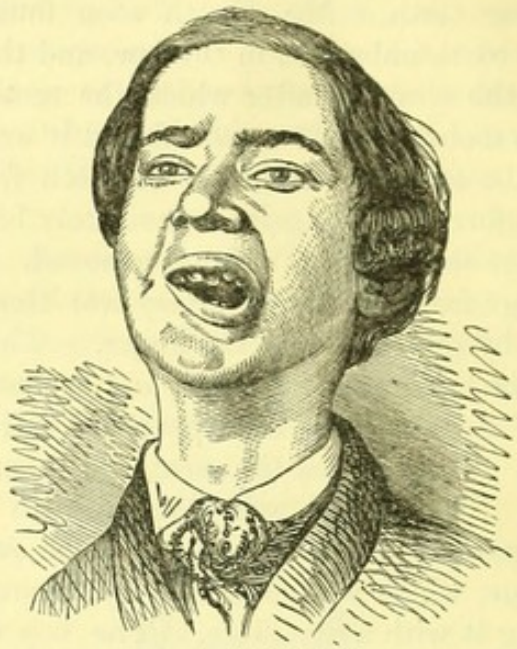
17th.—Ordered hard biscuit to eat, in order to exercise his jaw, and keep his teeth in order.

24th.—State of mouth very satisfactory; he is able to open it to the extent of nearly an inch, though the movement is necessarily one-sided. The first molar tooth of the right side was seen growing into the mouth; it was, therefore, extracted by Mr. Clendon. Wound of face granulating.

August 7th.—Discharged, to go to Walton for a month. The movement of the jaw is most satisfactory. Wound healthy, but not yet healed. Health much improved.

September 2nd.—Returned from Walton quite stout, and able to open his mouth most satisfactorily. When open to its extreme limit (Fig. 3), the distance between the molar teeth is seven-eighths,

Fig. 3.



between the central incisors three-eighths, and between the left lateral incisors, five-eighths of an inch; the small distance between the incisors being partly due to the one-sidedness of the movement, and partly to irregularity of the teeth. The amount of lateral movement is more than might have been anticipated, and the new joint gives no inconvenience. The amount of anesthesia, consequent upon the division of the nerve, is very small, only extending close around the incision, where he has an occasional numbing pain.

The boy has continued in the most satisfactory condition up to the present time, and there would appear now to be no further possible danger of contraction, since the parts where the joint was formed were healthy, and the diseased contractions have in no way been interfered with. That a false joint in the jaw is not a matter of any considerable inconvenience is proved by a case which has lately been under my care, viz., a soldier who was struck, two years ago, on the right angle of the jaw by a bullet, which fractured it, and gave rise to necrosis. The man continued in the army until a few months back, and was able to take his proper food without difficulty, although a false joint had formed at the seat of injury.

The second case of closure of the jaws, to which I have alluded, came under my colleague Mr. Barnard Holt's care, within a few

days of the admission of my own; and that gentleman, after witnessing the results of Esmarch's operation in the former case, adopted the plan proposed, and successfully carried out, by Mr. Clendon, dental surgeon to the Westminster Hospital, in a case under the care of the late Mr. Benjamin Phillips, and also in another in his own practice, viz., to divide the cicatrices freely within the mouth, separating the cheek freely from the jaws, and then employ mechanical means to prevent the reformation of the contractions.

The details of the case, and its treatment, will be best learnt from the following notes of the case; but I may say at once, that the results attained far exceeded my expectations, and that both Mr. Holt and Mr. Clendon may be congratulated on the exceedingly favourable result produced.

The only drawback to this mode of treatment, and one with regard to which it contrasts unfavourably with Esmarch's proceeding, is the amount of pain which the patient must, of necessity, undergo during the after-treatment. It requires no small amount of courage on the part of the patient, and some determination on the part of the attendant, to carry out the necessary manipulations within the mouth, more particularly during the first few days after the operation; and even after the shields are fitted to the mouth, they cause some pain and inconvenience, which only those who have arrived at years of discretion will submit to. The following notes of the case were kindly placed at my disposal by Mr. Holt:—

Frances H., aged 17, was admitted into the Westminster Hospital, under the care of Mr. Holt, 3rd of July, 1862, suffering from closure of the jaws.

