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SYSTEMIC DISTURBANCES PRODUCED BY PATHOLOGICAL TEETH.

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WE ARE hearing a great deal upon this subject today, but should not lose sight of the fact that it is by no means a new line of thought or even practice. Among the men prominently connected with this subject in the past, are Dr. James W. White, Dr. James E. Garretson, Dr. J. Foster Flagg and Dr. Albert P. Brubaker. Dr. White wrote an excellent article upon the "Diseases Incident to First Dentition" in Litch's American System of Dentistry. (Vol. III, Page 321), and altho it was thirty-five years ago it is so up-to-date that all who have not read it should do so. I beg leave to quote the following: "During the eruption of the teeth, the brain and the ner-

vous system, the stomach and the intestinal tract, the circulatory and respiratory systems show an increased tho varying liability to irritation." I wish to borrow this statement and extend it far beyond "diseases of first dentition," as it applies to all of the fifty-two teeth belonging to the first and second dentition, these fifty-two teeth are in dental activity during the entire time they are in the mouth, from early embryonic life until they are lost, and under certain conditions they are liable to produce pathological systemic disturbances. This matter has been enlarged upon in my second edition of the "Internal Anatomy of the Face."

Dr. James E. Garretson taught in his

lectures and published in several editions of his Oral Surgery that the teeth caused many disorders thru reflex action in various directions, in fact, to all parts of the body.

Dr. J. Foster Flagg records many varieties of trifacial neuralgia, pains in remote parts of the body, grave functional disorders of the eye and ear; and motor disturbances—chorea, epilepsy and paralysis—having a direct demonstrable connection with hyper-cementosis. He stated that insanity had also been produced from such reflex irritation. (Dental Cosmos 1878).

Dr. Albert P. Brubaker made a most exhaustive compilation of data upon the subject of nervous reflexes which was also published in the American System of Dentistry. (Vol. 111, Page 434). So strong was the teaching of these, and other men, I took it for granted that these facts were generally recognized thruout the profession, and have been somewhat surprised during the past two or three years to find doctors, both medical and dental, talking about the danger to the general system thru pathological teeth, as tho it were comparatively a new thought. Perhaps the general use of the X-ray in disclosing diseased areas in the jaws and teeth has brought this matter more emphatically to all practitioners. At the present time so important has the consideration of various reflexes from this cause become, that no disease of the nervous or alimentary systems should be diagnosed without first eliminating the teeth as a possible factor, and while the writer objects most strongly to the hysterical attitude of many practitioners in attributing all the ills of humanity, mental or physical, to the teeth, there is a sane comprehension of this subject on the part of both medical and dental profession that is very encouraging.

An organization known as the Upson Foundation has for its purpose among other objects, to act as a center for the

encouragement and stimulation of research in clinical problems wherein dental and medical factors are correlated. Dr. Edward C. Kirk is Chairman of the Foundation and will gladly receive reports of interesting cases and original data bearing upon this field of investigation. Such reports should be sent to the Commission, Care of the Thomas W. Evans Museum and Dental Institute, 40th and Spruce Streets, Philadelphia.

Pathological disorders may be divided into two general classes, those that are brought about by pathological dentition and those that are caused by focal infection from diseased teeth or surrounding tissues.

Belonging to the first class are teeth of either first or second dentition, that show some undue interference during their eruption or lack of eruption, it may be from over-density of the gum tissue, or over calcification of the alveolar process; from being "blocked" by other teeth, either normal or supernumerary, or by odontomas. It is possible for any of these conditions to occur with any one or more of the fifty-two teeth.

The second class includes all of those cases in which the infection from diseased teeth is carried from the mouth thru the alimentary canal or taken up by the circulatory system, thence to be distributed to any portion of the body most susceptible, thru weakness, to its poisonous influence.

REFLEX ACTION FROM IMPACTED TEETH.

