

"The most outstanding advance in treatment of carcinoma has come through the early recognition of the disease. With care and intelligence early diagnosis of cancer is possible, and is one of the greatest possible services that can be rendered to the patient with malignant disease."<sup>1</sup>

"It is of great importance to the patient that the proper diagnosis be made before

any extractions, operations or curettement are done."<sup>2</sup> This is an edentulous case; teeth do not have to be considered. In most cases of pain in this area, the extraction of teeth would have first consideration.

2. Gilkison, C. C.: Adenocarcinoma of Hard Palate, *Internat. J. Orthodontia*, 20:145 (Feb.) 1934.

## NECESSITY FOR ENDOCRINE TREATMENT IN SUCCESSFUL PROSTHESIS\*

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**A** DEFINITION of the term "successful prosthesis" may well be considered. One definition might be "one which functions well and looks good enough to satisfy the patient, and for which the dentist receives his fee."

Another and broader definition is: "a prosthetic restoration which functions well, looks well and is comfortable not only until the fee is paid, but also for many years."

To obtain the latter result, the foundations of the restoration must remain stable; for without this stability of foundation, the functioning of the dentures is, in great measure, lost. They no longer have the ability to maintain balance under stress. Even the centric relation becomes changed, resultant malocclusion in turn increasing the rate of change in the process of the underlying foundations.

That this instability of process under dentures is anticipated by the profession is evidenced by the common use of non-anatomic posterior teeth, by means of

which the ill-effects of the changed anteroposterior relationship are lessened, but at the expense of efficiency, esthetic values and loss of vertical distance.

It is to be expected that, in the majority of denture patients, the alveolar ridges will undergo more or less absorption, for the systemic conditions that brought about the loss of the natural teeth, unless corrected, will continue to lessen the stability of the alveolar process.

When we as prosthetists do have a case in which the ridges are stable, our reputations, as far as that patient is concerned, are made. Even when nothing else about the case is as it should be, the patient adjusts himself to the dentures to a remarkable degree. On such occasional stable cases depends much of the practice of the charlatan. If none of their dentures could be worn, their denture clientele would soon diminish.

It is a notable fact that the chief factor in the more or less occasional success of the charlatan is the use of cheap teeth, teeth in which the occlusal form was but faintly suggested; while the conscientious dentist used the best anatomic teeth to be procured, thereby obtaining the ut-

\*Read before the Section on Full Dentures at the Seventy-First Annual Midwinter Clinic of the Chicago Dental Society, Feb. 19, 1935.

most efficiency of the dentures if the process remained stable, but letting himself in for great difficulties if it did not.

I believe that the solution lies not in the general use of nonanatomic teeth, but in the attention paid to the correction of the systemic conditions which cause this shrinkage of denture foundations. Because we have learned to expect this shrinkage of process under dentures, the prognosis has been so bad for remaining teeth that it has been customary in a great many cases to sacrifice the lower six anterior teeth rather than construct a lingual bar partial denture, thus lessening the trauma due to unequal absorption.

Stable ridges alter the design of restorative appliances. It becomes less necessary to depend almost entirely on the remaining teeth for support; a situation which greatly increases the life expectancy of these teeth, and because their life expectancy is thus increased, the possibility of saving the few remaining teeth becomes greater.

In the large majority of patients, stability of process is negligible, but, in some cases, rather rare it is true, the process remains stable for long periods of time.

That this accidental stability occurs is known to every denture maker. A better understanding of the factors in these cases and in those in which the process is very unstable will show how this last condition can be rectified.

The problem before us is to make it possible to produce this stable condition of process in patients for whom, under prevailing practice, the dentures would remain stable but a very short time.

Practically all the literature on the conservation of alveolar process deals with the subject from the standpoint of trauma; that is, the mechanical perfection of the dentures as regards fit, balance and tissue tolerance. Still another means of helping to conserve the process which has

not been so well covered is the systemic condition of the patient, with its correction.

