

## CHAPTER XXVI.

### OPERATIVE DENTISTRY.

#### IRREGULARITIES OF THE TEETH.

##### ORTHODONTIA.

TEETH irregularly related to the common arch are, under favorable conditions, capable of having the malposition corrected without ill results.

Conditions to be appreciated are: 1st, general and local health; 2d, age of patient; 3d, nature of alveolar process.

A patient of extreme nervous temperament, or one laboring under a dyscrasia, is scarcely a proper subject for the endurance of details necessary for the correction of misplaced teeth: the latter, by reason of a degenerating inflammatory action almost certain to be provoked; the former, because of nervous excitability aroused, which involves a risk to the health at large, of greater import than any local good to be attained.

A patient over twenty-five years of age may, as a rule, be deemed to have attained a solidity and fixedness of stature which render the risk of change overbalancing the promise of good. The period intervening between twelve and seventeen years of age is found by experience to be the time of election for this class of operations.

An alveolar process of loose structure is more capable of affording response to a mechanical impression than is one of solid character. In the first, a tooth may be quickly changed in its position; in the second, not only is more time required, but great increase in the moving force.

Treatment which pertains to regularity and harmony in the second denture commences with the first, the rule being that a deciduous tooth is not to be extracted, save by compulsion, until a successor is ready to take its place. (See *Anomalies of Dentition*.)

A tooth is to be changed in its position by the application of force drawing in the required direction. The physiological changes induced in the alveolar process are, first, absorption of the parietes of that aspect of plate pressed upon; second, the exudation and organization of plasma in the part relieved. Change too rapidly effected excites inflammation, or otherwise draws the tooth from its cavity; haste in the correction of an irregularity is never safe.

In orthodontia, as in every other department of art, familiarity simplifies practice. To move teeth, but few means are really requisite. Complexities in appliances commonly signify lack of skill.

A full consideration of the associations of a case is to precede operation upon it. Such consideration embraces, first, age. As a rule, it is not found good practice to attempt the moving of an undeveloped tooth, the parts being too susceptible and irritable. (See *Dentition*.) Second, condition. Not only are dyscrasic and nervous conditions adverse to operation, but the more immediate expressions are to be taken into account. Teeth, from the shape and direction of their crowns, are sometimes to be recognized as possessed of peculiarities of fangs, which, in a proposed change, must compel the piercing of the alveoli. Again, teeth of bulky crown may have stumpy roots of such limited relation to their alveoli that very slight traction will drag them from their sockets. A tooth out of the arch may be a supernumerary; it may in every respect simulate the true teeth and yet not belong to the denture. Here, to avoid error, it is alone necessary to possess proper familiarity with the characteristics of the common denture. Mention as well is to be made of retained deciduous teeth which deny proper place in the arch to their successors. The writer has often met with such retentions in persons of advanced years.

The inferior anterior teeth of the second set are in nearly all instances found, in the earlier stages of the eruptive act, more or less irregular in the manner of their eruption; if not unduly crowded from narrowness of the arch it will be the exception to a rule where they do not prove self-correcting. Also is it found the case that in nearly every instance where accommodating space exists, irregularly developing teeth, wherever situated, will of themselves seek proper relation. Early interference is therefore, because of such natural tendency to self-correction, to be deprecated, except where it is evident that mechanical relations render such self-correction impossible. A single example may illustrate. Suppose a case where the superior central incisors develop with their cutting faces so inclining inward that in occlusion of the jaws the inferior teeth close against the labial surfaces: here it must be seen that time, instead of serving to correct the deformity, will only increase it. In such a condition, correction as immediate as possible is desirable; judgment must direct the means and the manner: the superior teeth should certainly be placed outside of the inferior: if this be done without provoking inflammatory resistance, however accomplished, the means employed have necessarily been judicious. (See illustrative cases.)