The sympathetic system of nerves, nerves of vegetative or organic life, presiding as it does over development, growth and maintenance of the general body, more than likely, secures its close association with the cerebro spinal nerves by interlacing fibers which convey impression or sensations from one to another by induction. These interlacing fibers form plexuses such as are found associated with the carotid artery extending into the brain

case and cervical region, there are also the plexuses of the thoracic, abdominal and pelvic regions, in fact, they are found in all vital parts of the body. When the functions of this complex system are recognized, it will be understood why an impingement on any portion within the body would cause a disturbance in some remote part. These disturbances may not produce the same manifestation in each individual for the reason that no two bodies are alike anatomically and physiologically, in fact, there are many cases in which several impacted teeth caused no appreciable disturbance anywhere, while other cases could be sighted in which one slightly impacted tooth produced great disturbance, sometimes mentally, sometimes interfering with hearing or sight, or producing many systemic troubles.

It is a question whether it is the impacted tooth or the condition of the surrounding tissue that causes the disturbance, for I have noticed when an impacted tooth is particularly difficult to extract it is not so much due to its position but because of the density of the bone tissue in which it is imbedded; those cases in which the extraction of the tooth is comparatively easy do not usually show as good results as where the bone has to be cut to loosen the tooth. There are many cases where teeth have been removed without giving relief from pain, but after taking away the dense bone, or an adjoining tooth which had been the cause of impaction, relief was obtained.

GOITER.

Impacted teeth are frequently found in conjunction with goiter, which indicates a possible connection between the thyroid gland and the development of the alveolar process. The abnormal condition of this gland may be responsible in producing goiter and this same pathological functioning may be a factor in causing an increased density of the alveolar process which would in turn in-

terfere with the normal eruption of teeth and cause impaction.

FOCAL INFECTION.

Focal infection is receiving a great deal of attention today, many reports seem very exaggerated, others deal with the matter in a thoroly sane and wise manner, acting upon the general principle that if any portion of the body is infected or producing infection that can be carried to other parts of the body, remove the infection and stop the source.

Again the excellent work of the X-rays in revealing sources of infection is responsible for bringing this class of disease before a greater number of practitioners. Unfortunately, there are still some men to be found in our profession who are not as careful about their prosthetic and other work as one would desire, their badly made dentures, crowns and bridges, make for septic conditions in the mouth, and are, perhaps, the largest factor in producing focal infection. Scarcely a day passes in the oral surgeon's practice that he is not called upon to consider the many ills occasioned by one or more of these appliances.

There are several other causes for focal infection such as simple dento-alveolar abscesses pointing and breaking into the mouth, they may be either acute or chronic. The acute can generally be treated and cured, the tooth becoming again a useful organ, but the chronic abscess does not usually respond to treatment. Another class is that of diseased and infected teeth that do not point or open in the mouth, but break down the surrounding tissue, this infected matter with the broken down tissue, may be taken up by the circulatory vessels and conveyed to more or less remote portions of the body. A most important class of tooth infection is that of diseased teeth that give but little pain or immediate local trouble, but the abscesses of which find their outlets into the nasal cavities or more commonly into the maxillary sinuses, as they have

"vent" in these cavities little or no disturbance from pressure or pain is observed and the infection may be transmitted to other pneumatic spaces, and part of it may pass directly into the alimentary canal from the nose.

The best method of diagnosing these troubles is, of course, by the help of the X-ray used with judgment and a thorough knowledge of the anatomy, physiology and pathology of the parts involved, but when the reckless radiographer takes it upon himself to advise the patient, without knowing the history of the case or having a good knowledge of the normal and abnormal aspect of the regions, he may cause unnecessary trouble by recommending the extraction of teeth which have had nothing to do with causing the disturbance.

All dentists have treated and cured diseased and abscessed teeth which have remained healthy and useful for many years, when these teeth are X-rayed a year or even ten years after treatment, the indication of a former disturbed condition around the roots is quite apparent, and this scarred tissue is often mistaken, by the radiographer as well as the physician, for a present abscess, so the patient is sent to an extracting specialist who too often extracts the tooth without further investigation, in this manner hundreds of good healthy teeth are ruthlessly sacrificed because the X-ray is not properly interpreted.

Again teeth with live pulps that never have been diseased often show apparent cicatricial tissue around the apices of the roots, which may be caused by their having been normally pushed forward by the eruptive force of other teeth behind them. (See first mandibular molar Figures 13 and 25). Or perhaps they have been moved forward by the orthodontist, (See Figures 24 and 25) when such a scar will be made in the tissue. It is not remarkable that an X-ray showing these apparent pathological scars is mistakenly read; for this reason

I should strongly urge every dentist to become familiar with radiograms showing normal as well as abnormal aspects, and to make a careful study of these unusual but healthy conditions, as well as of the many phases which the pathological presents.

