

YEAR BOOK
of DENTISTRY

(1957-1958 YEAR BOOK *Series*)

TABLE OF CONTENTS

The designation (Series 1957-1958) used on the cover and title page of this volume is to indicate its publication during the "series year" which begins in September 1957.

ENDODONTICS, PERIODONTICS, ORAL MEDICINE	7
CARIES AND HARD TISSUE LESIONS	112
PUBLIC HEALTH	131
ORTHODONTICS	153
Orthodontic Literature in 1957	153
Etiology	154
Case Analyses	175
Treatment	185
Technics	207
Growth, Development and Function	224
Speech	236
SURGERY AND RELATED PATHOLOGY	242
Pre- and Postoperative Care and Infectious Diseases	242
Temporomandibular Joint	268
Traumatic Injuries	289
Cysts, Tumors and Related Diseases	295
Anesthesia	314
RESTORATIVE AND PROSTHETIC DENTISTRY	319
Operative Dentistry	319
Acrylic Resins	385
Crowns and Bridges	390

Removable Partial Dentures	421
Complete Dentures	429
Research: Biologic; Materials	453

THE
YEAR BOOK
of DENTISTRY

(1957-1958 YEAR BOOK *Series*)

THE PRACTICAL MEDICINE YEAR BOOKS

This volume is one of the 15 comprising the Practical Medicine Series of Year Books founded in 1900 by G. P. Head, M.D., and C. J. Head, and published continuously since then. The complete list follows:

Medicine: *Infections*, edited by PAUL B. BEESON, M.D.; *The Chest*, by CARL MUSCHENHEIM, M.D.; *The Blood and Blood-Forming Organs*, by WILLIAM B. CASTLE, M.D.; *The Heart and Blood Vessels and Kidney*, by TINSLEY R. HARRISON, M.D.; *The Digestive System*, by FRANZ J. INGELFINGER, M.D.; *Metabolism*, by PHILIP K. BONDY, M.D.

General Surgery edited by MICHAEL E. DEBAKEY, M.D., with a section on *Anesthesia*, by STUART C. CULLEN, M.D.

Drug Therapy edited by HARRY BECKMAN, M.D.

Obstetrics & Gynecology edited by J. P. GREENHILL, M.D.

Pediatrics edited by SYDNEY S. GELLIS, M.D.

Radiology: *Diagnosis*, edited by JOHN FLOYD HOLT, M.D., and FRED JENNER HODGES, M.D.; *Therapy*, edited by HAROLD W. JACOX, M.D., and MORTON M. KLIGERMAN, M.D.

Ophthalmology edited by DERRICK VAIL, M.D.

Ear, Nose & Throat and Maxillofacial Surgery: *The Ear, Nose & Throat*, edited by JOHN R. LINDSAY, M.D.; *Maxillofacial Surgery*, by DEAN M. LIERLE, M.D., and WILLIAM C. HUFFMAN, M.D.

Neurology, Psychiatry & Neurosurgery: *Neurology*, edited by ROLAND P. MACKAY, M.D.; *Psychiatry*, by S. BERNARD WORTIS, M.D.; *Neurosurgery*, by OSCAR SUGAR, M.D.

Dermatology & Syphilology edited by RUDOLF L. BAER, M.D., and VICTOR H. WITTEN, M.D.

Urology edited by WILLIAM W. SCOTT, M.D.

Orthopedics and Traumatic Surgery edited by EDWARD L. COMPERE, M.D., with a section on *Plastic Surgery*, by NEAL OWENS, M.D.

Endocrinology edited by GILBERT S. GORDAN, M.D.

Pathology and Clinical Pathology edited by WILLIAM B. WARTMAN, M.D.

Cancer edited by RANDOLPH LEE CLARK, JR., M.D., and RUSSELL W. CUMLEY, Ph.D.

Dentistry

TABLE OF CONTENTS

The designation (Series 1957-1958) used on the cover and title page of this volume is to indicate its publication during the "series year" which begins in September 1957.

