

Irregularities of the teeth : their surgical treatment : a paper read before the Association of Surgeons Practising Dental Surgery / by Francis Fox.

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Fox, Francis.
Royal College of Surgeons of England

Publication/Creation

London : H. Doughty, printer, [1880]

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IRREGULARITIES OF THE TEETH

THEIR SURGICAL TREATMENT.

A PAPER READ BEFORE THE ASSOCIATION OF SURGEONS
PRACTISING DENTAL SURGERY.

BY

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(Reprint from the Lancet and Medical Times and Gazette.)



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MR. PRESIDENT AND GENTLEMEN,

In bringing the subject of irregularity in the arrangement of the permanent teeth before you this evening, I shall endeavour to regard it in its broad and general aspect, rather than to indicate any specific methods of treatment by mechanical appliances. Not that I would seem to disparage such treatment, indeed I am fully alive to the necessity, in some cases, for carefully adjusted mechanical force, but I am also firmly convinced of the importance of early surgical interference, and am persuaded that when this latter treatment is judiciously exerted, we can frequently dispense with mechanical assistance altogether.

Permit me, then, to occupy a short portion of your time in reviewing the chief physiological facts respecting the development of the teeth and jaws, as a prelude to the consideration of the abnormal conditions which may occasion their deformity.

The germs of the teeth are, as you well know, manifest at a very early period of embryonic existence,—those of the temporary series having been demonstrated at about the sixth week, and those of the permanent set some months before birth. I need not here dwell minutely on the various periods of development of the dental structures; how the enamel organ is formed by a dipping down of the epithelial layer of the membrane forming the jaws at this epoch; or how the dental organ or papilla consists of a projection of the submucous tissue; or how about the sixteenth week of gestation, the temporary germs become enclosed in their membranous capsules when calcification commences; or how about this time the germs of the permanent teeth are becoming developed by a reduplication of the oral mucous membrane from the necks of the temporary tooth germs; or how the calcification of these teeth commences a little before birth. It will suffice that I remind you that the process of development is a very gradual one, and in neither case is it quite completed until some time after the teeth have assumed their ultimate position. We therefore at once perceive how liable these structures are to be affected by any untoward circumstance which may arise in the course of development and growth of

the body. Without doubt the early decay of teeth, which so sadly marks the present generation, is to be traced to some malnutrition occurring in the very earliest periods of life, and is due in a large measure to the neglect by parents of those fundamental laws of hygiene which will not with impunity be set aside. At about seven months after birth a process of absorption commences in the walls of the crypts and parts superimposed and by this process the crowns of the temporary teeth become visible above the surface of the gums. When the crowns of the teeth are erupted, the absorptive action for a time ceases, and a renewal of the developmental process ensues by which the fangs of the teeth are completed and their alveoli built up around them. At about four years of age the temporary dentition is perfected, and soon after this perfection is attained a process of absorption again sets in, commencing now in the fangs of the temporary teeth, and these, together with their alveoli, are gradually removed, their permanent successors replacing them by an exactly similar process of absorption of crypt and subsequent development of fangs and alveoli. The important point for us to bear in mind is the fact that the alveolar portion of the jaws is developed with each dentition, so that a previous alveolar structure can have little to do with the position of the succeeding teeth, except as it may present an obstacle to their onward progress in consequence of its non-absorption.

Let me now refer briefly to the development of the jaw-bones. These bones consist of two distinct portions (A) an alveolar structure, which we have just seen to be developed with the temporary teeth, absorbed with them, and again redeveloped with the permanent teeth; and (B) a basal portion which is more prominently marked in the lower jaw, in which the inferior dental canal very emphatically indicates the junction between the two portions of the bone. The base of the jaw when once formed remains in pretty much the same condition throughout life, except in advanced old age, when the muscles of mastication are no longer in full use, and then in a slight degree it becomes wasted. In the superior maxillary bones at birth, the alveolar processes descend but little below the level of the palatal plates, and the anterior and posterior surfaces are as yet but imperfectly developed. As age advances the alveoli lengthen and the tuberosities increase in size and an active development of bone takes place in these