Of course, it goes without saying that any tooth which is diseased and causing suppuration in the surrounding tissue should be treated and cured when possible, pus discharging into the workshop where the preparation of food for digestion is taking place should not be allowed. The alimentary canal is more than likely immune to many infections but a continued supply of pus may eventually find some weak spot or abrasion in the canal and so cause a serious focal infection from the diseased tooth, when this infection is taken into the circulatory system even more serious results often occur, if this tooth cannot be cured and brought into a healthy condition it should by all means be extracted for there is no virtue in trying to conserve a tender sore tooth in the mouth; it renders mastication difficult and is a constant source of nervous irritation.

I will give three cases with illustrations.

The first case is a very interesting one of torticollis and arthritis. The patient came to the oral surgical clinic January 5th, 1917. A man about 40, who could not hold his head erect but carried it over to the left side in a spasmodic manner. He could not place his left hand back of his head, on account of arthritic condition. X-ray pictures showed several diseased teeth on each side of the upper jaw, and also an impacted left upper canine. (See Figure 19).

January 20th, 1917, extracted second right maxillary molar, the palatine root of which extended into the maxillary sinus, which was found diseased.

January 23rd, the movement of the arm improved. January 25th, extracted

third maxillary molar. January 27th, extracted the impacted canine. In a very short time, less than a half hour after the last extraction, the torticollis almost disappeared and the patient could carry his head over to the right side, showing that the spasmodic action of the head and neck was principally due to the reflex action from the impacted tooth and of the surrounding tissue which was cut away. There is also a focal infection from the diseased teeth and the maxillary sinus, which may be the cause of the arthritic condition of the arm and shoulders. The case is being closely watched and reports will go on record.

The second case, a lady of about 50 years of age, resident of South Dakota, suffering from a general breakdown in health. She was sent to a New York sanitarium for treatment, her physician finally concluded she might be suffering from focal infection produced by diseased teeth. He had X-rays taken from which figures 21 and 22 were made. She was sent from the sanitarium to Philadelphia for consultation with one of our leading physicians, who referred her X-ray plates to me, and this was the condition found. Beside infected teeth the patient was wearing a removable bridge on the left side of the upper jaw. I mention the removable feature as it is often considered a redeeming quality. This bridge had for abutments a second maxillary molar and a lateral incisor, roots of which were badly diseased; the X-ray also brought to view a badly impacted maxillary third molar of the same side, with infected tissue surrounding it; the maxillary canine of the same side was found impacted lying under the tissues horizontally. It was recommended that all diseased and impacted teeth should be removed as the patient was more than likely getting a double dose, one from reflex action thru impacted teeth, and the other from focal infection producing septic poisoning.

The third case, one of the most marked cases of focal infection that has come to my notice, where the whole general system was disturbed, was that of a patient exhibiting a general arthritis, also a diseased condition of the dermoid tissue, especially of the palmar surface of the hands and the soles of the feet, on these surfaces a large number of pustules were found. After unsuccessful treatment for several years, a possible source of trouble was finally located in the left maxillary sinus which was detected to be clouded under the X-ray examination; further investigation showed that a maxillary molar was involved, having a diseased pulp chamber and root canals, two of which communicated with the maxillary sinus.

A fine metal probe was passed along the anterior buccal root which penetrated the maxillary sinus but gave no evidence of pus, a larger probe was then passed, spreading the opening until a fine groove director could pass into the sinus, pus at once followed along the groove and when the tooth was extracted a large quantity flowed from the socket, the lamina dura between the root sockets was also removed, giving a free opening, and the sinus was flushed out with saline solution. Forced injection was then made until the fluid passed thru the ostium maxillary into the nasal cavity, which showed that there was pus along the hiatus semilunaris. These conditions were treated with saline solution for several days, followed by a very weak solution of tincture of iodine. There was considerable relief felt about the face, but a small quantity of pus still came from the sinus. A further exploration was made in the anterior portion, in the region of the infraorbital sinus, and as a premolar tooth was not in good condition, it was decided to extract it in order to reach the anterior pocket, where more pus was found, smears were made for microscopical examinations and cultures taken. The patient was placed under

the best medical care. Frequent examinations are made both by the physician and oral surgeon and the patient is making a fine progressive recovery.

