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Root Canal Therapy for Flying Personnel

CHARLES F. McCANN, A.B., D.M.D.

The results obtained from careful root-canal therapy on all types of infected pulps, including fairly extensive cases of granuloma, for flying personnel, has led me to believe that this type of therapy should be encouraged. The author has found it possible to obtain excellent results even without the aid of radiographs. However, radiography has been used whenever it has been available.

"It has been pointed out that in the case of fliers, even if the potential infection has not reached an advanced stage, the damage produced to the pulps of teeth and to the gums, the result, possibly, of low atmospheric pressure or low surface tension with consequent shock, may turn a doubtful focus infection into an active one. In many cases, this change occurs suddenly and is accompanied by intense pain." Therefore, it is imperative that such foci be eradicated as soon as possible. I have routinely checked every tooth that exhibits any abnormality, viz., off color and loose teeth. As to the former, I have used the hot and cold method for determining vitality and thorough examination of investing tissue as well as radiographic study when such was available.

I believe that in such cases root-canal therapy can be successful in most instances where exodontia has been the routine therapy. Of course, here again one must use judgment. Single rooted teeth are the best risks. The writer has been successful with some molars, but this is not routine procedure. Where periapical infection has been extensive apicoectomies have been resorted to and in almost every instance excellent results have been obtained. Apicoectomy has been found to be the surest and best type of therapy for flying personnel where the amount and extent of the infection would make routine root canal therapy impractical.

The purpose of this paper is to offer a relatively simple technique which has been successfully carried out in all types of field installations during a period of overseas duty extending over two and one-half years. It has been possible in most instances to complete each case in four to five weeks but where more time was imperative I have not hesitated to carry such cases for eight weeks. Where it has been imperative for the patient to fly, root canals have been left open and have thus avoided any uncomfortable experiences, delaying therapy until such time as the patient could be available. While every effort has been made to minimize the operative time in this technique, results and not time have been my objective.

In attempting to treat a tooth, the first thing to determine is its value in the arch. Unfortunately this cannot or should not be arrived at by any single observation alone but by a combination of findings, viz., clinical findings such as its position in the arch, its proximation and occlusal relationship to the other teeth in the arch, the appearance of the surrounding tissues, its mobility, the age of the patient, systemic conditions, viz., arthritis, tuberculosis, etc., the attitude of the patient, and finally a radiographic study.

After the above has been evaluated the next important step is the operative and surgical procedure in the immediate case. First, let us consider the mechanical exposure where immediate extirpation of the pulp is desirable with summary filling of canal. However, in cases where such is impossible, a small pledget of cotton with eugenol is placed over the exposed pulp and sealed with zinc oxide and eugenol, the root canal therapy being done at some future date. Acute pupitis is given the sedative treatment with eugenol and zinc oxide as the agents. Purulent cases are first opened, grossly cleansed and permitted to drain from three to four weeks. This, of course, being a variable. After this period, the tooth is isolated by means of cotton rolls which have

proven to be adequate and the root canal therapy is commenced. First, if the pulp chamber is not already opened, round burs are used to open into the chamber graduating from ½ round bur to whatever size is necessary to adequately expose the chamber and the pulp canal. It is imperative to remove all pulpal tissue for residual tissue brings about discoloration and this is undesirable. Barbed broaches #0 and #1 do an excellent job in removing all the gross tissue; these are followed by Kerr's files, numbers one to six. The canals are left as nature constructed them unless they are constricted and the apical area can't be reached. When the canal is narrow and obstructed we use a 50-per cent aqueous solution of sulphuric acid, followed with a solution of sodium bicarbonate. The canal is then dried out by means of cotton pellets and warm air from hand blower. This done, a few wisps of cotton are twisted on a #0 broach, soaked with alcohol and carefully teased up the canal just to make certain nothing obstructs the apical orifice.

Next we take a #0 barbed broach with a few fibers of cotton twisted around it, this is then saturated with beechwood creosote which I dry just before inserting in the canal and then carefully wipe the sides of the canal with this medicament. The last step in this treatment consists in placing a cotton pellet medicated (not saturated) with beechwood creosote in the chamber and sealing it with zinc oxide and eugenol. The patient is then dismissed for one week. After this period the dressing is removed and replaced by a plug of gutta percha which has been flamed and again the pulp chamber is sealed with zinc oxide and eugenol for another week. At the end of this period if subjective symptoms have disappeared the canal is filled with chlora-percha and in many cases a permanent filling inserted. In apicoectomies this procedure is followed except that the root canal filling is not completed until after the apex of the root is exposed. This procedure has been followed out successfully on flying personnel.