ENDODONTICS, PERIODONTICS, ORAL MEDICINE	7
CARIES AND HARD TISSUE LESIONS	112
PUBLIC HEALTH	131
ORTHODONTICS	153
Orthodontic Literature in 1957	153
Etiology	154
Case Analyses	175
Treatment	185
Technics	207
Growth, Development and Function	224
Speech	236
SURGERY AND RELATED PATHOLOGY	242
Pre- and Postoperative Care and Infectious Diseases	242
Temporomandibular Joint	268
Traumatic Injuries	289
Cysts, Tumors and Related Diseases	295
Anesthesia	314
RESTORATIVE AND PROSTHETIC DENTISTRY	319
Operative Dentistry	319
Acrylic Resins	385
Crowns and Bridges	390

Removable Partial Dentures	421
Complete Dentures	429
Research: Biologic; Materials	453

ENDODONTICS, PERIODONTICS, ORAL MEDICINE

Management of Obscure Pain by General Practitioner is discussed by R. Gordon Agnew¹ (San Francisco). The responsibility of the dentist in dealing with the nature of pain, pain pathways and psychologic considerations has assumed new, increasing proportions. Interest cannot be restricted only to pain associated with the teeth and supporting structures because the dentist will find himself concerned with affections of the masticatory muscles, temporomandibular joint dysfunctions and obscure pain of the face and jaws. Three categories of pain are of concern to him: pain originating in "dental" or associated tissues; pain referred from dental and associated structures to other regions; and pain referred from other regions to the dental or associated zones.

Analysis necessitates meticulous, comprehensive examination and recording. A good part of the procedure is basically identical with the technics and sequences requisite to modern oral diagnosis. A preliminary health questionnaire is of proved value. Examination must include exact evaluation of the hard and soft tissues, including x-ray study and pulp testing. Psychologic observation based on general understanding of personality and behavior problems should be made from the first contact with the patient and recorded. Medical, neurologic or psychiatric consultation may be important, but this may become obvious only after the dentist has concerned himself with the whole patient and not the mouth alone.

A vital phase of pain analysis is recording the nature and distribution of the pain. Localization, distribution and quality of pain should be established. Knowledge of time factors, such as occurrence, duration and length of intervals between attacks, also is important. Accurate clinical measurement of intensity of pain is not possible, although some information as to relative intensity may be obtained.

The analysis may be organized in natural sequence. First,

(1) J.A.D.A. 53:532-538, November, 1956.

the lesion basically responsible for the pain pattern should be accurately localized. This may be simple or difficult. Second, determination should be made, if possible, of the organic pathologic changes that have occurred, whether they result from dominantly local causes or are local manifestations of a systemic disease. This phase also may be relatively easy or may tax the skill of the dentist and his consultants. One or several hypotheses may be considered and diagnosis-therapy may be necessary to validate or reject the hypothesis. Third, in many instances evaluation must be made of the significant psychogenic factors that may play a major or minor role.

Therapy of oral and facial pain covers a wide range. Relief may be obtained by raising the pain threshold with drugs that depress the brain centers involved in the reception of pain impulses. Specific drugs or chemicals, such as vitamins, hormones, antispasmodics and muscle relaxants, also may be used. Physical therapy may also relieve pain.

Pain pathways may be interrupted by injection of anesthetics or surgically by avulsion of nerves or section of sensory nerve roots. Noxious stimuli may be removed by surgical removal of impacted teeth, cysts, scar tissue, neuromas, etc. Correction of occlusal disharmonies and bruxism also is important. Muscle relaxants and antispasmodics aid in eliminating noxious stimuli. Psychologic therapy may lie within the scope of the understanding dentist during the course of treatment or may require the services of a psychiatrist.

► [These obscure pains may require so much time and care that the dentist is taxed to the limit but, in the final analysis, their diagnosis and treatment are his obligation. Bryon (*Oral Surg., Oral Med., Oral Path.* 10: 495, 1957) pointed out that pain may be both a sensation and an emotion. In Behrman's discussion of facial pain (*Brit. D. J.* 101:342, Nov. 20, 1956) he directed attention to the rare, but important, relation between herpes simplex eruptions and paroxysmal neuralgia. The anatomic and physiologic aspects of dental pain have been reviewed by Gibilisco (*Journal-Lancet* 77:132, 248, Apr.-July, 1957).—H.B.G.R.]

Development of Endodontic Philosophy in Last Five Years. According to E. C. Aguilar² (*Nat'l Univ. of Mexico*), endodontics constitutes a fundamental aspect of dentistry in preservation of teeth with pulp and periapical lesions. The

(2) *Internat. D. J.* 7:114-136, March, 1957.

present concept is not confined to the limits imposed by earlier definitions that restricted endodontics to treatment of root canals. Endodontics must be broadened to include all problems relating to the pulp. Teaching in dental schools is fundamentally inadequate and is mostly confined to technics in treatment.

Classification of pulp diseases should be expanded and causative factors reassessed. A better knowledge of pulp physiopathology has brought about a radical change in the concept of the cause of pulp diseases. Dental caries has been considered to be the main cause, but recent observations indicate that causes are many and varied. Efforts toward prevention and early diagnosis of caries have aroused general interest in the conservation of teeth and brought about a reduction in the number of pulp disorders due to caries. Since pulp lesions have not been reduced in the same proportion, it is probable they are produced during treatment or as a direct consequence of it.

