

# TIC

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SEASON'S GREETINGS

**TIC**, the most readable dental magazine in America,  
comes to you, doctor, as a professional courtesy of your  
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*hasper*



# Try a Living Wall

By Mitch Pieronek

Looking for a different effect on a stairway? Try a living wall. It is particularly good if it is a blank area that needs visual warming or breaking up.

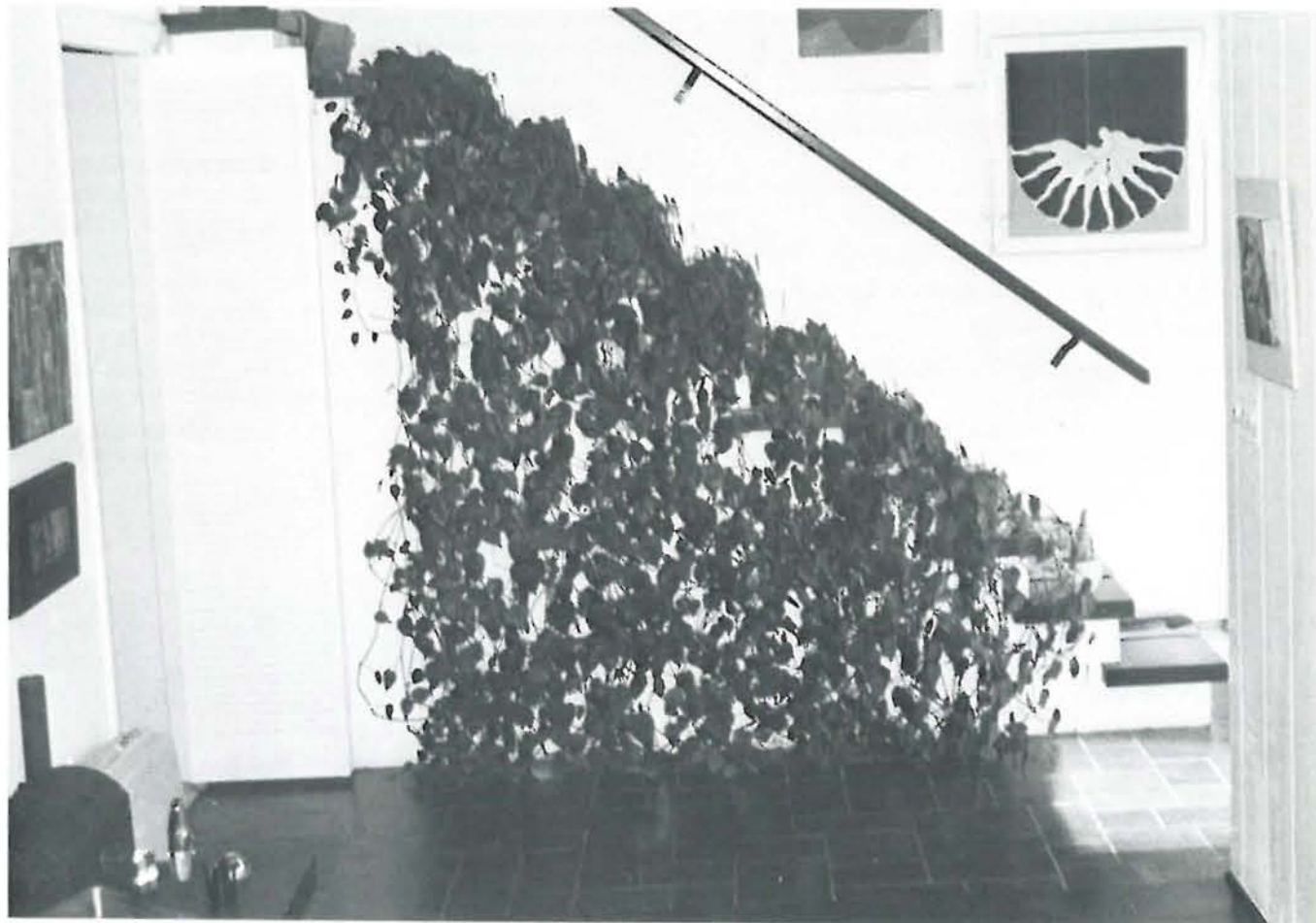
Philodendron plants are especially suited for a number of very good reasons. They are hardy and easy to care for. They can grow long for that appearance of a green, verdant wall.

Pots of philodendrons are placed along the stairs, leaving the vines free to cascade towards the floor. Should any plant need replacement, it's easily done

without upsetting the entire decor. The newest or shortest vine is put on the shortest stair, the longer ones are moved to the longer areas.

It is an effective way to bring living greenery into the office. The area not only becomes a conversation piece but a very appealing office addition as well. And should you ever want to change or redecorate, it is no problem merely to move the pots out.

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Grosse Pointe Woods, Mich. 48236



# TIC

A MAGAZINE FOR DENTISTS, DENTAL ASSISTANTS, AND DENTAL HYGIENISTS

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Editor Joseph Strack  
Contributing Arthur H. Levine, D.D.S.  
Editors Maurice J. Teitelbaum, D.D.S.  
Cover Artist Edward Kasper



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# Dentistry's Dilemma



by Maurice J. Teitelbaum, D.D.S.

"... today's medical training creates a physician with a value system better geared to studying a research model than confronting a fellow human soul . . . much of the blame for the problems that beset medicine today derives from the personality, character and attitudes of physicians (which are) the direct product of medical education . . . the process of medical training is fantastically effective in depersonalizing its students."

These are the words of the young author of *The Year of the Interne*, Robin Cook, M.D., in a piece that appeared in *Newsweek* earlier this year. This is part of what Dr. Cook refers to as "the new doctor's dilemma," because the public is tube fed the image of the family physician as seen in television programs in the guise of the kindly and sensitive Dr. Welby. In reality, the physician, according to Dr. Cook, is hardly a mirror of the concerned television character. To meet the real needs of the public, he calls for some revolutionary changes in the educational program for medical students. That is his answer to the dilemma facing the physician. So much for our medical colleagues.