When it is apparent that ordinary root-canal therapy would not insure a favorable result, then apicoectomy is the therapy of choice. In apicoectomies some thought must be given to adequate planning. The initial eliptical incision with convexity towards the gingival margin (Figure 1) must be suffi-

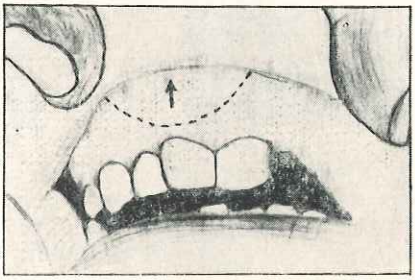


FIG. 1. ELLIPTICAL INCISION

ciently large to permit unhampered instrumentation and so planned as to effect esthetics. Distortion of the gingival margins about any tooth in the operative area must be attributed to lack of planning. The mucoperiosteal flap must not be traumatized and should be so deflected as to permit proper access. The outline of the flap is most important. I strongly recommend the elliptical type of incision (Figure 2). If the

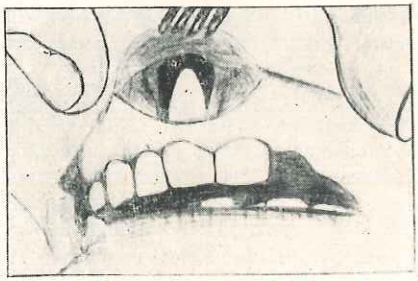
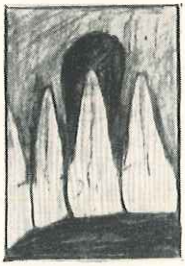


FIG. 2. AREA OF INFECTION

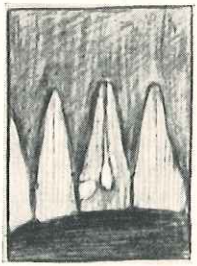
character of the buccal plate is such that immediate access to the periapical area is impossible then one must resort to bone burs. If these are not available, #8 and #10 round burs can and have been used very effectively, using a #560 fissure bur to enlarge the

FIG. 3. ROOT-CANAL FILLING COMPLETED AND APICO-ECTOMY

Apex Removed



Before



After

Above X-rays Revealed Before and After Treatment

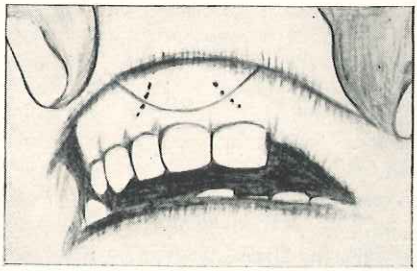
opening and permit an excellent view of the periapical area. A small currette or standard excavators #58, 59, 63, and 64 should be used to remove the pathological tissue. Every particle of the involved tissue must be removed. It is at this point that a small portion of the apex is removed (Figure 3). When the area is cleansed completely, saturate a piece of clean gauze (sterile gauze is not always available in the field) with 1 : 1000 methiolate or 1% solution of iodine and insert in area. Permit this to stand for three minutes. After removing the gauze the apex is then cauterized with a red-hot, blunt instrument. This done, dust the area if possible with sulfadiazine and suture flap in place (Figure 4). A wick is not necessary and should not be used.

Proof of the potential danger of quiescent alveolar abscesses to fliers at high altitudes has been demonstrated by actual reports from flying personnel in low pressure chambers in which atmospheric conditions at high altitudes were simulated. For example, one flier reported indefinite but severe pain in the left mandibular area at 5,000 feet. This pain became more severe at 15,000 feet. Extraction of a lower bicuspid, after radiographic examination revealed an abscess at the end of its root, eliminated the pain entirely. Another complained of pain on the right side of his face at 20,000, but relief was obtained at 14,000. Here, too, radiographs revealed an abscessed tooth with extraction ending the trouble. Still another experienced no pain on two ascents, but pain and swelling developed in the anterior part of the upper jaw when he went aloft for the third time. The removal of an acutely abscessed tooth which was the active cause relieved all symptoms. Cases similar to these have responded extremely well to root canal treatment.

It has been the writer's good fortune to treat many such cases under actual field conditions. Two of these were as follows: A navigator flying from Hawaii to New Caledonia developed a terrific pulpitis at approximately 20,000 feet. Attempts to relieve the pain by descending to a lower altitude was without results. The officer had a difficult time of it for fully one-half of the flight and upon landing lost little time in seeking out our dental clinic. The offending tooth, a maxillary lateral, was easily detected and subsequent opening into the pulp chamber gave immediate relief. Later radiographs revealed fairly extensive periapical rarifaction. Root canal therapy with apicoectomy was performed one week later. The officer was then grounded for 72 hours and recovery was uneventful. Follow up radiographs six months later indicated normal deposition of bone in the area. The case was examined one year later at Guadalcanal and it was noted that the color was unchanged and the tooth was apparently normal in all other respects.

