

In connection with Mr. Dicken's apparatus attention is directed to Trouvè's polyscope, an instrument differing nothing at all in principle from the former but not comparable with it in adaptability to oral requirements, the light in the latter being exposed in a porcelain saucer. An illuminator of similar signification is a design by Mr. Margetson, a surgeon of Dewsbury, England. This gentleman uses carbon filaments varying in size from one by half an inch to one-eighth by one-quarter inch. Mr. Stern, of the Swan Electric Company, has brought out an instrument of this same class, while still another, concerning which large confidence is entertained, is at the present time in course of construction by the Messrs. Queen & Co., opticians, of Philadelphia.

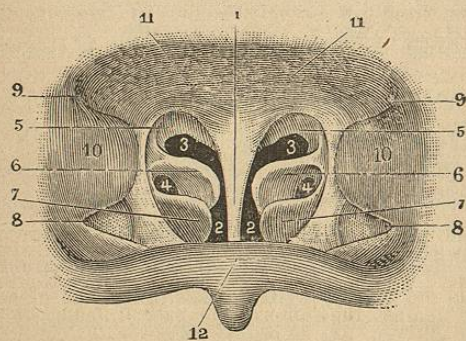
To employ a rhinoscope requires depression of the tongue and relaxation of the velum. The first is accomplished by means of an instrument known as the depressor; the handle of a spoon practically represents this. The second is secured by directing the patient to breathe entirely through the nostrils; in which act the veil falls towards the tongue.

A common rhinoscope is to be introduced warm; this with the double purpose of avoiding moisture upon its face and sparing irritation to the throat.

Everything being ready the glass is passed gently into the pharynx, the face being directed at a proper angle toward the space to be examined. Upon this glass is received the light reflected by the hand mirror; to be cast by it in turn into the naso-pharynx; and still in turn to give to the eye of the looker an image of the part illuminated by it. Practice is required to afford proficiency. Dicken's instrument is complete in itself.

What will be seen in naso-pharyngoscopy depends on the manipulative tact of the surgeon. What should be seen, the parts being healthy, is beautifully outlined in the accompanying diagram.

FIG. 410 (after Cohen).



1, septum; 2, free space of nasal passage; 3, superior meatus; 4, middle meatus; 5, superior turbinated bone; 6, middle turbinated bone; 7, inferior turbinated bone; 8, position of the opening into Eustachian tube; 9, fossa of Rosenmüller; 10, lateral wall of pharynx; 11, superior wall of pharynx; 12, posterior surface of velum.

CHAPTER XLI.

PALATINE DEFECTS, AND THEIR TREATMENT BY OPERATION.

In the treatment of palatine defects, the first consideration refers necessarily to cause and condition. Thus, it is found that such defects or deficiencies may, by influencing circumstances, require treatment so modified or changed as to seem, in cases apparently similar, quite at variance with each other. For example, take two perforations exposing the nares; one congenital, the other the result of disease. In the first of these cases any operation or appliance which would seem to promise relief might be adopted; in the second we might justly pause at any interference. No one would attempt staphyloraphy on a patient laboring under acute syphilis, or where a mercurial course had so broken down the crisis of the blood as to make a union by the first intention impossible, or even doubtful. No more would one be justified in attempting this or any other of the operations of expediency, with the constitutional conditions adverse to success, than he would be justified in avoiding the responsibility where such influencing associations were favorable.

Cleft Palate.—The condition known as cleft palate, to which we at once pass, may, from its exceeding frequency, be the first to claim attention. A cleft may be partial or complete; that is, there may be a simple lengthwise division in that portion of the mouth known as the soft palate, or the cleft may be so extensive as to extend from the uvula to the lip, a fissure separating both hard and soft parts. The first of these conditions is found sometimes as the result of disease; the latter is always congenital. Fissures produced by syphilis are constantly treated where there are breaks both in the bone and in the soft palate, but never where there is a coexistent one in the continuity of the lip.

