

PROGRESSIVE ALVEOLAR ABSORPTION WITH AND WITHOUT THE PRESENCE
OF TEETH

In the chapter entitled "Burning the Furniture and Beginning Death" I have revealed the problem of progressive decalcification throughout the body as part of nature's struggle to maintain life because of the fact that the amount of activators, (vitamins) available was not adequate to make it possible to take from the food each day a sufficient quantity of calcium for that day's requirements, thus compelling a draft on the storage calcium of the skeleton. In various chapters, different phases of this problem are disclosed showing that it has been a major factor in the struggle for life with most forms of animals under conditions of stress. In the chapter on Pyorrhea I have disclosed in detail several of the contributing factors stressing the influence of local irritation and systemic need for calcium. I wish to discuss some of the phases here which deal directly with quite disturbing changes in the hard tissues of the mouth in areas even where teeth have been removed. This has been a matter of great concern and worry on the part of the members of the dental profession who have had continued difficulty with absorption of the bony structures beneath artificial restorations

whether partial or complete dentures. It has been clearly evident in many instances that this progressive absorption of hard tissues had no connection whatever with the wearing of artificial restorations since in some mouths badly affected, artificial restorations had never been worn.

A striking illustration of extreme alveolar absorption is seen in Figure which has the following history: She presented for special study because she had been required to have five new dentures made in eight years. Following each reconstruction marked and progressive decalcification occurred with the result that her upper denture soon lost its retention. In the roentgenograms it will be seen that there is scarcely enough hard tissue available to cast a shadow by obstructing roentgen rays, there being little more shading produced by the bones of the face than the soft tissues. Apparently the absorption has taken place from all surfaces of the bone parts, the maxillary sinuses having greatly enlarged and separated from the oral cavity by only a slight structure. The roentgenograms of the hand of this patient shows clearly the same condition as in Figure There is marked reduction of the cortical layer and increase of the

medullary structure. No doubt dentists who have struggled with such cases have felt much responsibility and perhaps have considered the denture responsible in large part. Since, however, it is a problem of all parts of the body and occurs in mouths that have never worn artificial restoration it clearly cannot be related to the material used or even the presence of artificial restorations though this can have an influence for any condition which increases circulation or prevents radiation will by the retention of heat and increase of circulation contribute to and hasten the decalcification process.

The blood chemical analysis for this patient shows the cell volume at 47, slightly higher than normal; the calcium of 100 cc of serum 9.1 which is distinctly low; the serum plus bone at 7, a little high; indicating that when the bone chips were placed in this serum the calcium did not go from the serum to the bone chips and be deposited there in as great quantity as normal. The diffusibility of the calcium of the blood serum is a little low, slightly more than for normal. The blood sugar at 113 though taken in the morning several hours after eating was a little high; the inorganic phosphorus of 100 cc of serum was at 3.7 a little too low. The product of serum

calcium and serum phosphorus at 34 is low, about 40 being normal for adults. A microscopic study of the blood shows the polymorphonuclears to be low and the arneth index to be low, all of which factors I interpret to indicate a state of stress. The complete blood chemical findings are shown in Figure

The history of this case was: About 10 years ago this patient had a nervous breakdown at 45 years of age which preceded the menopause about three years. She had two spells of jaundice, one following "flu" four years ago. Her chief symptoms had been lassitude and nervousness, making it difficult for her to go through her daily duties as a teacher. In late years she had noticed marked increase in sensitiveness of the nervous system. On some occasions when she lies down and tries to go to sleep just before losing consciousness a disturbance occurs in the top of her head which seems like a circular motion and prevents her from going to sleep. This sleep is very easily disturbed. The treatment of this case has been by the use of a mixture of raw and activated cod liver oil of high vitamin A and D content; three capsules with each meal and one calcium lactate tablet was the dose prescribed. These are not taken before or after

the meal but during the meal for the most beneficial effect. The result of about ten weeks of this treatment is as follows:

Much evidence is accumulating indicating an important ^{inter-}relationship between disturbances of function of the thyroid gland and of calcium metabolism, indeed, it is probably true that the thyroid gland is directly responsible in some cases for disturbances of calcification or decalcification and it may readily be that one of the processes by which thyroid influence expresses itself upon the tissues and other organs of the body is through the influence of the thyroid on the available calcium for the fluids of the body and conversely it seems probable that disturbances of calcium anabolism or metabolism may directly influence and therefore disturb the functioning of the thyroid gland. There is a strong suggestion of such relationship in the next case. ^(case # 1829) This patient like the last was sent because of absorption of the supporting hard structures of the upper arch seriously disturbing the efficiency of the upper denture.