Aguilar believes that pulp diseases may be classified in two major groups: those of diverse origin and those due or related to dental procedures. The first group includes bacterial invasion from caries, extension of periodontal infection, anachoresis, physical injuries and barometric pressure. The second group includes all bacterial, chemical and physical injuries resulting from dental procedures. The various supraoptimal stimuli reaching the pulp result in inflammation. Objective and subjective manifestations of pulp disorders are for the most part caused by morbid disturbances in the vessels and sensory nerves of the pulp. The capacity of the pulp for protection and repair is considerable, as shown by the formation of transparent dentin, secondary dentin and new tissue in the case of pulp capping or pulpotomy. Death of the pulp occurs when the supraoptimal stimulus is higher than the physiologic threshold. The means for pulp diagnoses are basically inadequate. They are means for diagnosing the death of pulp, but not the state of health or disease.

Treatment of pulp lesions may be divided into three main categories: preservation of pulp vitality by capping or pulpotomy, removal of the living pulp and treatment of teeth

without living pulps with or without periapical lesions. The technics of endodontics are essentially surgical and must adhere to surgical principles. The introduction of calcium hydroxide as a biologic dressing to induce healing of exposed or amputated pulps has been one of the most important and fundamental advances in modern dentistry. Clinical, x-ray, bacteriologic and histologic studies support the concept of treatment and preservation of teeth without vital pulps with or without periapical lesions. Endodontic treatment is contraindicated in systemic disease in which the natural defense mechanism is weakened to such an extent that chances of recuperation are not favorable.

► [This important summary requires some discussion. We are irritated by constant references to the inadequacy of teaching in endodontics, or any other subject in dental schools, unless the author is thoroughly familiar with such instruction in most schools today. This would require more than a questionnaire, casual discussion, review of school catalogues or memory. It is important that we do re-evaluate causes of pulp disease and we must consider the great resistance of the pulp to any reasonable operative procedures (Robinson: Pulpal effects of operative dentistry, *J. Pros. Den.* 7:282, 1957). Aguilar's opinion that endodontic treatment is contraindicated in patients with systemic disease is not confirmed by Strindberg's statistical analysis (p. 37).—H.B.G.R.]

Histogenesis and Histochemistry of Pulpal Calcification.

Percy L. Johnson and G. Bevelander³ (New York Univ.) group pulp calcifications in two categories, denticles and areas of diffuse calcification. Denticles are located in the region of the pulp horns, and areas of diffuse calcification are found in the root canals.

Denticles arise from a nidus of cells. Subsequently reticular fibers surround the cells, then calcification of the initial organic matrix occurs while a peripheral organic matrix is laid down. Extensive calcification of the pulp horns results from fusion of several single denticles. Denticles are at first free but may become attached or incorporated into dentin as the result of dentin formation on the free surface of these structures. The only denticles observed which had dentin tubules were heterogeneous structures made up in part of concentric lamellae of calcified matrix—the free denticle, surrounded in whole or in part by dentin. The authors conclude that differentiation between "true" and "false" denticles is untenable. Denticles are false; i.e., they do not con-

(3) *J. D. Res.* 35:714-722, October, 1956.

tain dentin tubules. Diffuse calcification in the root canals develops as minute spheres which undergo subsequent enlargement due to fusion of neighboring centers. These structures also have an organic matrix of reticular fibers and a ground substance.

Histochemical tests showed that reticular connective tissue fibers and a ground substance containing mucoprotein and metachromatic components were constant constituents of loci giving rise to denticles and diffuse calcification. Nucleic acids, alkaline phosphatase and glycogen, commonly found in cells associated with the calcification of bones and teeth, were not present. It is not clear whether calcification in the pulp is correlated with retrogressive changes or pathosis or whether it is a protective mechanism or an exhibition of the multipotency of pulp constituents.

► [Pulp stones and pulp calcifications are interesting, but their contribution to dental problems is negligible, with the possible exception of their occasional contribution to difficulty in endodontic therapy.—H.B.G.R.]

Emergency Endodontic Treatment for Anterior Teeth of Children is reported by G. C. Hare⁴ (Univ. of Toronto). Emergencies caused by injuries to the teeth of children are a familiar trial in the dental office. This is a time for diplomacy on the part of the dentist and his assistant. Such emergency treatment is a form of first aid. A definite plan should be followed to assure the best results. The dentist should talk quietly to the patient while placing a topical anesthetic on the injured area. Use of a 28-gauge needle for the local anesthetic causes little pain. As soon as the anesthetic takes effect, x-rays are made. Color photographs also are valuable as records and in medico-legal matters. The dentist then should discuss the treatment with the parent, preferably out of the child's hearing.

