advanced until it shut up the left eye. The jaws began to stiffen, and ended, after three or four days more, in complete immobility.

The call to the case was after the lockjaw had existed nine weeks, the patient having barely been able to support life by putting his mouth into a basin filled with soup, and sucking the nutriment through his teeth. During this time he had been seen by seven different practitioners, no one of whom had seemed to appreciate his case, or, what perhaps is more probable, none of whom had been willing to assume the trouble of it. The patient had never told any of these gentlemen about the soreness first felt in his teeth, and no one of them had ever questioned him in the direction; his single complaint was of a great weight about the cheek.

The diagnosis of the case was, primarily, periodontitis. This inflammation, by a double continuity of structure, had extended into the maxillary sinus, and to the integuments of the face. The inflammation of the antrum had been sufficiently severe to result in abscess; abscess of the alveolo-dental membrane, and of the lining membrane of the cavity. The inflammation of the face had resulted in an exudation of lymph, which lymph in a state of coagulation was the cause of the trismus.

A first effort was directed to getting into the antrum, which it was felt assured was filled with pus. This was done by prying out a second molar tooth with an elevator, pushing it into the mouth (from which, with some trouble, it was afterward gotten out); the extraction was followed by profuse discharge. The patient described the relief as being immense.

This particular tooth was removed, not because it was more carious than its fellows, but because it was somewhat loose, and thus gave evidence of the diseased condition of its roots. Again, it is through the alveolus of the palatine fang of this tooth that we find our easiest and best road to the antrum; in this case, as is seen, the fang communicated with the cavity.

On the day succeeding the evacuation of the abscess, the patient expressed himself as entirely free from pain, his only trouble being the anchylosis, which had not, as yet, relaxed in the least.

To the touch, all the parts about the articular extremity of the inferior maxilla seemed completely indurated. Hesitation existed as to attempting the breaking up of the parts mechanically, fearing injury to the important vessels which are associated with the head of this bone,—the maxillary nerve and internal maxillary artery. The induration was of course extra-capsular, and of sufficient extent to have bound the jaw from the glenoid cavity to the anterior border of the masseter muscle; passive motion was resorted to, but employed very gently. Blisters and sorbefacients were depended on. The case progressed very slowly, the patient having to come to the office every day for half a month; at the end of this time, but after removing other diseased teeth from his mouth, he was dismissed cured.

When one is called to a case of trismus of any standing, the anchylosis being the result of inflammatory action, question may arise as to the propriety of mechanically breaking up the adhesions. The condyloid extremity of the maxillary bone is assuredly not the stanchest part of the body, and there are anatomical relations which it would not be at all pleasant to disturb: these things are for the surgeon to decide. So far, individually, as the writer is concerned, he now uses mechanical force in all cases that come under his care, premising of course that the condition is one where, from inflammation, the trismus depends on effused lymph. He is willing to run the risk for the great and immediate good yielded; some considerable experience in this direction assuring him that such risk is materially influenced by the manipulations. Of course it is not meant to recommend that attempt be made to open the mouth to its greatest capacity with a single turn of the lever employed, although there are cases where such practice would be very commendable. The author has so opened the mouth many a time, but not in cases of long standing. Generally, the force should be applied with gentleness, gain a little one day, and a little the next; it takes but a very short time to open a mouth in this way; besides, if your force be applied with such judgment as not to provoke vascular response, you will arouse to co-operation the absorbent system, the excitement acting as a stimulus to it, and it will be found to do its part vigorously.

A person will not infrequently be attacked with trismus after the dental operation of inserting a pivot tooth. Here the lesion is more than likely inflammatory in character, and the treatment is to be directed accordingly; the root of the tooth is in a state of periodontitis. Cases of pure tetanus, however, have had origin in such an operation. Where the lesion is inflammatory, the parts are sore, and tender to the touch.

A person will sometimes be attacked with trismus after the plugging of a tooth with metal; the attack comes on suddenly; it is a reflex nervous action, and is always to be esteemed of dangerous import. The conducting facility of the metal irritates the nerve periphery in the pulp; this irritation is referred to the medulla, and thence reflected to the muscles of mastication. To prove the existence of the lesion, direct the patient to hold cold water in contact with the organ.

To treat a case of this kind, remove the metal; when the irritation has subsided, be sure that before refilling, a non-conducting substance be placed between the plug and floor of the cavity; or, because of the thinness of the bony septum, it may be desirable to destroy the pulp.

Spasmodic trismus, very persistent, may result from the employment of different metals in the operation of a single tooth-plugging; galvanic action being a consequence, and the nerve subjected to a most harassing irritation. To test for this trouble, increase the action by holding silver and zinc against the plug. This test, however, will irritate any super-sensitive pulp into a state of excitement, and is an admirable search-warrant for obscure lesions of the organ. The treatment consists of course in the removal of the plug, and the medication, if required, of the irritated pulp.