Dentistry started out as a craft, concerned with the mechanical repair and replacement of missing teeth, and gradually grew to include the medical treatment of oral lesions, but in so doing found its field broadening, as one part of the body cannot be considered an entity separate from the rest of the body. In the mouth is found both the causes and the results of disease elsewhere. The trend is clear. The dentist must have as much medical education as the rhinologist, the pediatrician, the gynecologist or any other specialist of medicine. Likewise, the prosthodontist must consider not only the mechanical problems of denture construction, but also the effect of wearing the prosthesis upon the patient and the effect of the patient upon the prosthesis.

We know that alveolar process is similar to bone and like bone responds to the same laws of nourishment. We do mark this difference: the process may be lost under certain systemic conditions that apparently affect the other body tissues but slightly.

We also know that teeth and bone respond to the same systemic conditions, the difference being only in the degree to which they respond. We will not go far astray in assuming that, in general, the alveolar process is subject to the same laws as are the other bony tissues, including the teeth.

We find that teeth and process are subject to the same laws of nourishment and to similar laws of mechanics in that both are healthy under some systemic conditions and unhealthy under other systemic conditions, are capable of withstanding proper stresses and suffer from abnormal or traumatic stress.

Systemic treatment is advisable in nearly all denture cases. The patient us-

ually loses his teeth because of a disturbed mineral metabolism and will likewise lose his ridges if this condition is not rectified.

I find that immunity to caries in patients 18 years of age or over can be determined by the analysis of the blood for calcium and phosphorus. To be immune, the product of the usable serum calcium and phosphorus, in milligrams per hundred cubic centimeters of blood, must be 30 or above, and the calcium and phosphorus must be in proper proportion or balance. Price, Crile and others have also found that, when this condition exists, fractures of the long bones unite and heal rapidly and that when a low content of calcium and phosphorus or an imbalance is found in the blood, fractures are slow to heal, even to the point where union is impossible. It has been found also that the long bones will shrink in size in a person in whom the blood mineral content persists in being low or in imbalance for long periods of time, such as in the aged. A shortening of stature of as much as 5 inches has been noted.

The index of immunity to absorption is indicated by the usable calcium-phosphorus level. The usable calcium and phosphorus is that portion of these minerals, as determined from the blood analysis, which can unite in the proportion of  $2\frac{1}{2}$  of calcium to one of phosphorus or in the proportions of 10 to 4. Either one of these minerals in excess of these proportions is free and may be deposited as such in abnormal places, producing disease.

Free calcium is responsible for kidney stones and for calculi deposits on teeth and dentures. Free phosphorus is often associated with the presence of pulp stones, inflammatory conditions, such as pyorrhea and arthritis, chronic appendicitis and colitis.

Immediately after extraction, there can

be no real stability of the alveolar process. Spicules and rough areas must be absorbed and smoothed over and a cortical layer must be built. During this period, the patient should have immediate dentures built in such a way that minimum pressure is required to masticate food and constructed of some material easily trimmed, adjusted and relined.

During this time, systemic treatment proceeds, that the patient may have the desired cortical layer formed as soon as possible. To do so, instruction as to diet should be given.

The ordinary American adult diet in the northern states contains a sufficiency of calcium and phosphorus, but if, on inquiry, this is not found to be true of the individual patient, the diet is rectified. A common deficiency in the northern states is of vitamin D. City dwellers do not as a rule venture outdoors any more than is necessary in the winter months, which are seven or eight of the twelve, and when they do, it is mostly in glass enclosed cars. Such a mode of living creates a general deficiency in the sun-given vitamin D, which controls the assimilation and level of one of the important bone and tooth minerals, calcium.

In some parts of the country, there is a real deficiency of calcium in the soil. A deficiency of calcium in locally grown foods must be supplemented by the use of foods having the desired amount of calcium.

