ORAL DIAGNOSIS AND TREATMENT¹

THE RESPONSIBILITIES OF THE DENTIST AND THE PHYSICIAN

ELMER S. BEST AND CARL W. WALDRON

Minneapolis, Minnesota

CONTENTS

I. Introduction.....	317
II. A system of oral diagnosis and treatment.....	321
A four-page chart: for oral diagnosis, oral prophylaxis, and case records..	321
Plan of treatment.....	329
III. The responsibilities of the dentist and physician	332
The dentist's responsibility to the patient.....	332
The dentist's responsibility to the physician.....	334
The physician's responsibility to the patient.....	334
The physician's responsibility to the dentist.....	335
IV. References to literature	336

I. INTRODUCTION

A complete systematic examination of the teeth and investing tissues, followed by a carefully formulated diagnosis, is necessary before dental operative or restorative work can be successfully undertaken. A permanent record of this examination, and the plan of treatment recommended and followed, should be made; and this record should be kept up-to-date by treatment and progress notes, and filed for future reference. The general adoption of such a system would result in as great a benefit to the practice of dentistry as has case-record standardization in medical and surgical practice; and also would prove a material aid in the solution of the problems of oral focal infection, which are now demanding the most careful study, investigation, and coöperation of members of both medical and dental professions. The increasing interest shown during the past eight years by both professions regarding these problems is well known; and is evidenced by the time and space allotted to their consideration

¹Read at a meeting of the Minnesota State Dental Society, St. Paul, February 10, 1921.

in the proceedings of the medical and dental societies and in the representative journals of the two professions. Like many true advances in the healing art, the tendency to a hasty diagnosis coupled with radical and over-zealous action have been followed by reaction; and we now see, from time to time, reports of cases in which the extraction of infected teeth has been followed by an aggravation or recrudescence of the general condition, leaving the patients worse off than before [Calvy (5), Alvarez (1)]. This may have been due in many cases to imperfect operative technique.

Calvy (5) has called attention to the danger of stirring up infection, in cases of organic heart disease, by the extraction of infected teeth in elderly persons in whom the myocardium is degenerated accompanied by valvular disease, when the energy index is low and cardiac decompensation is imminent. We agree that in such cases "it behooves to make haste slowly," and that the diagnostician in internal medicine should be consulted before determining methods of procedure. It is a fact worthy of note that reports of adverse results usually fail to state that the extraction of the infected teeth was followed by careful curettage of all infected peridental membrane, granulomatous tissue, and softened bone, *under direct vision with good illumination*.

More free and direct access to the diseased area must be secured than that afforded by the root socket. To accomplish this, the buccal or labial alveolar plate overlying the roots is removed before the tooth is extracted; and, in the case of multirooted teeth, the alveolar septa are also removed sufficiently to permit ready access to all areas of infection [Novitzky (11), Dunn and Shearer (6)]. Dunn, in referring to the removal of extensive mouth pathology by the method described by Shearer, states: "Since we have used this method, we have ceased to worry about exacerbations of temperature, collapse, rapid heart action, and the other manifestations of acute toxemia or hematogenous infection. Alarming symptoms have been uniformly absent. Of course, patients will occasionally have exacerbations of joint manifestations and of pains in the muscles and bones, but not to the degree that we were accustomed to see under the old methods, even when only one or two teeth were removed at a time."

The surgical removal of infected teeth in clearing up mouth disease is becoming more widely practised, and statistics regarding oral focal

infection will thereby become more valuable [Fontaine (7)]. That such rational procedure is necessary is evidenced by reports of the aggravation of systemic conditions following simple extractions, later relieved or markedly improved by re-operation and complete removal of all infected tissue [Grove (8)]. It is quite obvious that simple extraction is not sufficient. Such procedure is closely analogous to partial removal of infected tonsils in cases of systemic disease associated with tonsillitis. In the light of this fact, in justice to the patient, it would seem necessary to re-examine those who have shown no improvement following the simple extraction of teeth. In our opinion one cannot rule out alveolar infections as the etiological factor in such cases, unless they have been eradicated in a surgical manner as outlined. The necessary operative care involves considerable time and precludes the removal of a large number of infected teeth at one operation, either under local or general anesthesia. Furthermore the gradual removal of foci is a more rational and a safer procedure [Rosenow (13), Hartzell (9), Thoma (15)]. In some cases the general condition may remain *in statu quo*; but the extraction of several teeth, vital or non-vital, leaves the mouth more or less permanently impaired from the standpoint of efficient mastication, and there results considerable discomfort and dissatisfaction. In many conversations with internists, we have been impressed by their interest in this subject, the disappointing results met with at times, and the urgent need for more careful clinical study and closer coöperation between the two professions.