A similar experience in a lower lateral was reported by a pilot on a return trip from New Zealand. The same procedure was followed. Radiographs disclosed an area of rarifaction about the size of a pea around the apex of the offending tooth. Nine days later root-canal therapy and an apicoectomy was performed. However, in this case as in

FIG. 4. MUCO-PERIOSTEAL FLAP SUTURED IN PLACE



Two Sutures are Adequate

all other mandibular apicoectomies the writer found some difficulties working without the help of a saliva ejector. However, subsequent checks have indicated a successful therapy and radiographs taken three months and six months postoperatively have shown normal repair taking place. These two cases have been sighted merely to indicate what can be done for such emergencies in the field. Here one encounters difficulties that many times tries his patience but a desire to be of service will help to overcome these problems. Drawings on following pages will graphically illustrate some of the procedure outlined in this paper.

In every instance, whether it is a routine root canal case or an apicoectomy, we must always be sure that every last bit of caries or foreign material is removed from the pulp chamber. More nonvital teeth have been discolored by residual caries and breakdown products from the blood than from any other set of causes. Therefore it is important that some attention must be given to this phase of the operation.

Care should be given to approximating the tissue surfaces, thus insuring rapid healing and preventing oral flora from communicating with the resulting wound cavity. Another important point to keep in mind relative to extraction of fliers' teeth or minor-oral surgery, is the influence of low atmospheric pressure in the production of secondary hemorrhage. This complication has arisen when fliers have gone to high altitudes within 48 hours after having had teeth extracted. Grounding for 72 hours is advisable in such cases.

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The Pulpless Tooth and Focal Infection*

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A pulpless tooth is a tooth which has lost its central tissue—the pulp. This loss may have occurred through natural physiological processes, through purposeful extirpation or through disease.

Focal infection implies the presence of a focus of infection in the body with dissemination of bacteria from this focus and establishment of an infection elsewhere in the body.

In 1818, Rush reported the case of a woman, afflicted with chronic rheumatism who was cured by extraction of a tooth. Thus by removal of a focus of infection, the tooth, a distant affliction was cured. It was not until much later, however, that the importance and prominence of this concept arose in the medical and dental professions. The works of Hunter and Billings popularized the concept of focal infection. In 1910, Hunter (1) emphasized the role of oral sepsis in systematic disease. Billings (2), in 1912, popularized the concept that arthritis deformatans might arise from distant infections in the tonsils, appendix, alveolar processes, sinuses, gall bladder, prostate and cervix. In 1916, Rosenow (3) gave further impetus to the theory by his works. Immediately, the theory was grasped by the medical profession in the hope that many obscure conditions confronting them might be relieved by removal of localized areas of infection. The dental profession, being anxious to cooperate in combatting disease, joined the crusade and many teeth were removed. Thus the clinical application of the theory began.

Today, over thirty years have elapsed, and it is time to re-evaluate the theory in terms of clinical and laboratory investigations. Also, since the pulpless tooth in particular (along with tonsils, kidneys, and other organs), has been sacrificed at the altar of focal infection believers, it is necessary to re-evaluate the pulpless tooth at this time.

During the past thirty years many new reports of clinical and laboratory investigations in regard to focal infection have been published. It is not the intent of this paper to attempt to discuss in detail the pro and con of focal infection. Yet, a brief review of some important recent developments which have influenced our thinking on focal infection must be made at this time.

Cecil (4), of Cornell Medical College, in 1937 reported 200 cases of arthritis in which treatment consisted of removal of suspected foci. He found little appreciable benefit from surgical interference. In 92 of these cases, tonsils were removed. In this group 86 experienced no benefit, 4 had temporary relief, and 2 experienced exacerbations of symptoms. In 52 cases teeth were suspected and removed. Of this group, 47 experienced no benefit, 2 were relieved temporarily, and 3 actually became worse. Cecil (5) therefore doubts the wisdom of surgical interference in these cases. Certainly he is far less optimistic of results in cases of infection than he was ten years previously when he positively advocated surgical removal of all suspected foci.

Reimann and Havens (6), after a thorough and critical study of the problem, caution that the routine extraction of teeth and removal of tonsils for the purpose of curing of focal infection has not been justified clinically.

