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Worcester District Medical Society.

REGULAR MEETING, FEBRUARY 9, 1921.

SYMPOSIUM OF DENTAL INFECTIONS AND THEIR RELATION TO DISEASE.

I. THE VIEWPOINT OF THE ROENTGENOLOGIST. THE SIGNIFICANCE OF CERTAIN X-RAY APPEARANCES IN THE DENTAL ROENTGENOGRAM.*

BY FREDERICK W. O'BRIEN, M.D., BOSTON.

THE certain x-ray appearances in the dental roentgenogram, of which there is here question, are those interpreted to mean, pericementitis, apical abscess, pus pocket, pyorrhea and necrosis. There is no controversy concerning frank osteomyelitis of the jaw with definite bone destruction, involucrum and sequestrum formation, nor of other pathological conditions of the maxillae as the cystic odontomata which are accepted as definite entities requiring operative interference. Of course, if you specify your granuloma as a simple cyst under the generic term, cystic odontomata, then the statement just preceding must be modified, since the granuloma is the much discussed apical abscess which, along with the others in the group above,

* Read at the Annual Meeting of the New England Roentgen Ray Society, Boston Medical Library, Nov. 22, 1920.

is believed to be definitely related to systemic infection.

The roentgenogram is essentially a shadow picture, a photographic image, registered by x-rays. It represents the relative values in light and dark tones of the radiability of the object in the path of the x-rays. Therefore, when in the roentgenogram you get a color value that is light in tone, it means decreased radiability. Wherever you get a color value that is dark in tone, that represents increased radiability.

The normal tooth structure and surrounding alveolar process presents the approximate appearances as seen in Figure 1. I want you to notice, with care, the apparent complete contiguity of tooth and socket. There is no color line of demarcation. Now look at Figure 2 and therein you observe a linear area of increased radiability that outlines the tooth socket. This linear marking is an actual change in color value. It is dark in tone and in a properly made x-ray negative can indicate only one thing, *viz.*, a linear area of increased radiability. It means the absorption of something. I know it is not the tooth proper, for that is present. It is not the alveolar process in this case, for that is intact. Since increased radiability signifies infection, chronic or subacute, the roentgenologist interprets this black line

FIG. 1.

FIG. 2.

actually about the cementum to the peri-cementitis.

Now one may not see this black line outlining the entire tooth, but find it localized about the apex of a devitalized tooth with or without an incompletely filled root canal. If in the former case, you accept its pathological basis, then it should hold here. In fact, I believe, dental experience tells us that it is the x-ray film with very little, or only questionable evidence of pathology, from the clinician's viewpoint, that most often checks up with abscess findings on extraction. Linear changes at the apex must also be considered in another light. One must be certain that the angle used in the process of roentgenography is correct, for often the slight apical change may in reality (Figure 3)

FIG. 3.

be relatively great when properly represented.

Once this dark tone about the apex of a tooth is increased in size and is definitely circumscribed, then is one upon the royal battleground, for such is the x-ray image of what is commonly, but often erroneously, called, an apical abscess. There has been a great deal of talk about whether or not x-rays can show an abscess. The meticulous person argues an

abscess means pus, and the x-rays do not show pus. I am not so certain about that. I will agree that it is not always spelled out, p-u-s, in the roentgenogram, but I do know that the competent roentgenologist will note tone changes in the roentgenogram that denote the photographic representation of pus, or the result of pus processes.

This circumscribed area of increased radiability about the apex of a tooth, represents the absence of something, *viz.*, alveolar process, and often the tooth itself. Then there has been destruction from trauma or infection with pressure necrosis. Indeed, you do not have either process without pus.

If this area of increased radiability is homogeneous in color tone, black as opposed to white, with no x-ray evidence of the anatomical structure, then one is dealing with an abscess cavity (Figure 4), whose previous contents have

FIG. 4.

been absorbed, and which now is probably benign, all the more so if this area is encircled by a line of decreased radiability, light in tone, signifying a calcified, walled-off abscess cavity. It is these very abscess cavities that are called habitually abscesses, and often they are nothing of the sort.

Occasionally, the roentgenologist can, without question, demonstrate what can only mean one thing, if there is anything in this interpretation of color tones, and that is a definite active focus of infection, a granuloma or pus sack, which really contains abscess products. Figure 5 pictorially demonstrates this. In Figure 6, you will note the old walled-off apical abscess

FIG. 5.

FIG. 6.

cavity, a potential source of trouble, to be sure, and the apical abscess definitely an active source of trouble here and now.

At other times, one will see about the apex of a tooth on the x-ray film, an area of increased radiability that is not delimited and within which one can make out the anatomical architecture (Figure 7). This often has been called

FIG. 7.

necrosis. That is a very foreboding term. It may mean a very early change in abscess formation, or a senile atrophic condition or end process of nutritional disturbance. One should employ the term, "necrosis," with caution. There has been death, perhaps, microscopically, but I should be fearful to take upon myself the burden of reporting necrosis, if such a diagnosis were to be used as an attempt to justify a surgical procedure without very definite subjective and objective signs.

There is a parallel for my treatment of these circumscribed areas of increased radiability about teeth in the roentgen ray study of the lungs. Surely, there one can demonstrate walled-off abscess cavities, frank abscesses and abscess cavities partly filled with pus, to the satisfaction of even the uninitiated.