Instances, again, are met where certain teeth have completely changed position: a lateral incisor appearing in the situation of the central, the central occupying the place of the lateral. Here there is no correction possible, except it be found in transplantation, in the pivoting process, or in extraction of the teeth and their rearrangement upon a plate.

Teeth irregular to the arch, being held in the false position only by pressure from articulating teeth, find easy correction; forced into proper place, the same teeth which continued the deformity will prove the instruments of permanency to the new relation.

Apparatus used for correcting irregularities are to be as delicate as regard to a necessary strength will allow: they are to permit of ready change of form or relation to suit the constantly varying requirements of cases; the construction and application are to be as simple as practicable, that thus, as much as possible, the assistance of the patient be engaged; they are to be easy of removal and replacement, that thus a necessary cleanliness be maintained.

In the relation of plates to the necks of teeth, care is to be exercised that unduly sharp edges shall not cut the enamel; while in the employment of rubber rings, now in common use, attention is demanded to the avoidance of injury to the gums so apt to ensue from the sliding of the ring, a result easily avoided by placing between the gum and ring a thread of waxed silk tightly tied around the tooth.

Teeth changed in position, through mechanical means, are to have support in the new location until the required alteration is effected in their alveoli. This support is commonly seen to be given by nature: as for example, where a tooth being inside of the arch and so retained by overlying teeth, being forced outside, is equally compelled to retain the new place by the pressure of the same teeth. In all cases, however, where circumstances deny natural support, advantage is to be taken of mechanical appliances; such appliances being found in ligatures, metal bands, or plates.

With such appreciation of the simplicity of the principles underlying the practice of orthodontia, a few illustrative cases in practice may be presented as hints to the ingenuity of the practitioner.

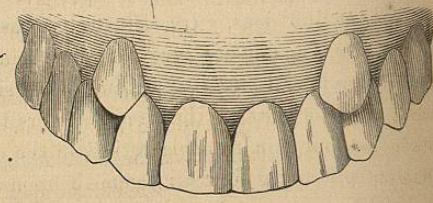
ILLUSTRATIVE CASES.—Fig. 232 exhibits a cast taken from the living mouth, in which, as is seen, the bicuspидati and lateral incisors approximate. Age of patient, ten years.

Studying this case, it becomes recognized that a required space is absent, namely, that for the accommodation of the cuspis of either side. At eight years of age, the incisor found its place; at nine years, the bicuspid. Most important was it that the space occupied by the deciduous cuspis should be preserved by the retention of that tooth until the eleventh year, the period

FIG. 232.



FIG. 233.



of eruption for the permanent. Not preserved, the room naturally became occupied by adjacent teeth; hence irregularity was inevitable: unless, indeed, it should have happened that the second cuspis remained unerupted,—a

matter which must always necessarily occasion more concern than even a deformity. Fig. 233 exhibits a front view of a similar mouth, the cast being taken in the fifteenth year, four years after the eruption of the cuspidati. This irregularity is the one most frequently met with.

TREATMENT.—If an arch so presenting exhibit the proper articulation, practice lies between the removal of the projecting cuspidati, and that of the immediately adjoining bicuspидati.

As facial expression is concerned, it is to be remembered that much of character resides in the eye-teeth. Many mouths from which these teeth have been removed show a flat, expressionless appearance, most undesirable. Again, it is found that these teeth serve as keystones to the arch: hence it frequently follows that secondary irregularity associates with their removal.

Where a mouth with overriding eye-teeth possesses proper articulation,—that is, where the superior incisors fully override the inferior; where the bicuspидati resemble in their labial outlines the cuspidati, and where the approximation of these teeth with the lateral incisors is complete and regular; where the cuspidati are situated well forward, and not over the bicuspидati, or even over the interspaces; where the patient is advanced in years, the process having become fixed in its relations; it is, in case of this kind, the proper practice to extract the eye-teeth. On the contrary, where the patient is young, where the articulation is harmonious, where the projecting teeth are situated over the interspace, or, still better, posterior to it; where the bicuspидati do not simulate in appearance the cuspidati: the practice proper to be pursued consists in removing the underlying premolars.