A question of primary interest to us is: Does the new dentist face a dilemma? In fact, are all of us in the dental profession faced with a dilemma, not solely in the public image of us, but in our response to the public's needs? This is unquestionably an era of unprecedented progress in dentistry, at least in a material sense—in equipment and technique.

### Is This Our Golden Age?

Today's dental offices are models of functional elegance and truly beautiful in the blending of woods, metals, and colors. Some of the artistic styling, waiting room decor, plush carpeting, and wall treatment would make any lay homeowner envious.

And with the new materials, equipment, laboratory services, techniques, preventive programs, and dental health plans, it would seem that we may very well have entered the golden age of dentistry. But all is not gold that glitters. For despite the aforementioned achievements, there are some rather depressing facts that cannot be swept under those beautiful office carpets.

### The Dentist-Patient Ratio

For example, the dentist-patient ratio is less today than it was 40 years ago. This fact becomes even more disturbing with the realization that patient dental education is more widespread today than 40 years ago, and the public is more knowledgeable and oriented

### OUR COVER

Artist Edward Kasper records the magnificent beauty of December frost crystals on the windshield of his car.



toward seeking dental care. Along with the program of preventive dentistry and plaque control, there are some 80 million untreated carious teeth in the heads of Americans and it is estimated that about 80 percent of adults have some form of clinical periodontal disease. Implant dentistry has made some remarkable strides in recent years and yet some 25 million people are in need of prosthetic services. Add to this, the fact that last year "10 percent of the population received two-thirds of the dental care, and only 25 percent can boast of routine treatment," and the hoped-for "golden age" seems to be less precious. Obviously, dentistry is faced not only with a simple dilemma, but one of momentous proportions.

#### Is This Problem Unsolvable?

The reasons for this dilemma, for dentistry's inability to properly fill the dental needs of the public, is due, in the main, to the shortage of dentists. With the government's curtailment of funds for education, the problem seems unsolvable. Perhaps, like the medical schools, our dental school programs must be rearranged to meet the needs of the public and provisions made to increase the number of students.

Various proposed health insurance programs may make more people eligible for treatment but a dental manpower shortage will doom the success of any health program, at least in quality dental care.

#### Dentist — View of Patients

Another reason for the dilemma may be the attitude of many dentists toward their role as dentists. When the acquisition of money and status is far more important than service to the community, the public must suffer. The ever-increasing number of courses and seminars devoted exclusively to increasing one's income has driven many men in the profession more into the business end of practice than service. Dentists in offices that are overly expensively decorated and equipped and have a large staff will generally demand high fees. The result is not necessarily better dentistry, though there may be an increase of patients, but at the same time a barrier to the vast majority of those who need dental care but cannot afford it.

Indeed, dentistry is faced with a serious dilemma and it will take wise and concerned men in our profession to pave the way toward a solution.

174 E. Mt. Pleasant Avenue  
Livingston, New Jersey 07039



"MERRY CHRISTMAS—AND SORRY TO WAKE YOU. THEY'RE PROBABLY RIGHT IN FRONT OF MY NOSE, BUT I CAN'T SEEM TO FIND YOUR VALUABLES."

## Foolproof System

(Continued from Page 4)

either by the supplier or the dentist, it will be repeated until someone does note the error. The person making the error is not aware of it, and it has become a habit. Other errors may happen only infrequently. If the supplier is informed of the error, the employee can be corrected. Employees who persistently make shipping and billing errors may need to be transferred to tasks which they can handle correctly.

So, if a dentist wants to keep his material and supply costs accurate, and have an accurate record of material and supply inventory, he needs a foolproof system for handling incoming shipments. It is his responsibility to catch any errors at his end of the supply line.

#### Kinds of Errors

Examples of errors which can prove costly to a dentist, if not detected, include the following:

- Short count on goods shipped
- Billing for certain goods not shipped and not back-ordered
- Substitution of lower-priced goods but with billing at the higher price of goods ordered
- Damaged, defective or imperfect goods shipped
- Incorrect pricing of one or more items on invoices
- Incorrect total on invoices
- Monthly statement which does not coincide with the month's invoices
- Absence of credits on statement for goods returned or amounts paid on account
- Lower discount than agreed on or altering of other terms

#### Receiving

A systematic routine should be established for handling incoming shipments. Besides the dentist, only a certain designated employee should be authorized to check them out. Haste in disposing of goods received should not be permitted to discourage careful checking and handling.

A separate area should be designated for goods not checked out. They should be checked off item by item as received. Nothing should be taken for granted. A numerical count, where necessary, should be made. Vigilance should be exercised in watching for substitution and short count as well as absence of any items billed. Goods should be physically examined for defects, imperfections or shipping damage where this is a possibility.

Only after this has been done and a notation made by the person who checks them out, should the goods be commingled with other supplies. If there is a dam-

age claim, goods involved should be set aside, together with original shipping container, if any.

#### Accounting

Either the dentist or an assistant should check each invoice for errors in arithmetic as well as pricing errors and incorrect discounts and terms previously agreed upon. Invoices should be totaled for accuracy. Billing machines are no more accurate than their operators.

Invoices from each supplier should be segregated from those of other suppliers as they are received, being stapled or clipped together. Many a monthly statement has been accepted without question because a missing invoice cannot be located. If goods have been returned to a supplier, a memorandum at that time should be made and be attached to that supplier's invoices for quick later reference. A similar memorandum should be attached for any payments made on account during the month. When the monthly statement arrives, this should be compared carefully with the invoices as well as credits, if any.

Probably all dentists have some method of checking and examining shipments and invoices. However, a good many dentists may leave out or skimp some of the steps necessary for a foolproof checking method. They may be honoring monthly statements without thought to the possibility they may be overpaying.