It is not the purpose of this communication to elaborate upon the problems of oral focal infection, but rather to present a system of oral examination, diagnosis, and principles of practice, which place the oral tissues in a healthy condition; and which, supplemented by oral hygiene and regular observation, maintain this highly desired condition of the mouth. The advantages derived from the general adoption by the dental profession of a system of recording routine examinations of the entire mouth, the formulation of an accurate diagnosis in every case, and the application of surgical principles in the cleaning up of oral infection, cannot be overestimated. This, followed by carefully planned and constructed restorative work, preserving tooth vitality and conforming to physiologic principles, and

by regular prophylactic treatment and observation, will go a long way towards solving, in a more constructive manner, the many perplexing problems concerning the relation of the mouth to the general health of the individual. The opportunity now afforded the dental profession to standardize its methods of procedure and, by closer co-operation with the internist, become an integral part of those forces striving to promote and maintain perfect health for the individual, is greater than at any period in dental history.

The vascular system of the human being extends in a relatively liberal manner to the investing tissues of the teeth. It is also found in the very center of vital teeth as part of the tooth pulp. In addition, the mouth is the portal of entry for all the nourishment the normal human being receives. The influence that mouth conditions exert on the entire body is therefore quite apparent. To create and maintain in the mouths of our patients, healthy and efficient masticatory function is of far-reaching benefit.

The critical condition of the practice of dentistry at the present time is the logical outgrowth of conditions and tendencies that have existed since 1839, when dentistry was made a separate profession, instead of a special branch of medical science and art which it unquestionably should be. Evidently, the relation between mouth conditions and the general health of the individual was not understood at that time; otherwise the two professions would never have been separated. The decision made was tantamount to deciding that the *basic* training of the dentist need not be identical with that of the other specialists in medicine. In consonance with this thought, we have the marked tendency in dentistry to the mechanical and cosmetic side of the work. This has resulted in such a high stage of development that American dentistry, viewed from this angle, is pre-eminent. Of the dentists who have earned for themselves national reputations, the majority are men of marked and highly developed mechanical ability.

Apparently, the part of dentistry that has been most neglected has been the non-mechanical, or the part that would have been given attention early by men with medical training and thought. When we consider that this phase of the work is fundamental to, and should precede the mechanical or restorative work, it is easy to understand

why its neglect has created a grave weakness, so far as the foundation upon which dentistry rests is concerned. The great need for perfect dentistry is recognized by all; and it would seem that our duty to our patients demands that, as quickly as possible, the non-mechanical phase of the practice of dentistry be developed until it equals the attainments of the restorative branch. When this is accomplished, and our highly developed restorative dentistry rests upon its new and more rational foundation, the benefit to our patients will be self-evident.

II. A SYSTEM OF ORAL DIAGNOSIS AND TREATMENT

As a step in this direction, a system of oral diagnosis and procedure, which has been employed with most gratifying results, is here presented. It is earnestly hoped that the members of the medical profession will lend their active coöperation in encouraging such work among dentists.

A four-page chart: for oral diagnosis, oral prophylaxis, and case records

The plan of examination we have adopted is an adaptation of the principles of case records, used in the best hospitals, to the needs of the dental profession, and corresponds in a general way to the case-record standardization advocated by the American College of Surgeons. The chart is used in all cases coming under our care—it is applicable alike to the healthy individual presenting himself for dental restorative treatment; to the sick patient referred by the physician for the clearing up of septic conditions in the mouth; and to the child for whom we confidently hope to establish and maintain such a condition of oral health as will be a potent factor in normal growth and development, and in the maintenance of a healthy body. The chart consists of a four-page folder, 11.75 x 8.5 inches, as follows:

Page 1. A tabulated record of the condition of individual teeth and investing tissues, x-ray findings, operations indicated and other dental information (*fig. 1*).

Pages 2 and 3. These are devoted to the case history, findings (correlated from the record on page 1), diagnosis, prognosis, record of treatment and follow-up record (*fig. 3*).

Page 4. On this page is placed an oral-prophylaxis chart, which is a tabulated record of the condition of the mouth, soft tissues, saliva, etc., noted at each subsequent visit of the patient for oral prophylactic treatment (*fig. 2*).

It is by means of the consistent use of this chart that the oral cavity is maintained in a condition of health.

The routine examination consists of (1) case history, (2) clinical examination of the mouth, (3) complete (or full-mouth) x-ray examination of the teeth and investing tissues (standardized), (4) study-casts of the upper and lower teeth, and (5) use of the oral-prophylaxis chart.

