DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

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It is the object of this department to publish each month original articles on dental and oral radiography. The editors earnestly request the cooperation of the profession and will gladly consider for publication papers on this subject of interest to the dental profession. Articles with illustrations especially solicited.

DENTAL RADIOGRAPHIC PATHOLOGY

WITH THE PRESENTATION OF INTERESTING CASES

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RADIOGRAPHY in the last few years has established itself so firmly as a diagnostic agent in the practice of dentistry that the writer will endeavor through the presentation of the following cases to show that dental radiography must be practiced as a specialty to attain the proper radiograms and correct interpretations.

It was a great surprise to hear certain reputable men state at a dental convention held at the Hotel Commodore in New York recently, that there was no justification for specialization in dental radiography, and that a diagnosis given by one specializing in this branch of dentistry should not be accepted.

The contention appeared to be that unless the general dental practitioner takes the radiogram personally and knows the clinical history, radiography can not be practiced correctly. This argument if it is what the writer understood it to be, can conclusively be proved weak, since in the majority of cases presented that came under my observation, it will be noted that the patients went through the hands of general dental practitioners who radiographed them without disclosing the findings correctly. It was evident that the general dental practitioner failed in his radiography because of doubtful and inconsistent technic, which inevitably results in an erroneous finding and interpretation.

I desire to state emphatically, so as not to be misconstrued, that clinical history is of paramount importance in rendering of an interpretation of a radiogram.

In radiography there are three primary technical factors involved; *first*, position and style of negative to be used; *second*, exposure, which includes consistency of tube; *third*, the development of negative. It is becoming increasingly evident that radiography has reached the stage of an exact science requir-

ing the development of a carefully laid out technic and any deviation from this fixed technic will inevitably result in an improper radiogram resulting in an incorrect interpretation. The general dental practitioner has so many duties to perform in his endeavors to conserve the teeth that consistency of technic is usually lost or this feature of the work is assigned to a technician who works more or less mechanically.

To be able to interpret any radiogram, one must know definitely the anatomy of the parts involved and the various type shadows these parts present upon the negative when exposed. It so happens that the general dental practitioner does not come across as great a variety of dental pathology in his own practice as the radiographic specialist, and therefore he can not acquire so keen a diagnostic ability since he is confined to a narrower and more limited field of work.

The general dental practitioner should recognize this fact and be guided by the opinion of the radiographic specialist, but should only accept his verdict if the clinical findings substantiate the radiographic ones. After all radiography is a means of diagnosis and the nearest one we have to a positive one.

Two common fallacies in interpretation often brought to my attention are, first, the antrum shadow created over the apices of the molar teeth which was diagnosed as a cyst or infection, about these teeth: second, the shadow of the mental foramen sometimes situated close to the apices of the inferior premolars diagnosed as an apical focal infection about one of these teeth.

Usually when the general practitioner takes a radiogram he confines his work to the No. 1 film and herein is a false procedure in technic. Cases will be shown where it was impossible to disclose the pathologic condition present due to the limited area exposed upon this small negative.

In the complete radiographic examination of the oral cavity in a large number of patients, it was rare to find a perfectly healthy condition, especially where dental restorations or corrections were performed. Since so many constitutional disturbances have been traced to the teeth and adjacent tissues it is only a question of time when the mouth must become a gauge to the individual's health. It seems certain that in the very near future, when a physician makes a physical examination of a patient, he will insist upon a radiographic one of the teeth and the adjacent tissues to determine the existence of any pathologic conditions, the same as he insists upon the examination of the urine for the determination of the presence of sugar or of the blood in a Wassermann test, in order to eliminate as soon as possible this source as a possible cause of a constitutional reaction.

Obscure cases which have resisted the efforts of all medical aid were readily treated by the discovery of the fact that the etiological factor lay hidden away about the oral cavity. Constitutional disturbances, resulting in rheumatic arthritis, endocarditis, and gastrointestinal conditions, have so often been traced to the teeth, where foci of infections were disclosed about the apices or adjacent tissues, that an earlier radiographic examination as a preventive measure, would have gone a great way in forestalling such ailments as ultimately befell the individuals.