Fissure of the hard palate, a result of disease, differs from the congenital form in a particular which would scarcely allow of the surgeon's being deceived. A fissure the result of disease exhibits an irregular break in the continuity of one or both palatine processes; a fissure having congenital origin exhibits the deficiency harmonious to the line of contiguity; that is, to the palatine raphé.

Let first be considered the condition and treatment of a congenital cleft. A child is born, toward whose mouth attention is directed either by the nasal character of the cry, or, a little later, by inability to take the breast properly; or the condition is marked, perhaps, by the break continuing through the lip, giving the deformity known as hare-lip.

When a child is thus unfortunate and the attention of the surgeon is called to the case, a single question presents itself; namely, how is the deformity to be corrected? If suffered to continue, every day increases the difficulty of the cure; that is, as the most formidable part of the operation is involved, while if its correction be at once attempted, the prospect of complete success is very great.

Fissure of the hard palate has generally been deemed irremediable as operative means are concerned, and the surgeon has been taught to consider his whole duty done in describing to the parents the mechanical method which in after-life is to conceal and correct the defect of his patient. Now, in this connection will be presented a remedial surgery which is as practicable and feasible as any other of the operations of expediency, and perhaps one is justified in going so much further as to say that the modes of procedure will be found much more promising than the majority of such operations. Through the proper application of mechanical allied with the more strictly surgical means, the writer has not infrequently succeeded in effecting changes in the young maxillary bones, a simple description of which might cause his veracity to be doubted; yet this ability to effect such changes becomes very evident if for a single moment we pause to consider the difference between the composition of the young and that of an old bone. Young bone, or bone at birth, as is well known, is almost if not quite half made up of animal material; while in the osseous structure of the adult there is excess in the inorganic or unyielding material representing from seventy-five to perhaps quite eighty-five per cent. of the substance of the part.

To illustrate more familiarly this yielding constituent of young bone, reference may be made to the old experiment of maceration in dilute muriatic acid. We know that if a rib bone be subjected to the action of this acid for one or two weeks, we may tie it like a whip cord. This is done simply by reducing an old bone to the condition of a young one. As has been shown in the chapter on dental irregularities, one may take an inferior maxilla, even in a child of fifteen years, where the projection of the chin is so great as to produce deformity, and with a properly-constructed vertico-mental elastic sling can, in a period varying from three weeks to as many years, so change the angle as to do away entirely with the deformity. One may take the projecting myrtiform border, and through the instrumentality of the occipito-alveolar sling compel it in quite a short period to a natural relation. On this known yielding character of young bone operations for the correction of congenital fissures of the hard palate are founded.

A congenital fissure of the hard palate may be corrected instantly, or the cure is to be effected slowly. The first of these procedures is applicable to such cases as present but a limited separation of the bones; the latter, when the break has considerable width.

The operative procedure for immediate cure is as follows: an instrument, a modification of the Hoey clamp, ordinary arterial compressor, or a Hainsby

compress, is to be made by so arranging the pads that they shall apply to the sides of the jaws and allow of the force being so directed that the pads can be approximated without undue facial pressure. The clamp of Hoey, it will be seen, needs alteration only so far as the pads are concerned, and is quite easy of adjustment to this purpose.

The instrument ready (the infant being in proper condition), the operator commences by paring the soft parts and bone on both sides of the fissure, beginning on the approximal faces of the palate bones, and cutting forward to the alveolar face of the chasm. This part of the operation completed, the little patient is to be allowed to rest until the bleeding ceases. A succeeding step is to re-etherize and apply the compressor; the curved pads to embrace the buccal faces of the alveolar arch. By now gradually turning the screw of the instrument, the yielding bones are brought together. The next and last step in the operation is to retain the parts in position by the use of compresses placed upon and below the malar bones, and secured by adhesive strips applied as in the occipito-labial cravat of Mayo.