(1) *Case history.* In securing the case history, the following general outline is followed:

The complaint or condition for which the patient seeks treatment, and its duration, are first recorded.

The age and weight are noted, and the names of the family physician and any specialists by whom the patient is being treated, are obtained for the purpose of communicating with them if necessary.

The purely dental history is then secured. This consists of a brief record of present or past diseased conditions of any tooth pulp, acute abscesses, chronic abscesses with fistulae, devitalization of teeth, diseases of the gum tissue and mucous membrane, traumatic occlusion, condition of contact points, and orthodontic treatment. Any other related points of interest are noted.

Conditions of the throat and nose, which might be secondary to or aggravated by infections in or about the teeth, are recorded, such as recurring acute tonsilitis, chronic tonsilitis, quinzy, pharyngitis, laryngitis, etc. Also, inquiry is made regarding symptoms of acute and chronic maxillary sinusitis, that may be due to the extension of dento-alveolar disease.

History of past or present trifacial neuralgia is recorded.

The general history: While it is not our purpose to go into unnecessary detail regarding the general health of the patient, yet we feel that it is important for the dentist to know whether the patient is in excellent health, as evidenced by ability to carry out his or her daily duties without undue fatigue, as compared with a few years previous, and whether the patient enjoys normal sleep and freedom from pain or other disabilities, with a constant sense of well being.

The digestive functions are inquired into with special reference to the appetite, habits of mastication, character of the diet, discomfort or pain after meals, or other symptoms.

Brief inquiry is made regarding the incidence of eye infections, extremity and intercostal neuritis, arthritis, myalgia, heart or circulatory conditions, diseases of the blood (excessive bleeding from minor cuts), and nervous conditions.

(2) *Clinical examination of the mouth.* The fascination of locating concealed conditions with the roentgenogram has resulted in a tendency to ignore the importance of a carefully taken history and the making of a complete clinical examination of the tissues of the mouth. In determining the probable effect that mouth conditions have on the health of the patient, it is very easy to overlook a most important diagnostic point. We refer here to the presence in the mouth of food debris and desquamation of the mucosa. Such material is ideal pabulum for the proliferation of bacteria and is being constantly carried into the digestive tract. The frequent incidence of this condition, together with the presence of varying degrees of suppurative conditions around the teeth, makes a most careful inspection and palpation of the teeth and investing tissues absolutely necessary. In this connection Pickerell (12) says: "When such a suppurative arthritis (term used for the condition known as pyorrhea alveolaris) is general, it constitutes a very potent but frequently overlooked, because painless, source of oral sepsis and almost invariably originates grave secondary systemic disorders due to chronic toxemia and sapraemia."

A survey is also made of the entire mucous membrane of the mouth for the purpose of detecting the presence of localized mucous-membrane infection, or diseased conditions of the salivary glands or ducts. One must be constantly on the lookout for the oral manifestations of syphilis and for the early manifestations of tumors.

The value of the teeth as units of mastication is largely determined by their relation to each other, the strength of their attachment to the alveolar process, and freedom from disease. Consequently, we note the teeth present, their solidity in the alveolus, and the absence or presence and degree of pathology of the soft tissues adjacent to them. Definite relation having been established between malocclusion, re-

PAGE 1

CASE NO.

ORAL DIAGNOSIS CHART

M

19

COMPLAINT

GENERAL CONDITION OF MOUTH

		CLINICAL FINDINGS								RADIOGRAPHIC FINDINGS								TREATMENT & OPERATIONS INDICATED	
		GINGIVA	CARIES	CARIES XRAY	RESTORATIONS	TRAUMATIC OCCLUSION	MOBILITY	VITALITY	CONTACT POINT	PULP CHAMBER AND CANALS	PERICEMENTAL MEMBRANE	PERICEM JAMILLA	CREST	BITUR	APICAL CIRCUM	APICAL DIFFUSE	HYPERTROPHY	STOMATOLOGY	DENTAL RESTORATIONS
UPPER	RIGHT	8																8	
		7																7	
		6																6	
		5																5	
		4																4	
		3																3	
		2																2	
		1																1	
UPPER	LEFT	1																1	
		2																2	
		3																3	
		4																4	
		5																5	
		6																6	
		7																7	
		8																8	
LOWER	RIGHT	8																8	
		7																7	
		6																6	
		5																5	
		4																4	
		3																3	
		2																2	
		1																1	
LOWER	LEFT	1																1	
		2																2	
		3																3	
		4																4	
		5																5	
		6																6	
		7																7	
		8																8	

PERIODONTIA

EXAMINATION

STOMATOLOGY

RESTORATIVE

TOTAL

FIG. 1. PAGE 1 OF THE CHART; FRONT, OUTSIDE (ORIGINAL: 10 $\frac{3}{4}$ ×8 IN.)