In other cases, this circumscribed apical area of increased radiability is absent, but extending down from the gum line on one or both sides of a tooth, may be seen a triangular-shaped area of increased radiability, dark in tone, but not as intense as that seen in the apical abscess cavity, because there has not been complete destruction of the alveolar process. Such areas are described as pus pockets. (See Figure 8.)

FIG. 8.

While there has not been complete destruction of the alveolar process, there has been atrophy with recession of the gum line, and some retraction of the alveolar process. This recession and atrophy, it is true, may be due to improper fillings, but one does not see the triangular area of increased radiability with the base line along the gum in pressure atrophy cases, but rather is there a retraction of the alveolar process, with little or no atrophy, and gum recession which is symmetrical. Were the roentgenologist to fail to report such appearances and their probable significance, he would be recreant to the patient, his consultant and to himself.

When the black line is present along with atrophy and retraction of the alveolar process, again indicated by areas of increased radiability, then does the x-ray negative portray the appearance of what we call pyorrhea (Figure 9).

FIG. 9.

In conclusion, let me query what sort of a report should the roentgenologist render his consultant? Should it be a mere recital of the changes in radiability observed by him, *e.g.*, a circumscribed area of increased radiability about the apex of such and such a tooth, or should it go further and be a completed judgment, in other words, an opinion, circumscribed apical area of increased radiability consistent with abscess cavity of long standing, or consistent with abscess and probable active source of constitutional disease. Only by rendering a diagnosis of the latter type, I believe, can the roentgenologist justify his medical training and experience. I do not think it is within

his province, however, to indicate to a dental consultant the method of treatment of the conditions found. However, he has the right and the obligation to point out what he finds, and believes to be pathological.

II. THE VIEWPOINT OF THE DENTIST.

BY FREDERICK A. KEYES, D.M.D., BOSTON.

UPON few specialties, in recent years, have the eyes of the medical profession and the laity been focussed with greater attention than on roentgenology and dentistry. This attention has been due, probably, to the increased popularity of the theory of focal infection. Unfortunately, however, at the present time, both roentgenology and dentistry are suffering from radicalism on the subject of focal infection which, though nourished in an atmosphere of ethics by high authorities in both professions, has carried with it an air of quackery.

It was to be expected that the advent of roentgenology should bring with it inadequately trained men whose sole object was to profit by mystification. Fortunately, this type is limited in number. The introduction of focal infection, I regret to say, has produced the same type of mystic in dentistry. A closer co-operation and understanding, then, between genuine roentgenologists and dentists will eliminate many of the present-day radicalists and faddists in both professions.

A graduate in dentistry is one whose special province in medicine is the care of the teeth and jaws. The activity of many of our dental and medical supply houses in selling their wares, such as x-ray outfits, blood pressure apparatus, stethoscopes, etc., to dentists, has created a type of man who is neither dentist, roentgenologist, rhinologist, nor physician. To quote from an article in a recent dental journal relative to the modern dentist and his prerogatives,¹ "His records should include blood-pressure readings, both systolic and diastolic, with the deducted pulse-pressure, blood count, with differential count and hemoglobin percentage, urinalysis, heart and chest sounds by auscultation and percussion, and the most complete bacteriological determination possible by means of stained smears from lesions, cultural growths and of a definite differential determination of the colonized organisms.

"The pulse, temperature and respiration should be charted, heart murmur and regurgitations noted, history of palpitation and dyspnoea on exercise, loss of weight, neurasthenia marked by malaise, lack of energy, insomnia, loss of appetite, and pain in the back, regional cephalalgia and clinical or submitted history of opsialgia should be charted. The condition of the eyes with reference to purulent conjunctivitis, the condition of the ear with reference to foruncular or suppurative otitis, the condition of the stomach and bowels, and every clinical evidence which might be in any measure attributed to subacute infection should be noted and charted."

It would appear, then, that instead of practising one specialty, we dentists are expected to be specialists in *all* branches. If we do not feel competent to be a one-man hospital staff, we should at least own an x-ray outfit. I say, own, and merely own, for it is surprising to see how many x-ray machines are at present established as ornaments in the offices of some of our best dentists. In fact, we have an abundant supply of dentists posing as dental roentgenologists, exodontists, oral surgeons, etc., all, or one at the same time, as the occasion demands, whose sole training in roentgenology has been the supply house catalogue. The dental roentgenologist justifies his existence by the claim of greater familiarity with the anatomy of the parts, etc. Should not a surgeon, then, make the same claim with regard to the abdominal viscera and likewise become his own x-ray man? My contention, therefore, is that x-ray work is a specialty, that this work should be sacred ground and that no other branch of medicine has any right to trespass.

Let us now consider the various methods employed by some of our professional men in diagnosing dental disease and its application to the individual patient.

First, I would like to call to your attention the abandon with which the patients are referred for x-ray pictures. Many physicians and dentists believe that teeth should be x-rayed as a matter of routine, whether there is any physical indication or not. With radiograph reports for an excuse, thousands of teeth have been extracted from normal adults on the slight suspicion that arthritis, pyelitis, etc., may or may not be present. In fact, the patient may be enjoying splendid health today; but tomorrow, what may happen? Now to my mind, it

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