In 1857 the patient had fever, attended with an abscess in the cheek on the right side, which led to such contraction and adhesion of the mucous membrane to the jaw as to cause great difficulty in opening the mouth. This difficulty continued to increase; and attempts were made, by direction of the surgeon under whose care she was, to force open the mouth with a spoon, frequently used, but to no purpose. Early in March, 1859, she had scarlet fever, very slightly; and in August, 1859, she was sent to the Kent and Canterbury Hospital, where several of her teeth were extracted, and an iron screw was used to force open the mouth, but without permanent benefit. On the 29th November, 1860, she was admitted into the Westminster Hospital, when Mr. Holt divided the bands of cicatrix within the cheek freely, and, by careful

dressing she obtained some power over the jaw, and was discharged in January, 1861.

On the 3rd July, 1862, she was again admitted into the Westminster Hospital, in the following condition:—

The mouth is contracted on the right side, but not sufficiently to prevent the lips from opening to expose the front teeth. The jaws are firmly closed, the upper incisors overlapping the lower in the ordinary way, leaving a space of one-sixteenth of an inch between them, through which food is introduced. The right cheek is very dense and rigid, and there is a considerable depression in it. The finger cannot be introduced beyond the canine teeth, owing to the firm adhesions of the cheek to the gums, while on the left side the mucous membrane of the cheek is free and healthy. The patient's general health is good, as she takes sufficient food, although slowly.

Operation, 23rd July, 1862.—The patient having been placed under chloroform, Mr. Holt divided the cicatrices freely within the mouth, separating the cheek from the upper and lower jaws, until the fingers reached well back to the ramus of the jaw. When this had been effected the jaw still remained fixed, and it was found that the teeth of the lower jaw, from the bicuspids backwards, had been thrust inwards, and that from the outer margin of the alveolus in this region, a firm plate of bone extended to the alveolus of the upper jaw, and effectually prevented any movement. With a narrow saw introduced into the mouth Mr. Holt succeeded in dividing this, and the mouth could then be opened; after which the remains of the ridge were removed with the bone forceps. The cheek was stuffed with oiled lint, to prevent the recurrence of the adhesions, and the patient was put to bed.

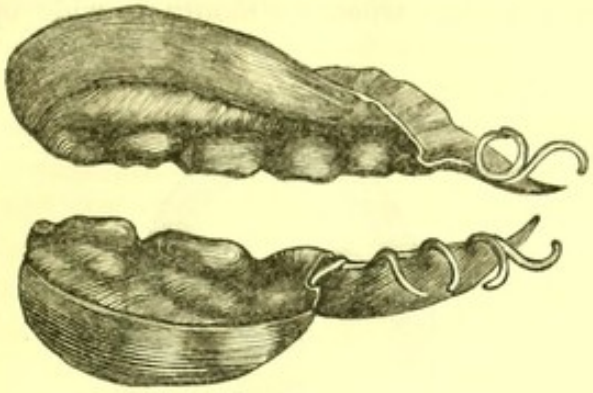
25th July.—There was considerable swelling of the face; the lint was removed, and the finger passed freely in every direction, after which the lint was replaced.

28th July.—The swelling of the face having somewhat subsided, Mr. Clendon took wax and gutta percha impressions of the mouth, under chloroform, in order to form the shields to be attached to the teeth, and inserted between the cheek and gums.

30th July.—The shields (Fig. 4) were fitted. They consist of a horizontal portion, fitting upon the molar teeth, and fastened with bands to the canine and incisor teeth, and a vertical portion which passes by the side of the alveolus to the bottom of the sulcus between it and the cheek. The edge of this is quite thin, and

serves to cut a groove in the adhesions, which are already beginning to fill up the space.

Fig. 4.



7th August.—The shields keep thoroughly in their places; but as the cheek is still raw, wet lint is inserted between the gums and the lining of the cheek, and the finger is daily passed freely beneath the cheek, to the full extent of the teeth. Two wedges of wood were fitted to the mouth, one on each side, so as to maintain the constant separation of the jaws.