ORAL PROPHYLAXIS CHART

INSTRUCTION IN HOME CARE OF MOUTH

DATE	EXAMINATION	PRESENCE OF			NEW CAVITIES			TOOTH BRUSHING			DENTAL FLOSS			MOUTH WASH			DIET			BEVERAGES			TOBACCO			
		CALCULUS	STAIN	SUPPURATION	EROSION	OCCUSAL	PROXIMAL	LABIAL BUCCAL	LINGUAL	SALIVA	FREQUENCY	OCCUSAL	PROXIMAL	LABIAL BUCCAL	LINGUAL	DENTAL FLOSS	DENTIFRICE	MOUTH WASH	SUGAR	STARCH	PROTEIN	FAT	FRUIT	WATER	TEA	COFFEE
	1																									
	2																									
	3																									
	4																									
	5																									
	6																									
	7																									
	8																									
	9																									
	10																									
	11																									
	12																									
	13																									
	14																									
	15																									
	16																									
	17																									
	18																									
	19																									
	20																									
	21																									
	22																									
	23																									
	24																									
	25																									
	26																									
	27																									

FIG. 2. PAGE 4 OF THE CHART; BACK, OUTSIDE (ORIGINAL: 9 1/2 x 7 1/2 IN.)

sulting in undue stress upon certain teeth and destruction of their supporting tissues, it is of importance to look for evidences of traumatic occlusion and early pathology in order that such may be corrected before too serious involvement has taken place.

The extent of dental caries, the quality of restorative work present in the mouth (and its effect upon the condition of the teeth and investing tissues) are observed and noted.

The normal relation of the teeth being by contacts similar to that of two spheres in apposition, it is important that we record the normal or abnormal condition of the contact points. The health of the tissues between the teeth is clearly involved in this relation.

Vitality tests of the pulps of the teeth are essential in order that a well balanced diagnosis may be formulated. There are many instances of the death of pulps that are not revealed in roentgenograms.

Pages 2 and 3

CASE RECORD					
Age		Weight	Referred by		
Physician					
Date	Reported by	History	Findings	Diagnosis	Treatment

FIG. 3. HEADING OF PAGES 2 AND 3 OF THE CHART; INSIDE (ORIGINAL: $8\frac{1}{2}$ IN. WIDE, AT TOP OF DOUBLE PAGE, $23\frac{1}{2}$ IN. LONG)

The tendency for the tooth pulp to undergo degeneration is more pronounced as the patient approaches middle life. This is not a new observation but a fact that has been known for years [Black (4), Hopewell-Smith (10)]. The vitality of each tooth is determined by testing the individual tooth with the faradic current. This test is of great importance and in no case should be omitted.

(3) *Complete (or full-mouth) x-ray examination of the teeth and investing tissues (standardized).* In making an x-ray examination of the teeth and investing tissues, it is obvious that the "hit-or-miss" method of raying certain "suspicious" teeth, and calling this a complete examination, results in so much dissatisfaction and so greatly decreases the value of oral diagnosis, that this method should be discontinued.

From the standpoint of visibility, reliable signals of root-end infection are not present in the oral cavity. In making this examination,

it should be the aim to look first for unerupted or impacted teeth. These are present in a surprisingly large number of cases and many times are the direct cause of most serious conditions, especially of a nervous order. Next we should look for root-end infections, as shown by destruction of the periapical tissues. Following this our interest in the case leads us to a careful study of the alveolar process, to determine whether or not there is a tendency to pathological change. In case there is, we may be able to find a local cause and remove it.

It is an interesting fact that in alveolar radiology there is a considerable display of pseudo-pathology and there is an ever-present danger of making mistakes in diagnosis. It requires constant vigilance on the part of the dentist, specially trained, to keep his diagnosis free from mistakes.

As it is impossible to secure on one plate or film a picture of all the alveolar structures, the examination has been carefully standardized and the areas to be examined are arranged in logical order. This prevents confusion and simplifies the work of the diagnostician.