situations. The tuberosities are to the upper maxillæ what the coronoid processes are to the lower jaw; from these points the alveolar line is lengthened. In the lower jaw an alteration in the position of its articular surfaces and ascending rami, together with an absorption of the coronoid processes, accompanies the development of the posterior permanent teeth. The bone is lengthened by additions to its posterior cornua, and is not increased in size by any alterations in its anterior part; for the capacity of the jaws in childhood is equal to the anterior portions of the adult bones: the ten anterior teeth of the permanent set in each jaw, replace the temporary, and occupy the same positions as these, so that if there should be an imperfect development—a want of capacity—in childhood the same condition will remain throughout life.

The replacement of the temporary teeth by their successors is effected by a purely physiological process, and is absolutely independent of pressure. There appears to be a physiological law by which the cells in the neighbourhood of a developing tissue, have the power of absorbing a mature structure. That pressure from the advancing tooth has nothing to do with the process, may be proved by the fact that in cases in which the shedding of the first teeth has taken place prematurely, a layer of bone has often been observed to intervene between the crown of the advancing tooth and the base of the socket of its predecessor. At the time when the temporary teeth are about to be shed we notice in the well developed jaws of the child, a decided separation between contiguous teeth; and this circumstance is a fair indication of a future regularity in the succeeding dentition and an evidence that the jaws have already been prepared to receive the larger permanent teeth. Should the process of absorption continue uninterruptedly, the fangs of the temporary teeth will be gradually removed, leaving little more than the crowns which readily drop from the gums as their successors advance to occupy their vacant spaces. But should any arrest in the process occur (and such is far from an uncommon circumstance) these temporary organs are prone to offer very considerable obstacles to the regular advance of their permanent successors. But let me not anticipate what I have to say under the next division of my subject, viz. —

The Causes of Irregularities of the Teeth. The causes which give rise to abnormal positions of the permanent teeth, may

arise during the developmental periods of life, or may be occasioned by some accidental circumstance subsequently. In the first case the malposition will be due to a disproportion in the size of the teeth and jaws or to a faulty development of these bones; in the latter to such circumstances as the prolonged retention of the temporary teeth, the presence of supernumerary teeth, the habit of "Thumb-sucking" or to undue pressure from a like cause.

There is abundant evidence to prove how frequently such deformity depends upon hereditary influences, how constantly do we observe certain peculiarities in dentition, such as an absence of one or more of the dental series, occurring in the offspring of parents who have suffered the same defect. The conditions of life also to which our race has, for so many generations, been subjected, seem to have lessened the necessity for the broad and well-formed jaws which were so characteristic of our early ancestors; certainly for many years the advance in civilisation has been marked by a deterioration in the capacity of our jaw-bones. Mr. COLEMAN in some interesting investigations made some years ago, found that the percentage of contracted jaws was immeasurably greater in the children of the "well-bred" population than in those of less refined cultivation. The prolonged retention of temporary teeth or their decayed remains, is a frequent cause of irregularity; and the presence of supernumerary teeth in the dental arch may prevent the normal members from assuming their proper places: but doubtless a disproportion of size between the teeth and jaws is of all causes of irregularity the most common. This disparity leads to a crowding of the teeth, sometimes to such an extent as to altogether prevent the eruption of some one or more of the dental series, these remaining impacted in the substance of the bones. Certain injuries in early life may occasion displacement of the permanent teeth, especially in the lower maxilla, such as the contraction of cicatrices after burns about the face and neck.

I will now mention some of the varieties of irregularity, and for the convenience of description, they may be divided into two classes, *Simple* and *Compound*. In simple irregularity the misplacement is confined to one jaw, and is independent of the position of the teeth in the opposing jaw. Compound irregularity depends upon an abnormal position in the teeth of the opposing jaw.