Other vitamins have been found to play a part in bone building and maintenance. These are vitamins A and C, which can readily be supplied in the modern diet with almost the ease and facility in the north as in the south, owing to the marvels of modern transportation.

Most cases will show a sufficiently high calcium content, as it does not usually

vary to the degree that the phosphorus does. A range of from 9 to 11 mg. is usual. The minimum requirement is 8.7 mg. If it is desired to raise the calcium content of the blood, feeding of calcium in the form of dicalcium phosphate, calcium lactate, calcium gluconate or milk with the addition of vitamin D will give the desired results.

Usually, the addition of cod liver oil to the diet will increase the calcium content of the blood to the desired point, for lack of sufficient calcium in the food is not so common as has been thought.

The phosphorus level should be exactly 40 per cent of the calcium level. When the phosphorus level is more than or less than 40 per cent of the calcium level, an imbalance exists. Such an imbalance cannot be corrected by feeding phosphorus or omitting it from the diet, except possibly temporarily. The imbalance of phosphorus is caused by endocrine dysfunction, and endocrine treatment must be used to restore the balance.

When the phosphorus of the blood does not have the correct proportion of 40 per cent of the amount of the calcium, there is direct evidence that the metabolism is abnormal. Restoring the metabolism to normal will correct the disproportion.

There are five endocrine glands involved in calcium-phosphorus metabolism, the thyroid, the parathyroids, the gonads, the hypophysis and the thymus.

Of the endocrine glands involved in calcium-phosphorus metabolism, the thyroid apparently is the most important, as it more or less determines the functioning of the others. When there is an imbalance of calcium and phosphorus with an abnormal metabolism, the treatment lies with the thyroid. It is perfectly possible that the dysfunction of the thyroid is due to its effort to counterbalance a dysfunction of some other endocrine

gland, but as far as my experience goes, treatment of the thyroid seems to do the work, except in cases of secondary hypothyroidism; i.e., lessened function of the thyroid due primarily to lessened secretion of one of the hormones of the anterior lobe of the pituitary. These cases are relatively few, and the calcium-phosphorus level of these also can be built up to the immunity level by suitable treatment.

In that section of the United States known as the Great Lakes basin, dysfunction of the thyroid is very prevalent. This condition may evidence itself either in hyperfunction or hypofunction. The former is easily recognized, and nearly all of the literature on thyroid dysfunction deals with this phase. A condition not so generally recognized is hypofunction of the thyroid. In Michigan, where I have been investigating thyroid dysfunction in its relation to teeth and process, it has been difficult to find patients not affected in this manner. The percentage of hypothyroidism is very high. I believe, from what opportunity I have had to examine patients from other parts of the country, that this condition is not confined to the states bordering the Great Lakes, but exists to a greater or less degree throughout the country.

The general run of patients in my practice show endocrine dysfunction to about 94 per cent, of the total of which about 4.5 per cent show hyperfunction. This has been determined by symptomatic diagnosis, by calcium-phosphorus balance and by metabolic registration.

Dysfunction of thyroids is supposed to be due to lack of iodine in the food. Attempts to rectify this condition have been made by adding sodium iodide to the drinking water in some large cities and by the use of iodized salt. Goiter in these cities is much less prevalent now than formerly, but I believe the organic form

of iodine rather than the inorganic would be more easily assimilated.

Again, we are not so sure that all the blame can be laid to the absence of iodine. There is definite evidence that the lack of minute quantities of manganese in the food tends to lower the metabolism. Also, some forms of anemia affect the metabolism, the condition being much improved by the addition of iron and copper to the diet.

The minerals in the soil are nearly all more or less readily soluble, and in the course of countless centuries, a great deal of those most readily soluble must have been washed from the soil or taken up by plants and not replaced.

Hypothyroidism affects the phosphorus level of the blood. The phosphorus will not have the correct ratio to the calcium, but will be either less or more than 40 per cent the amount of the calcium.