The following slides will be shown to illustrate other cases, and bring out further points:

Figure 1.

A vertical X-ray picture thru the anterior portion of a skull of a child about 5 years of age, giving a general idea of the framework of the skull.

Figure 1 is an X-ray picture showing anterior portion of the skull of a five-year-old child giving a general idea of the frame work. The tissue is soft and

yielding at this time of life, but as age advances the interspaces become filled with deposits of salts of calcium and the bone becomes more firm and compact. These deposits are often disturbed in

Figure 2.

A side view of the upper and lower jaw of a typical skull, with good occlusion and alignment of the teeth.

various ways; pathological conditions such as inflammation may cause decomposition, or on the contrary it may cause an increase of these calcic salts to be de-

Figure 3.

Mandible with cortical portion of bone removed, showing arrangement of the cancellated tissue.

posited in such a manner as to interfere with the eruption of teeth.

Figure 2 shows an adult skull, the upper and lower jaws giving good occlusion and alignment of the teeth. I think a man would be safe in saying that the person to whom this skull belonged had little or no pathological dentition and

years of age. At this period there are usually forty-eight teeth in activity, the twenty deciduous are preparing to be "shed" while the permanent ones are advancing into their normal positions, the four third molars have not yet developed. It stands to reason that if any of these forty-eight teeth be interfered with

Figure 4.

Skull of a child, age about six years, showing all the deciduous teeth in position and the developing permanent teeth.

might have lived for years without requiring the services of a dentist, barring accidents.

Figure 3 shows the left side of a mandible where the outer corticle portion of bone has been removed. The outer wall of the mandibular tube (canal) is intact, it will be noticed that the small tubes are curved upward and forward, caused by the passage of the teeth as they erupt into their normal positions when there is no blocking of the parts by inflammatory condition or deposit of lime salts within the cancellated tissue.

Figure 4 is from a child about 5 or 6

either pathologically or mechanically that tooth will have its influence in displacing all the other teeth in proportion to the interference. Teeth are in a "balanced" condition, interfere with one of them, you are liable to disturb the whole, and you will not have the result as shown in Figure 2.

Figure 5. It will be noticed the developing second mandibular premolar is inclined forward, if the deciduous molar should be lost prematurely the first molar would move forward and might entrap the second premolar.

Figure 6 is from a skull of a child

Figure 5.

Side view of upper and lower jaws of a child about seven or eight years of age, shows the growing second premolar somewhat out of position.

Figure 6.

Side view of upper and lower jaws of a child about twelve or thirteen years of age. There is a pathological condition between the second premolar and first molar of the upper jaw.

about twelve years of age. It will be noticed that the position of the roots of the upper first and second premolar teeth and the roots of the first molars

Figure 7.

X-ray picture, side view, upper jaw, showing where a deciduous molar and premolar had been entrapped by the first molar.

have been interfered with by some pathological condition, which will have its influence in the occlusion and alignment of the permanent teeth.

Figure 7 gives a case where the first maxillary molar has entrapped a deciduous molar and a premolar tooth. The bicuspid lies nearly horizontally across the upper part of the alveolar process.

Figures 8 and 9, give side views of

two halves of a mandible. It will be noticed in both pictures that the bone has a general appearance of hardness especially near the molar teeth. Such conditions produce discord in various ways. The removal of impacted teeth will not always give the desired relief, it is sometimes necessary to remove other teeth and also a portion of the hardened bone of the alveolar process, in order to obtain desired results.

Figure 10 is made from a patient suffering from mental disturbances. There is a diseased maxillary sinus and an entrapped first molar, the roots became exposed in the sinus producing a center of infection which gave general systemic disturbance, this tooth was extracted without disturbing the second or third molars. Within a short period the systemic and mental trouble cleared up.

