conditions which have or are supposed to have their origin in mouth infections, of which pyorrhea is a common and important one; but it must be remembered that there are lots of people with arthritis who are wearing full upper and lower dentures and have been so doing long before they became afflicted with arthritis. There are a great many cases of arthritis that have their foci in the mouth, but these infections are sometimes present in cases of arthritis, the removal of which does not result in the disappearance of arthritis to any degree. In these cases, therefore, while there may be pyorrhea and other foci of infections present, and while every effort must be made to eradicate them, we must not devote all energy to these infections to the exclusion of foci in other parts of the body which may be the chief foci, and relief cannot be had until they are located and removed. Further, there are many roentgenograms which show rarefied areas around the apexes of the roots that are rightly interpreted as being foci of infection, but it must also be remembered that there are lots of others which show the same rarefied

areas which are not foci of infection, being localities in which there possibly once was a focus but which has been removed, and the tissue not yet completely filled in, which may never completely take place. This is amply proved by using an aspirator and removing a portion of the content of that supposed focus, only to find it to be nearly free from bacteria. Except in extreme cases, therefore, there is no justification for the extraction of a tooth, simply because a roentgenogram showed a rarefied area, unless substantiated by other diagnosis. The extraction of teeth, in an effort to check infections in other parts of the body, just because a roentgenogram showed a rarefied area, except in extreme cases, is to be condemned. If this practice is to be indulged in, it must have its completion in the extraction of all devitalized teeth whether or not the Roentgen ray shows a rarefied area to be present. Also all teeth that are pyorrheic would have to be extracted because they are foci of infection, and those that are not yet affected would have to be extracted because they might become foci of infection.

THE ETIOLOGY AND TREATMENT OF INTERSTITIAL GINGIVITIS.*

By Eugene S. Talbot, M. D., D. D. S., Chicago, Ill.

My researches on interstitial gingivitis and pyorrhea alveolaris¹ were published in book form in 1899. In this work every conceivable phase of the disease was studied on animals as well as man. The pathology was beautifully illustrated from its beginning to the formation of

abscess, on the one hand, and exfoliation of the teeth, on the other.

The object of this paper is to try to make clear the etiology, pathology and treatment based on the researches laid down in my work.

The tissues about the roots of the tooth may become diseased under extreme local irritation or from constitutional disease, but as a rule the progress of tissue building about the first and second set of teeth prevents tissue degen-

*Read before the Section on Stomatology at the Sixty-Seventh Annual Session of the American Medical Association, Detroit, June, 1916.

¹Talbot, E. S.: *Interstitial Gingivitis or So-Called Pyorrhea Alveolaris*, Philadelphia, S. S. White Dental Manufacturing Company, 1899.

eration. Not until the bone has obtained its growth, from 27 to 35 years of age, does degeneration take place to any great extent, altho marked inflammation of the gums may be present. When the alveolar process has obtained its growth about the second teeth, the bone may be said to have reached the senile stage, and absorption under favorable conditions begins.

THE ETIOLOGY.

In considering the etiology of interstitial gingivitis, my researches have shown that the tissues surrounding the roots are end-organs, owing partially to the fact that the teeth, so far as nerves and blood vessels are concerned, are foreign bodies, and partly to the end-structure of the bone. An end-organ is a structure in the body in which nerves and arteries extend to the extreme end and then stop. The veins extremely sluggish, the blood containing poison remains, and, being unable to return, sets up a low form of inflammation. The dental pulp is the best example of an end-organ in the human body. A study of this structure under the microscope, of persons over 40 years of age, will reveal all the degenerative pathologic conditions possible.²

The blood, then, which flows into the alveolar process, owing to local irritation about the gum margin or root of the tooth, does not return into the circulation. Blood charged with metallic, drug or body poison collects in the alveolar process and produces irritation. Stasis results (Fig. 58, Interstitial Gingivitis¹), nutrition is cut off, and a low form of inflammation is produced. Nerve end degeneration takes place, endarteritis obliterans, and arteriosclerosis occurs.

Ziegler³ says:

"The causes of inflammation may lie

either in mechanical, thermal, electrical or chemical influences, as well as in the influence of parasites. The common characteristic of all these injurious agencies is the production, in the first place, of a local tissue degeneration, which, when of a certain extent and intensity, is associated with disturbances of the circulation and of vascular secretion."

This exactly describes the condition found in the alveolar process. Stasis of blood in interstitial gingivitis is, then, due to mechanical irritation and possibly chemical changes in the blood.

Ziegler³ again says:

"Under the designation inflammation are grouped those pathological processes, consisting on the one hand of tissue degenerations and tissue proliferations, and on the other, pathological exudations from the blood vessels."

In this particular form of inflammation, tissue degeneration takes place. There is no pain, heat or swelling as observed in the other forms of inflammation.

When we consider the peculiar endo-transitory nature of the alveolar process, degeneration of tissue is the natural result. At the senile period when the excretory organs are diminishing in activity and in disease, vital resistance is at its lowest ebb, metabolism is diminished, and degeneration and absorption of the alveolar process is in active operation. As age advances, the destruction of bone is a natural normal pathologic process.

The disturbances in circulation bring about tissue degeneration because the gingival border of bone is very thin, transitory and easily destroyed. The action of this mechanical irritation is to produce artery changes, nerve end degeneration and absorption of bone about the arteries, called halisteresis. Stasis of blood may take place in a circumscribed area, or on the entire border of the alveolar process; or the apical end of one or more roots may be involved. This depends on the nature and quality of the irritant. The nature and severity of the irritation, stasis of blood and a lowered

²Talbot, E. S.: Developmental Pathology, Boston, Richard G. Badger, 1912, chapter on the dental pulp.