(4) *Study-casts of the upper and lower teeth.* Study-casts, which are plaster-of-paris reproductions of the teeth, are a most valuable aid for the purpose of reference and study in making a diagnosis and in outlining the plan of treatment, both surgical and restorative. There are certain easily recognized standards to which the teeth and their supporting tissues must conform, in order satisfactorily to perform their functions. Any departure from the normal in shape, position, or arrangement, generally means diminished function. With this thought in mind, it at once becomes apparent that to replace lost natural teeth with artificial substitutes, requires a most intimate knowledge of dental function. Also, when a relatively large number of teeth have been removed, it often becomes important to decide whether or not the remaining healthy teeth are of any value for reconstruction, and whether it might not be the best policy to extract all the teeth. As it is impossible to recall the conditions in each individual mouth, we make use of our study-casts in this relation.

(5) *Use of the oral-prophylaxis chart.* There is a vast difference between periodic "cleaning of the teeth" and oral prophylaxis. A patient who thoroughly understands, appreciates, and carries out the principles of prophylactic dentistry, never needs to go to a dentist

to have his "teeth cleaned." Patients can be taught how to do that themselves. However, be it clearly understood that there are innumerable chances for disease processes to develop in the human mouth, and it is for the purpose of preventing or keeping these conditions under control that the patient should seek the services of the dentist at regular intervals. Part of this work the dentist can and must assign to a qualified dental hygienist. However, it is our firm belief that to relegate to the dental hygienist, this most important work, which before long will constitute the chief object in dentistry, without routine supervision by the dentist, is a serious mistake.

In consonance with this thought, the oral-prophylaxis chart is employed. Here we record the condition of the mouth, particular attention being paid to the presence of food around the teeth, calculus, stain, hyperemia or anemia of the gums, presence of erosion, new cavities developing and the condition of the saliva. A careful record is further made of the frequency of brushing the teeth, use of floss, and the kind of dentifrice and mouth-wash employed. Lastly, owing to the effect that diet and habit have on the general health, and the relation that mouth conditions apparently bear to the general health of the individual, both in influencing and being influenced, we record certain important facts relative to the diet. The amounts of sugar, starch, protein, fat, and fruit, constituting the routine diet, are recorded. It is a fact worthy of note, in this connection, that certain people, on account of some gastro-intestinal trouble, restrict themselves to a limited diet and often to a scorbutic diet, resulting in a scorbutic condition of the mouth.

In view of Pickerill's findings relative to tea and coffee, we inquire into the beverage in daily use, never neglecting the daily intake of water. In the case of those who use tobacco, we record the amount used daily. Owing to the effect on the general health of normal exercise, we record whether the patient's mode of living is active or sedentary.

In order that a condition of oral health may readily be maintained the dentist must place the mouth in such a condition as will facilitate and encourage efficient home care. This means that such conditions as overhanging margins of fillings, badly fitting crowns and bridges,

restorations not conforming to natural shape and contour, and poor contact points, must be corrected. When this has been accomplished, the patient must receive complete instructions and drilling in the care of the mouth. The date of such instructions is noted on the chart. The patient is then seen at definite intervals, when the teeth are thoroughly gone over and the surfaces polished. Conditions showing a tendency to pathology are eliminated or brought under control. If there are any areas in the mouth that show lack of care on the part of the patient, they are drawn to his attention and further instruction is given. This affords excellent means of checking up progress and awakening the interest of the patient to the importance of a clean mouth. The objective in this work is the beautiful picture of teeth free from dental caries, and the soft tissues of the mouth pink and healthy. In this environment, restorative appliances properly and painstakingly constructed will be protected.

In order to detect early signs of traumatic occlusion, also for the protection of those patients who have non-vital teeth and, further and most important, to detect incipient or hidden caries, a complete x-ray examination is made once a year.

Plan of treatment

When the examination has been completed and the diagnosis presented to the patient and accepted, we proceed to establish a healthy oral condition. In consonance with this plan, the following outline of procedure is carried out with most satisfactory results: (1) oral prophylaxis and instruction in oral hygiene, (2) extraction of diseased teeth and eradication of alveolar infection, (3) correction of traumatic occlusion, (4) treatment of infected dentine, (5) root-canal operations, and (6) scaling of teeth.

(1) *Oral prophylaxis.* By this treatment we aim to bring about as rapidly as possible, a sanative influence upon the entire mouth. This is accomplished in part by the usual prophylactic procedure (cleaning the teeth and removing the heavy deposits of salivary calculus).

The introduction of the correct use of the tooth brush: In resolving disease and restoring tissue tone, the tooth brush is a most

important factor. Incidentally, it is amazing how few people understand just what can be done in maintaining health in the mouth by the correct use of a proper tooth brush. At subsequent visits, the condition and care taken of the mouth are noted on the oral-prophylaxis chart. This affords an excellent means of checking up progress and awakening the interest of the patient in the importance of a clean mouth.