Certainly, we all have heard of isolated cases where dramatic recoveries followed removal of suspected foci. These are the cases which attract attention and receive publicity, while the many cases where no improvement is experienced go unreported, receiving little publicity except in scientific

*Read before the Buckeye State Dental, Medical and Pharmaceutical Society, Columbus, Ohio, June 17, 1948.

journals. It has been reported that many patients who apparently had experienced remarkable cures, later had recurrences of symptoms which indicate that either the effect was only psychological or at most temporarily beneficial. Burket (7), after careful study of many cases, concludes that clinical improvement after removal of foci suggests at best only a casual relationship between the foci and the disease process.

Bauer (8), in a study of 300 cases of arthritis, reported that improvement resulted more rapidly in his cases where there was no surgical interference with the suspected foci than in those where surgical removal was performed.

Woods (9), after a study of 1000 cases of ocular disease, concluded that removal of "minor and symptomless foci as a cure-all for endogenous ocular disease" is erroneous.

Arnett and Ennis (10), at the University of Illinois, compared 300 college students' physical and dental examination records. They could establish no correlation between dental findings and the presence or absence of systemic disease.

Laboratory evidence in support of the concept of focal infection has proved to be of great value in clarifying the problem. The work of Fish and MacLean (11) in 1936 showed that it is practically impossible to remove a tooth aseptically since bacteria are pumped into the pulp and periapical tissue during the act of tooth extraction. This finding negated practically all of the bacteriological studies on dental foci and focal infection prior to 1936, for prior to this date, most bacteriological studies were in apices of extracted teeth. Okell and Elliot (12) demonstrated also the inaccuracies of bacteriological studies on the teeth in the past. Not only did they show the possibilities of infection of the pulp and periapical tissue during extraction, but also they demonstrated transient bacteremias in 60 per cent of cases after extraction even though blood cultures were negative prior to extraction.

Finally, in this period, no positive test has been devised which is capable of singling out and identifying any organ as a focus of infection of some other part of the body. Tests have been perfected which will detect the presence of infection it is true, but none will identify the location of the infection.

We must conclude with Reimann and Havens that there is no more justification for removal of chronic foci in an effort to treat a distant infection than there is for removal of the primary focus of Tuberculosis or Syphilis, a practice surgeons ceased many years ago.

The pendulum has swung away from the focal infection theory as a panacea for man's varied ills and obscure ailments as a result of these findings. In the medical and dental fields, in view of these recent findings, we, too, must look upon the focal infection concept in a new light,—with considerable question as to its validity,—with decreased hope in its clinical application,—and with a desire to correctly diagnose, and to treat rather than to take the "short cut" of surgical removal of suspected foci in every instance.

During the past 30 years, the status of the pulpless tooth also has changed. Following Hunter's paper, the pulpless tooth rapidly fell into disrepute. Today, however, we must look on the pulpless tooth in a new light.

I would like at this time to eradicate two misconceptions many have had in regard to the pulpless tooth.

1. "That a pulpless tooth is a dead tooth." A pulpless tooth has lost only one of its five tissues—the pulp. Marshall (14) states, "The life of the tooth is dependent upon the integrity of the periodental membrane—not the integrity of the pulp." It is true that the hard tissues of a pulpless tooth have a lowered metabolism. Volker, Blayney, and Wasserman (15), however, have shown by radioactive phosphorus experiments that these tissues do possess a definite though low vitality and metabolism. Final proof of vitality is seen in any attempt to remove the tooth without anesthesia.

2. "Pulpless teeth are infected." Some pulpless teeth are infected, it is granted. However, all are not infected any more

than all tonsils or kidneys are infected. By endodontic techniques today we can remove the bacteria from many pulpless teeth and thereby eliminate possibilities of infections of the tissues at the root ends of these teeth.

At the turn of the century treatment of pulpless teeth was done in a hap-hazard manner. There was no established technique of treatment and often no roentgenograms were taken before or after treatment. The only aim or purpose of treatment of the pulpless tooth then was to mechanically remove the necrotic pulp tissue and to fill the cavity it formerly occupied in the tooth. The resultant tooth often harbored bacteria. These bacteria were able to migrate from the infected root canal, enter the periapical tissues and maybe even the blood stream. Hence the pulpless tooth was properly looked upon as a potential source of danger to the body.

Today, as a result of the efforts of men who recognized the weakness of existent methods of treatment of pulpless teeth, we have techniques which enable us to follow a definite course of treatment of each pulpless tooth. After careful diagnosis by roentgenograms and clinical tests, careful case selection and pulp removal, we proceed with our treatment of the root canal. Our treatment is partly mechanical and partly chemical preparation of the canal for reception of the root canal filling. However, even more important is the bacteriological preparation of the canal. In the office now, it is possible to sterilize these canals by medication and also to remove infection from the periapical area by electrolytic medication or by surgical interference. Checks upon the efficacy of treatment are made by bacteriological smears and cultures and the canal is sterile prior to being filled. Having so treated the canal and periapical tissues, the root canal can be filled and we may confidently feel there is absence of infection in this pulpless tooth. Furthermore, we have today histological, clinical, roentgenographic, and bacteriological evidence that repair and restoration of the health of the periapical tissues will take place after root therapy treatment.