Time spent in setting up and following a definite routine on incoming goods and invoices and monthly statements is negligible. In fact, it may take less time than in not having a routine. It may result in savings that are substantial and continuing, year after year.

6529 Western Ave.  
Riverside, Calif. 92505



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## ARTICLES

### Problems with Removable Orthodontic Appliances

Although removable orthodontic appliances are effective in correcting various types of adult dental malpositions, there are many disadvantages and they are discussed in this article. Generally, where controlled movement is required, a fixed appliance is preferred. Without adequate clasping, removable appliances tend to be easily displaced. Some anchorage in adjacent teeth is important for the proper stability and use of the removable appliance. Often it is better to use a series of appliances rather than a single one when anchorage teeth are not present. Since springs, clasps, and wires are held in an acrylic base, the possibility of fracture is always present under masticatory force when the acrylic is not of sufficient bulk.

Another disadvantage is the increase of plaque accumulation that often occurs with the use of removable appliances. Patients must be cautioned to remove the appliances regularly and instructed in good oral hygiene procedures. Sore spots and tissue laceration is also not uncommon around the tissue-bearing areas. Of course, in a fixed appliance this problem is avoided.

There is also the problem of clasp slippage making the appliance move freely and, with conical-shaped teeth, causing impingement of tissue. Occlusal interference may also occur with clasped cases. Another drawback is the interference of speech with the removable appliance. Patient cooperation and instruction is essential in the success of removable orthodontic appliances both in maintenance and in continued use. Proper design and construction can also minimize the disadvantages.

Schlossberg, Allan; Temple University School of Dentistry. Problems associated with removable orthodontic appliances; *Journal of the Academy of General Dentistry* 21:36-39.

### Second Premolar Extraction in Class I and Class II

The rationale presented here is for the removal of the second bicuspid instead of the usual first bicuspid in Class I and II orthodontic cases. Thirty-six cases are presented in this study.

Although the decision to extract second premolars is not predicated upon the following factors, they should be given serious consideration with reference to this procedure.

(1) If the mandibular second molars have inadequate space, it is easy to move the first molar mesially.

(2) The extraction of second premolars in Class I makes the closure of the anterior open bite easier by reducing the posterior vertical dimension.

(3) Overbite is as easy to control with the loss

of the second premolar in Class II as with the loss of the first bicuspid.

(5) The lower first premolar is anatomically better suited for band retention than the second premolar.

(6) Since the mandibular second premolar is generally larger than the first and the maxillary first premolar is larger than the second, fewer end to end bites result when the second premolar is removed.

(7) The contact point between the mandibular first molar and first premolar tends to stay close and tight.

(8) The maxillary premolar is probably more valuable than the maxillary second.

(9) Rotation and axial inclination of the molar, canine, and first premolar can be easily controlled with the extraction of the second premolar.

(10) The more the mandibular molars are moved mesially and the less the mandibular incisors are retracted, the less distance the maxillary incisors need be retracted. This produces less need for Class II elastic force, less anterior torque problems, less overall extraoral traction time and possibly less anterior root resorption.

Logan, Lee; Northridge, Calif. Second premolar extraction in Class I and Class II; *American Journal of Orthodontics* 63:115-147.

### Editor's Note

Some readers may wish to obtain copies of the journals containing the complete texts of the articles whose abstracts interest them, so that they can benefit fully from the original material. Information on how to get these magazines appears below.

#### DENTAL JOURNALS

A study of plaque distribution in the gingival crevice. *Oral Surgery, Oral Medicine, and Oral Pathology* (Vol. 35, No. 4, April 1973). \$3.50 per single copy. The C. V. Mosby Company, 11830 Westline Industrial Drive, St. Louis, Mo. 63141.

An effective treatment for injuries to the young permanent anterior teeth. *Journal of the Nebraska Dental Association*. (Vol. 49, No. 1, Autumn 1972). \$1.00 per single copy. Journal of the Nebraska Dental Association, University of Nebraska College of Dentistry, 40th and Holdrege Streets, Lincoln, Neb. 68503.

Second premolar extraction in Class I and Class II. *American Journal of Orthodontics* (Vol. 63, No. 2, February 1973). \$3.50 per single copy. The C. V. Mosby Company, 11830 Westline Industrial Drive, St. Louis, Mo. 63141.

Problems associated with removable orthodontic appliances. *Journal of the Academy of General Dentistry* (Vol. 21, No. 3, May-June 1973). \$1.50 per single copy. Journal of the Academy of General Dentistry, 211 East Chicago Avenue, Chicago, Illinois 60611.

## A new method to identify human remains:

# COMPUTERIZED DENTAL RECORDS

BROOKS AIR FORCE BASE, Texas—The American fighting man and his adversary often share a greater fear than death itself—the fear of dying and being left on a foreign battlefield.

Traditionally, our military forces have been taught to bring our dead home—none are to be left if at all possible.

To that end, a dedicated dentist at the USAF School of Aerospace Medicine here, has called upon the magic of computerization to help remove that fear.

Lt. Col. Albert C. Jerman, chief of the School's dental consultation function, has, with the assistance of Lt. Col. Cecil E. Brown Jr. and Lt. Col. Gaylord Hall (now retired), developed over the past five years, a computerized dental record that provides identification specialists with another method for identifying human remains.

And for what reason?

"Basically Vietnam," Dr. Jerman explained. "The attitude of countries about their dead warriors is perhaps best explained by a statement made by Sir William Gladstone, Prime Minister of England in 1871."

Gladstone said, "Show me the manner in which a nation or a community cares for its dead and I will measure with mathematical exactness the tender sympathies of its people, their respect for the laws of the land, and their loyalty to high ideals."

"The Air Force, like the United States, is not insensitive—it cares a great deal about its dead. Every effort, every available means and scientific resource is used to positively identify an airman's remains and bring him home," Dr. Jerman said.

"It is for this reason we became interested in developing some sort of system that would alleviate a lot of the suffering that occurs when bodies are improperly identified," he added. "Vietnam has proven to us that it is extremely important to have, not only an accurate method of identification, but a rapid means as well."