Hypofunction of the thyroid is diagnosed by various clinical symptoms, some of which are: increased weight in the lower part of the body and legs in females; thickening of the tongue, dryness of the skin and brittleness of the hair and nails, loss of hair in the male; mental sluggishness, quick flare-ups of temper, anemia and chronic constipation, sometimes changing to chronic diarrhea. Rectal crypts and hemorrhoids are common. The determination of the basal metabolic rate is subject to much error by the present means of determination of oxygen consumption, the error usually being on the side of increased metabolism, and therefore less useful in the determination of hypofunction.

The treatment of hypothyroidism is the administration of thyroid extract to augment the supply which the thyroid produces or to administer those minerals the lack of which caused the dysfunction.

The administration of thyroid, except in experienced hands, is dangerous. No

more should be given than to supply the deficiency existing in the person treated. Administration of a greater quantity tends to decrease the functioning of the gland so that the condition is worse than before. A safer and surer method is to administer kelp in daily doses to supply as a food those minerals which will give the gland an opportunity to recover its function normally. This recovery will take place ordinarily in a very short time in the vast majority of patients. Occasionally, a patient is met in whom hypofunction is more or less hereditary. They usually give a family history of having lived for several generations inland. Either early loss of teeth or arthritis characterizes the family history.

In such cases, thyroid not to exceed one-fourth grain of the enteric-coated product is administered daily, together with kelp. Frequent calcium-phosphorus checks should be used to determine whether the dosage should be decreased.

Sea food other than kelp furnishes the desired minerals and, if a supply is readily obtainable, it is desirable as a frequent portion of the diet. Kelp is a god-send to those living where animal sea food is not readily procurable. A small quantity furnishes more minerals than a large quantity of animal sea food and at a fraction of the cost.

I believe that the ability of cod liver oil to raise the phosphorus level is due to the mineral content of the oil rather than the presence of vitamin D.

We find a marked difference in the ability of cod liver oil and viosterol to raise the phosphorus level. Likewise, the general level of calcium and phosphorus of those hospitalized patients that I have examined does not run markedly different in June and July from what it does in January and February. Yet, in our locality, we have an abundance of sun-

shine in the summer and very much less in the winter.

Hyperthyroidism is recognized clinically by an increase in weight in the upper part of the body in females, rapid pulse, palpitation, increase in appetite, nervousness and thinness, irritability, fine tremor of the hands, loss of weight and a high basal metabolic rate, for determination of which the present method is more reliable than for hypofunctioning thyroids.

The treatment for hyperfunctioning thyroids is surgical, by removal of infection; or the administration of small doses of organic iodine, such as in kelp, if the hyperfunction is susceptible to treatment, as in the incipient stage. The same condition—lack of minerals—may be factors in either condition.

Cod liver oil in the winter months to furnish vitamin D for calcium fixation, with kelp the year around to establish and keep the phosphorus level in proportion, will do much to keep the patient in good health, not only dentally but systemically, and will raise the usable calcium-phosphorus product above 30; a condition favorable for the maintenance of alveolar process.

The case showing the highest level of phosphorus that I have observed had the most serious disease. This reading was: calcium 11 x P 8.4, a phosphorus proportion to a calcium of 76 per cent. The reading was taken shortly before the patient spent six weeks in bed with arthritis in the lumbar region and sciatica. He had a blood pressure of 95 and a metabolism of -9. He was treated with a daily dose of one-fourth grain of thyroid extract, whereupon his arthritis disappeared. His tests at later dates showed: 12 x 4 and 10 x 3.5. At present, the figures are 10 x 3.8. The blood pressure has risen to 118, where it is fairly stable.

A number of cases of arthritis have

been cleared up by balancing the calcium and phosphorus of the blood serum. The point to be brought out is that, in all of these cases, the phosphorus was in excess of 40 per cent of the amount of calcium.