It may be urged against these manipulations that they are formidable and entirely too heroic; that fractures may result, etc. On these points the surgeon must decide for himself. If carefully performed, the operation is not dangerous; fracture of the bone, even if it occur, is of little consequence, the parts having to be kept, as it were, in splints, consequently the treatment of the one would be the treatment of the other. The marked risk is from inflammation that may be provoked; but a surgeon not infrequently has to run far greater for even a less result.

Another mode of securing the same end is as follows: take a circle of india-rubber tubing, the circumference of which shall be about one-third or one-half that of the child's head; next prepare two firm compresses, of a size adapted to the case under treatment; place these pads, or compresses, one on either cheek, in such position as will give them their rest on the buccal faces of the alveolar border, and secure them in place by one or more delicate strips of adhesive plaster; next take up the ring of rubber and pass it over the pads and around the cervico-labial diameter of the head. Resting upon the compresses, the ring will exert, as is seen, a gradual pressure, serving to push the bones toward a common centre, this centre being the mesial line of the palatine arch. This process is a gradual one; but, if the patient be young, it will be likely to succeed; the only real objection to the manipulation is the constant care necessary to prevent excoriation of the tender skin.

When, by this procedure, the bony parietes have been brought into contact, the operation, as the hard palate is concerned, is completed by simply paring or cauterizing the adjacent mucous surfaces. If the bones have been brought very close together, the granulations will bridge the slight remaining chasm.

In either of these operations it is seen that the break, both in the soft palate and in the lip, is not remedied. It is well not to attempt operation on

the face until the patient has entirely recovered from the foregoing treatment. It may at such time be performed, and, if done according to rules given, will secure a lip so perfect that, in adult life, little or perhaps no mark of the manipulation will exist. The operation for the cleft in the soft palate is to be left to a period later in life, for reasons alluded to presently.

These suggestions for the cure of cleft in the hard palate were, it was thought by the writer, original with himself,—though it is of slight consequence who invents an operation, so that it be good; but in the periscope department of the *Dental Cosmos* is to be found the following extract, taken from the *Australian Medical Record* and *Dublin Medical Press*, which shows that the performance was conceived by another. The extract is a short one, and so *apropos* to the matter that it may be presented entire:

Pressure in the Treatment of Cleft Palate.—I am not aware, says the author, that the subject of using pressure in treating fissure of the palate has been before suggested. I am inclined to think that it has not; for when the plan first presented itself to my mind, in 1851, I carefully examined French, German, English, and American works to see whether it had. I was first led to try it on the dead body of a child, which had died three weeks after birth. The fissure was longitudinal, and large enough to admit the extremity of the little finger; fissure of the lip also existed. By means of a pair of clamps, the sides of the fissure were brought readily in contact, without any fracture or displacement of the bones; the only fault was that the gums of the upper jaw were within those of the lower; but nature would modify this as the living child grew up; the use of pressure on the lower jaw would remove a great deal of this deformity; of course the amount of deformity would depend on the size of the fissure in the palate. I several times repeated the experiments on young dogs, removing a piece of the palate bone by means of Hey's saw, and then applying the pressure. The animals did well.

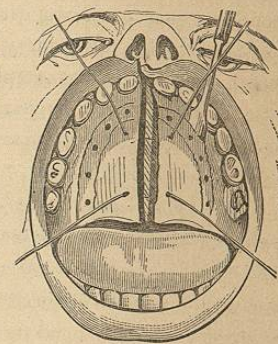
The operation should be performed as early as possible after birth, when the bones are in their softest condition. The following is the plan which I would suggest: the edges of the fissure having been pared, the superior maxillary bones are to be embraced by a horseshoe-shaped clamp, with a shelf on its lower border to receive the gums and prevent it slipping. It should be padded with india-rubber or some other material, to prevent the germs of the teeth being injured. The clamp should work on a joint, and possess arms. It may be said to resemble a large pair of pincers with horseshoe-shaped blades. A screw may be attached at the extremities of the handles, for the purpose of bringing the blades in contact, or the hands may be used: the former would be, I think, preferable, as the force could be applied gradually, and not be likely to be carried too far. It may also be employed in grown-up children, when the bones are so widely separated as to render it difficult to get soft parts enough to close the opening, but in a gradual manner and at intervals more or less prolonged, according to the

amount of pain it excites. If it were used suddenly it might produce inflammation, and subsequently abscess, which would prove troublesome to treat. From the foregoing it will, I hope, be understood that the younger the child the safer the operation is likely to prove, and that even in grown-up children it may be adopted, with precaution, with decided benefit.