"It hasn't been a one man job by any stretch of the imagination. Our Service has done a most effective job, I feel, in bringing this new procedure into being."

Dr. Jerman explained how the new system came about. First, the Air Force recognized that there was a need for a better, more effective, system. Vietnam established that.

Secondly, the Air Force had to design a dental record to accept the information it would need and convert existing dental record information on all of its personnel listed as missing, killed in action or unaccounted for.

In preparation for the possible requirement to identify these individuals, the Memorial Affairs Division of the Air Force Logistics Command, which is responsible for the identification of deceased personnel, has been compiling complete medical, dental, and other personal data characteristics. The data are systematically coded, placed on automated records, and computerized. So far the Division has developed more than 800 records on these "unresolved" cases from all branches of the military.

Dental data provide a significant portion of the physical remains and characteristics. Since any remains unrecovered for a long period of time will be skeletal, positive identification will be accomplished, in many instances, exclusively by dental means.

There are four sources of identification data presently being put to use. They are: photographs in the personnel record, dental health records, radiographs, and polaroid photographs of the maxillary and mandibular arches.

The combined information from these four sources should give a reasonably accurate profile of the individual's dental characteristics, Dr. Jerman believes. Even with this information, the final determination can only be as accurate as the data from which it was gleaned.

The Air Force form has been modified to eliminate all mention of soft tissue pathology because these recordings would not be significant for positive identification, especially if the remains were skeletons. The form does make provision for recording the location of caries, restoration, defective restorations, missing, nonfunctional and malposed teeth, endodontic



Lt. Col. Albert C. Jerman, chief of the USAF School of Aerospace Medicine's dental consultation function at Brooks Air Force Base, who developed the new computerized dental records system.



therapy, retained roots, tori, and so forth.

The form, with minor revisions in its five years of use, can record virtually all pathological conditions, abnormalities, and restorative work found in the oral cavity. Auxiliary personnel can readily learn to use this form, and its design allows easy transferral of data to computer punch cards.

"There is much at stake in the identification of deceased persons," Dr. Jerman observed. "Not only is

considerable money involved, but the marital status of the spouse and emotional state of the survivors depend upon positive identification of the deceased."

He concludes: "For those who have given their lives in service to their country, the least we should be able to do is to return their remains to their families and state with certainty that we have positively identified these brave men."

## A Foolproof System for Checking Shipments and Invoices

by Harold J. Ashe

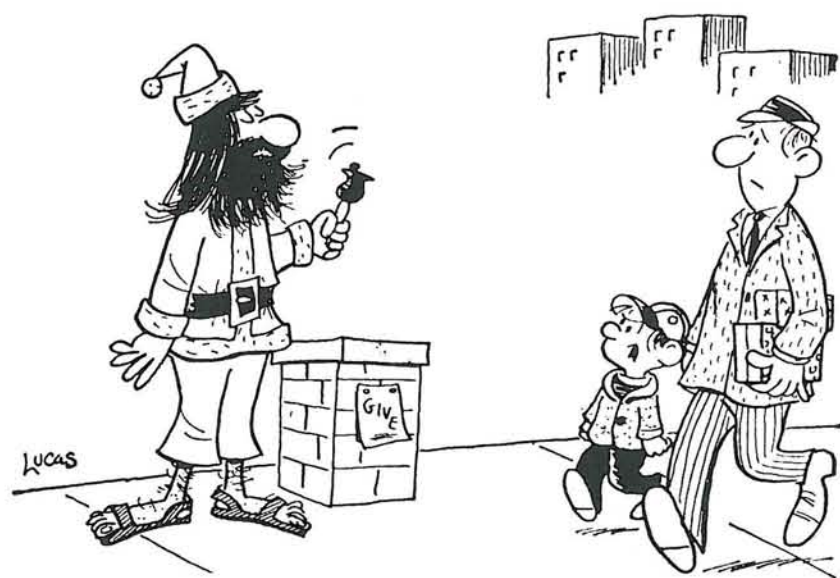
A dentist who does not already have a foolproof method of handling incoming shipments and suppliers' invoices and statements could be paying a big price for this carelessness.

If a statement is incorrect, a shipment short of the amount of goods ordered, or other mistakes are made, he could be losing anywhere from a few cents per order on some orders to several dollars or more an order. Some of these errors may not be easy to detect, especially small ones, on cursory examination. While the error of each sum may be small when they are found, if he figures the percentage of loss on his total orders a month, he may find that this would wipe out most or all advantages of a cash or quantity discount, or even more. On an average of errors, he could be

losing one-half percent a month, or 6 percent a year in higher costs. Or, he might be losing 2 percent a month, or 24 percent a year, or more. If he had to pay interest at these rates, he might consider them burdensome.

Suppliers' shipping and billing clerks are not infallible. They are subject to making honest mistakes of any nature that is possible in the various steps of handling shipment of materials or supplies. Sometimes these mistakes are at the expense of the dentist, sometimes at the expense of their employer. Suppliers will welcome the opportunity to make any necessary corrections.

Often, when an error is made, and it is not caught  
*(Continued on Page 15)*



"EACH YEAR IT GETS HARDER TO BELIEVE."

### KEEPING UP WITH DENTISTRY



## YOUR DENTAL LIBRARY

Reviews of important books and abstracts of significant articles

### ARTICLES

#### Plaque Distribution in the Gingival Crevice

The purpose of this study was to determine the presence of subgingival plaque in order to provide a sound program of oral hygiene for the control of plaque and its prevention. Over 300 extracted teeth were examined to ascertain plaque distribution. Before the teeth were removed (the variety included carious teeth as well as periodontally involved teeth) measurements of the gingival crevice were made and marked. After the teeth were extracted a disclosing solution was used on them made of a 4 percent solution of methylene blue prepared in equal parts of alcohol and water. The dye stains all accumulations on the surface but does not discolor clean tooth structure.