If the pulp is widely exposed and the root fully formed, the pulp should be removed at this visit. Use of the rubber dam is not essential in first aid, but in most instances it can and should be used to prevent accidental aspiration of material. After removal of the pulp, the canal is dried and sealed with a paper point moistened with a mild germicide. The orifice is sealed with permanent cement. Definitive endodontic ther-

(4) J. Canad. D. A. 22:652-657, November, 1956.

apy is carried out at a later date after any associated injuries have healed. Every dentist should have a plan of action ready for the patient who presents with a recently knocked out tooth.

TECHNIC.—The assistant should carefully cover the root of the tooth with a double layer of gauze saturated with normal saline and embed the root in a block of plaster. Before the plaster sets, the block is trimmed to expose several millimeters of the root tip. The dentist then eliminates the root contents and sterilizes and obliterates the canal. A heavy silver point is used for the filling. Before the root is removed from the plaster block, the apex is polished back for 2 mm. so the root will go into place easily in the socket. The injured region then is anesthetized, the socket cleaned and a new clot allowed to form. The tooth is firmly seated and held in place for several minutes. A stainless steel band with a spot-welded, short retaining wire is the most satisfactory splint.

In a patient aged 7 or 8 with a widely exposed pulp of an anterior tooth, every effort should be made to secure completion of root calcification. In such cases, a rubber dam is applied, and the roof of the pulp chamber is removed with a sterile round bur. The pulp is severed at the point of constriction and calcium hydroxide, mixed to a heavy paste with sterile water, placed over the stump. The paste is covered with crown and bridge cement. X-rays several months later will show a dentin bridge in successful cases. Time is important and the shorter the interval between accident and pulpotomy, the greater the chance for success.

Routine use of antibiotics for acute alveolar abscesses in children is unnecessary and may be potentially dangerous. Incision into the palpable mass will cause a spurt of pus and almost instantaneous relief from pain. The pulp then can be opened the next day with little discomfort. The child who has a continuous throbbing toothache usually has an abscess formation in a still vital tooth. Under anesthesia, the pulp is opened with the smallest round bur available. A trickle of pus and blood will appear. Flow is encouraged by rinsing with tepid water. The area is carefully dried and sealed with eugenol, beechwood creosote and cement. The patient is seen in 2 or 3 days for further treatment. The pulp should not be removed at the first visit because this may drive the infection into the deeper tissues.

► [We cannot agree that, because "thousands of cases" of acute periapical

or periodontal abscess were brought to "happy solution over many years when the term antibiotic was known to very few" and that someday an antibiotic may be needed to save the patient's life, use of antibiotics should be discouraged in acute oral infections. Routine or indiscriminate use is, of course, unnecessary and unwise, but judicious use is invaluable.—H.B.G.R.]

Preliminary Report on Reaction of Dental Pulp to Cavity Preparation Using Ultrasonic Device is presented by David F. Mitchell (Indiana Univ.) and James R. Jensen⁵ (Univ. of Minnesota). A buccogingival cavity was prepared by conventional methods or with an ultrasonic cutting device in 7 of 8 sound bicuspid of 3 young patients. The cavities were filled with gutta-percha and the teeth extracted 6 days, 12 days, 6 weeks and 9 weeks after preparation.

Figure 1 shows a cavity prepared with a bur. The relatively square angle, the step in the floor and the depth of the preparation are evident. Figure 2 shows a preparation cut with the ultrasonic vibration instrument. The unevenness of the floor and rounded angles are apparent. With more experience with the device, the operator might improve the cavity outline. The relative depth of the 2 cavities is comparable.

No cavity was cut in the upper left 2d bicuspid of a girl, aged 12, in order that the undisturbed pulp could be studied. The pulp was vital and showed normal histologic structures. Figure 3 shows the regular row of odontoblasts beneath the thin zone of lighter predentin. The cell-free zone of Weil was immediately beneath the odontoblasts. The vessels, nerve fibers and connective tissue stroma of the pulp were normal.

The lower left 1st bicuspid of a girl, aged 18, was prepared with a bur and extracted after 6 days. The dentin and predentin were normal (Fig. 4). The row of odontoblasts was disrupted by hyperemia and hemorrhage and the zone of Weil was not apparent. There was a slight infiltration of neutrophils and lymphocytes in the immediate area of the pulp adjacent to the cut dentinal tubules. The rest of the pulp was unaffected.

A cavity in an upper left 1st bicuspid of this same patient was prepared with the ultrasonic device and the tooth extracted after 6 days. Findings (Fig. 5) were comparable to

(5) J.A.D.A. 55:57-62, July, 1957.