So over many pages might be extended the consideration of dental lesions in connection with trismus. Enough, however, has been written it is presumed, to direct proper attention to the subject.

To recapitulate: It is suggested that many of the cases of so-called idiopathic or obscure trismus will be found to depend on conditions associated with the dental arch.

That to insure permanent relief, the treatment must include the primary lesion.

That such primary lesions as are described in the chapter on Anomalies are always distinguishable.

That where it is desirable to extract an offending wisdom-tooth, and such extraction seems too difficult to attempt, the removal of the tooth immediately anterior to it will, as a rule, meet the indications.

That the immobility of the jaw, where acute inflammatory action exists, is to be treated on general antiphlogistic or phlogistic principles, according as it seems probable or improbable that the inflammation may be resolved.

That when the acute action has passed, adhesions are to be broken up by mechanical force carefully applied.

That mechanico-dental lesions are not to be overlooked, but are to be searched for, and discovered *secundum artem*.

Trismus Traumaticus.—This is that anchylosis, true or false, intra- or extra-articular, dependent on local injury. Blows inducing inflammation are among the common causes; a not infrequent origin, one difficult to combat, resides in severe burns; sloughs from the undue use of mercurials are to be named; in short, enumeration might instance any lesion in which the locked jaw associates with conditions of local signification attended with solutions or iregularities in the continuity of the structures. A case just dismissed from the writer's practice, in the person of a boy twelve years of age, had the anchylosis dependent on false articulation, the result of injury done the glenoid fossa three years before by a blow upon the chin. The force of this blow being carried to the joint, a chronic inflammation had resulted in a filling up of the cavity to a level with the articular eminence. While in this peculiar situation, a species of irregular cavity had formed, which partially accommodated the condyle, permitting, however, dislocation whenever the jaw was opened beyond a certain point. In this case a fair cure was obtained by a tri-weekly manipulation of the bone, which resulted in a better-adapted fossa through absorption. To procure such motion as seemed demanded, frequent luxations resulted,—causing at first not infrequently much trouble in the reduction. This patient has been advised to watch any tendency to contraction which may appear, and to keep it counterbalanced by rolling corks between his teeth,—an excellent means, by the way, where the expense of instruments prevents their purchase.

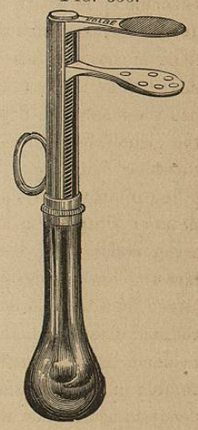
The use of common bottle-corks as a means of overcoming false anchylosis is employed with satisfactory success. Beginning an operation with one of a

diameter to be readily introduced, increasing sizes are to be rolled, one after the other, between the teeth, into place. Timid children who resist the screw will permit the use of corks.

At a late clinic, a young man presented himself with the lower jaw so fixed that only by profoundly etherizing him was it possible to pass the blade of a common table-knife between his teeth. This condition, which had existed for two years, had resulted from a blow received on the cheek, involving, in an inflammatory fixedness, the masseter muscle. This case was treated by subcutaneous section of the muscle, associated with the daily use of the screw. Through the use of this instrument there is no doubt of his being kept comfortable; he is directed to employ it daily, and never to allow the jaws to deny the introduction of two fingers. Without doubt, it will be found that eventually such modification of the contracted muscle results that a fair cure shall be obtained. The section of the muscle in this case had of course but the meaning of affording the use of the second and true means of cure, namely, the daily stretching of the part.

Fig. 536 represents the instrument employed in the stretching process, and which has been furnished the patient for daily use: it is one devised or modified by the ingenious cutler to the Hospital of Oral Surgery clinic, Mr. Kolbe, and surpasses any other form with which the writer is acquainted: by simply turning the handle, the blades, as seen in the drawing, are gradually separated. The power residing in this instrument is sufficiently great to break up any anchylosis, true or false; a jaw is easily to be broken with it. A necessary addition to the instrument, as felt, is a transverse bar in the handle to afford a more convenient application of the force. The apparatus is to be recommended as the best in use; it will fulfil the requirements of any case to which such application of force is indicated, while the most careless patient may be intrusted to use it on his own jaws.

Fig. 536.