(2) *The surgical removal of periapical infection.* Complications incident to removing teeth are greatly minimized in a mouth which has been prepared by preliminary prophylactic treatment. The removal of the infected areas contiguous to diseased teeth lightens the load on the general system and the local tissues benefit greatly.

In well patients, the dental surgical problems are as a rule easy of solution. Comfortable non-vital teeth, showing well filled root canals with no evidence of apical pathology, are retained if essential; or sacrificed, if they interfere with the most satisfactory plan of restoring mastication. Teeth showing periapical infection are considered a "load" and are surgically removed. In the case of anterior teeth, root-end resection, with careful curettage and removal of all infected tissue, is indicated at times in lieu of extraction, in cases where cosmetic dental restoration would involve extensive sacrifice of tooth structure of the adjoining teeth or necessitate a denture. The retention of such teeth may be essential in the case of singers and public speakers.

In sick patients, all teeth showing periapical lesions should, of course, be surgically removed, the time of removal to be determined in consultation with the internist. The application of surgical principles in the removal of infected teeth and the eradication of the diseased tissue, followed by painstaking care of the operative wounds, results in very rapid healing with a minimum degree of discomfort to the patient.

(3) *The correction of traumatic occlusion.* The relation that exists between traumatic occlusion, due to the incoördination of opposing teeth, and the condition called pyorrhea alveolaris, it would seem, has been definitely established [Stillman (14)]. Consequently, in harmony with our plan for lessening the load that prevents conditions of health, comfort and efficiency in the mouth, we must equalize the stress

(in adult cases) by judiciously grinding the cusps of teeth that strike too heavily on opposing teeth, thereby preventing further injury to the pericementum and its contiguous structures.

(4) *Treatment of infected dentine* [Best (3)]. The disease that most commonly attacks the human teeth is dental caries. When it has gained entrance through the enamel, its progress is generally quite rapid; and many times before it is drawn to the attention of the dentist, the diseased process has extended almost if not actually to the pulp. As a consequence, there are today very many devitalized teeth; for it has been the common practice, under such conditions, to destroy the pulp and remove it. This was done because dentists felt that the life of the pulp was endangered—where they had tried to save such pulps, trouble frequently followed.

In the minds of the writers, a tooth affected by dental caries that extends to or close to the pulp is seriously involved, and is in no condition immediately to have placed in or on it a large metal restoration or filling, regardless of any desire to finish up the case. The history of pulps that died and of infections, generally of a serious nature, that resulted under such conditions, should give us pause in such procedure. Teeth of this kind should be given proper protection, which includes a period of rest before being required to withstand the shock of thermal stimulation through metal fillings.

Certain conditions and influences in the mouth are detrimental to the tooth pulp, but against which it will generally protect itself if vital. When teeth wear down from use in mastication, it will be found that, through the activity of certain cells in the pulp, the odontoblasts [Black (4), Hopewell-Smith (10)], a formation of secondary dentine and a recession of the tooth pulp takes place, thereby maintaining a safe amount of tooth structure between the surface of the tooth and the pulp.

When dental caries develops slowly, a similar process takes place. However, in most instances, caries advances so rapidly that the pulp is unable to protect itself, and the diseased condition approaches very close to, and sometimes is in actual contact with, the pulp tissue. In such cases, where there is no actual disintegration of the tooth structure at the base of the cavity, and where the pulp is still vital, the operation for preserving the vitality of the tooth pulp consists of (a)

removal of the actually decalcified dentine; (b) placing over the layer of discolored dentine at the base of the cavity a layer of Sterident, which contains magnesium, zinc, silver nitrate powder, and is mixed with eugenol, or a layer of similar material containing silver nitrate, (c) to be covered with a layer of oxychloride of zinc, and (d) filling the cavity with cement or gutta-percha. This treatment prevents further progress of the disease, encourages activity of the cells that produce the secondary dentine in teeth that wear down, new tooth structure is formed, and recession of the pulp takes place. Handled judiciously, this treatment will, according to the writers' experience, save a large percentage of pulps from dying and thereby will prevent a great deal of root-end infection and the loss of many valuable teeth. In three, six, nine or twelve months, according to the depth of the cavity, a metal filling may be inserted without resultant injury to the dental pulp.

The question whether or not root-end infections in reality make a patient sick (to express it in the simplest terms) has, it would seem, been discussed a reasonable length of time. A review of current literature, however, reveals the fact that the fight is still on. Inseparably connected with the pulpless-tooth problem is the question of root-canal operations. We have made over 75 per cent of such operations unnecessary by modern methods (treatment of infected dentine). The balance must be left to the judgment of the individual practitioner of dentistry, whose daily routine work brings him in contact with cases where such problems must be considered. He must solve them for himself, for he alone bears the responsibility.