An examination of the stained extracted teeth revealed the accumulation of plaque and remnant of the periodontal membrane. A check of the measurements located the stain in relation to the gingival margin and crevice depth. An area free of plaque was present in each tooth at the base of every gingival crevice or periodontal pocket. It was concluded that this plaque-free zone may be due to (1) prevention of invasion of microorganisms by the proximity of the crevicular epithelium to the tooth, (2) the flushing action of the crevicular fluid capable of removing bacteria from the sulcus, (3) an antigen-antibody reaction in the gingival crevice, (4) the action of fluid enzymes under the crevice and (5) phagocytic action in the crevice and gingival margin. The presence of a plaque-free zone in the gingival crevice may be a complex interaction of these factors, in addition to other factors not yet identified.

Hutchins, Dale W., Parker, Warren A.; U.S. Army Institute of Dental Research, Walter Reed Army Medical Center. A study of plaque distribution in the gingival crevice. *Oral Surgery, Oral Medicine, and Oral Pathology* 35:585-592.

#### Injuries to the Young Permanent Anterior Teeth

It is the responsibility of the dentist to restore the injured tooth in a young patient, not only for physiological reasons, but for psychological reasons as well. The unesthetic, fractured tooth has been shown to be psychologically damaging to the young person. Since most fractures in young people occur in the maxillary anteriors of those children with protruding teeth, preventive means should be taken with mouth guards and orthodontic appliances to protect them.

The author presents a systematic treatment plan for coronal fractures involving only the enamel, the enamel and dentin, and fractures involving the pulp. The possibility of success is better when treatment is undertaken soon after the injury occurs. When a small piece of enamel is broken, if radiographs are negative and mobility is negative, the treatment consists merely in disking the roughened surface to improve esthetics and eliminate any sharpness.

If the dentine is involved in a fracture, a zinc oxide and eugenol dressing is placed on the fractured area and then an orthodontic band is fashioned and cemented upon the dressing and tooth. Four weeks later, if the examination is negative, the tooth is prepared for a ceramco crown which is cemented into place.

In cases where the pulp is involved a pulpotomy is recommended. However, if the exposure is only a pinpoint, and there are no complications, a pulp cap of calcium hydroxide is used, followed by a zinc oxide eugenol dressing, and the band cemented into place. Both the pulp capped tooth and the one with a pulpotomy are checked in six weeks and if there are no complications the ceramco crown is again used as a permanent replacement.

Pike, J. Sanders; Emory University School of Dentistry. An effective treatment for injuries to the young permanent anterior teeth. *Journal of the Nebraska Dental Association*, Autumn 1972, Vol. 49, No. 1.





Typical frontal and profile extra-oral photos used in orthodontic diagnosis. (Fig. 12)

it is necessary to eliminate the halo type shadow cast by the head. To accomplish this, use a background whiter than the normal patient's complexion. We use a snow white window shade that is suspended from the wall. It can be drawn down when needed and then retracted out of the way when not in use.

#### Film Used

The film used is Kodachrome II which gives the dentist a 35 mm colored slide. Kodachrome II gives the most natural color tones for dental structures when used with an electronic ring light. The slide that is made from the film, can be reproduced into duplicate slides, color prints or even black and white prints.

A new interesting camera was developed by Unitek Corporation recently called the Dentograph Intra-Oral camera (Fig. 17). It uses Polaroid film and produces a full size photograph in black and white, or color. The camera has a mouth piece that is inserted into the open mouth and centered on the arch. The camera window is positioned against the occlusal surface of the teeth, either maxillary or mandibular arches. The camera is then exposed with the lighting accomplished by a self-contained illumination system. It gives a distortion free accurate size reproduction of the occlusal view of the dental arches. The benefits of this system are valuable for patient education in which the photo can be taken at that specific time and

shown to the patient immediately. The orthodontist can use it for arch wire selection and design, arch form, band sizes and evaluating finishing details.

The routine photographic technique that is discussed in this paper should help to establish a clinical routine. Once the procedural techniques have been established the dentist should be willing and able to use the resultant photos in his practice. The camera will give the dentist a memory storehouse of important information for his use in all facets of dentistry.



Frontal extra-oral photo being taken against a white window shade used as a background. (Fig. 13)

*Tic* is grateful to the *Journal of the Wisconsin State Dental Society* for permission to reproduce this excellent article.

# A Clinical Application of Practical Photography For Dentistry

By Russell T. Kittleson, D.D.S.

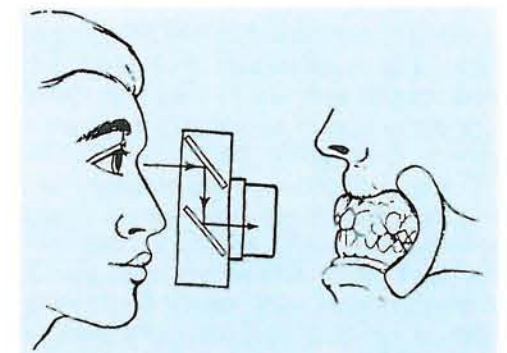
The use of photography in dentistry has become more widely advocated than ever before in everyday practice. It records a patient's dental condition for use in a complete diagnosis as well as the treatment procedure for use in legal protection, patient education and teaching. Dental photography is a specialized type of close-up photography. There have been many articles written that have dealt with a type of technique or a type of camera equipment to be used, but it is the purpose of this paper to establish a clinical application of practical photography for dentistry.

Good dental photographs are easily obtained if attention is given to some basic requirements. The dentist should be willing to learn the use of the camera and equipment as well as he has learned the use of any other dental instrument or equipment. The simple equipment that is routinely sold foregoes some technical excellence and its limitations are known.

#### Accepted Camera Noted

The most widely accepted camera that is used in close-up dental photography is the 35 mm single lens reflex (fig. 1). It allows a direct visual analysis of the object that is to be photographed, as well as high quality of pictures with the greatest flexibility. The dentist will be able to look directly through the camera lens itself allowing the subject to be framed precisely and allowing every part of the subject to be focused. The dental field is viewed as it will appear on the slide or photograph. This helps eliminate the poor field framing that can happen with cameras using pre-established framing mechanisms.