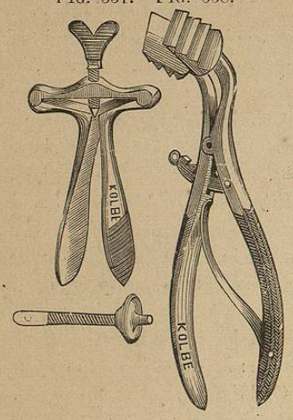


Cases of false anchylosis are most frequently found extra- rather than intra-articular; or where the condition has existed for a long time, say for a year, then it is reasonably to be inferred that the two conditions combine, that is, that portion of the articular cavity which is not used has been modified by nutritional changes. Wherever the lesion of a false anchylosis is situated, the philosophy of its relief consists in the practice of passive motion,—it is really only another expression of the mode of cure of urethral stricture: operation may be necessitated, but it is only to be practised in cases of urgent necessity.

Besides the instrument commended, various others have been devised for the purpose of passive motion. Figs. 537 and 538 show forms. Fig.

537 is that known as the wedge of Scultetus. Fig. 538 is a modification, as is seen, of such instrument: neither of these deserves mention as compared with that devised by Mr. Kolbe.

Fig. 537. Fig. 538.

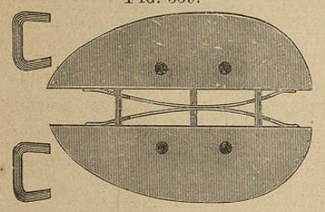


In sections of the country where the mercurials are freely used, anchylosis as a result of sloughing is not uncommon; it is frequently found in these cases that the mucous aspect of the cheek has been converted into a dense unyielding fibro-cellular cicatrix, which cicatrix resists all attempts on the part of the depressor muscles to antagonize it. In cases of this kind, instrumental aid applies most happily, and, if properly and judiciously persisted in, will eventuate in a reasonably satisfactory relief.

A form of instrumentation applying in this direction finds its suggestion in the deep, yet perfectly healed cuts existing in the mouths of patients who have worn for considerable time dental plates which impinge unduly about the vestibular base. Acting on such hint an impression of the parts is taken, and an apparatus constructed possessed of dull edges, which impinge continuously and increasingly upon the cicatrix where it relates the cheek and gum surfaces. This plate is to be worn for months. Success in securing permanent division of the cicatrix by this means is sometimes very satisfactory.

Fig. 539 represents an instrument of this class, the mutual device of the author, and of Mr. E. B. Buckland, a student of the Philadelphia Dental College, by the latter of whom it was made. It consists, as seen, of two wings constructed of vulcanite and separated by pieces of watch-spring. The uprights, of which there are three, have the single office of steadying the wings. The clamps, seen to the left, are with a view of holding the wings together until fixed in place in the mouth. They fit in the holes seen. This instrument accomplishes its intention with great satisfaction.

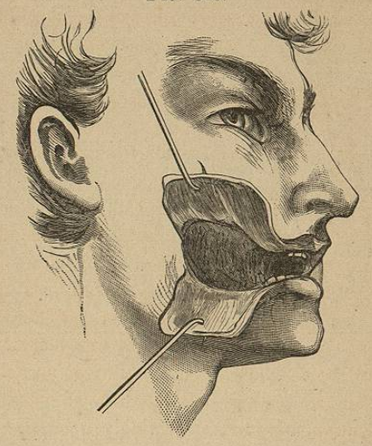
Fig. 539.



Cutting the face open with a view of getting at the cicatrices is an operation to be avoided where possible. Fig. 540 shows a mouth so cut, where, after the structure has been removed and the teeth separated, an interdental splint, with attached vestibular wings, made from celluloid, has been inserted. Here are met the double indications of holding the jaws apart and preventing

reunion of the cicatrix to the gums. In principle the manipulations work beautifully, not so well, however, in practice, objection existing in a degenerative action which is found most apt to interfere with union of the cut cheek. Instruction exists in the diagram, as it exhibits the relation of the interdental splint. Where it is possible to get such apparatus in place by separating the cicatrix from the gum without external incision, the performance is not too

Fig. 540.



highly to be commended. If attempt is to be made, the surgeon incises freely above and below, and, after forcing the teeth apart by means of a Kolbe gag, he moulds softened gutta-percha between the teeth and into the vestibule, hardening this by use of ice-water. Celluloid requires to be prepared upon an impression, a difficulty in procuring which stands in the way of the use of the agent. When, however, a mouth can be so opened as to permit of the introduction of impression cups and material, a vestibulo-interdental splint of this material is the least irritating of the different kinds used in the direction.

The use of modelling compound, as employed in dentistry, is not permissible in the direction here considered. As an agent ductile under a low degree of moist heat it peculiarly commends itself, but it is not in the mouth more than a day when it begins to crumble and lose its supportive power.