Figure 11 shows the occluding surface of the maxillary third molar pointing upward towards the posterior portion of the orbit. The patient had been suffering from disturbance of the left eye for a long time. It was very blood shot with constant overflow of tears and protrusion of the eye ball. Removal of the impacted third upper molar was prompt-

Figure 8.

Showing very dense bone.

Figure 9.

An impacted mandibular third molar, the bone is very dense.

ly followed by disappearance of all eye symptoms.

Figure 12 is made from a patient about 13 years of age who suffered for several years from epilepsy. It will be noticed that the bone around the roots of the second molars is very compact. The writer is of the opinion that this dense condition of the bone was the

cause of the epilepsy, the roots of the teeth and nerves within their canals are compressed in the dense bone and irritation of the nervous system follows. It was decided to extract the second molars on both sides of the mouth. Great relief was obtained and the improvement continues, as the alveolar process belonging to these teeth becomes resorbed. The third molars are now approaching good occlusion.

Figure 13 shows an impacted mandibular third molar lying horizontally, well

Figure 10.

X-ray picture showing an impacted mandibular first molar.

cause of the epilepsy, the roots of the teeth and nerves within their canals are compressed in the dense bone and irritation of the nervous system follows. It

Figure 11.

X-ray showing an inverted maxillary third molar.

down in the body of the mandible. The patient, an active business man, about sixty years of age, developed a marked neurasthenic condition, finally requiring

an attendant. After extracting the impacted molar the patient improved rap-

idly and was able to take an extended trip to Europe without attendant.

Figure 12.

X-ray showing impacted upper and lower third molars.

idly and was able to take an extended trip to Europe without attendant.

Figure 13.

X-ray showing an impacted mandibular third molar.

Figure 14. An X-ray taken from a dental student of the University of Pennsylvania who gradually developed an

Figure 14.

X-ray showing impacted upper and lower third molars.

had developed. It was thought best he should go home, as the doctor failed to locate the special cause. At this time

Figure 15.

X-ray showing impacted upper and lower third molars, also abnormal condition over the first maxillary molar.

Dr. Edward C. Kirk became very much interested in the case. He had X-rays made of both sides of the face, which

distinctly showed four impacted third molars. Being connected with the hospital and having been acquainted with the patient's father, I was consulted and did the surgical work, extracting four teeth in order to give relief from pressure upon the trigeminal nerve and the sympathetic filaments of the associated plexus and ganglia of these regions, within a short time the attacks of chorea ceased and by giving the patient a rest from study he returned the next session

lanced gums over three wisdom teeth, after which there was continued improvement.

Figure 16 is an X-ray picture from a patient suffering from facial neuralgia and other disturbances. It will be seen that the impacted mandibular third molar is resting against the posterior root of the second molar where resorption of the root has taken place, this would be enough to produce neuralgia. The clouded condition around the roots of

Figure 16.

X-ray showing impacted upper and lower third molars, the lower third molar rests against the posterior root of the second molar causing resorption of the root.

to continue his work and graduated well up in his class.

Figure 15. A boy of 16, suffering from attacks of epilepsy. Early history shows an eruptive dermoid condition at three years of age. Enamel of all teeth forming at this time became pitted. X-rays indicated that epilepsy might be caused by impacted third molars. As the four second molars were decayed and badly pitted it was thought advisable to extract them, allowing the third molars to move forward and assume a better position. December 15, extracted the four second molars under nitrous oxide. December 22nd the patient's condition improved, lanced gums over the two mandibular third molars. January 11,

Figure 17.

X-ray showing four impacted molars.

the impacted tooth caused by congestion would also be sufficient to cause neuralgia and added to this is the curved condition of the maxillary molar roots, all factors in producing severe disturbance.

Figures 17 and 18 show X-ray pictures of a patient belonging to Dr. E. R. Sausser showing four impacted left molars on one side, three impacted molars on the opposite side with the fourth in an abnormal position. The patient suffered from a nervous condition, the extraction of all impacted teeth was recommended.

Figure 19. X-ray picture showing an impacted maxillary canine with very dense surrounding tissue. This case of

torticollis is described in the body of the paper.

Figure 20. Three pictures. X-rays

since September, 1916, it is now March 12th, 1917.

Figures 21 and 22 are X-ray pic-

Figure 18.