At Howard University College of Dentistry, since 1936, we have treated many hundreds of pulpless teeth. In all cases, where the patient's medical history reveals a systemic condition which might be of infectious origin, i.e., arthritis, valvular disease of the heart, iritis or the like, prior to treatment, we consult with the physician on the case. Together we consider the value of the tooth from a dental standpoint and possibilities of its relation to the systemic condition. The course of treatment is then determined on the basis of this consultation. In this way we have been able to save many teeth, and at the same time, we feel these teeth, as a result of treatment, are no longer infected but healthy units in the dental apparatus. Periodic re-checks by x-ray have proven these teeth to be healthy over the years. Three cases might further illustrate:

1. Dr. U. M., a physician on the faculty of our Medical School in 1937, came in for extraction of an upper central which was devitalized. We explained the root therapy treatment to him. He agreed to save the tooth. Being skeptical, he insisted on not two consecutive sterile checks on the root canal but eight sterile readings. We then filled the root canal. Since then x-rays reveal that bone has refilled the area where it had been destroyed at the apex of the tooth. He still retains the tooth which is functionally, roentgenographically and symptomatically healthy today.

2. Patient R. M. referred to us for extraction of two devitalized anterior teeth. This patient had arthritis. We elected to treat this case by root therapy and root resection. The patient and physician refused to cooperate. The patient went elsewhere and the teeth were removed. She still has the arthritis but she has lost these teeth which might have been saved. She blames the dentist who removed the teeth for their "unnecessary loss."

3. Patient, H. B., presented with a devitalized upper cuspid. She also revealed in her medical history a chronic sinusitis. Treatment elected consisted of root therapy on the cuspid followed by root resection. The

physician agreed to treat the sinus condition, after the root therapy treatment. The result of this cooperative treatment is that the patient still retains the cuspid tooth, her sinus has cleared and she is a very satisfied patient.

Hence, we feel that we have in our power the ability to treat the pulpless tooth, making it not a focus of infection but a serviceable healthy functional unit of the dental apparatus.

In closing, let me suggest that the whole subject of focal infection must be viewed with caution and conservatism in light of recent studies. Only after careful study and thorough diagnosis of the systemic illness by the physician coupled with an equally careful study and diagnosis of the pulpless tooth by the dentist, can we arrive at proper treatment of the pulpless tooth. The dentist should report his findings and opinions together with suggested treatment of the pulpless tooth to the patient's physician. The physician should correlate his findings including laboratory and clinical reports and the reports of consultants. If we follow this procedure together we will be able to give the patient our best health service. Each patient and each tooth will require individual attention. Only after careful study, should treatment be instituted. The type of treatment, whether conservative or radical, should be determined by both the dentist and physician. In all instances this treatment should be the one which will be most beneficial in restoring and maintaining the patient's systemic as well as dental health.

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PRELIMINARY ANNOUNCEMENT OF PROGRAM FOR FEBRUARY MEETING

Hotel Stevens, Chicago, Ill.

Saturday, February 5, 1949

Banquet:
Speaker—William T. Osmanski, D.D.S.
Subject—Football Review.

Sunday, February 6, 1949

10:00 A. M.
Pathological Lesions of the Pulp.
Donald A. Kerr, D.D.S., M.S., Associate Professor of Dentistry (Oral Pathology), University of Michigan, School of Dentistry, Ann Arbor.

11:00 A. M.
The Healing of the Exposed Pulp.
Helmut A. Zander, Tufts College, School of Dentistry, Boston.

1:30 P. M.
Evaluation of Methods of Sterilizing Root Canal Instruments and Materials.
George G. Stewart, A.B., D.D.S., School of Dentistry, University of Pennsylvania, Philadelphia.

2:00 P. M.
Management of the Pulp Conditions which Arise in Young Teeth.
Kenneth A. Easlick, D.D.S., A.M., Professor of Dentistry (Pedodontics and Public Health Dentistry), University of Michigan, Ann Arbor.

3:00 P. M.
Essentials in Endodontic Practice.
E. A. Jasper, D.D.S., Saint Louis University, School of Dentistry, Saint Louis, Mo.

4:00–5:00 P. M.—Table Clinics.
"The Restoration of the Pulpless Tooth."
Glenn R. Brooks, D.D.S.
"The Mechanical Cleansing of the Root Canal under Accurate Measurement Control."
Saul Levy, D.D.S.