Another case more nearly pertains to the subject of alveolar bone:

A woman, aged 45, had had several sets of dentures in three years. A blood test was obtained to determine whether the cause of the excessive absorption could be ascertained. The calcium-phosphorus product was found to be 18. The diet was carefully regulated and another test made after four weeks. The product at that time was even lower, only 16. A metabolism test was made and the rate found low. Thyroid extract was given and the third test after a short interval was 25. The treatment was continued and later dentures were made.

In the three succeeding years, there was no perceptible shrinkage of the process. A good cortical layer had developed and the patient had attained comfort in wearing dentures.

After the patient's usable serum calcium and phosphorus product has reached 30 or more and sufficient time has elapsed for the cortical layer of the process to form, it is perfectly safe to make the permanent dentures, and without fear of failure, if the mechanical causes of absorption are avoided in their construction.

The foregoing statements in regard to absorption of alveolar process and means toward overcoming this undesirable condition are not theoretical. The ideal of prevention is just as important in prosthesis as in other branches of dentistry or medicine, and although its principles are applied a little late in the case of the denture patient, his previous experiences make him very receptive.

A few case histories, with the corre-

sponding tests for serum calcium and phosphorus, are illustrative:

Total  $8.2 \times 3.8 = 31$ ;  $P = 46.3\%$   
Usable  $8.2 \times 3.3 = 27$ ;  $P = 40\%$

This test was of an elderly man who gave a history of having several sets of teeth, none of which were comfortable. His dentist had made repeated efforts to make him comfortable, without success. The story told by the blood test furnished the reason. Both calcium and phosphorus were low, and the proportion of phosphorus to calcium was high. Cod liver oil and kelp were taken daily and new metal based dentures were made. The patient is now comfortable and, best of all, grateful.

Other patients appeared, showing the following figures:

Total  $11.2 \times 2.4 = 27$ ;  $P = 21\%$   
Usable  $6 \times 2.4 = 14.4$ ;  $P = 40\%$

Total  $9.5 \times 3 = 28$ ;  $P = 31\%$   
Usable  $7.5 \times 3 = 22.5$ ;  $P = 40\%$

Total  $10.5 \times 3.1 = 32$ ;  $P = 30\%$   
Usable  $7.75 \times 3.1 = 24$ ;  $P = 40\%$

Total  $8.5 \times 4.2 = 36$ ;  $P = 50\%$   
Usable  $8.5 \times 3.4 = 29$ ;  $P = 40\%$

These all responded to treatment, so that, in a space of two or three months, it became safe to construct permanent dentures for them with assurance of satisfaction.

Most of my records are of patients that still had their teeth, some of them having rapidly progressing caries. In a short space of time, they became immune to caries, on the daily administration of small amounts of kelp.

May 26  
Total  $8.5 \times 3.5 = 31$ ;  $P = 41\%$   
Usable  $8.5 \times 3.4 = 29$ ;  $P = 40\%$

Oct. 6  
 $9.5 \times 3.8 = 36$ ;  $P = 40\%$

May 25  
 $9 \times 4 = 36$ ;  $P = 44\%$

July 27  
 $10 \times 4 = 40$ ;  $P = 40\%$

July 7  
 $10 \times 3.6 = 36$ ;  $P = 36\%$

Aug. 8  
 $10 \times 4 = 40$ ;  $P = 40\%$

Another case showed a reading in March of

$8 \times 3.5 = 28$ ;  $P = 44\%$

This patient, who had pyorrhea for ten years and had caries also, was given dicalcium phosphate and cod liver oil. In April, a test showed

$10 \times 3.5 = 35$ ;  $P = 35\%$

She was then given kelp and in May, a test showed

$11 \times 3.9 = 43$ ;  $P = 36\%$

Thus, a condition of immunity to caries and pyorrhea developed in two months. Continued use of kelp throughout the summer resulted in

$9 \times 3.8 = 36$ ;  $P = 42\%$

This was not quite perfect, but improving.