In this case the blood chemical analysis shows (see table) the cell volume to be 39, calcium per 100 cc of serum 8, inorganic phosphorus of serum 3.4; the product of serum calcium and serum phosphorus 27.3 or 12.7 below 40; and the saliva calcium was very low, at 3.8. A microscopic study of the blood showed the white blood cells at 9,500 but notwithstanding this high level the polymorphonuclears were only 48% the small ? at 43%.

The history of the case shows the patient was 61 years of age and has had two operations for the removal of thyroid the first one thirteen years ago, the last one but a year ago. It is significant that the last flare up of the thyroid was preceded by heat prostration and was associated with marked acute heart irritation.

The treatment of this case was the placing of the patient upon three capsules of cod liver oil, two parts raw and one part activated, of high vitamin A and D content, with each meal and one tablet of calcium phosphate extracted from grain.

A condition of marked decalcification with the consequent loosening of the teeth due to the loss of their supporting bony structures often occurs in connection with an acute disturbance in some organ in which both are symptoms of the same general condition, namely

disturbed calcium metabolism. Such a condition is well illustrated by the following case of a man of 37 years of age who was found unconscious on the floor of the bathroom in the early morning. Medical aid was called and when he did not regain consciousness he was hurriedly taken to a hospital. The appearance of the stool revealed internal ~~hemorrhage~~ ^{hemorrhage} which proved to be from the stomach. Twice within two weeks blood transfusions were necessary. His condition was necessarily very serious, the stomach condition being diagnosed as peptic ulcer, and it is interesting and important that he did not have previous knowledge of its existence. In anticipation that the stomach ulcer might have as an important contributing factor, dental infection the writer was asked to study the case. The chemical studies showed the cell volume to be 30%; serum calcium notwithstanding his two transfusions 9.4; inorganic phosphorus at 3.8. The detailed blood and saliva analyses are shown in table . A microscopic study of his blood showed the white cells at 16,500 with the polymorphonuclears at 64 per cent. The dental conditions found showed a very marked general decalcification enveloping the supporting structures of practically all the teeth, all being quite loose in their sockets.

This marked absence of hard structures is shown in the roentgenograms in Figure . An effort was made to remove one of the badly infected and filled teeth but owing to the very profuse persistent hemorrhage following the preliminary puncturing of the mucous membrane for the anesthetic the operation was delayed until he could be gotten into better physical condition by treatment. With the improvement the extractions were made without difficulty from hemorrhage and because of the lack of bony support the few acutely involved teeth were easily removed the majority of the teeth were retained because of the splendid attachment of the soft tissue to them and the clear evidence that their looseness was due to the systemic disturbances. A most remarkable improvement followed the treatment and the removing of the acute dental infections. The patient gained about 23 pounds in about three or four months? and all the loose teeth tightened so that there was marked evidence of the rebuilding of their bony support. Their return to normal was so complete that it would be hard to appreciate that they could ever have been in a condition of so poor attachment and support. A striking incident occurred; his wife told me that she could look back to the year preceding his attack during which time

he was progressively getting more and more irritable and impatient even with his children but with the progressive return of his calcium metabolism factors toward normal his personality rapidly returned to his original calmness and affectionate interest in all the members of his family. The evidence and history of this case strongly suggest if they do not indicate, that the mental and physical disturbances including the stomach ulcers were directly the result of the two factors, the source of focal infection about his teeth and the accumulated physical disturbances due to disturbed calcium metabolism. He has retained his improvement progressively to this time which is about a year and a half and I anticipate that so long as he will be free from focal infection and provide to his body an adequate quantity of activators together with a suitable diet he will remain well. This type of condition is discussed from a different standpoint in the chapter on "Calcium Metabolism Disturbances and the Degenerative Diseases."

It is exceedingly important that we shall come to recognize the early symptoms of calcium metabolism disturbances even long before physical breaks come in order that both the symptoms as degenerative

processes and the general injury due to mal-development and misfunction shall have handicapped the individual more or less seriously for life.