Report of Nomenclature Committee

The Nomenclature Committee offers the following report as a start toward the development of a nomenclature for endodontia. It is in no sense intended as a complete or final compilation of terms and definitions. The Committee feels that no attempt should be made to formulate a complete nomenclature at one time, but that a basic terminology should be established to which additions may be added.

The terms herein are suggested for study by the members of our association. Action upon them should be deferred until the next annual meeting. The Committee welcomes suggestions and criticisms on its efforts.

We are grateful to Miss Martha Ann Mann, who is the indexer for the American Dental Association, for the valuable assistance she has given the Committee in the preparation of this list of terms.

Respectfully submitted,
Dr. Clifton O. Dummett,
Dr. Frank Inskipp,
Dr. Robert G. Kesel, *Chairman.*

Accessory canal: See Canal—accessory.

Abscess
- **alveolar:** Localized collection of pus in the alveolar bone, at or near the apex of a tooth root, usually resulting from the infection within the (pulp) (root) canal. *Syn.:* Apical abscess.
- **alveolar, acute:** A locally spreading infection of short duration, arising at or near the apex of a tooth root, resulting in pain, swelling and a collection of pus formed by the disintegration of periodontal tissues.
- **apical:** See Abscess—alveolar.

Aerodontalgia: Pain or discomfort in a tooth, occurring at reduced atmospheric pressure such as experienced during aeroplane flights.

Alveolar abscess: See Abscess—alveolar.

Amputation
- **pulp:** See Pulpotomy.
- **root:** See Apicoectomy.

Apical abscess: See Abscess—alveolar.

Apical foramen: See Foramen—apical.

Apicoectomy: Excision of the apical portion of the tooth root and of infected periapical tissues by surgical procedures. *Syns.:* Root amputation, root resection.

Canal
- **accessory:** Lateral branching of the main (pulp) (root) canal, usually occurring in the apical third of the tooth.
- **root:** See Pulp—canal.

Capping the pulp: See Pulpotomy.

Cyst (root): A sac lined with epithelium which may contain cholesterol attached to the apex of a tooth. *Syn.:* Radicular cyst.

Dead pulp: See Pulp—necrotic.

Devital pulp: See Pulp—necrotic.

Devitalized tooth: See Pulpless tooth.

Endodontics: The science and art of treating pulp and periapical tissue and filling root canals. *Syns.:* Root canal therapy; Root surgery.

Endodontist: A dentist who practices (pulp) (root) canal therapy.

Endodontitis: Inflammation of the pulp of the tooth. *Syn.:* Pulpitis.

Extirpation of pulp: See Pulpectomy.

Fistula: An abnormal canal joining two normal surfaces or cavities.

Foramen
- **apical:** An aperture at or near the apex of the tooth, through which the blood and nerve supply of the pulp enters the tooth.
- **lateral:** Accessory or additional openings through which the pulp joins the periodontal tissue.

Granuloma: An area of granulation tissue at or near an apical foramen, produced by an irritation from within the pulp canal, which may appear in the roentgenogram as a roentgenolucent area. *Syn.:* Chronic inflammatory pericementitis.

Gum boil: See Sinus.

Hyperplastic pulp: See Polyp.

Hypertrophic pulp: See Polyp.

Inflammation of pulp: See Endodontitis.

Lateral foramen: See Foramen—lateral.

Necrotic pulp: See Pulp—necrotic.

Non-vital pulp: See Pulp—necrotic.

Periapical: Relating to the area about the apex of a tooth, including periodontal membrane and alveolar bone.

Pericementitis: Inflammation of the tissue surrounding the cementum of the tooth—the periodontal membrane.
- **chronic inflammatory:** See Granuloma.

Pericementum: Tissue immediately surrounding the cementum of the tooth, and between the cementum and alveolar bone, the periodontal membrane.

Polyp (pulp): Proliferation of an exposed pulp beyond the pulp chamber. *Syns.:* Hyperplastic pulp; Hypertrophic pulp.

Pulp (dental): The vascular organ occupying the pulp cavity of a tooth that is the formative organ of the dentine and that supplies sensation to the tooth.
- **Amputation:** See Pulpotomy.
- **canal:** That portion of the pulp cavity extending through the root of a tooth from the pulp chamber to the apical foramen. *Syn.:* Root canal.
- **capping:** See Pulpotomy.
- **chamber:** The cavity in the central portion of the tooth crown occupied by the dental pulp.
- **extirpation:** See Pulpectomy.
- **horn:** An extension of the pulp into an accentuation of the roof of the pulp chamber directly under a cusp or developmental lobe.
- **hyperplastic:** See Polyp.
- **hypertrophic:** See Polyp.
- **nodule:** See Pulp—stone.
- **removal:** See Pulpectomy.
- **stone:** A calcified deposit in the dental pulp. *Syn.:* Pulp nodule.