Experience exhibits that the developing tendency of the teeth is always in a forward direction; the extraction of a first molar, therefore, a plan often recommended for the correction of this irregularity, does not favor to any extent the accommodation of the cuspis: the second bicuspid will not fall back into the space made. On the contrary, a second irregularity is favored in the immediately manifested inclination of the second molar to fall obliquely forward, thus breaking the harmony of the posterior articulation. The preservation of the first molar teeth is of great importance to the process of dentition. It is a misfortune where they have been neglected.

A third condition of this special deformity is met with where it is evident that the slightest curtailment of the superior arch would destroy the harmony in articulation,—that is, the overriding is so slight that the extraction of two teeth might possibly result in the interior organs closing directly upon each other, or perhaps, indeed, in the inferior teeth closing outside. Two lines of practice here offer. The bicuspидati may be removed as before directed, and by the employment of an occipito-mental elastic sling, exhibited and described on a succeeding page, the inferior arch may be retracted; or the superior arch may be enlarged to an extent which shall afford the required space through the aid of instrumental assistance; or, still again, equality may

be maintained by the extraction of corresponding bicuspidati from the lower jaw.

Of appliances used in the correction of irregularities, every variety is to be met with. The operator will always, however, find himself best served in employing the most simple means capable of meeting indications.

Fig. 234 represents an apparatus devised by Dr. J. D. White, the office of its mechanism being the enlargement of the whole superior arch and the consequent accommodation of any outlying tooth or teeth. Taking an impression of an arch, a plate, in shape as shown, A, is made; this plate, separated into two parts, has its association preserved by a spiral spring, C, so arranged as to lie directly back of the teeth, being thus as much out of the way as possible. B, B represent crib bands for attachment to the first or second molar teeth, as may seem advisable. D, a hinge,

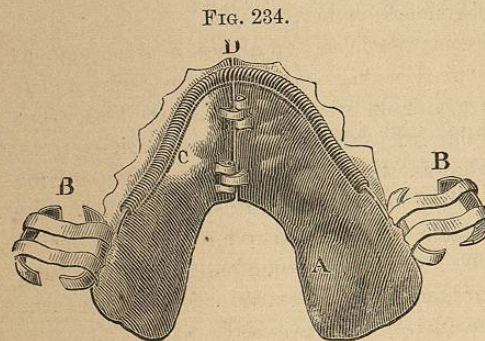


FIG. 234.

joins the parts in front,—a device, however, which, for the purpose now considered, is to be replaced with advantage by any arrangement admitting of lateral separation on the line of division. It is to be recognized that in the tendency of the spring to straighten itself the plate is separated, outward pressure being thus exerted against each tooth.

A second appliance, having similar import, shown in Fig. 235, is a device by Dr. A. Westcott. This apparatus possesses in its construction the ability to move outwardly any tooth or teeth requiring change of position. The instrument may thus be described: First, a double clasp (A, A), these clasps connected by a straight bar made of tubular wire. This tube has a screw cut in its inside the whole length, and is soldered

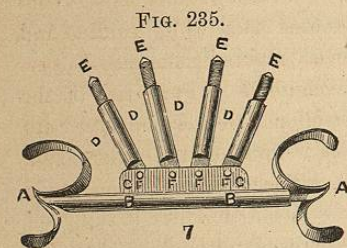


FIG. 235.

to one pair of the double clasps; the other pair of clasps are soldered to a wire which screws into the tube, the object being to lengthen or shorten the bar at pleasure. Next a flat piece (C, C) of sufficient width for hinge-joints is soldered to the bar. To these are connected by hinge-joints (F, F, F, F) a series of tubes (D, D, D, D), each having a screw cut on the inside, these receiving and accommodating an equal number of spurs (E, E, E, E). These spurs, as is recognized, screw back and forth as may be desired, and are therefore capable of pushing (in time) any tooth from its socket.