Another expression of anchylosis is found in bridges of bone associating neighboring parts, commonly the edges of the glenoid cavity, with the neck of the lower jaw, or it may be that the relation is between two maxillary bones. These bridges are not infrequently to be broken and their absorption secured through dilatation conjoined with passive motion and the use of sorbefacients. In no cases, however, is it more desirable to guard against inflammatory results, and therefore such procedure is to be conducted with the same care as obtains in breaking up anchylosis in the knee- or elbow-joints; a principle

being, to make haste slowly: fracture of the neck may readily attend rough manipulation. Should such fracture occur, the desirability of making a false joint is to have consideration: if a diagnosis exhibit complete fixedness of the head of the bone by an osseous relation, then nothing better is to be attempted than the creation of such false joint, union of the parts being prevented by passive motion, and inflammation combated through antiphlogistics. Cases offer where the only possible prospect of relief exists in the production of such a false joint by operation particularly directed to that end. The author has met with success by excising from the posterior part of the body of the bone a V-shaped piece. A flap raised, the engine quickly removes the section. Saw or bur is used; the latter preferably.

In such conditions of anchylosis as depend strictly on superficial cicatrices, the propriety is always to be considered of a plastic operation, which, removing the deformed tissue, shall replace it with that which is normal, secured from some convenient part in the immediate neighborhood. If the cicatrix to be replaced be small, adjoining portions of the cheek may furnish the required material; if, on the contrary, it be large, the neck will have to be depended on, or it may seem preferable to employ the Italian method of taking a flap from the arm. The principle of the operation consists in mapping out on the part from which the flap is to be made such extent and shape of surface as shall replace that designed to be removed. The cicatrix being dissected out, and all bleeding checked, the flap as marked is raised, leaving it attached alone by its pedicle; and when hemorrhage in this also has been controlled, and the surfaces begin to glaze, it is carefully to be turned on the pedicle into its new position, and, being fixed by stitches, is to receive the attention required by wounds in general. The space left by the removal of the part is to be drawn together by stitches, adhesive strips, or other convenient means. Before undertaking a plastic operation, however, nothing is more necessary than to possess an appreciation of the reparative and nutritional powers of the patient. To operate on a person in a typhoid state, or on one the plasticity of whose blood is destroyed by the influences of syphilis, scrofulosis, scorbutus, or mercurialization, would be simply to court failure. (See *Plastic Surgery*.)

Concluding this consideration of fixedness in the jaw, a résumé of the subject exhibits as causes of the condition,—

1st. Spasm; the treatment being of constitutional consideration.

2d. Anchylosis by muscular induration; the treatment being by local medicaments, combined with the employment of the dilator.

3d. Osseous anchylosis; the treatment being the breaking up, by section or otherwise, if permissible, of the bony bridges.

4th. Cicatricial anchylosis; the treatment being by dilatation and by plastic operations.

CHAPTER LVII.

NEURALGIA.

THE term neuralgia is from the Greek roots *νεῦρον*, a "nerve," and *ἄλγος*, "pain." It signifies a condition, or an effect, not a cause; or, if this definition be not an absolutely correct one, the exceptions to the rule it would form are exceedingly few. For such reasons it is, as commonly employed, a meaningless term, expressing a condition about as definitely as the word suppuration conveys idea of the meaning of inflammation.

Neuralgia, as the appellation has definite application, refers to paroxysmal pains, localized or metastatic, presenting no manifestation of any lesion at the seat of pain outside of the single phenomenon.

The pains of neuralgia are mostly, although not exclusively, acute in character, are confined to the tract or to the periphery of a certain nerve, remit, or more commonly fully intermit, and are accompanied with tenderness of the part involved only when an accidental associate lesion may exist, or when an irritation is so severe or has been so long continued as to have reacted on the neighboring vascular system.

When, then, a practitioner has his attention directed to a seat of pain without apparent lesion, the matter of first importance is an appreciation of cause. To say that such a one has neuralgia, and to treat him with nervines, is to say just nothing, and certainly is to do nothing in the way of good except indeed by accident. A first duty is to search for cause, and, if discoverable, to remove it, if this be possible. Now, the causes of neuralgia are, as farther on will be shown, sometimes very evident, and very easy of removal; and it will be seen, from illustrations offered, that one, from lack of observation, may utterly fail in giving a relief very easily and naturally afforded by another.

Correctly speaking every pain is a neuralgia. It is quite proper to say rheumatic neuralgia or gouty neuralgia. The suggestion affords a lesson in diagnosis. Rheumatism is always accompanied with vascular perversion; the pain is not distinctly localized, but is diffused over a part involved; as a general thing it is a soreness rather than sharp, acute, concentrated pain. Movement aggravates this soreness, changes in temperature affect it; it is not paroxysmal, although it may be, and generally is, remitting; in short, it has a history, and this history is not difficult to read. Gout exists in heredity and in over-generous living. It is decidedly inflammatory in its local manifestations. It attacks in preference small joints. It is accompanied by œdema, by congestion, and by enlargement of the veins. If it prove metastatic, the seat