In a timely and interesting article entitled "The Relation of Oral Infections to Mental Disease," which appeared in the *Journal of Dental Research* of De-

cember, 1920, Dr. Cotton, of New Jersey State Hospital, Trenton, N. J., has shown that by the correction of certain dental pathologic conditions existing in the oral cavity a great percentage of cures has resulted.

It is not my contention that all ills and ailments can be attributed to the teeth, but after the elimination of all possible causes it has been found that where a pathologic condition existed about the oral cavity the correction of it very often leads to a complete cure.

Before entering upon the discussion of various cases, a word is timely relative to the commercial x-ray laboratories. In the last few years these laboratories have come into existence and I believe no greater form of quackery has arisen, both for the medical and dental professions and also for the laity, and not until the professions as a whole unite, can this evil be curbed. A great many cases have been referred back to me for radiographic confirmation of the findings

Fig. 1.

by these laboratories, and it is my belief that through the "promiscuous x-raying" of the teeth and the unscientific interpretations given to the profession, and diagnosis to the laity upon their request, many individuals are unnecessarily losing teeth, which in the hands of conscientious and skillful dentists could be conserved.

The citations of the following cases are from private practice and some are taken from the Vanderbilt Clinic where I spent some time as a radiographer, and where it was possible to ascertain clinical results or operations performed, they are described.

The form of examination in all cases is clinical history and radiographic interpretation. At no time do I feel that the radiographer should give a prognosis, course of treatment, or results from a radiographic examination, because this is beyond his field of operation and should be left entirely to the dentist's judgment.

CASE I.—*Clinical History*.—Patient, male forty-three years old, suffering

from chronic suppuration in the mandibular left third molar region. Operated upon for this condition twice, but no permanent cure resulted. Patient was told that both the second and third molars were removed. Radiogram taken on small dental film did not disclose any definite cause for this suppuration. Entire area anterior to third molar region necrosed and infected.

Radiographic Interpretation.—Entire left side of mandible taken on an 8x10 plate discloses fully developed third molar embedded in the ramus at the angle of the jaw. Area anterior to this impacted tooth and up to the second molar necrosed and infected. (Fig. 1.)

Clinical Result.—Fully developed third molar removed, area curetted. After several weeks complete recovery took place and permanent cure resulted.

Note.—Patient was radiographed previously but all radiograms being confined to small dental films, the etiologic factor was not ascertained.

CASE II.—*Clinical History.*—Patient, female. After an extraction of a mandibular left first molar severe neuralgic pains developed. This pain which be-

Fig. 2.

Fig. 3.

came worse for the last three years, developed into characteristic douloureux. Pain had a tendency to localize in certain teeth, and patient had these teeth extracted periodically, six were removed through this procedure hoping to relieve the condition, but without any success. Alcohol and ether injection gave temporary relief. As a last resort sought the aid of a surgeon who suggested the resection of the gasserian ganglia. The patient went to several prominent neurologists, physicians and dentists for this condition and it appears at no time was a radiographic examination of the teeth or oral cavity suggested. In examining the oral cavity all the teeth with the exception of an inferior molar which had a filling were normal, and gums healthy. Complete radiographic examination of the oral cavity made.

Radiographic Interpretation.—In the mandibular left first molar area a foreign body was present, which appeared to be a hypodermic needle about half an inch in length, situated perpendicular to the mandibular canal and penetrating the nerve. At first it was suspected that the needle was external to the alveolar process in the soft tissues, but was found to be between the alveolar plates of process. (Figs. 2 and 3.)

Clinical Treatment.—Dissection of the soft tissues external to the alveolar

process did not disclose any needle, but situated between the external and internal plates there was found a corroded needle about three-quarters of an inch in length which was broken in the removal of same. It appears that the needle was broken at the hub during the administration of losal anesthetic for extraction.

Note.—This case is of extreme importance in that the patient was about to be operated on for the resection of the gasserian ganglia. At no previous time was a radiographic examination suggested of the oral cavity. In all neuralgic disturbances about the head and teeth, the examination of these parts radiographically is of paramount importance before any other procedure is suggested.

CASE III.—*Clinical History.*—Patient, male, 38 years. Small area present in the palatal region above central teeth, which upon probing disclosed a large hollow. All teeth in the maxillary arch normal and vital to all appearance. Patient gives history of three-plus Wassermann reaction.