III. THE RESPONSIBILITIES OF THE DENTIST AND PHYSICIAN

The dentist's responsibility to the patient

To recapitulate, it is the dentist's responsibility to the patient to make a complete examination of the entire mouth, teeth and investing tissues, in order to minimize as much as possible errors in diagnosis and practice. He must adopt surgical methods and aseptic technique in the operative measures necessary for the removal of oral infection, in root-canal operations and in the treatment of pyorrhea. In the construction of dental restorations, he must make every effort to preserve

tooth vitality and restore function. It devolves upon him to educate his patients in the advantages of a clean mouth and of the normal function in mastication; to instruct them in oral hygiene and prophylactic dentistry. He must point out the danger arising from oral sepsis, and should discourage in every way the tendency on the part of many patients to consider the dentist's services as purely reparative. *The big objective must be preventive professional service.* He must appreciate the fact that minor, ill-defined impairments of health, due to oral focal infection, are of great importance. Dunn and Shearer (6) have aptly referred to the carrying of oral focal infection in these patients as a useless load on the organism that results in dissipation of energy. They state that "in the study of these cases, two fundamental reasons for the removal of a focus should be kept in mind: (1) the closing of a door of entrance into the circulation for infecting microorganisms and their toxins, and (2) the removal of a useless load which the system is compelled to carry. The load factor has not been sufficiently stressed. The energy required to keep an infection under control, destroy toxins, and repair damage, must be subtracted from the sum total of disposable energy. Therefore, the focus must be considered not as the sole cause of disease, but as one factor or one condition participating in the production of that 'peculiar abnormal course of the same processes which make up the life phenomena of healthy individuals' (Cohnheim's definition of disease.) It might be well to adopt a dynamic viewpoint in studying disease and to conceive of certain diseases as resultants of several forces. It is a condition comparable to the dynamics of chemical reactions involving several substances. One views disease too often from a fixed point, one assumes a single etiology and a single explanation for what may be the result of several forces. If pathology is the result of an effort at adaptation to unfavorable internal or external conditions, there can be no reason why the system may not be adapting itself to several different conditions or forces at the same time."

We are heartily in agreement with their conception of this problem and feel that, where the patient's health is below normal and there is lack of energy with absence of the personal sense of well being, oral foci of infection, if not the chief etiologic factor, are important contributing factors and should be eradicated.

The dentist's responsibility to the physician

What are the dentist's responsibilities to the physician in the handling of sick patients? In addition to being competent to handle the case in the manner described, the dentist must be ever ready to coöperate with the physician. The findings, diagnosis and treatment advocated should be conveyed to the physician in charge. This will enable the latter better to weigh the evidence from various sources and more readily to decide upon the plan and order of treatment. Further consultation may be easily arranged and the time of operative treatment of oral sepsis decided upon to the satisfaction of all concerned. This get-together principle should be encouraged. The dentist must be ever cautious in the matter of prognosis, so far as the general condition of the patient is concerned. Improvement or cure of systemic conditions must on no account be promised, ever bearing in mind the difficulties of diagnosis, and the essential difference in the prognosis of focal infections and of intoxications resulting from foci of infection.

The physician's responsibility to the patient

In the light of many unfortunate experiences of the past few years, the physician should make every effort to prevent unnecessary destruction of the dental organs. Irons, in the discussion of Rosenow's (13) paper, states that "one error for which the physicians are mainly at fault, is that arising from a tendency to make incomplete examinations. A patient complains of arthritis or other pain, his physician looks in his mouth, sees a few crowns, and at once says: 'It's your teeth,' and advises their sacrifice; and the conscientious dentist has great difficulty in convincing the patient that his crowns are on sound roots. Now the fact is that, in a case of this sort, the physician may be right, but, taking all chances together, he is more likely to be wrong. What he should do is to give the patient a very careful and complete examination, with the coöperation of the dentist, and then decide upon the course of action." Barker states (2): "I do not think a tooth should be sacrificed unless indications are clear for its removal. I would urge you not to give widespread orders to extract teeth unless they are so diseased that they must come out.

On the other hand, please do not try to save teeth that cannot be made aseptic, for there is real danger that they may injure the rest of the body."