The pads and the ledge to rest the teeth upon should be made to slide in the sides of the clamp: the former, that the pressure may be directed on any part of the bones; the latter, that the edges of the teeth may rest on it, without the pressure being directed either too high or too low, but at the point where the palate bone joins the superior maxillary.

Fig. 411 shows the steps of an operative procedure for closing breaks in the hard palate, which is not unworthy close consideration. First, an incision is to be made through the soft parts upon either side, midway between the fissure and alveolar ridge. From the line of this incision, the periosteum is to be dissected inward or outward, as found most convenient. Or, as preferred by some, the strip seen between the two lines in the diagram may be cut away. Next, using a spear-drill, a series of closely-related holes are made through the bony parts which the previous steps have exposed. (The writer employs a circular-saw, revolved by the engine.) A concluding process pares the edges of the fissure, introduces two wires through soft parts and bone, applies a wedge instrument, as shown in the cut, and forces the edges into contact. Granulations springing up in the seats of the lateral separations quickly fill up the breaks, thus completing a cure.

FIG. 411.



Cleft of Velum.—We pass now to the consideration of treatment of fissure in the soft palate. The operation, done for the cure of this deformity, is known as staphyloraphy, a term derived from two Greek words, signifying suture of the uvula. As generally practised, it is rather difficult of performance, and so frequently unsuccessful that surgeons seem disposed to avoid the responsibility of it. It is proposed here to suggest for consideration a new mode, which renders the manipulations as easy of accomplishment as by the old they are tedious and difficult.

Preparation of the Patient.—For weeks before it is designed to perform staphyloraphy, preparations are made for it by subjecting the parts to such daily manipulations as shall educate to forbearance the natural sensibility of the throat. In the absence of such preliminary manipulation, the retchings and spasmodic twitchings are such as to render a proper performance of the operation, without the use of an anæsthetic, almost an impossibility. With such education, the parts are found to assume, in a reasonable time, quite

a stoical indifference to even severe irritants. This forbearance is secured by roughly fingering the velum daily. Some surgeons are in the habit of daily tickling the parts with a fine brush; this answers a very good purpose. A very admirable idea, and a most successful one, is to have made an obturator,* which shall extend back to the palate border, or nearly to it. This is to be placed in the mouth, and, as soon as the irritability produced by it is so far overcome as to permit of its permanent retention, the bands attached to it are clasped firmly about the necks of the teeth, and it is worn continuously for one or two months. When the parts have thus submitted to the presence of an obturator, they will be found quite ready for an operation.

On the evening before the day of performance a saline cathartic is to be given the patient, particularly if he be robust and strong. In operating on a depressed and anæmic person, the deficiency in vital force is to be first considered, and, as far as possible, corrected. If such attention be neglected, failure is almost certain to result; the parts will not unite. Exercise in the open air, generous living, iron tonics are to be prescribed. To sum up in a single sentence, preliminary treatment is to meet the indications of each particular case. If, for example, one should operate on a scorbutic patient, or a patient disposed to purpura, without correcting such dyscrasia he would be no more likely to gain union of the parts brought together than in an operation done on the cadaver.

The surgical anatomy of the region is to be fully understood. So much of success depends on a thorough knowledge of the muscular relation to the cleft that such acquaintance gives a success where otherwise failure would be sure to result. This anatomy we may look at before taking up the steps of the operation.

