

Original Communications.

ON THE CAUSES OF THE EVILS INCIDENT TO INFANT DENTITION.

By J. C. CLENDON, M.R.C.S., Dental Surgeon to the Westminster Hospital.

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I THINK no one will dispute the fact that, notwithstanding the great progress which medicine and general surgery have made within the last fifty years, yet, so far as the profession at large is concerned, dental-surgery has remained stationary. The errors, delusions, and questionable practices of the ancients with regard to the teeth, handed down and repeated through succeeding ages, are rife at the present day, not with the uneducated merely, but amongst medical practitioners themselves.

It would seem that the authorities shut their eyes to the plain truth, that these same practitioners of medicine and surgery are, and must remain, the actual surgeon-dentists to the great bulk of the people all the world over; for the poor—in rural districts—in the army—on board ship—and in the colonies—there can be no other; besides that everywhere and with all classes, the medical man, and the medical man only, is in the first instance called in, in numberless cases, not apparently, but really, connected with the teeth; when, from never having studied the peculiar influences they exert on the general health, he is frequently unable either to detect the source of the suffering, or to suggest a remedy.

Now, much as we may regret the want of progress in this department of knowledge, there is no room for surprise, when we remember that the College of Surgeons persists in separating between this branch, and surgery in general; on the one hand, sanctioning (most unwisely I think) a fragmentary education for special practitioners of the dental art, ignoring its own members altogether; and on the other, with regard to these its own members, not requiring that diseases and treatment of the teeth should be included in the curriculum of medical education at all, so that, although a gratuitous course is given yearly at most of the metropolitan schools, very few pupils avail themselves of it. The great majority enter upon the actual work of their profession, wholly ignorant of one entire branch of its duties; though it is certain that they must perform this portion of their duty when called upon to do so, whether they like it or not; and moreover, that without some knowledge of this subject, many of the cases within their so-called legitimate sphere will prove but hopeless enigmas, or mere guess-work; as, for instance, amongst many that might be given, in the case of infants committed to their medical care during that critical process, more productive of suffering—more pregnant with mischief—more frequently fatal in its results—than any other ordeal to which human nature is liable—I mean *infant dentition*.

To this let us now direct our attention. An infant, healthy from its birth, continues to thrive until the seventh or eighth month, when it suddenly becomes restless, fretful, and impatient at the breast. The medical attendant is called in, and on hearing of the symptoms, examines the mouth, finds the gums heated and swollen, and at once ascribes the evils to teething, that is, as he understands it, to the pressure on the gum of an advancing tooth. To take off this pressure and *liberate the tooth* he at once has recourse to lancing; after which, the child, relieved in some measure by the loss of blood from the inflamed parts, and weary from its crying and struggling, as well as from long pain and restlessness, drops off to sleep, and the mother is satisfied. But does the

medical man really believe that he has liberated the tooth? Is he not perfectly certain, if he thinks on the subject at all, that, while no gum-obstruction could hinder that tooth if it meant to come, so likewise no gum-lancing, nor any power on earth could bring it out of its hiding-place, one day or one hour before its appointed time. In making these observations, I beg especially not to be misunderstood: I do not pretend to say, that the most experienced and scientific surgeon-dentist could by any means always grapple successfully with these most intricate and difficult cases; but I do mean to say that such cases cannot be judged of fairly by those who have not studied the parts with which they have to deal; I do contend, that gentlemen of a learned profession should not be satisfied, even if the authorities are, without some personal knowledge of the subjects they undertake to treat; and that, inasmuch as wrong theory is sure, both to lead to wrong practice, and also to prove a barrier to the perception and admission of truth, and to all improvement, therefore, false views should be combated wherever found, and by whatever authorities supported.

I grant that there are on this question authorities enough. The treatment above described has been recommended and practised time out of mind. To go no further back than a hundred years, in 1770, Mr. John Hunter published his treatise on *The Natural History of the Teeth*, the first standard work which appeared in this country, and which keeps its ground to the present day.

In a short chapter on *Teething, or the Cause of Pain in Cutting of Teeth*, he says, "these twenty teeth in cutting the gum, give pain, and produce many symptoms which are often fatal to children in dentition. It has been generally supposed that these symptoms arise from the tooth's pressure on the inside of the gum, and working its way mechanically; but the following observations seem to be nearer the truth. The teeth when they begin to press against the gum, irritate it, and commonly give pain, the gums are then affected with heat, swelling, redness and other symptoms of inflammation. The gum is not cut through by simple or mechanical pressure, but the irritation and subsequent inflammation produce a thinning or wasting of the gum at this part; for it often happens that when an extraneous or a dead substance is contained in the body, that it produces a destruction of the part between it, and that part of the skin which is nearest it, and seldom of the other parts, excepting those between it and the surface of a cavity opening externally, and that by no means so frequently. And in those cases there is an absorption of the solids or of the parts destroyed, not a melting down or solution of them into pus. The teeth are to be looked upon as extraneous bodies with respect to the gum, and as such they irritate the inside of that part in the same manner as the pus of an abscess, an exfoliation of a bone, or any other extraneous body, and therefore produce the same symptoms, excepting only the formation. If, therefore, these symptoms attend the cutting of the teeth, there can be no doubt of the propriety of opening the way for them; nor is it ever, as far as I have observed, attended with dangerous consequences."