In my two volume work on dental infections, I have presented extensive data indicating that dental caries tends to affect some individuals much more than others and that the individuals susceptibility to dental caries prove also to be those who are susceptible to the rheumatic group diseases such as acute heart involvement and arthritis. While dental caries tends to involve dental pulps and thereby to produce focal infection through devitalization of the pulps indirectly or directly from the invaded vital pulp the evidence strongly suggests that there is a difference in the defensive mechanism of the individuals of this group from those of the typical group without extensive dental caries. Since the latter as a group do not tend to have these rheumatic group disturbances my data published in those volumes and in other communications such as "Some Systemic Expressions of Dental Infections", reprinted from "Annals of Clinical Medicine" and much evidence published by other authors seem strongly to indicate that a hereditary factor and

therefore a characteristic of the structure of that individual's family tree. One of the factors that I have stressed very often and I hope with deep emphasis, is that dental caries, while serious because of the injury or loss of the tooth involved or even because of the systemic involvements which may arise from the pulp infection or subsequent to its devitalization, still the dental infection should be looked upon as having its chief significance as a symptom of a very serious systemic disturbance. We often see individuals breaking with nervous disturbances a few months after dental caries has become active and both the nervous breakdown and the caries are symptoms of metabolism disturbance, chiefly of calcium and phosphorus due primarily to insufficient utilization of proper activators some of which are vitamins A, B and D.

A case illustrating such a condition is that of a little girl, *(Hilthy Bauer, seen at May 11/26/29)* $8\frac{1}{2}$ years of age. She was sent by her physician because she seemed to be so nervous. As she presented with her Mother an evidence of her trouble was immediately disclosed by her great difficulty to sit up straight. Her spinal column seemed to have no rigidity and she found it necessary to be either leaning against the chair back or some

object, or else she sat with her shoulders far forward in a crouching position. In Figure there will be seen the roentgenograms of the teeth; two deciduous molars had been extracted within a few weeks because of their abscessed condition; at least three others are abscessed and there is much active caries. Even the first right permanent molar shows some decalcification, next to the pre-molar even the enamel of the tooth is low of density.

The history of this case was:

I see large numbers of cases of boys and girls between 10 and 20 years of age where there is evidence of serious stress and severe nervous symptoms associated with dental caries.

A very striking one is the following: (Donald Wepser)

A boy of 13 was brought by his mother from another city because of his very rapid dental caries associated with nervousness and a tendency to colds. She reported that it had been impossible to fill the cavities as rapidly as they had formed and that the dental operations were so hard on him she had come to an impasse. We find the boy to be a most lovable chap with a sincere desire to co-operate but with a nervous system so sensitive that when he would draw an instrument with a rough handle across his teeth he would almost go into paroxysms, a typical expression of the increasing irritability of the nerves with disturbed calcium level in the tissues and fluids bathing them. It would certainly be unwise to induce a child in this condition to have dental operations made whether by persuasion, coercion, fear or force. After a few weeks treatment his nervous reactions had so changed that several cavities could be filled at one sitting and while he presented with a large number of cavities for the year following

his being placed on treatment, he had almost no dental caries.

The abnormally large pulp chambers due to delayed calcification from cavity of the odontoblasts was followed by quite normal decrease in the size of the pulp chamber and in 3 months time he gained five and one-half pounds and grew one and five-eighths inches.

The treatment in this case consisted of the addition to his diet of small doses of cod liver oil (taken with his meals) which by testing was found to be high in activators and low in toxic substances, which I have discussed in detail in the chapter on Cod Liver Oil. An important phase of this case and one which is almost a constant factor was the marked improvement in the ease with which he could carry his studies and the level of his grades. There was practically a complete relief with his tendency to colds.

Nearly every case we meet of under development and nervous irritability in childhood is found to be associated with delayed calcification of the teeth, indeed, one readily comes to read the significance and consequences of these calcium metabolism factors so ready that in a group much can be correctly anticipated by the first casual meeting with the child. The mental and nervous expressions as

well as the physical are so directly related to calcium metabolism factors it becomes quite impossible for a child to express normality in any of these phases. A striking illustration is found in the following case. This boy a little over 11 years of age has not been able to attend school much because of his extreme nervousness. He is very poorly nourished, shuns fruits and vegetables, does not get along well with his playmates, a typical illustration of malnutrition due chiefly to a lack of proper activators for calcium utilization. I had seen this boy some four years previous and had made roentgenogram of his teeth. At 11 years and 5 months of age he was still retaining his deciduous molars and the bicuspid which were to displace them and which should have been erupted before this period show at 11 years and 5 months only a little more calcification than at 7 years and 4 months. This is shown in Figure *(series of John Drury's teeth)*. In one month's time the deciduous teeth had loosened and been spontaneously shed. The development of the teeth progressed normally as will be seen in the subsequent roentgenograms. This boy grew rapidly; in 60 days he gained 4 pounds in weight and 11/16 of an inch in height; his appetite changed from shunning fruits and vegetables to liking them and most