In establishment of a photography system for use in an office, the following requirements are necessary. First, the camera setting for the lens and for the flash should be standardized for each specific type of use of the camera.



Direct visual analysis of dental structures through single lens reflex camera. (Fig. 1)

If the number of focusing and setting adjustments can be limited to a definite pattern, it will encourage uniformity of results. Therefore, each preceding film will have a standardization scale of reproduction.

#### Focus Through View Finder

The second requirement is that the focusing should be done through a view finder. This allows the dentist to view the subject not only in sharpness but can be viewed in the relation to the orientation of the object. The use of a wire frame for framing the subject is useful but does give some limitation to direct visual framing of individual objects such as cavity preparation, soft tissue lesions, or individual teeth. This requirement is where the advantage of the single lens camera lies, because it allows the subject matter to be viewed exactly as it is recorded on the film. It gives the dentist a chance to give accurate composition and perspective.

The third requirement is the ability of the camera to have exposures made intra-orally or extra-orally without the use of a tripod. The use of electronic flash is ideal for dental photography because its flash duration is between 1/500 and 1/2000 seconds. This action freezing speed and capacity for release of near instantaneous flash at extremely brief duration gives the electronic flash its principle advantage. It allows the operator to use the camera without a tripod at extreme close up distance without the fear of camera movement blur.

#### Close-up Techniques

The fourth requirement should be the use of close-up techniques without the multiple changing of auxiliaries. Auxiliaries that are used in close-up photography are either extension tubes, bellows, or close-up lens (fig. 2). The extension tubes and bellows are methods of extending the lens



Single lens reflex with various close-up auxiliaries: (a) bellows; (b) extension tubes; (c) macro-lens focusing range down to six inches. (Fig. 2)



from the camera and therefore give close-up reproductions. The disadvantages of extension tubes and bellows are that they can be extremely cumbersome and time consuming in switching from profile to intra-oral photos. If the profile photos are taken first and then the intra-oral photos, it is necessary to remove the lens from the camera and place the extension tube or bellows. This additional process can also lead to undue wear on the lens mount and camera. However, if the camera is used mainly for close-up intra-oral work, a series of automatic extension tubes can be used without constantly changing the lens.

In dentistry, the photographic technique requires close focusing of the subject and it is necessary to use the basic principle of "depth of field" focusing. The "depth of field" focus is the optical planes of sharp focus at the object. In dentistry, this could be useful to the details of an occlusal view of the mandibular arch with the most distal molar and the central incisor in a given picture in sharp focus. This zone of sharp focusing is therefore known as "depth of field," or "depth of focus."

#### Depth of Focus

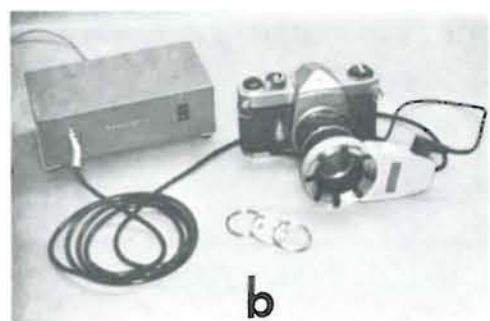
A determining factor in increasing the "depth of focus" is the lens aperture. The lens aperture is the size of the opening of the diaphragm which is found in all camera lenses. The index of the lens aperture opening is the f/stops, which is the ratio of the focal

length of the lens to the diameter of the iris opening. This diaphragm opening is used to control the amount of light passing through the lens. In the dental application of intra-oral close-up photography, usually settings of f/16, f/22, and f/32 are used, because they give better "depth of focus."

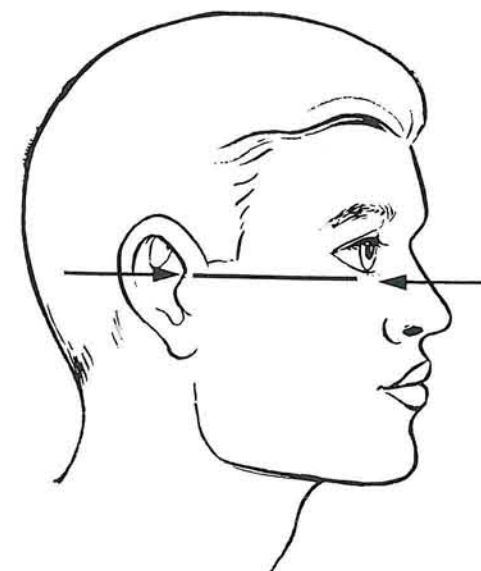
The camera set-up used in our office was established with simplicity and quality as the basic goals. The camera is a single lens reflex Pentax camera with a Honeywell Prox-o-lite ring light. There are two basic camera systems. One camera has an automatic extension tube used only for intra-oral photos and the camera is kept in the working operator. The second camera used for both intra-oral and extra-oral photos has a drop-in lens system sold by the Lester Dine Company (fig. 3). The close-up lens which is a plus six power is placed in the adapter ring situation between



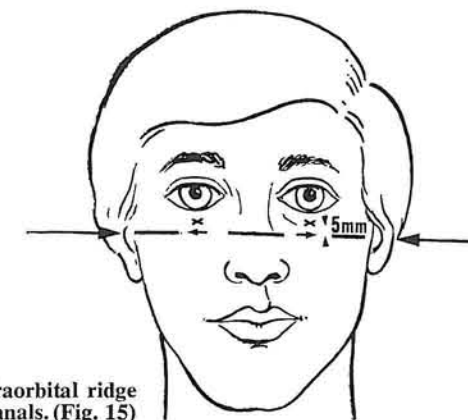
The close-up lens is dropped into the adapter ring (a) and the set screw (b) is tightened to hold close-up lens securely (c). A series of three different close-up lenses are available for extremely close-up photos. (Fig. 4)