To get a correct idea of the soft palate, we commence the study by first carefully examining the parts on the living subject. When we look into a mouth, we see an arch, stretching from every portion of the alveolar ridge inward and backward toward the pharynx, terminating in a tongue or uvula, pendent in a vertical direction from its centre. One-half of this arch is seen to be fixed, the other—the posterior half—in almost constant motion. If now the finger be called into service, the fixed part is found to correspond with the boundaries of the palatine faces of the maxillary and palate bones; that is, for a certain extent the parts are felt to be solid, as if the finger passed over an arch of bone which might be covered alone by mucous membrane; and this is, in fact, about the case. The finger traverses the anterior bony border of the mouth, or the hard palate. As now the finger is passed backward, it falls over a hard ridge upon parts that are soft and yielding; the hard ridge is the posterior face of the palate bone, and terminates the hard palate. The part upon which the finger has fallen is the veil, or soft palate, the part observed to be movable. This is the region in which occurs

* A description of this instrument and of its proper use will be found on page 442.

the rent, or cleft, for the cure of which is demanded the operation about to be considered.

The mobility of this part, which pertains to its function, depends, as will be anticipated, on an associated muscular structure. To study properly this structure, which it is all-important to understand and appreciate practically, the student is to take up a scalpel and pass to the cadaver; it is, perhaps, only by dissecting that a really satisfactory idea of these muscles is to be secured,—that is, as pertains to that kind of knowledge which gives confidence when one comes to perform operations upon the part.

The external coat, or covering, which is seen on every mouth, living or dead, is the mucous membrane,—simply the continuation of that which covers the hard palate; but while in the case of this part the underlying structure is found osseous, in the soft palate the deep tissue is made up exclusively of muscular substance,—at least as a surgical anatomy is concerned, or as it serves the present purpose to study it.

Commencing with the mesial line, one can dissect out the attachment of five muscles, each of which is of course duplicated on the opposite side, and each of which has such relation to a mesial line that, in case of cleft, or split, it serves more or less to draw away the parts postero-laterally.

These muscles, mentioned in the order of their signification to such lateral displacement, and consequently in their relation to the operation of staphyloplasty, are the tensor palati, palato-glossus, levator palati, palato-pharyngeus motores uvulæ. Of all these structures the tensor palati plays the most important part, and is therefore entitled to the first consideration.

This muscle arises from the scaphoid fossa at the root of the internal pterygoid plate, from the anterior surface of the Eustachian tube, and from the spinous process of the sphenoid bone. If the student carry his finger (in his own mouth) back to the wisdom-tooth of the superior jaw, and let it drop over and back of this organ, it will fall on the tuberosity of the maxillary bone; carry it now half an inch farther back, and it will come to a second prominence; this is the hamular process of the pterygoid plate of the sphenoid bone. The tensor palati muscle descends from the origin of which we have just informed ourselves, and, meeting this hamular process, it winds—as a tendon—around it, and then, by a fan-like expansion, spreads itself into the substance of the soft palate. Its action is evident: it expands the palate laterally.

To perform successfully the operation for cleft palate, it is perhaps desirable, in every case, that the strain made by this muscle be taken off. A moment's reflection will show that the action of the muscle, in case of a cleft, would, when the parts are brought together, be much increased over its natural capability, not only because it would be put considerably on the stretch, but also because such stretch would, more than likely, excite to spasmodic contraction. The muscle of course is then to be divided: as well here, as anywhere else may be considered the easiest point at which such preliminary operation is to be done.

It is remarked that the muscle is found winding—as a tendon—around the hamular process. It winds from the back, outwardly, inward, and forward, so that just in front of the process, between it and the tuberosity, is the place at which its section may be best accomplished; there are here no important vessels to be wounded, if we except the posterior palatine artery and nerve, and these hug the base of the tuberosity so closely that it would have to be a very badly-managed knife that should interfere with either of them. The cut is to be a little oblique. The interference with function, as in most cases of myotomy or tenotomy is, of course, but temporary. The action of the muscle will be found recovered quite as soon as the cleft operation is ready for it.

The next most important muscle is the palato-glossus; this is simply the anterior half-arch, the constrictor isthmii faucium. It arises, as will be seen, from the soft palate on either side of the uvula, and, passing outward, is inserted into the sides of the tongue, blending with the fibres of the stylo-glossus muscle.