Owing to the wide variation in the readings of successive metabolism tests taken on the same case, no significance has been attached to the incidence of caries and density of bone, and alveolar absorption and metabolic dysfunction. The key to this relationship has been discovered.

If the assumption that metabolism controls the incidence of dental caries is correct, an accurate determination of the basal metabolic rate should check with immunity or susceptibility to caries.

The prevailing method used to establish the basal metabolic rate is to measure the oxygen consumption for a given

length of time. To do so, a quite complicated piece of apparatus is used, and from the amount of oxygen consumed over a given period of time and by means of tables of average body surfaces for a person of given height and weight, modified by the room temperature, the energy consumed is calculated.

The patient must be prepared for the test. The method commonly used is to hospitalize the patient for the night preceding the test, which is made the following morning on an empty stomach. Not so much as a glass of water is allowed, as this would consume energy and influence the results.

A nose clamp is applied and the patient breathes through his mouth, through a mask which is connected by means of a tube to the apparatus. The patient should not be nervous or be excited in any way by the procedure as this would raise the metabolic rate considerably. The very term basal is descriptive. To be accurate, the test should be made under ideal conditions of a uniform nature and at about 3 o'clock in the morning, while the patient is having a dreamless sleep, as the life processes are at their lowest ebb at this time and under these conditions.

As it is apparent that it is impossible to obtain such conditions, the results of such tests must indicate a metabolic rate greater than the actual basal metabolic rate.

That such is the case is well known. It has been generally considered that the first test of a patient is useless, and only by repeated tests can a fair determination be made. Even these may vary over quite a range. The practical effect of this method of determining the metabolic rate is to establish an average; but as the average person has caries of the teeth, it is not of much use to us in determining caries susceptibility. It is of great use in

determining the presence of hyperthyroidism.

Theoretically, there should be another method of measuring metabolism by measuring the effect of a continued metabolic disorder, if such effect is quite common to a large class of persons and is proportional to it in degree. Such an effect exists.

It has long been noted that women showing hypothyroidism have a tendency to acquire weight from the waist down, while women showing hyperthyroidism tend to have thin lower extremities, but well developed upper portions of their bodies.

By means of a system of comparative measurements of the forearm and leg, this effect of alteration of metabolism can be demonstrated in cases of slight metabolic dysfunction and in young women in whom this effect would not be evident to the eye.

The method, a simple one, can be applied in a very few minutes by the dentist himself or his assistant with no more complicated equipment than a tape-measure and pencil and paper.

This test is based upon the symmetry of the person in whom there is no endocrine derangement and upon the asymmetry which develops when there is an endocrine derangement. It is very accurate for the untreated patient or for the treated patient when sufficient time has elapsed to change the proportionate dimensions of the body members measured.

It is as follows: The length of the forearm is measured from the tip of the elbow to the wrist joint and marks placed on the arm with a soft lead pencil at intervals of one-fourth this distance, beginning with the wrist. The leg is measured, from the knee cap to the ankle and marks placed on the stocking with tailor's chalk at points one-fourth



this distance apart, beginning with the ankle.

The circumference of the arm and of the leg at these points is measured with a tape-measure held lightly in contact with the skin and stocking. This gives the circumferential measurements at five equidistant points on the arm and five on the leg.

Now, the leg measurements are divided by the corresponding arm measurements and the five results secured are added and divided by five to obtain the average. This gives the comparative size of the leg and the arm.

In the normal healthy female, there is a relatively constant proportion of the leg to the arm and, in such a person, the proportional measurement secured will be from 1.420 to 1.430, irrespective of size or shape.

When there is an endocrine hypofunction, the measurements will give a result showing the leg to be larger in proportion to the arm than the normal. When there is an endocrine hyperfunction, the measurements will show a leg smaller in proportion to the arm than in the normal person. The range in my experience will be 1.300 to 1.400 for hyperfunctioning endocrines and from 1.430 to 1.650 or more for hypofunctioning endocrines. The farther away from the normal the measurement is, the greater the dysfunction.