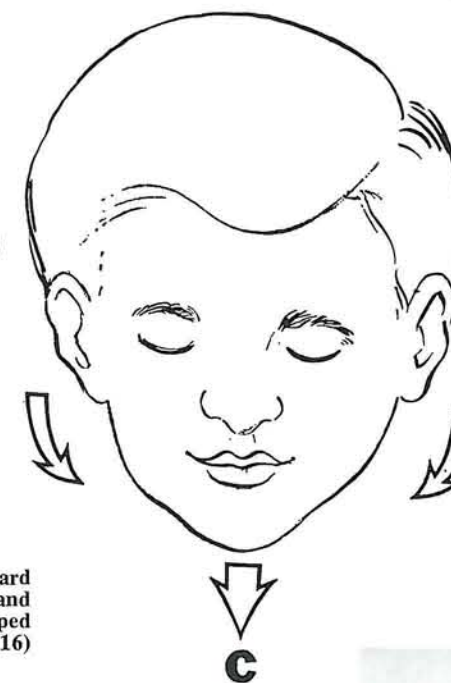
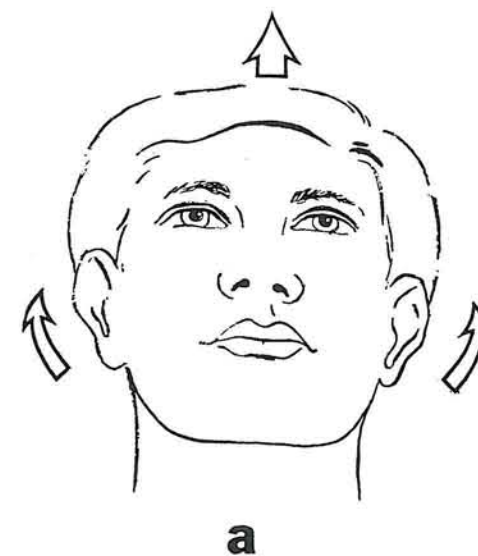
(a) Camera used specifically for intraoral photos in operator — 50 mm lens with an extension tube; (b) camera for extra-oral and intra-oral photos used for records—50 mm lens with a "plus 6" close-up lens. (Fig. 3)



Profile photo alignment with Frankfort horizontal plane parallel to floor. (Fig. 14)



Frontal photo alignment with infraorbital ridge 5 mm above line connecting ear canals. (Fig. 15)



(a) When head is tipped up from the standard alignment for frontal photo, chin is distorted and elongated; (b) good alignment; (c) head tipped down with chin shortened. (Fig. 16)



Unitek Dentograph camera which is cordless in design and uses an automatic charger to maintain batteries ready for use. (Fig. 17)



torted because of the severity of the malocclusion, it may be necessary to take an extra series of profile and frontal films with the teeth in centric but the lips at a normal rest position. Profile and lateral photos are a weak area in dental photography because if the head orientation is not done in consistent manner, then facial changes resulting from treatment cannot be comprehended. Another important aspect is the lighting of the patient, which can be the same ring-

light strobe used for the intra-oral photographs. The ring light will give a picture of low contrast because it does not produce distinct shadows. It also produces a 360 degree small shadow or halo around the patient's head. However, once the ring light is attached to the camera and the settings established, it will require few if any adjustments. This simplicity makes its use ideal for the busy dental practice. To make the head outline contrast sharply with the background,

the camera lens and the ring light, and is held by tightening a set screw (fig. 4). The close-up lens can be simply removed for profile photos and replaced for intra-oral photos. When training yourself and your office personnel in photo technique, the most important initial step is the careful reading of the instruction manual for the specific camera. The careful following of film loading, and control settings instructions can eliminate costly mistakes.



Patient's head is adjusted so occlusal plane is at same plane as the camera lens. (Fig. 5)