Such an apparatus prepared, the clasps are slipped about the teeth for which they have been adapted, and, slight depressions being reamed upon the posterior faces of such teeth as it is designed to move, the spurs are screwed forward, the point of each thrusting upon the depression prepared for it.

Examining the construction of this piece of mechanism, its peculiar adaptability to the end designed must certainly strike any one; a single weak point is the reamings used as supports to the spurs,—an objection which may, however, in many instances, be obviated by receiving them between a double ligature of gilling or bookbinder's twine.

The moving of the teeth accomplished, the apparatus is at once to be removed, the parts being maintained in their new position by fitting a plate covering the whole roof of the mouth, so constructed as to act like a wedge in its relation to the common arch. Fig. 248 exhibits such a retaining plate.

Still another means of enlarging an arch so as to afford room for outlying cuspidati consists in adapting to the lower denture an accurately-fitting envelope of metal, from the articulating face of which pass upward and inward springy flat spurs, against which, in the act of occlusion, the superior teeth close, thus being directed outward, and to such extent spreading the parts. A spur, of course, is not to strike either of the eye-teeth.

Coffin's system differs nothing in principle from that employed by Dr. White; its distinguishing feature depending on the principle of permitting a relative motion, or maintaining a particular controllable reaction, between two semi-independent parts, usually its symmetrical halves.

The general form of Mr. Coffin's apparatus, as described by himself, consists of a thin vulcanite plate capping or clasping some or all of the bicuspidati and molars, and fitting the lingual surfaces of anterior teeth, but divided along the median line (as shown in Fig. 234), into two distinct halves, connected, however, by a slight steel wire, so disposed that, while guiding and limiting their relative motion, its tension exerted between them may be perfectly determined and varied in direction and magnitude. Perfection of the model is insisted on, as an entire plate may fit well and securely, and yet both halves be so loose when divided as to be useless; while, on the other hand, the halves of a split plate may be easily fitted, which, before division, could not possibly be inserted.

As a means of dispartment, Mr. Coffin recommends piano-forte wire of a diameter varying between three- and four-hundredths of an inch. The extremities of this wire being buried in the lateral plates and bowed like to the spring C in Fig. 234, the character and nature of the tension becomes self-demonstrable. A modification of the bow suggested as an upper general expander is a three- or five-curve serpentine figure, like a rounded capital W.

The experience gained of steel wire, says Mr. Coffin, referring to his own practice, has led to its almost exclusive adoption for ordinary regulating purposes, as spring levers acting directly on the teeth, for pulling, pushing, or

rotating; and, being permanently fixed to the plate, their convenience, adjustability, and many adaptations are remarkable. Combined with a split plate, they are found to replace, with advantage, screws, inclined planes, wedges, levers, and ligatures, in their many local uses, and, moreover, are practicable, where nothing else can be applied.

The means just described is recommended equally as a widener of the inferior arch, and on trial is found to work satisfactorily. It is also recommended by its deviser as a means of securing room for the treatment of approximal cavities, it being maintained that less discomfort relates with such manner of dispartment than associates with simple wedges of wood or rubber even, as in the latter way the separation of two teeth is implied.

Passing here to another study, a case may be presented where, with room in the arch, the lateral incisors maintain a posterior position.

Fig. 236 exhibits such a condition. This is an irregularity capable of quick correction, as exemplified in the use of the bar (Fig. 237). This bar,

FIG. 236.

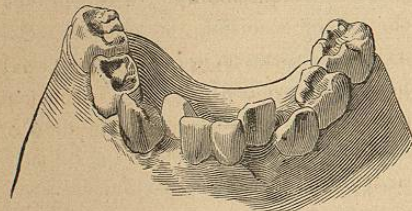


FIG. 237.