This method of measuring the effect of continued endocrine dysfunction checks very accurately with the patient's susceptibility or immunity to caries. The calcium-phosphorus balance also checks fairly accurately with the plotted position of the measurement.

Discrepancies are due to the differences in rate of change of the calcium-phosphorus level of the blood, the density of hard tissue and the relative proportions of the body members; the blood picture

changing first; then, the density of the hard tissues, and last, the body proportions.

This chart shows that patients may be divided into three classes according to their response to endocrine dysfunction. The first and larger class are those whose phosphorus level is lowered coincidentally with endocrine dysfunction. In these persons, about 80 per cent of the total, the number of carious areas per year can be accurately estimated by the degree of disproportion shown. Also, the percentage of phosphorus to calcium can be very accurately estimated.

The second class are those whose response to endocrine dysfunction is an increase in the percentage of phosphorus to calcium. The increase here is also in proportion to the dysfunction. Such persons have almost always perfect teeth, but are particularly susceptible to arthritis, the development of pulpstones and pyorrhea.

The third class, the variables, whose phosphorus level swings like a pendulum, part of the time being in excess of normal and part of the time being less than normal, have caries, but do not average as many cavities as those in the first class. They are subject to intermittent flare-ups of arthritis.

When we find a patient with normal proportional measurements, we find the phosphorus level almost exactly 40 per cent of that of the calcium, and we find an immunity to decay.

Finally, we find that, by endocrine treatment, we establish immunity to caries. The phosphorus becomes 40 per cent of the amount of calcium in the blood serum and the disproportion of the body members changes to a correct proportion.

All of these facts apply equally to process; therefore, the necessity of endocrine treatment for successful prosthesis.

## SUMMARY

Alveolar absorption is due to three conditions, the chief of which is the systemic. The systemic condition as regards bone is determined by clinical evidence, by the Benedict test for calcium and phosphorus in the blood serum, and by the metabolic rate. Under the ideal condition, the calcium and phosphorus

(usable product) should be 30 or over, and the proportion of phosphorus to calcium 40 per cent. These proportions are obtained by dietary measures of which the most important in our latitude is the addition of vitamin D and organic minerals, correction of dysfunction of the endocrine system and removal of infection.

## FULMINATING OSTEOMYELITIS OF THE MANDIBLE WITH PATHOLOGIC FRACTURE\*

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**O**STEOMYELITIS of the mandible is perhaps one of the most serious complications which may follow the simple extraction of teeth. Fortunately, the incidence of this infection is comparatively narrow. It is important, nevertheless, that those men who concern themselves with the responsibility of routine exodontia be well informed regarding the etiology and pathology of this disease.

We do not intend in this short paper to present a comprehensive review of a subject which has so many ramifications. Rather, we plan to discuss a series of roentgenograms that clearly reveal the various stages in the progress of the disease. A careful study of this series of films will, in our opinion, be of considerable aid in arriving at a clear understanding of the condition.

The previous history of this case as reported to us by the dentist referring the case may be briefly stated as follows: A railroad man, aged 54, decided to have

all his remaining upper and lower teeth extracted. The general condition of the teeth and supporting structures prior to extraction may be described as unhygienic. An extensive alveolar absorption was present about the necks of all the teeth, accompanied by the presence of heavy calcareous deposits and much soft food débris about the gingival margins.

The mouth was divided into sections and four or five teeth were removed at each sitting, under local infiltration anesthesia. In three sittings, all the upper teeth were removed. Healing was rapid and uneventful. When the upper jaw was healed, the five posterior teeth on the lower left side were extracted, under conduction anesthesia. There was no subjective or objective evidence of an acute pathologic condition at the time of the extractions, which were of themselves uncomplicated. None of the teeth were fractured and no curettage of any kind was performed. The patient did not return to the office for postoperative treatment for nine days. When he did return, there was marked swelling on the left side

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