The crown only may be irregularly placed—the apex of the root retaining its normal position—or the entire tooth may be displaced or faulty in its development. In this case the tooth is often entirely removed from the dental arch and may be impacted in the substance of the jaw. When the apex of the root retains its normal position, much good may be effected by judicious treatment, but when the entire tooth is displaced little can be done to remedy the evil, except by the removal of the offender.

As examples of “Simple irregularity” I would mention the eruption of the permanent canines above the alveolar ridge or in the palate, owing to insufficient room for them in the dental arch. An early loss of their temporary predecessors, by permitting the first bicuspids and the lateral incisors to approach each other, and thus to narrow the space for the reception of the permanent canines, is not unfrequently the immediate cause of this displacement. Sometimes, however, the undue retention of the temporary canine or the presence of a supernumerary tooth will occasion the deformity. In treating these cases we should always bear in mind that time will aid us greatly in the gradual development of the posterior portions of the jaws; however, it is often necessary to remove one or more of the posterior teeth before sufficient space can be obtained.

Frequently there is some difficulty in determining which teeth shall be sacrificed; of course if any are decayed, they should be selected; but if all are sound, most authorities recommend the extraction of the first permanent molars as being the teeth most liable to decay; but we should take into consideration the age of the patient, for if the deformity has existed for some time the removal of a bicuspid will more quickly remedy the evil. An overlapping of the incisors is another form of “Simple irregularity” and frequently requires for its treatment similar surgical proceedings to those just described, and not uncommonly we have to resort in addition to some mechanical appliance in order to obtain regularity in these teeth.

Another form of “Simple irregularity” is seen when an incisor tooth (central or lateral) is more or less twisted on its axis, so that the side of its crown may occupy the position which should be held by its anterior surface. A forcible and immediate twisting of the tooth into its right position is the treatment very generally

adopted in such cases. I have seen several examples of this deformity and have myself performed the "immediate operation" of twisting, and invariably with success. Others are averse to this prompt treatment, and suggest the employment of a plate carefully adjusted to the palate and having certain properly constructed points of resistance, by which the tooth may be gradually twisted round into a normal position. The advocates of this treatment argue that by "immediate" twisting there is some possibility that so much injury may be done to the pulp and soft tissues around the fang, that the life of the tooth may be in jeopardy. I can only say, in my experience, such a mishap has not occurred, and that I am inclined most firmly to support the first proposed mode of treatment, viz., by forcible and immediate turning.

An unsightly separation of the Central incisors in the upper jaw sometimes occurs, and if this deformity should continue after the eruption of the lateral incisors, it may be necessary to draw them together by means of a ligature passed around their crowns. In treating these cases care should be taken to prevent the ligature from slipping below the edge of the gum, for the irritation set up by such an accident has been known to cause the death of these teeth. In order to prevent any displacement a small plate may be constructed to which the ligature can be attached and thus prevented from shifting its position.

The second form of irregularity is dependent upon an abnormal position of the teeth in the opposing jaw. As examples I may cite cases in which the "bite" is intersecting or altogether under-hung some or all of the six front upper teeth being shut, in closing the mouth, behind the corresponding teeth in the lower jaw. This condition arises in consequence of an excessive development of the lower jaw, or of a want of development in the superior maxillary bones. It may also arise from a retardation in the eruption of the superior incisors or by these teeth being pushed inwards by the prolonged retention of their temporary predecessors. An early treatment of this irregularity is all-important, and should consist in the removal of any opposing or obstructing temporary or supernumerary teeth, and in preventing the contact of teeth in the opposite jaw, this can only be insured by the employment of a well constructed mechanical appliance.

Another form of "compound irregularity" sometimes occurs

in which the *incisors of the lower jaw* "bite" close up to the palate, so that they press against the necks of the upper teeth and push them forward. This deformity is liable to occur when the six-year-old molars are lost before the second permanent molars have erupted sufficiently to form the necessary 'prop' in order to prevent an undue closure at the anterior parts of the jaws.