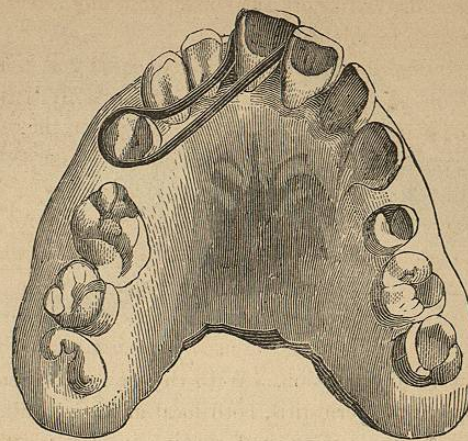
being adapted to the labial face of the teeth, is held in position by silk ligatures bound tightly to the misplaced teeth. A great improvement on the silk, however, as has been shown by Dr. J. H. McQuillen, consists in the substitution of india-rubber rings, applied, as will be understood by referring to the diagram, by being slipped into the holes through file cuts made from the face of the bar.

Another study is presented in Fig. 238. Here, it is seen, a central incisor is out of the arch. To correct this deformity a very common and very satisfactory practice is that exhibited. This consists in an india-rubber ring thrown about the projecting tooth, being stretched back until it reaches a bicuspid, around which it is placed. In thus employing the elastic ring, it will not infrequently be found that undue strain is exerted upon the base-tooth, making it quickly very sore. In these cases the ring is to be changed to other teeth, or assistance may be rendered by relieving the first tooth of an excess in strain by dividing the work by means of a ligature carried to some back tooth.

Fig. 239 exhibits another deformity. Here, as is seen, irregularity exists in both arches. The treatment consists in removing all the second bicuspidati, above and below, and throwing india-rubber tubing ligatures around the six-year molar, and the left inferior first bicuspid and cuspid, drawing the two

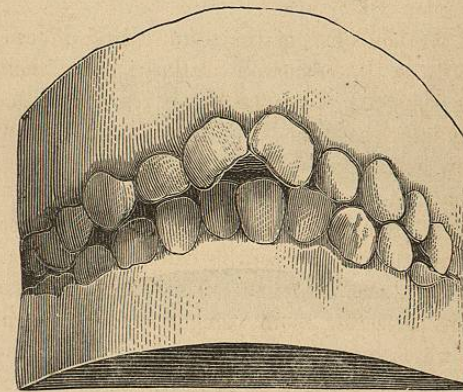
latter backward into the arch, at the same time passing a silk ligature around the lower incisors (Fig. 240) in such manner as to force into position

FIG. 238.



an overlapping central. In the upper jaw a plate (not a necessity) may be adapted to the palate, secured by silk ligatures to the first permanent molars. Pins are to be placed in the plate in such manner as to allow of

FIG. 239.



the attachment of two elastic bands, which are secured by silk threads to the central incisors (Fig. 241), drawing thus upon the mesial face. Other bands are so arranged as to draw upon each lateral angle of the centrals, passing between these and the laterals from their palatine faces, and running along the labial and buccal faces to the first molar of either side. Tubing is now to be thrown around the remaining superior bicuspid of either side and the molar, for the purpose of approximating these teeth, thus affording space for

the proper placing of the irregular centrals. By this arrangement, nine ligatures will be exercising traction at the same time, gradually and beautifully

FIG. 240.