X-ray showing three impacted molars and one second maxillary molar, not in a typical position.

showed two impacted maxillary third molars and an impacted canine. Extracted the second molars and the impacted canine at the University Hospital, patient had been suffering for a

Figure 19.

X-ray showing the upper impacted canine tooth, surrounded by very dense bone.

long time from epilepsy, his mother and grandfather had also been subject to these conditions, no history of their teeth. The patient gradually recovered from epilepsy and has not been troubled

Figure 20.

Three X-rays from one person, showing impaction of two maxillary molars and also an impacted canine.

tures taken from the patient spoken of in the body of the paper. The removable bridge extended from the second molar to the lateral incisor, the surrounding tissue of each root was in a diseased con-

dition, the impacted molar tooth was partly in very dense bone, the canine tooth is shown lying somewhat deep in

Figure 21.

X-ray showing the arrangements for holding a removable bridge, also an impacted canine tooth.

partly broken down bone of the alveolar process. Unfortunately the pictures were taken on two films which do not give a true relation.

Figure 23, an X-ray of the left side of

Figure 22.

X-ray from the same mouth as Figure 21, showing again the appliance on the second molar tooth. It also shows an impacted third molar.

the upper and lower jaws. Patient about 20 years of age. The point of the picture to which I wish to draw your attention is the light area around the apices of the roots of the first mandibular mo-

lar, it might easily be mistaken for an abscessed condition, the cause, however, of this appearance is that the eruptive force had carried this tooth bodily forward, leaving its track in the bone tissue. Several months before this case was referred to me, the patient suffered from a severe nervous breakdown, culminating in insanity. After examination it was decided to extract four impacted and three deformed teeth. The result was remarkably successful, the pa-

Figure 23.

X-ray showing two impacted third molars with a light area around the roots of the first molar, caused by the eruptive force of the second and third molars.

tient was able to leave the insane hospital within a week and by the following month the mental disturbance entirely cleared up and he returned to his occupation.

Figure 24 is an X-ray of the lower jaw of a patient of Dr. Mershon. The appearance of the alveolar process surrounding the four mandibular incisors near the roots, shows that there has been a change of tissue which might be mistaken for a case of pyorrhea alveolaris with abscessed pockets near the apices, instead of this, it is a case of bodily movement of the teeth by an orthodontic appliance, the tracks left by the teeth are shown in the X-rays by the light spaces.

Figure 25 is a similar condition of an upper jaw showing the extending wire used in changing the position of the teeth.

We generally claim that the third mandibular molar is the tooth most liable to become impacted and that the maxillary canine is next in order. It will be noticed in Figures 4, 5 and 6 that the roots of the developing canine tooth extend above the nasal cavity, in

picture showing a right impacted canine interfering with the four teeth mentioned, if this tooth is not extracted it will eventually cause the devitalization of the four teeth and probably become an important factor in producing a variety of pathological conditions. It is also liable to become diseased itself when an abscess of its root may point and break into the maxillary sinus or nasal cavity. Another factor is that the tooth

Figure 24.

X-ray of the anterior teeth and their alveolar process. Showing rarafaction of the bone caused by the orthodontic appliance.

Figure 25.

X-ray of the upper jaw showing the rarification of the alveolar process by the action of orthodontic appliances.

close relation to the lachrymal canal and the infraorbital foramen. If the deciduous incisors, canine, and first molar should be prematurely lost, the permanent incisors and premolars will erupt and more than likely close in the space, thus cutting off or entrapping the canine, which will force its eruption in the direction of the least resistance, which is frequently toward the median line passing either over or under the second incisor, usually under, until it reaches the first incisor, its roots often incline over the roots of the premolar teeth doing great damage to all the four teeth. See Figure 20, upper

normally is placed in the most solid portion of bone in the upper jaw, if this position is interfered with or it becomes impacted, an inflammatory condition may be induced which will cause surrounding bone to become still more dense. In Figure 20 the canine tooth is resting across the maxillo-premaxillary suture virtually connecting the two bones, each of these are supplied by different branches of nerves, among which are the superior alveolar, the infraorbital and the nasopalatal nerves, a branch from the sphenopalatine ganglia, making it most susceptible to reflex action.