Mr. Hunter is not so clear and concise in his reasoning as usual; it seems to me, that starting with the full belief that pressure of the advancing tooth on the gum is the cause of the suffering, he is quite at a loss to account for it, since there is no analogous suffering from "extraneous bodies, or exfoliating bone working its way to the surface, or from the rapid absorption of bone from pressure of the sac of an abscess." Now it is quite plain, as Mr. Nasmyth has observed, that this distinguished physiologist had not paid any great personal attention to the diseases of the teeth, but obtained much of his information from others; and hence we find that many of the opinions, amusing conceits, and objectionable practices,

commonly ascribed to Hunter, were borrowed from Ambrose Paré's book on the same subject, published in Paris two hundred years before.

We pass over Blake—for the sake of brevity, not from want of merit in him—to the year 1803, when Mr. Fox published his large and valuable work in two volumes, *On the Natural History of the Human Teeth*." Mr. Fox was for many years Surgeon-dentist of Guy's Hospital, and the first regularly educated surgeon who practised special dental surgery. In Chap. x. *Of the Diseases which Attend Dentition*, Mr. Fox says, "The period of dentition in children is generally considered one of the most critical in life. In infancy, the *animal frame is so delicate* that the least local irritation produces a sudden and universal sympathy throughout the whole body. Hence the excitement occasioned by the passage of the teeth through the gums often gives rise to the most alarming constitutional symptoms, which are always with difficulty alleviated, and not unfrequently terminate in death." Mr. Fox is more clear in his argument than Mr. Hunter, but he agrees with him in opinion, and adopts the same theory, viz., that the evils arise from the pressure of an advancing tooth, causing ulceration of the gum; and recommends the lancing of the gum to relieve its tension by liberating the tooth.

Mr. Thomas Bell, a fully educated surgeon, succeeded Mr. Fox as surgeon-dentist to Guy's Hospital. In his work *On the Anatomy and Physiology of the Teeth*, published in 1829, Mr. Bell complains that the study of the teeth is too generally neglected by medical men during the period of their professional education, and, that when in practice they find the necessity for more extended information on the subject, they seek in vain for books from which to derive the knowledge that they had neglected to acquire during their attendance upon classes. Mr. Bell coincides with and repeats the views entertained by Hunter and Fox, attributing the evils of dentition, to the obstruction offered by the gums to the advancing teeth. He says, "a recurrence to the relative condition of the teeth to their including parts, at that period when they are about to pass through the gum, and to the means by which their exit is effected, will readily explain the causes of those numerous and severe affections, both local and constitutional, to which infancy is exposed at this important and critical epoch." He contends that, "it is only by removing the pressure which has occasioned all the mischief, that anything beyond the mere temporary palliation of the symptoms can be hoped for. As soon therefore, as any of the affections now described, or others which can possibly be supposed, shall arise, the gums should be carefully examined and wherever there is any unusual redness or turgescence, and especially if it occur over the part where the next tooth is expected to appear, the including parts should be freely and effectually divided. It is not sufficient that the incision should merely pass through the gum, the lancet must be carried down to the rising tooth, and only stopped when resistance of its point is felt against the edge of the instrument." Mr Bell enumerates the constitutional effects and severe diseases, which frequently arise from dentition, immoderate diarrhoea, difficulty of breathing, eruption on the skin, convulsions, hydrocephalus, idiotcy and death. He recommends appropriate medical treatment; but, in common with his predecessors, maintains that the cause of the mischief is the obstruction of the gum, and the prompt remedy, its free incision.

There is a remarkable uniformity of opinion in the three great authorities I have quoted; and a firm belief in its truth is all but universal at the present day. So I was taught, and so I believed and acted, until being called upon to instruct others, I was led to study the question for myself.

I will now ask you to go with me, as briefly as may be, over the grounds on which I feel it impossible to avoid arriving at conclusions, different from those of our justly

esteemed predecessors, whose works I have quoted. Of course, you will not take my word for it that my views are right, but if you will kindly give me your attention, you will be able to weigh the evidence on both sides; even then, I do not expect or desire that the opinions, or if I may so say, the prejudices of a life-time should at once give way. All I hope is, that if but a germ of truth can be made to appear, there will be just that much more chance of error giving way and truth gaining ground sooner or later.