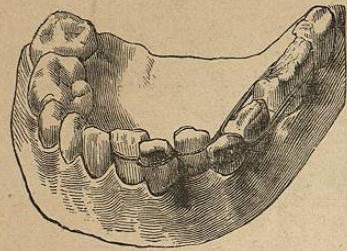
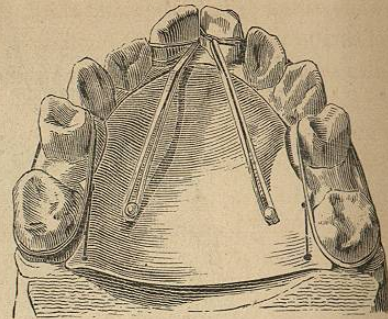
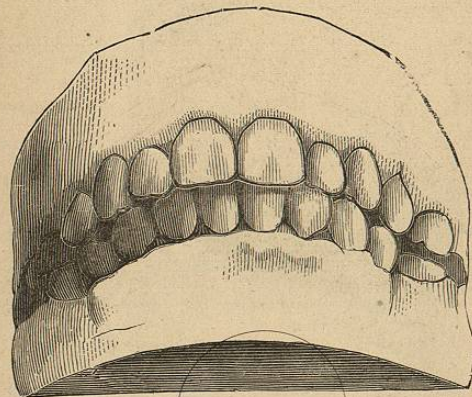


FIG. 241.



performing their work of correction. With the view of preventing periosteal irritation from becoming periostitis, both local and constitutional treatment may be required. A simple manner of turning incisors, related as shown in Fig. 241, is to lay across the labial faces a simple bar, which is attached by

FIG. 242.



means of elastic to a second, which, when in place, will pass across the mouth from bicuspid to bicuspid.

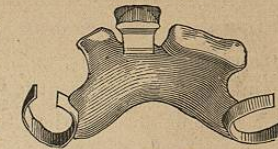
Another study, to which attention may be directed as being a quite common condition, resides in that articulation in which the anterior teeth of the superior jaw, in place of overriding the inferior, close directly upon them. This manner of bite, when found in elderly persons, is not to be remedied by any change in the position of the teeth, but by the adoption of some mechanical device, which shall relieve the organs of the abrading influence to which they are subjected, and which, unrelieved, will wear them to the gums.

To treat such a malarticulation, three modes have been employed: one consisting in a metal cap inclosing the molar teeth, this keeping the anterior organs apart and taking the strain of mastication; second, a cap to be worn over the front teeth while eating (Fig. 243); and third, the cutting of cavities in the antagonizing faces of the abrading teeth, and building thereon faces of gold.

Fig. 244 exhibits a malarticulation known as "underhung,"—the teeth of the lower arch closing beyond the upper. To correct this deformity, different operators employ different means. A first consideration is as to the nature and cause of the condition.

Protrusion of the inferior teeth may exist in a variety of reasons. The jaw itself may be elongated, the angle being too obtuse for the age. The

FIG. 243.



Cap for Front Teeth.

FIG. 244.

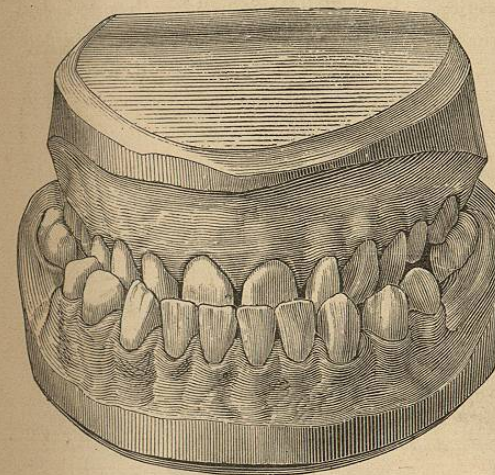


FIG. 245.



body of the lower jaw may be out of proportion to the upper. The teeth themselves may unduly spread or evert. The fault may be in the superior denture.

An anatomico-physiological examination of the inferior maxilla exhibits a body and ramus whose angle of relation varies with the age of the patient, or some other influencing circumstance. At a very obtuse angle in young life, it passes to the right angle in adult life, to fall again into obtuseness on the approach of old age and the loss of the teeth. The three illustrations (Fig. 245) represent these varying conditions,—the first, the infant bone, being very obtuse; the second, the adult, being at a right-angled relation; the third, the bones of an edentulous old person, having the ramus almost on a plane with the body.

BIBLIOTHECA