³Ziegler: General Pathology, p. 314.

vitality of the patients will also determine the extent of the destruction of tissue, whether the irritation is located at the apical end of the root, midway between the apex and the cervical margin, or at the cervical margin.

When the inflammation has once become established at the cervical margin, the absorption is progressive to a greater or less extent until the tooth or teeth are removed. Owing to the transitory nature of the alveolar process when irritation and stasis of blood occur, the nutrition of the part is interfered with and the bone tissue may be partially or wholly destroyed, leaving the fibrous tissue (trabeculae) undisturbed, thus holding the tooth firmly in position, altho it can be moved laterally by the fingers. In most cases, however, the entire structure, including the fibrous tissue, is destroyed.

My researches have shown that the deposits on the roots of the tooth, other than tartar, are the detritus of destroyed bone and not deposits from the blood, as was formerly supposed. The pus stage is an after-consideration, and has nothing to do with the disease.

In summing up the etiology, then in this disease: 1. We have to contend with the bone as an end-organ in which the blood accumulates (stasis). 2. Stasis of blood cuts off nutrition. 3. Local and constitutional irritation and chemical changes in the blood set up a low form of inflammation and bone absorption. 4. The absorption is enhanced because of the transitory nature of the alveolar process. 5. Nerve end degeneration and arteriosclerosis occur. 6. Want of vital resistance assists absorption.

LOCAL TREATMENT.

The first symptom of interstitial gingivitis is bleeding of the gums on the slightest injury. The classification of the different phases of the disease renders the treatment, so far as we are capable of directing it, simple and easy.

The first thing that naturally comes to the mind of the operator is to remove the cause. The local treatment may begin immediately. For personal reasons of cleanliness of the patient and the operator, one or two applications of iodine should first be made to the gums, which will destroy the germs and cleanse the mouth. After this has been accomplished, the removal of all local irritation may begin.

We have seen that stasis of blood cuts off nutrition, causing degeneration of tissue (absorption of bone). The main object to be obtained in the treatment of this disease is to remove the stagnant blood, reestablish the metabolic process and cause a normal flow of fresh blood to nourish the parts. The nutrition of the part must be renewed that Nature may restore the tissues to health.

How shall this be accomplished? To remove congested blood, physicians, from fifty to a hundred years ago, resorted to cupping, leeches and scarifying the tissues. These methods must be resorted to at the present time in treating this disease. If the gums are congested and festoons hang down between the crowns of the teeth, they may be removed on a line with the alveolar border with a lance.

The gums should be allowed to bleed as freely as possible. In removing the deposits from the roots of the teeth, the parts may be injured as much as possible with as little pain to the patient as possible, the germs having first been destroyed. In this way much of the congested blood can be removed.

The suction process, not unlike the old method of cupping, is excellent when properly performed.

Scarifying the gums is also a good method of procedure. Vigorous gum massage with a stiff gum massage brush should now be employed to stimulate the tissues to healthy action.

Before the operation and after bleed-

ing, iodine should frequently be employed to destroy all germs in the mouth. All loose teeth should be removed.

The following preparation has been used since 1878:

Water	10 parts or grams.
Zinc iodid	15 parts or grams.
Iodin	25 parts or grams.
Glycerin	10 parts or grams.

The iodine destroys all germs in the mouth and cleanses the tissues. The zinc iodid is used to contract the tissues, the glycerin to assist absorption. This preparation is applied to the gums, teeth and mucous membrane by a long, slender applicator with cotton wound about the end. It should be applied as often as every other day if possible. It is not to be used by the patient.

Friction and stimulating methods must be employed by the vigorous use of a "gum massage brush." The brush should be so shaped that it will reach the festoons between all the teeth.

It should be made of the stiffest unbleached bristles that can be obtained. The brush should be inserted into the mouth, the mouth and teeth closed. In performing this operation the mind should be concentrated on the gums and not the teeth. When the tissues have become revitalized, deposits from the alveolar process on the roots of the teeth will cease to form.

One of the best gum washes for the patient to use in connection with "gum massage" is that of the zinc sulphocarbonate recommended by Dr. W. H. Whistler of Cleveland. This drug may be used in different strengths and in many forms. The following is a combination which I use:

GUM WASH.

Zinc sulphocarbonate	60 grains
Alcohol	1 ounce
Distilled water	2 ounces
True oil of wintergreen.....	8 drops

The patient should use this gum wash and massage the gums three times a day.

The patient should be under the care of the operator at least two or three times a week, so that he may direct the treatment. The treatment of interstitial gingivitis at the apical end of the roots must be carried out according to symptoms.

CONSTITUTIONAL TREATMENT.

While the local treatment is being conducted, the patient's general health should be inquired into. A twenty-four hour sample of urine should be obtained, and a thorough laboratory examination made. If there are casts and high acidity, and indican is abundant, meat should be excluded, the patient placed on a vegetable diet, and the acidity reduced. The bowels should be kept open and large quantities of water consumed. There are many methods of cleaning the system and bowels. The following may be used to good effect; a teaspoonful in half a glass of warm water every four hours:

Calcined magnesia (heavy)....	$\frac{1}{2}$ ounce
Sodium bicarbonate	$1\frac{1}{2}$ ounces

If the patient has sugar, albumin or other complications, it is best to refer the patient to a physician for general treatment.

By this method of treatment the patient, in the estimation of the average dentist, is cured, not, however, as other diseases of the body are cured. Eternal vigilance is necessary on the part of both operator and patient to prevent blood from again collecting in the blood vessels of the alveolar process, and a return of the disease.

The bone is still an endotransitory structure, and having once become diseased, it is much easier for the stasis of blood again to take place. As the patient advances in years, the excretory organs become senile, poisons collect in the blood, resistance is lowered, and there is a gradual absorption of bone taking place about the teeth throughout life.