15th August.—Condition of the mouth is every way satisfactory; the gums and cheek are beginning to be covered with mucous membrane, and the discharge is slight. A band in the middle of the cheek having become rather tense and prominent was freely cauterized with nitrate of silver.

1st September.—The shields and wedges are worn without any discomfort, and the girl can open her mouth most satisfactorily. The shields effectually prevent adhesions forming between the gum and the cheek.

From this time the patient's progress was uninterrupted; she recovered perfect use of her jaw and mouth, and all tendency to recontraction seemed to have disappeared; she was kept under observation at the hospital many weeks longer than was absolutely necessary for the further carrying out of the treatment, with the view of testing the permanence of the cure; and was finally sent to the country 1st November, 1862, with the shields still in the mouth, and still wearing one of the wedges, which she had become quite accustomed to.

She returned to the hospital for a few days, in December, that the progress might be noted, and the accompanying portrait (Fig. 5, from a photograph) was then taken, for the sake of comparison with that showing the result of Esmarch's operation. The shields

were removed for five days, in order to be sketched, and no apparent change resulted from their non-use; but, for safety's sake, she is to continue wearing them for the present. The distance between the incisor teeth, when the mouth is wide open, is three-quarters of an inch.

Fig. 5.

The effect of the use of the shields seems to have been, not merely to prevent adhesions between the inside of the cheek and the alveolus, but to re-establish, to a great extent, the sulcus of mucous membrane at the base of the alveolus, upon which so much stress is laid by Professor Esmarch. Surgical experience in cases of ruptured perineum, &c., shows how soon mucous membrane is reproduced where it has once existed, or even appears on adjacent parts when its presence gives rise to inconvenience; and there can be no question, that in this case the mucous lining of the cheek has been reproduced to a great extent, and particularly near the lower alveolus. Esmarch's theory, that there must be some portion of old mucous membrane remaining which afterwards becomes stretched is certainly untenable as regards this case at least, for, without doubt, the whole lining of the cheek and the outside of the alveoli were perfectly raw, owing to the division of the firm cicatrices.

The cause of non-success in former attempts at mechanical appliances is to be found, I think, in the fact that they have all been directed simply to keeping the jaws apart, without any reference to the re-establishment of the mucous lining of the cheek, upon which, as Professor Esmarch says, the movements of the jaw

so much depend. That the success in this case depended upon this fact is proved, I think, by the existence of a firm band in the cheek which would effectually control all movement were its extremities attached to the two alveoli; but as it is, it gives no inconvenience, and will, in all probability, atrophy in the course of time.

Since the above was written I have had another case under my care, of even a more serious character than either of the preceding, owing to the fact that contractions of a most severe nature existed on *both* sides of the jaw, reaching to the angles of the mouth, which was contracted and firmly bound down to the alveoli in consequence. In this case Esmarch's proceeding was manifestly inadmissible, for a section of the jaw must, of necessity, have been made in two places to be of any benefit, and the resulting central portion of bone would have been entirely uncontrolled by the muscles of mastication. I, therefore, in December, divided freely all the cicatrix tissue on both sides of the mouth, severing, as far as possible, all connexions between the inside of the cheek and the alveoli, and opened the mouth sufficiently to convince myself that no bone had been developed between the jaws.

Mr. Clendon subsequently adapted two entire shields to the alveoli, which were modified, from time to time, as the case advanced; and the results obtained, to the present date, are most satisfactory, as will be seen by the following detailed history of the case from my hospital case-book:—

Isabella M'N., aged 18, admitted into Arden Ward, 15th Dec., 1862, under Mr. Heath, with closure of the jaws and mouth from cicatrices.

History.—When five years old she had measles (?), and is supposed to have taken mercury; and, a few months after, it was noticed that the cheek was contracting, so that when six years old the jaws were firmly closed. When about seven, she was admitted into the Dundee Infirmary, and some operation was performed, by which she was benefited for a short time, but the jaws were soon as firmly closed as before. When about 11 years old, she was admitted into the London Hospital, under Mr. Luke, who divided the cicatrices, and opened the jaws with a screw. She was in the hospital three months, and was slightly benefited for a time. Eighteen months after she was again admitted, and the same operation was repeated, oiled lint being introduced beneath the

cheeks, and wedges inserted between the teeth to keep them apart. The parents took considerable pains to keep the wedges in, and to make her move her jaws; but the contractions soon recurred, and for the last two years and a-half the jaws have been firmly closed.