Fig. 4.

Fig. 5.

Radiographic Interpretation.—Large area of necrosis present about the centre of the palate, teeth normal, small filling in central made to test vitality of this tooth which was suspected as devitalized. Diagnosis large area of necrosis. Specific origin, tertiary lesion, gumma of palate. (Fig. 4.)

CASE IV.—*Clinical History.*—Patient, 33 years. Chronic pus discharge from the palatal region above central teeth. Right lateral and central teeth crowned.

Radiographic Interpretation.—Large cyst formation above centrals and lateral teeth present. All crowned teeth disclose poorly filled canals. These teeth were the cause of this large area of necrosis and infection. (Fig. 5.)

Note.—These cases are presented together since the clinical manifestations were similar in reaction as determined radiographically, but having two different etiologic factors. Case III, which was due to a specific condition, could not be corrected without proper medication under a physician's supervision. Case IV

which was due to poor dental operations about the teeth was corrected by the removal of the diseased teeth and curetting the area, resulting in complete bone regeneration. In the specific necrosis the ravages of the disease were checked by proper medication, but the destruction of bone was permanent and perforation had to be closed by a mechanical appliance.

CASE V.—Patient, female, thirty years old, suffered from severe headache for several years. Examination of oral cavity disclosed the absence of any third molars superior or inferior. No history of any eruption or extraction of third molars. Patient had one third molar area radiographer (Fig. 6) and an unerupted third molar was disclosed. Several weeks later patient came back for a complete mouth examination to determine whether any other third molars were present.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Radiographic Interpretation.—Fig. 6. Maxillary left third molar unerupted and impacted against second molar.

Fig. 7. Mandibular left third molar unerupted and impacted against second molar.

Fig. 8. Maxillary right third molar unerupted and impacted against second molar.

Fig. 9. Mandibular right third molar unerupted and impacted, in the body of the mandible close to the mandibular nerve.

Note.—In all disturbances about the head and teeth it is important that the oral cavity be considered as a unit of study. This case disclosed four impactions of different types in one individual.

CASE VI.—Patient, male, nineteen years old. Swelling of the chin present. About three years ago had similar swelling opened by physician and at the time it took several weeks to heal. At present, swelling large and area inflamed,

Fig. 10.

Fig. 11.

right lateral appears discolored. No radiogram was taken previously to present one.

Radiographic Interpretation.—A cyst formation situated in the region of the medium line below the mandibular incisors. The right lateral is a devitalized tooth. (Fig. 10.)

Clinical Result.—Devitalized right lateral tooth treated, and entire area of necrosis curetted. After several weeks permanent cure took place.

Fig. 12.

Note.—This case as originally treated by a physician resulted in a temporary cure, but the origin was dental. In all obscure cases of this nature there must be closer cooperation between the dentist and physician.

CASE VII.—*Clinical History.*—Male, thirty-nine years old. Last three years, previously to being radiographed, suffered from chronic swelling of the sub-maxillary gland on the left side. During this period had incision of the gland made to evacuate pus which accumulated, but no permanent relief from these treatments. Several dental films were taken and it was decided that mandibular

first molar was the cause of this trouble. The dentist refused to extract this tooth because there were no symptoms of its being devitalized, and he referred patient for a more complete radiographic examination. Plates of this side of the mandible were taken.

Radiographic Interpretation.—Film discloses mandibular left first molar normal. Plates (Fig. 11 mouth in closed position) disclose a mass about the size of a sweet pea, having the same density as tooth structure or bone, situated beneath the apices of the second molar and slightly below the path of the mandibular nerve. Fig. 12 discloses same mass situated beneath the apices of the second molar but more in the path of the mandibular nerve. Diagnosis, salivary calculus (stone) in the submaxillary gland. This stone probably obstructed the duct causing retention of fluid from this gland and interfering with the function of the gland, producing ranula.

Note.—Radiograms taken were confined to small films, and tooth diagnosed

Fig. 13.

as cause was normal. Entire gland was enucleated and salivary stone found therein.