A Separation of the incisor teeth in the opposing jaws, is occasioned by a congenital malformation of the lower jaw, the oblique position of the ascending rami, natural in early development, being unduly maintained: there may be also a want of development in the alveolar portions of the bones, especially in the regions of the molar teeth, thus permitting these teeth to come into contact before the incisors. Contractions of cicatrices in the throat and neck may also give rise to this form of irregularity.

The bicuspid teeth are not unfrequently misplaced, and when so, they usually occupy a too inward position. This may arise solely from their having been prevented from assuming their proper position in the dental arch by the prolonged retention of the temporary molars, but usually is dependent upon a diminished capacity of the jaw, and in the superior maxilla is generally associated with a projection of the incisor teeth, and a more or less elevated palate, constituting *the V shaped jaw* or "*Rabbit-mouth.*" This malformation is congenital, but, except in very exaggerated cases, is not manifest until the posterior permanent teeth are about to be erupted, when the additions to the maxillæ have been made for their accommodation; the newly formed bone which has been gradually developing, is now found to be placed at an angle with the pre-existing alveolar line; this has arisen in order to effect a harmonious arrangement with the other bones of the cranium; the maxillary bones having been imperfectly developed during early childhood, the subsequent additions for adult conformation are placed in a wider circle; hence the point of junction between the two portions (the old and the new, so to speak) is marked by an angle of more or less extent. This deformity is usually associated with great delicacy of constitution, and may occur in those of weak mental power, but is also often to be observed in persons of considerable intellect. The treatment of these cases consists in endeavouring to gain an increase of space in the dental arch, by the removal of certain teeth, and to diminish the projection of the upper front teeth, by a mechanical contrivance.

Irregularity in the Wisdom-teeth is often met with, and may give rise to very serious mischief, when extraction is the remedy.

Transposition of one or more of the teeth does occasionally occur, when usually it will be found amongst the anterior teeth. I have seen a canine in the upper jaw placed between the first and second bicuspid of the same side, and other irregularities of this kind have from time to time been recorded.

Inversion of the teeth is of rare occurrence. Mr. Salter has recorded a case in which both the superior lateral incisors were growing upside down, the crowns of the teeth appearing in the nostrils, from which situation they were removed.

In considering the treatment of irregularities of the teeth I have wished to confine my remarks very much to the surgical proceedings which are calculated to benefit, and I would venture, Sir, in conclusion, to refer once more to this subject. When the displacement of a tooth is complete, it will either remain impacted in the jaw-bone, or the irregular conformation of its root will not permit it to range with its fellows in the dental arch, therefore the removal of any of the normally placed teeth, in order to gain increased space, will be of no avail. But when irregularity is the result of over crowding or of a disproportion between the size of the teeth and jaws, much may be done by surgical interference to relieve the condition. I look upon the timely extraction of temporary teeth as a matter of considerable importance; for the prolonged retention of these I have frequently seen to be the direct cause of irregularity in their successors. That temporary teeth should not be prematurely extracted I am most willing to allow, but when their time is accomplished and when from any cause they are impeding the advancement of their successors, I cannot conceive that mischief can arise from their immediate removal. Some have stated that their removal by other than the natural process, is liable to cause contraction of the jaw bones; this statement our present knowledge of physiology entirely controverts, for we know that the alveolar portion of these bones is removed with the temporary dentition and that an entirely new structure is developed with the succeeding teeth. Some subsequent difficulty may arise from the premature extraction of certain of the deciduous teeth, viz., the posterior temporary molars, before the eruption of the first permanent molars, and the temporary canines, but this difficulty is altogether independent of contraction of the jaws properly so called.

In cases of advanced irregularity, it will often be necessary to remove one or more of the permanent teeth, and then the selection should generally fall upon the first molars, as being the teeth most liable to decay, but under certain circumstances upon the bicuspid teeth.

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