As the teeth may be only one focus in association with chronic tonsillar infection, chronic sinusitis or chronic infection of the gall bladder or appendix, it is obvious that the internist should determine the order in which the various sites of infection should be attacked. Where a chronic maxillary sinusitis is secondary to root-end infection, the latter should be operated upon first. In the case of chronic infection of the tonsils, oral infection should also receive attention first for the logical reason that the lymphatics of the mouth and jaws drain into the tonsils. Clinical experience bears out the advantages of this order of treatment. Fontaine (7) states: "If the cases are carefully studied from every angle and all other possible etiologic factors eliminated, the prompt relief obtained by radical measures should convince the most skeptical that it is not due to accident, coincidence, or any effect on the mind." Billings, in the discussion of Fontaine's paper, calls attention to the neglect of further management of the patients. In addition to the removal of the focus, supportive treatment is necessary. He states: "Our duty is to build up the resistance of the host, against the invaders already there, by all of the known means of support of the patient from the beginning of treatment."

The physician's responsibility to the dentist

Recognizing the grave responsibilities of both internist and dentist toward the patient involved, whose personal welfare must be the first consideration, how may this problem be best solved to the satisfaction of all concerned? Between physician and dentist are responsibilities and courtesies, which, if ignored, are bound to lead to trouble; whereas, if accepted with full coöperation, will mean greater service to the patient. One of the chief sources of misunderstanding has been the habit of many medical men to send cases direct to x-ray laboratories for films, and from those films either to accept or make a diagnosis and to send the patient to the dentist with *instructions* as to the teeth to be extracted. We quote, on this subject, from an editorial in *Minnesota Medicine*: "The question, abscess or no abscess, should be

determined by the dentist. The dark circular area of deeper x-ray penetration about a tooth root should not be the only consideration. Shadow projection is tricky at times. The vitality of the tooth is an important consideration and each case should be considered on its own merits with due regard for disease elsewhere."

Would the nose and throat specialist appreciate the reference of a patient from the internist with a note requesting operations for drainage of the right maxillary sinus, left frontal and sphenoidal sinuses, the internist having diagnosed diseases of these sinuses from roentgenograms? The rhinologist would surely feel that he should have had a major share in the nasal diagnosis and rightly so, knowing that a decision in consultation is a much better procedure.

Much could be written of the errors of commission and omission on the part of both physician and dentist, but such would serve no purpose. The problem today is to encourage and promote the practice of *prophylactic dentistry*, in order that the next generation will not suffer from the lamentable oral conditions so frequently seen today. We must strive to obtain the best possible condition of oral health in our patients, and restore as far as possible the power of mastication. The patient's health will be the prime consideration. How easy it will then be for physicians and dentists in all parts of the country to get together in consideration of individual cases and how great will be the advantages to the patients of such a course of action! To encourage team work and to further the realization of this ideal, this communication is submitted.

IV. REFERENCES TO LITERATURE

- (1) ALVAREZ, WALTER C. 1919 *Journal of the American Medical Association*, lxxiii p. 1179.
- (2) BARKER, L. F. 1919 *Southern Medical Journal*, xi, p. 481.
- (3) BEST, E. S. 1920 *Oral Health*, x, p. 157.
- (4) BLACK, G. V. 1915 *Special dental pathology*, p. 265. Medico-Dental Publishing Co., Chicago, Ill.
- (5) CALVY, P. J. 1920 *Journal of the American Medical Association*, lxxiv, p. 1221.
- (6) DUNN, A. P., AND SHEARER, W. L. 1920 *Minnesota Medicine*, iii, p. 241.
- (7) FONTAINE, B. W. 1920 *Journal of the American Medical Association*, lxxiv, p. 1629.
- (8) GROVE, CARL 1920 *Journal of the National Dental Association*, vii, p. 763.
- (9) HARTZELL, T. B. 1916 *Journal of the National Dental Association*, iii, p. 172.
- (10) HOPEWELL-SMITH, ARTHUR 1903 *Normal and pathological histology of the teeth*, p. 429. Dental Manufacturing Co., London, England.

- (11) NOVITZKY, J. 1919 *California State Journal of Medicine*, xvii, p. 314; *Journal of Dental Research*, 1920, ii, p. 569.
- (12) PICKERILL, H. P. 1919 The prevention of dental caries and oral sepsis, p. 27. Paul B. Hoeber, New York, N. Y.
- (13) ROSENOW, E. C. 1919 *Journal of the National Dental Association*, vi, p. 982; *Journal of Dental Research*, i, p. 205.
- (14) STILLMAN, PAUL R. 1919 *Journal of the National Dental Association*, vi, p. 691.
- (15) THOMA, K. H. 1917 *Dental Items of Interest*, xxxix, p. 516.

933 Metropolitan Bank Building