Endeavouring, then, to view the question in all its bearings, we are led to consider:—

1. That amidst the wonderful harmony and adaptation to their purpose of all the works of the great Author of our being, this alone could not have been left imperfect. In the inferior animals we do not find it so; those, for instance, most closely allied to ourselves, both in general development and in the structure and anatomical arrangement of the teeth, give no evidence of this sort of suffering and derangement. There seems to be little or none of it amongst savages; and we could not suppose that God had specially willed and ordained for the highest of His creatures, that they should undergo an inevitable operation on the very threshold of their existence, such risk and evil as fall to the lot of no others. God's plans are always wise and beneficent; it is man who mars what was created good.

2. That, while a large proportion of infants suffer seriously and are subject to such dire diseases, as a result of dentition, in others there is only slight constitutional derangement; whilst in others, again, the same operation proceeds to its termination, unfelt and unnoticed, without any disturbance whatever.

Passing from these general considerations to more particular ones, we observe,

3. That the period of suffering is limited, being, as a rule, from about the eighth to the eighteenth month, when dentition is not half completed.

4. That the teeth erupted in that period are the smallest and sharpest of all; they could cut their way through gum tissue almost as well as a lancet, yet they come with so much difficulty; whereas at a later period—about the thirtieth month—the four largest of the twenty temporary molars, pass through the gum quietly and unobserved.

5. That again, at a later period, about the sixth year the four first permanent molars, the largest of the adult teeth, advance also without pain or observation.

6. That the roots of the twenty temporary teeth are absorbed, and the twenty permanent teeth come forward into their places without any trouble whatever.

7. That the twelve large molar teeth, added on behind or beyond the original twenty, large and obtuse as their surfaces are, pass through the gums and assume their positions in the dental arch in the same quiet manner.

8. That the gum is a tissue of low organisation, endowed with but a small degree of vitality and sensitiveness, as is proved in cases of premature loss of teeth when the gums are frequently used for mastication in their stead, without suffering or inconvenience. And further, the gum is an elastic easily-yielding substance, totally incapable of resisting the pressure or advance of a sharp cutting edge; as is shown, when with artificial teeth there is any uneven pressure; in that case, the edge of the plate will cut or ulcerate through the gum, and rest on the bare maxillary bone, in the course of a few hours; again it is shewn in the passage of pus (from periostitis) through the bone (alveolus) and through the gum, in gumboils, in twenty-four hours.

There are different theories for the mode of advance of the tooth through the gum, by anticipation, by absorption, or by ulceration. Certainly the *necessity* for its advance is the addition of its root. In infant jaws the bodies or crowns of the teeth occupy the entire depth of the alveolar cavity; when, therefore, the ossification of the

elongated pulp proceeds, and the root is adding on, the body must escape from the cavity through the gum, just in proportion to the increase of root; so that, whether it is the *vis nature*, ordinary development, or the *vis a tergo*, the addition of root forcing the body onward, the tooth *must* advance, no resistance even of solid bone could possibly withstand it, how much less, then, could gum!

These were some of my difficulties and objections with regard to the hitherto admitted theories. We have seen that the period of suffering is limited to about ten months, from the eighth to the eighteenth of the child's life, and it is manifest that Mr. Fox's mode of accounting for this limitation, viz., "that in infancy the animal frame is so delicate, that the least local irritation produces unusual sympathy," etc., can not hold good, inasmuch as infant delicacy does not cease with the eighteenth month, neither do infants suffer more than adults from operations, injuries, etc. We have seen, too, that while all the later and blunter teeth make their way with no pain at all, the great period of suffering coincides with the eruption of the sixteen small sharp temporary teeth, which would cut through anything. All these considerations made it clear to my mind that the suffering did not arise, as was supposed, from the pressure on and resistance of the gum; that we must therefore retrace our steps, and failing to find the satisfactory and sufficient cause of the mischief in the third or eruptive stage, must look for it in the second or saccular stage of development.

Now, what is the condition, what are the contents of the maxillary bones, six months after birth, just when the first teeth are about to appear? We have in those hidden cavities forty-four bodies, perfect or in progress, organs destined to last for life. Here is before you a preparation of first and second dentition, containing forty-eight teeth, more than half of them of full adult size, packed away in every direction, like bees in a hive, all elbowing and pushing their way to obtain space. And we must remember that although, in the dry preparation, the tooth alone seems to fill the socket, leaving no room to spare, yet that in life each one, besides the pulp, has also its own proper covering, the dental sac with its external and internal coats, and an enamel organ with a considerable interspace; the sac, too, highly vascular, and sensitively endowed with branches of the trifacial nerve. Trace back this nerve to its source, to the pons varolii and the floor of the fourth ventricle, where it is in close proximity to the glosso-pharyngeal, pneumogastric, spinal accessory, and spinal nerves, and at once the whole train of evils, difficult breathing, immoderate diarrhoea, convulsions, squinting, effusion on the brain, and death, are easily accounted for.*

Imagine some forty or fifty of those highly organised dental bodies, supplied with branches of this nerve, closely packed in the maxillary bones, and that any obstruction or arrest of their natural development should arise from

the cramped position and want of space, and ask yourselves—Is not that much more likely to derange the whole economy, than the simple passage of a tooth through gum?