Present condition.—The mouth is smaller than usual, owing to contractions at the angles, but she can show the incisor teeth, and the upper ones are seen to be firmly closed over the lower. The cheeks are firmly bound down to the alveoli from the angles of the mouth, and there is no power of separating the jaws at all; but she can move the lower jaw a little from side to side. She introduces her food through an aperture on the right side of the incisor teeth, where a tooth has been lost. She is plump and well nourished, but has not menstruated for five months.

Operation.—Dec. 16th.—The patient, having been put under chloroform, Mr. Heath proceeded to dissect up the cheek from the alveoli, by passing a knife from the mouth. The bands of cicatrix were exceedingly firm, and were found to pass not only between the gum and the cheek, but between the gums themselves; and these required free division before the mouth could be opened at all, and then only by the help of a screw. During the operation a small wedge of wood was extracted from between the teeth, where it had been for some months. Oiled lint was carefully stuffed between the alveoli and the cheek, and the patient put to bed, and given twenty minims of tincture of opium.

Dec. 18th.—The pledgets of oiled lint were removed, and the mouth well washed out. She can open the mouth for a short distance, but the movements are necessarily painful. Lint, soaked in myrrh lotion, was placed inside the cheek.

Dec. 20th.—Chloroform having been again administered, Mr. Clendon attempted to take models of the mouth, but found that the aperture was so small, and the space between the teeth so contracted, that it was almost impossible to obtain a satisfactory mould. The teeth appear to have been only partially developed, with the exception of the incisors, which also are so loose as to offer little support to a shield.

Dec. 22nd.—Mr. Clendon took moulds of gutta percha of the outer surface of the jaws, as some guide for the formation of temporary shields.

Dec. 25th.—The house surgeon was called up last night to the patient, who was bleeding freely from the left side of the mouth. He plugged the cheek with fresh lint, which arrested the hemorrhage. A second hemorrhage occurred in the afternoon, and the blood

came from quite the back of the mouth, between the cheek and alveolus, on the left side. Mr. Beadles (H. S.), finding that a coagulum had formed, which had stopped the hemorrhage, left it undisturbed.

Dec. 26th.—Mr. Heath saw the patient, who was rather reduced by the bleedings, but thought it better not to disturb the clots for another day. Ordered eight ounces of wine and beef tea.

Dec. 27th.—A severe arterial hemorrhage occurred this morning, and was arrested by clearing out all clots, and syringing the mouth with cold water. Twelve ounces of wine, beef tea, eggs.

Dec. 29th.—No more hemorrhage has occurred, but the patient has become somewhat anæmic. Mr. Heath thought it would be safer to postpone any further interference with the case for a week, so as to allow her to recover fully from the loss of blood. The mouth to be simply syringed out with warm water and myrrh lotion.

5th Jan., 1863.—The patient having been put under the influence of chloroform, Mr. Heath carried his finger freely between the cheeks and the alveoli, breaking down the soft adhesions which had begun to form. Mr. Clendon then removed some stumps of teeth and all the incisor teeth (except one of the upper centrals), which were loose; and then succeeded in taking more satisfactory moulds of gutta percha, from which the shields might be made.

7th Jan.—Under chloroform, silver shields were fitted upon the alveoli, the edges of which passed between the alveolus and cheek. Blocks of gutta percha were wedged between them, to keep the jaws apart.

10th Jan.—Fresh shields, with deeper sides, were inserted, under chloroform. The remaining incisor tooth came away, and several stumps were removed.

14th Jan.—Bone wedges were fastened on to the shields to keep the jaws apart, and to permit of greater cleanliness than was possible with the gutta percha. To use a lotion of chlorinated soda frequently.

21st Jan.—Under chloroform, Mr. Heath made a thorough examination of the mouth, and found everything in a satisfactory condition so far. The sulcus on each side of the mouth has considerably increased in depth, and the finger can be carried between the gum and cheek, as far back as the wisdom teeth, on each side. The mouth is kept well open by the bone wedges, and the absence of incisor teeth gives plenty of room for the introduction of food. Mr. Clendon extracted several stumps, and then took fresh moulds

of the mouth. The old shields and bone blocks were then re-inserted.