CASE VIII.—Patient, female, nurse. Suffering from severe headaches for the last eighteen years. Sought the aid of any number of specialists and received various treatments but at no time did patient become relieved from these severe headaches. Wore a full upper plate; the mandibular incisors and canine present. Her dentist radiographed the mandibular teeth, but did not bother about the upper jaw because the patient wore a plate, and the gums appeared healthy.

Radiographic Interpretation.—Mandibular teeth normal. In the maxilla on the left side, embedded in the alveolar process, near the alveolar ridge, there was present a fully developed canine tooth. (Fig. 13.)

Clinical Treatment.—Permanent tooth removed. Six months later headaches had lessened to a marked degree and the patient said, "I think we have struck the cause."

It is a false procedure at any time to take for granted any supposition as regards the normality of a part unless definitely known. In this particular case, because the patient wore a full upper plate, the maxilla was not radiographed,

and the cause was not found. The oral cavity must be considered as a unit, not as a sectional part, for a complete diagnosis.

CASE IX.—*Clinical History*.—Patient, female, twenty-seven years old. Seven months pregnant. Developed growth above the canine region on the gum about size of a hazel nut. Very vascular, and least irritation causes bleeding. Growth

Fig. 14.

Fig. 15.

Fig. 16.

appeared benign since size remained constant for the last three months. There appeared to be no root present, lateral normal, canine recently extracted.

Radiographic Interpretation.—Fig. 14. Alveolar process is not regular and a small spine-like process present, which is probably the septum of bone between the canine and lateral incisor. Fig. 15 shows the size of the epulis with direct

attachment to this irregular, spine-like process. Diagnosis, epulis due to irritation from this irregular process.

Clinical Treatment.—Radical removal including the lateral tooth for the prevention of a recurrence of same.

Fig. 17.

Fig. 18.

Note.—These growths known as benign epulis occur frequently in pregnant women, probably due to some change in metabolism during this period. To determine as to whether the growth is benign or malignant in character, a small section should be made and examined microscopically by a pathologist before operating. At no time should a growth about the oral cavity be neglected, as it may become malignant in time. The etiology of an epulis usually lies in some local irritation as a root, shell crown, bridgework or as in this case of ragged alveolar process.

CASE X.—Clinical History.—This case is presented because of the rare possibility of an error in interpretation due to a defective film or artifact in a film. The upper film was taken and when developed both films disclosed what at first appeared to be an unerupted second premolar tooth or malformed tooth above the canine area. The second film taken immediately afterwards and confirmed by

Fig. 19.

several more did not disclose any similar condition, and upon close examination of the first negative it appears that there was a decided defect in both these films. There was present a second premolar root only. (Fig. 16.)

Note.—In determining any abnormal condition that may occur, at no time should one negative be relied upon, but several should be taken, and at different angles.

CASE XI.—Patient, female, twenty-eight years old. Mandibular right premolar and molars removed, because of large swelling and apical alveolar abscesses. Suppuration from this area for several weeks previously to being radiographed. Recovery very slow after extractions.

Radiographic Interpretation.—Fig. 17. Entire area from the mandibular premolar to third molar region disclosed that the entire body of the mandible on this side was necrosed and infected, extending to the inferior border of the jaw. Diagnosis, pathologic fracture of the inferior mandible due to necrosis.

Fig. 18 is same area radiographed six months later showing marked bone regeneration taking place.

Note.—In order to ascertain whether bone regeneration of any given area has taken place, a number of radiograms should be taken periodically, and by a comparative study, note the difference in bone structure.

CASE XII.—*Clinical History.*—Patient, fifty-five years old. Entire left side discloses large growth in the oral cavity and mucous membrane from the mandibular left canine ulcerated and broken down. Probing the bone in this region showed it to be necrosed. Very foul odor present. Glands swollen. Suspected carcinoma present and appeared very malignant because of rapid growth in the last few weeks.

Radiographic Interpretation.—Entire area from the canine to third molar discloses body of the jaw broken down and a necrosed mass. (Fig. 19.) Diagnosis, carcinoma of the mandible. Inoperable.

Clinical findings of growth was carcinoma, epithelioma variety, malignant.

Note.—In all growths about the oral cavity a small section should be made and sent to a pathologist for further examination microscopically and determine as to its malignancy. This case was too far gone for an operation, because of its malignancy and metastatic involvement, manifested by the glandular enlargement. Patient died six weeks later.