Pulpectomy: Complete removal of a vital pulp from the pulp chamber and (pulp) (root) canal. *Syns.:* Pulp extirpation; Pulp removal.

Pulpitis: Inflammation of the dental pulp, may be acute or chronic, partial or total. *Syn.:* Endodontitis.

Pulpless tooth: One from which the pulp has been removed and the (pulp) (root) canal treated and filled. *Syns.:* Root filled tooth; devitalized tooth.

Pulpotomy: Removal of a portion of the pulp, amputating it at a level short of the apical foramen. *Syn.:* Pulp amputation.

Radicular cyst: See Cyst (root).

Radiogram: See Roentgenogram.

Radiograph: See Roentgenogram.

Radiography: See Roentgenography.

Radiolucent: See Roentgenolucent.

Radiopaque: See Roentgenopaque.

Roentgenogram: A photograph produced by means of x-rays showing the penetrating effects of these rays through tissue as registered against a sensitive film or plate. *Syns.:* Radiogram; X-ray.

Roentgenography: The process of making a photograph with the Roentgen or X-rays.

Roentgenolucent: Substances which transmit or are penetrated by X-rays. *Syn.:* Radiolucent.

Roentgenopaque: Substances which do not transmit or are not penetrated by X-rays. *Syn.:* Radiopaque.

Root
- **amputation:** See Apicoectomy.
- **apex:** The end of the tooth—location of the foramen.
- **canal:** See Pulp—canal.
- **canal orifice:** The opening in the floor of the pulp chamber of multi-rooted teeth leading into a (pulp) (root) canal.
- **canal therapy:** See Endodontia.
- **resection:** See Apicoectomy.
- **surgery:** See Endodontia.

Sinus: A hollow tract or canal leading from a suppurative cavity to a normal cavity or surface. *Syn.:* Gum boil.

Vital: Living, having sensation and circulation: referring to the condition of the pulp as indicated by pulp tests.

X-ray: See Roentgenogram.

Report of Montreal Endodontia Society

The annual meeting of The Montreal Endodontia Society was held on May 5th, 1948, with the following election results for 1948–49:

President . . . . . Dr. S. A. MacSween
Vice-President . . . . . Dr. H. M. Robichaud
Secretary-Treasurer . . . . . Dr. Louis J. Rosen

At its first meeting, the executive drew up the following plan for the society's sessional activities:

The first general meeting will be held in September, when Dr. Fred Smith, Dean of the faculty of Medicine, McGill University, will deliver an address on "Antibiotics from the bacteriologists point of view." Thereafter, monthly meetings will be held, alternating with practical demonstrations and essays on the various phases of Endodontia. Among the subjects and clinicians are the following:

Immediate sterilization—Drs. W. J. Johnston and G. Zimmerman; Bleaching of discolored teeth—Dr. A. D. Richardson; Anterior restorations—Dr. H. M. Robichaud; Pulpotomy—Dr. J. Renaud; Histopathology—Dr. Louis J. Rosen; Further reports on

Indium—Dr. H. H. Pearson; Sutures and Flaps—Dr. M. Goldenberg.

Removal of Cysts, Oral Surgery and Endodontia, Essays on Bone, Blood, Nerve. Whenever time will allow, the latter part of the meeting will be taken up with case and film reports. It is also planned to wind up the season with an out-of-town clinician, who will give a talk on "The Role of the Periodontal Membrane in Endodontia."

Obituary—Dr. Alfred Walker

Dr. Alfred Walker, former president of the New York State Dental Society, died in Miami Beach, Fla., where he had made his home for several years. He was 72 years old.

Born in the city of New York, Dr. Walker graduated from the New York College of Dentistry in 1897. In the following 46 years, he became very active in his profession and contributed much to the field of Endodontics. For several years he was Professor of Pulp Canal Therapy at New York University.

From 1923 to 1941 Dr. Walker was a member of the Board of Dental Examiners of the State of New York. He had been president of the First District Dental Society of the State of New York; of the Dental Health Service, Inc., of the Alumni Association of the College of Dentistry, New York University; chairman of the Judicial Council of the American Dental Association; of the Dental Advisory Committee of the Association for Improving the Condition of the Poor; of the board of directors of the New York Journal of Dentistry; of the Advisory Committee of the Murry and Leonie Guggenheim Dental Clinic.