28th Jan.—Under chloroform, the shields were removed, and having been relined with soft gutta percha, were replaced. The mouth opens very satisfactorily, and the soreness is diminishing.

4th Feb.—Under chloroform, fresh shields, with deeper edges, were introduced, which kept the mouth widely open.

12th Feb.—Some little swelling about the right eye has come on during the last day or two, but is gradually subsiding under fomentations.

28th Feb.—The patient is able to move the jaw to a slight extent, even with the shields in the mouth, and the case seems to be going on satisfactorily.

28th Feb.—The shields were removed, under chloroform, having been *in situ* three weeks, and were lined with some fresh gutta percha, so as to fit more accurately to the alveoli. The mouth has increased in size, and the sulci on each side of the alveoli are much deepened.

11th March.—The shields were removed, under chloroform, and the bone blocks cut off, their places being supplied by movable wedges of hard gutta percha, so as to permit the patient's removing them when eating, and thus to exercise the jaws. The granulations in each cheek were touched with nitrate of silver.

25th March.—Under chloroform, the adhesions between the lips and the alveoli were divided by Mr. Heath, and fresh silver shields were then fitted, the edges of which were purposely made deeper in front, so as to free the lips from subsequent contractions.

On the 2nd April I took a careful measurement of the extent to which the jaws could be separated, and found that there was a distance of exactly one inch between the metal shields, in the situation of the incisor teeth. As the shields have some gutta percha beneath them, and do not, therefore, fit closely upon the gums, it will not be necessary to allow much more than a quarter of an inch for the absent teeth, making the present aperture considerably over half an inch, if the teeth were *in situ*. This must be allowed to be a very satisfactory result so far; and the distance will probably be increased, as the patient has been supplied with beech-wood wedges, which she introduces and wears, between her meals. When the mouth is widely opened the lining of the cheeks can be seen between the shields, and it is already assuming something of the appearance of mucous membrane. The mobility of the lips, and hence the size of the mouth, have increased considerably since the last operation;

and, as far as I can see, this case promises to be as successful as the preceding one.

It has thus been shown that cases of closure of the jaws by cicatrices are amenable to two modes of treatment, and with most satisfactory results; and having had personal experience in carrying out both methods, I shall venture to draw a brief comparison between them.

Esmarch's operation is a comparatively easy proceeding; and, in cases where only *one* side of the jaw is affected, restores the patient a very useful, though one-sided, amount of masticatory power in two or three weeks, and with very little suffering or annoyance. One side of the jaw is, however, rendered permanently useless (its previous condition), and there is a necessarily resulting deformity which is not, however, of a very distressing character. The paralysis, from the division of the nerve, is so slight as not to be worthy of mention.

The treatment by internal division, and the use of metal shields is applicable to *all* cases, and can, with due care and attention, be made to yield most satisfactory results—the patient enjoying the full use of both sides of the jaw, and having no deformity nor loss of sensation. On the other hand the operation itself is difficult and bloody, and the after-treatment is tedious and troublesome; and it is essential for success to have the coöperation of a dental practitioner, fully conversant with the frequent modifications which the metal shields must necessarily undergo. The age of the patient is an important element also, since it would be impossible, I imagine, to carry out the treatment with any hope of success, unless the patient were of an age to assist, or at least not to resist, the surgeon. In my own case chloroform was resorted to on every occasion of real operative interference, but the intermediate treatment was much hindered by the timid character of the patient.

In conclusion I would suggest the propriety and feasibility of attempting to *prevent* the formation of these serious contractions by the introduction of metallic shields, of the character I have described, in cases of "cancrum oris," &c. Unfortunately these destructive disorders occur, for the most part, among children of tender years, in whom it might be dangerous to keep up constant irritation by the presence of a foreign body in the mouth; still, at three or four years of age, it would be quite worth while to try the effect of metal shields carefully and securely fastened in *before* the contraction of the cicatrices had taken place, the appliances being changed under chloroform as often as might be necessary.