The palato-pharyngeus arises from the soft palate by an expanded fasciculus, and, passing outward, goes to be inserted into the posterior borders of the thyroid cartilage. These muscles constitute the posterior half-arches. Section of the palato-pharyngeus and the palato-glossus is to be made through the substance of the muscles, and is accompanied simply by nicking, somewhat deeply, the arches, four cuts, one to each arch. These nicks are best made with curved scissors.

The levator palati muscle arises from the petrous portion of the temporal bone, passes into the interior of the pharynx, and then descends obliquely downward and inward, spreading its fibres out over the posterior surfaces of the soft palate as far as the raphé.

The action of the fifth and last muscle, the azygos uvulæ, it is perhaps not absolutely necessary to consider,—its influence, for separation of the wound, being very trifling.

Section of the levator palati is thought to be easiest of performance after a manner suggested by Mr. Pollock. This gentleman first puts the flap on stretch, and then, with a double-edged knife, makes an incision through the soft palate just on the inner side of the hamular process. The handle is now alternately elevated and depressed, a sweeping cut being made along the posterior surface of the soft palate.

The other anatomical elements of the soft palate are glandular structures, vessels, nerves, etc., all associated, more or less intimately, by connective tissues; but these need not be particularly referred to, as one could not well dissect out the muscles without necessarily familiarizing himself with them. Thus, then, we understand the surgical anatomy proper of the parts,—the anatomy as it has relation to cleft palate.

The operation of staphyloraphy was first practised by a dentist of Paris,—La Monier. It has for its object the bringing together of the separated

portions of a cleft soft palate and the retention of the parts in apposition until nature shall unite them.

The operation consists of four different stages, with an object to be attained by each stage:

- 1st. The paring of the edges of the cleft.
- 2d. The introduction of ligatures.
- 3d. The bringing together of the freshened edges, and fixing the ligatures.
- 4th. The relief of any tension on the ligatures that may attend the approximation of the parts.

These are the steps or stages, and to accomplish them various means and instruments have been devised,—some good, some bad, some indifferent. The reader curious in such matters will find an admirable and most instructive chapter on the subject in a System of Surgery, published in 1851, by Professor H. H. Smith. In the chapter therein devoted to staphyloraphy is given a synopsis of the operations as practised by surgeons whose names have been and are particularly associated with the subject.

An epitome may be made of this chapter by noticing that the operation first suggested by La Monier, in 1764, was revived by Graefe, of Berlin, in 1817, but first methodized and published, with the rules for its accomplishment, by Roux, of Paris, about 1819. In 1820 a nearly similar operation was performed by Dr. John C. Warren, of Boston, he being at that time ignorant of the views or operations of other surgeons. In many respects the steps proposed by Drs. Warren and Roux correspond, though the means suggested by Dr. Warren are simplest, the operation of the latter being generally regarded as the basis of the various modifications that have since perfected the proceeding.

The instruments prepared by Roux for performing the operation are alluded to as being sufficiently complicated. To execute the manipulations, that surgeon seated his patient before a strong light, the head being thrown back and supported against the chest of an assistant, the mouth kept wide open by means of a cork placed between the molar teeth. The operator then placed himself in front, and, with forceps held in the left hand, seized the right lip of the fissure. With his right hand armed with a needle-holder, he next introduced the point of a needle from before backward behind the uvula, in order to traverse the flap from behind forward, at three or four lines from the free edge of the fissure. The needle, being thrust in as far as its head, was then freed from the holder, and seized at its point by forceps, which drew it, and the ligature, through into the mouth. After permitting a few minutes of rest to the patient, the same manœuvre was practised on the left side of the fissure with the other needle of the same ligature, the two ends of which were thus brought out of the mouth. In passing these ligatures, M. Roux commenced with the lowest, next passed to the highest, and ended with the middle.

The next step in the operation of Roux was to freshen the edges of the