To impress you more fully with the effects of the crowding of the teeth in the maxillary bones, let me call your attention more particularly to one tooth, the first permanent molar, the largest tooth of adult age, as the one more likely to be the cause of evil than all the others, perhaps, together. At the period of suffering, the crown of this tooth is fully formed, and struggling into position in the dental arch. Here is one before me of its usual size; and here, also, are four of the same, lately removed from the jaws of a young child. Picture to yourselves four such monstrous teeth existing in the compressed arches of some children under twelve months old, whom we see, and can you be astonished at any amount of evil that ensues? To account for the subsidence of all unfavourable symptoms in the third year, we must remember that these teeth are then already in position, *under* the gum, the jaws are relieved of the presence of twenty teeth, and, to accommodate the remainder, the bones are also considerably enlarged.

Reviewing the whole subject—bearing in mind the condition of the teeth and dental sacs, in relation to the maxillary bones—I come to the conclusion that, when the development of the teeth, and the growth of the bones that contain them, proceed in relative proportion and in due order, there you have natural and harmless dentition. On the other hand, when the development of the teeth proceeds rapidly, and the jaw-bones are preternaturally small, then you have the train of evils so often referred to, commencing with simple diarrhoea, and terminating in death. That the maxillary arches often are preternaturally small, we have frequent evidence in the crowding together of the permanent teeth; in which cases we are compelled to remove some of them, to make room for the remainder.

I am continually asked, "But, if you reject the old views, how do you account for the relief which gum-lancing immediately affords? That it *does* so, can hardly be denied." I do not deny it. I admit it fully. But, if the theory of the practice were true, it should result in the emancipation of the tooth, which it does not; it is only a palliative, as its highest advocates admit; the evil is in no wise cured, and will be sure to run its course. No doubt the blood-letting, and the incision itself, like any other counterirritant, may afford temporary relief; though, perhaps, still greater might be obtained by the application of a leech or cupping-glass to any part of the inflamed gum, could such means be adopted in an infant's mouth. The lancing may do no harm, though of this I am by no means sure, but the principle involved in it is wrong; and it would be, indeed, an unworthy argument for a scientific man, that he does no harm, when, by seeking right principles and following them out, he might instead be doing a great amount of good.

Finally, I may be asked—What, then, do you propose? That is quite another question, and a very wide one. At present, I propose nothing but that we should start fair; should disabuse our minds of wrong views, so as to admit right ones; should remove error from our path, in order to see the way to truth. My only wish, in fact, on this subject is, that we should strive to ascertain the real causes of the evils we have been discussing, in the hope that better knowledge, and more appropriate treatment, may be attended with happier results.

I have given you a slight sketch of my views, not hastily formed, any more than your own, but arrived at through considerable experience, and after much thought; and not having, as I said before, the smallest idea that your own mature opinions can be suddenly relinquished, nor wishing any opinion to prevail unless it be *the truth*, I now leave the question to your calm consideration.

* "If we now examine the influence of the trigeminus on the other nerves, we shall discover in its functions a full explanation of the consequences I have described. The trigeminus is in fact the reflex nerve, *par excellence*; for stimuli applied to its different branches, everywhere give rise to reflex phenomena in the neighbouring nerves. That the trigeminus forms connexions with the nucleus of the facial nerve, may be inferred, *a priori*, as every irritation of the face, for example, in pain, immediately produces a reflex action of the muscles of the face, betraying an intimate connexion between the facial nerve and the trigeminus. What use there is in the connexion between this last nerve and the auditory, I cannot clearly see; we know too little of the action of the bones of the ear, and of hearing itself, to explain it. It is scarcely necessary to dwell upon the use of the connexions of the trigeminus, considered as a reflex nerve, with the glosso-pharyngeal, vagus, accessory, and hypoglossal nerves, in swallowing, inspiration, coughing, sneezing, etc. These connexions are, however, sufficient to explain the peculiar course of this root of the trigeminus, which alone of all the nerves extends from above downwards through the medulla oblongata. Its downward direction, in fact, enables it to form reflex connexions successively, with all the nerves of the medulla oblongata, according as it approaches the level of their nuclei." (J. Schröder van der Kolk.)