important perhaps of all his nervous state changed from being listless and irritable to one of affability and longing to go to school. In $2\frac{1}{2}$ years he grew in height seven and thirteen-sixteenths inches and increased in weight thirty-six and a half pounds, a net gain of 50 per cent in weight. For most of his life he had been a semi-invalid; he rapidly changed to a vigorous, athletic boy, keen mentally and strong physically. This change was produced by putting into his system a type of activator which very markedly changed his ability to utilize the calcium and phosphorus present in his food, and to metabolize them for utilization and growth. The degree of activation of the cod-liver oil which was given to him in small doses was in excess of what we would use now with increased experience. The change in his physical condition is parallel in the blood picture in which it will be seen the serum calcium increased from 9.06 to 9.56; the inorganic phosphorus from 2.6 to 7.7 in 60 days; the product of serum calcium and serum phosphorus at the beginning was 24 and after 60 days 73. I do not now consider it best to carry this case quite so rapidly. While the case we have just cited had as chief expression in delayed calcification and growth processes and due probably in large part to a deficiency in the quantity of vitamins

A and D in the daily food intake, we see many cases in which the chief expression will be dental caries with sensitive nervous system. The extreme rapidity of dental caries in some of these cases is appalling and probably no problem pains the conscientious dentist more than to see the progressive advance of this state in spite of all his best effort. A striking illustration is the following case. A fellow dentist of very high standing in this community telephoned me one day that he desired to send a patient, a young lady of 16 years of age to be studied by me and put in my care. Since notwithstanding the fact that he had been giving her appointments weekly for many months he had not been able to fill the cavities as fast as they had developed and he did not wish to continue to have the responsibility. On presentation we charted 32 open cavities and immediately placed her on treatment after making our blood chemical studies. During the following year only one or two small cavities were found though she was examined roentgenographically every 2 or 3 months. There was marked improvement in her physical and nervous condition.

Among the many problems confronting the dental specialists few are more difficult and disheartening than those which at times

confront the orthodontist, for occasionally after great gains and effort teeth may be moved into place only to have them migrate usually toward their former undesirable position. These cases are often associated with marked lack of development of maxillary bones or mandible or both.

A case presenting such difficulties is the following:

The position of the upper cuspids as seen in Figure both are deeply imbedded and approach the palate in a direction that is greatly narrowing the arch. It was necessary with both of these teeth to operate and adapt extruding appliances. When the crown of the left cuspid was uncovered a small hole was drilled in the enamel which was threaded and into which was screwed a very small platinum bar. This is shown in Figure . After this tooth was extruded it tended readily to settle back. This condition was checked readily and relatively quickly by the administration of small doses of a cod liver oil very high in vitamins A and D. It seems very probable that the problem of delayed development in this case was directly related to the amount of activators this patient was able to obtain from his normal diet it being much too small an amount to meet his particular needs. His second permanent molars instead of erupting at

12 began erupting at 15. The very structure of the bones and the history of this case suggest a condition of stress which we may anticipate will become an important factor in the future as well as the past history. I anticipate that unless there is provided for his system an ample supply of these activators he will not readily withstand overloads. This problem is discussed further in the chapter on Overloads.

This problem of the movement of unerupted teeth by simply extruding them with suitable apparatus is associated with very great difficulties. When the distance to be moved is considerable but not nearly so great as obtains when in addition to extruding the teeth it must be swung through considerable of an angle because of the ease with which blood vessels may be ruptured or serious injury done to the internal as well as external structures even to the extent of devitalization of the pulp. This seems largely to be influenced by not only the skill in adapting the appliance and supplying the force but also the facility with which tissue may be built about the moving tooth and the ease with which absorption may take place on the side receiving the pressure. We not not appreciated that

As an illustration of the possibility of such movement I present a
(Ode Briney)
case which is shown in Figure In this we see the position of the
lower right cuspid at approximately right angles to its normal position
and lying deep in the tissues with its apex behind the right lateral;
the left lateral and first bicuspid had moved toward each other.
The first molar had been removed some previous time; the general
characteristic in this young man of 16 was one of incomplete cal-
cification one phase of which is disclosed by the abnormally large
pulp chambers. An operation was made removing both the soft and
hard tissue over the crown and a bar was placed in a threaded hole
of minute size in the crown of the tooth as shown in B. The movement
of this tooth through a rotation of approximately 90 degrees was
shown in successive stages in Figure and it will readily be
noted calcification followed rapidly closing the chamber left behind
the tooth while decalcification progressed on the side toward which
it was moving. A feature of this case was the acutely painful
sensitiveness of both knees which had been diagnosed as arthritis.
He also suffered severely from a sense of lassitude or weariness.
These conditions all rapidly improved under the same stimulation of
calcium utilization processes.