Dr. Walker was a life member of the American Dental Association, a fellow of the American Association for the Advancement of Science and the New York Academy of Sciences; honorary trustee of the Boys Club of New York; advisory editor of The Journal of Medical Care; Supreme Counselor of the Psi Omega Dental Fraternity; a member of the board of directors of the New York Tuberculosis and Health Association. In 1935 he received the Alumni Federation Medallion of New York University; in 1940 the Fauchard Academy Gold Medal.

In the early years after graduating in dentistry, Dr. Walker was active in the State Militia, finally holding a commission as Captain, D.C. 107th Infantry, when he resigned in 1911. From 1937 to 1940 he was a Lieutenant Commander in the Naval Reserve.

Dr. Walker leaves his wife, who was Elizabeth Muir at their marriage in 1912; a son, Alfred, Jr., and a sister, Mrs. Nathaniel Roe.

By his many services and accomplishments in his chosen profession, he has endeared himself to his colleagues who will feel his loss greatly.

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Mexico, D. F.....Dr. Aguilar, Enrique C.—Insurgentes 56-4.
Mexico, D. F.....Dr. Lycequi, Felix R.—Cordoba, 205, Dept. 1.
Mexico, D. F.....Dr. Kuiiler, Yury, Madero 67, Desp. 209.

PALESTINE
Haifa.....Dr. Kellner, Ernest—3 Balfour St.

PHILIPPINE ISLANDS
Manila.....Dr. Felizardo, Genaro B.—Univ. of the Philippines, College of Dentistry.

PUERTO RICO
San Juan.....Dr. Gonzalez, Jose M.—Box 624.
SCOTLAND
Aberdeen.....Dr. Logie, David—86½ Crown St.
SOUTH AMERICA
ARGENTINA
Buenos Aires.....Dr. Maisto, Oscar A.—1999 Arenales.
BRAZIL
Sao Paulo.....Dr. Degni, Francisco—Rua Marconi 131–9.
Sao Paulo.....Dr. Silva, Ibanez A.—Rua Marconi 948 Andar.
CHILE
Santiago.....Dr. Santelices, Agustin—Pio Nono 199.
Santiago.....Dr. Carrera, Louis de la—930 Huerfanos.
Santiago.....Dr. Daniels, Victor—360 Estado.
PARAGUAY
Asuncion.....Dr. Ynsfran, Pierpont—Calle Espana 523.
URUGUAY
Montevideo.....Dr. Pucci, Francisco M.—1213 Mercedes.
Las Piedras.....Dr. Trobo, Luis Alberto—592 General Artigas.
VENEZUELA
Caracas.....Dr. Brewer, Charles A.—Sur del Municipal 2.
Caracas.....Dr. Henriquos, Pedro E.—Este 4, No. 140.
SWITZERLAND
Zurich.....Dr. Hess, Walter—Freudenbergstr, 18.

Nominating Committee Reports

Nominating Committee announce candidates for 1949 election:

President-Elect.....R. L. Girardot
Vice-President.....G. C. Sharp
Secretary.....N. W. Burkman
Treasurer.....V. B. Milas
Executive Committee—
H. H. Pearson.
L. A. Lucas.
B. L. Wolfsohn.

Annual Index—Journal of Endodontia

Volume 3 — Numbers 1 - 4

Form 3526
Rev. 7–46

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946

Of JOURNAL OF ENDODONTIA, published Quarterly at Columbus, Ohio, for October 1, 1948.

STATE OF OHIO, }
COUNTY OF FRANKLIN } ss.

Before me, a Notary in and for the State and county aforesaid, personally appeared J. Henry Kaiser, who, having been duly sworn according to law, deposes and says that he is the Editor of the Journal of Endodontia and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily, weekly, semiweekly or triweekly newspaper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (section 537, Postal Laws and Regulations), printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—American Association of Endodontists, 418 Beggs Bldg., Columbus 15, Ohio.
Managing Editor—J. Henry Kaiser, D. D. S., 418 Beggs Bldg., Columbus 15, Ohio.
Business Manager—J. Henry Kaiser, D. D. S., 418 Beggs Bldg., Columbus 15, Ohio.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

American Association of Endodontists, 418 Beggs Bldg., Columbus 15, Ohio.
President—L. I. Grossman, 1002 Medical Arts Bldg., Philadelphia 2, Pa.
Secretary—N. W. Burkman, 525 Merrill Ave., Birmingham, Mich.
Treasurer—V. B. Miles, 2559 W. 63rd St., Chicago 29, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)
None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is.....
(This information is required form daily, weekly, semi-weekly, and tri-weekly newspapers only.)

(Signature of Editor): J. H. Kaiser, D. D. S.

Sworn to and subscribed before me this 25th day of September, 1948.

Harold S. Beggs.

(SEAL.) (My Commission expires January 9, 1950.)

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