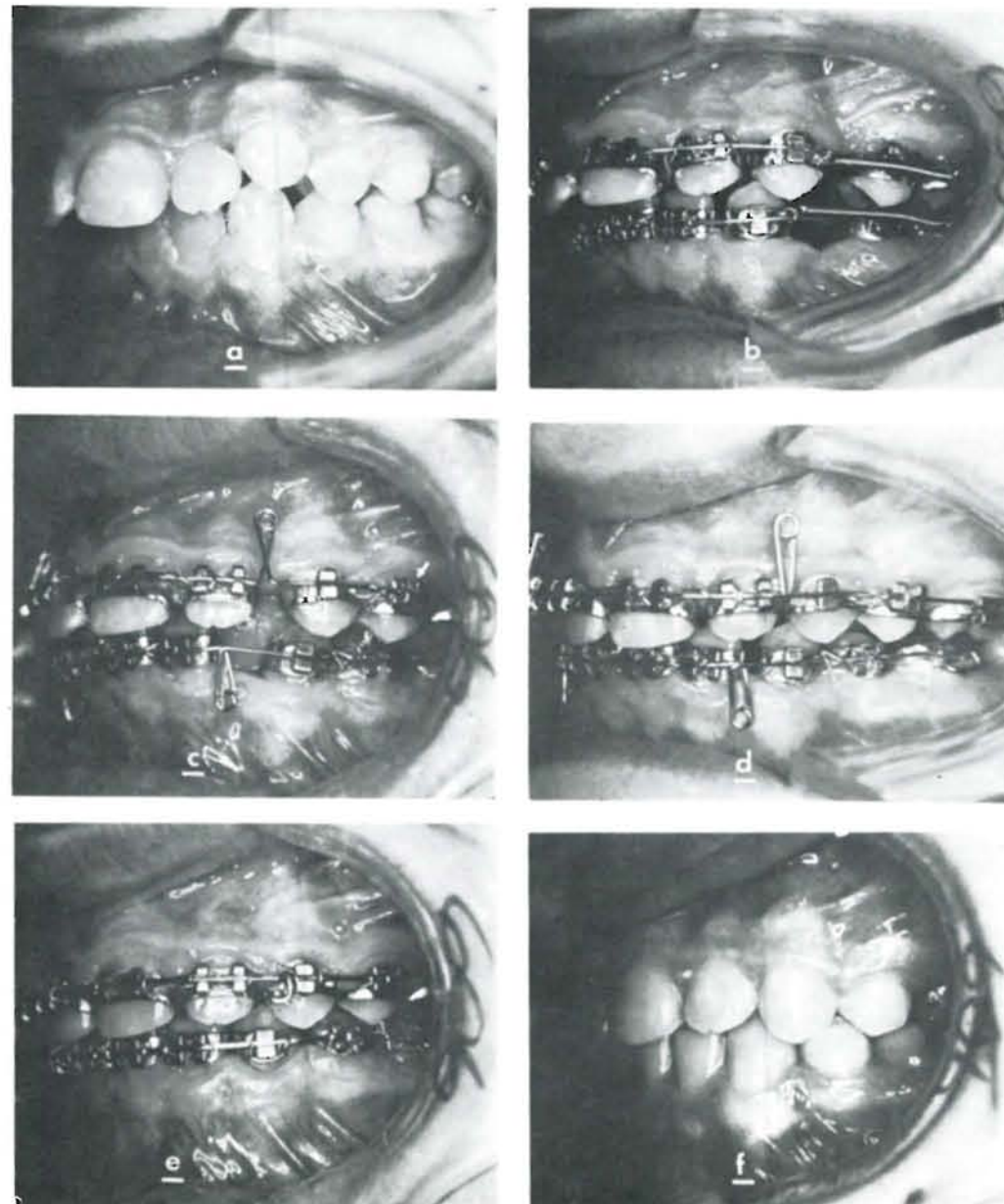
It will take time and effort to correctly compose a good intra-oral photo. The well composed photo will show the main objective and not have excessive extraneous substances throughout the photo. Once a basic technique is established with strict rules of composition, each progressive future photograph will have the same composition. We have established taking four basic intra-oral photographs on all patients which will be taken at each photo assignment of that patient (fig. 6).

The initial camera technique is a close check of all camera settings to assure uniformity in exposure. The f/stop, shutter speed, and flash attachment connection should be checked. The settings that are used with the camera set-up are a "plus 6" close-up lens at an 18 inch setting, shutter speed 1/50 and aperture at f/16. This will bring the camera down to about 6 inches from the patient's mouth. Two sets of plastic cheek retractors are necessary, one larger set for adults and one smaller set for children. The cheek retractors are marked on the inner curve and this allows the photos to always have the patient's number recorded (fig. 7). Each patient is given a number and that number is used only for records from that patient. The cheek retractors are marked in two areas on both right and left retractors. Once the cheek retractors are placed all extraneous material, such as bubbles of

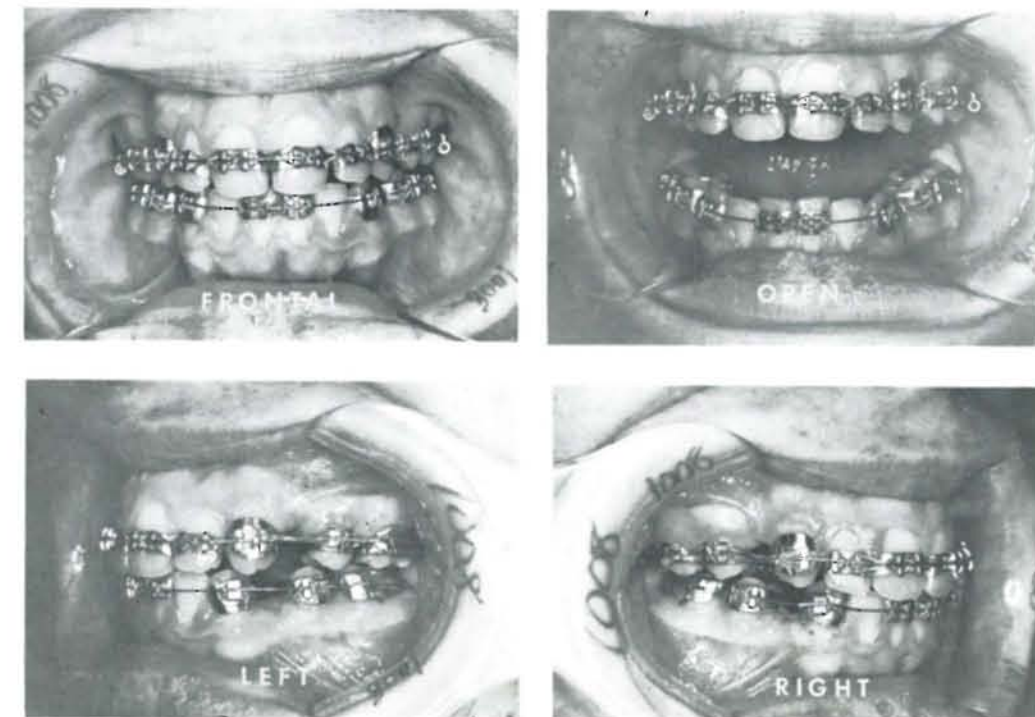
#### Recommended Intervals

The most common photographs taken in a dental office are the intra-oral type. In an orthodontic practice, photographs are taken at each appliance change and activation, or just at 4 to 6 month intervals. These will show a record of the changes that have taken place during each phase of treatment. The intra-oral technique should be established with a limited number of adjustments so a definite pattern is maintained for standardization of results. The patient's head should be placed so that in the open or close positions the occlusal plane will be easily accessible to gain parallelism in the view finder (fig. 5).

The teeth and appliances should be clean. However, sometimes one of the most valuable purposes of dental photography can be to show poor oral hygiene.



A series of six photos showing treatment appliance progress of an orthodontic case from pre-treatment to retention. (Fig. 11)



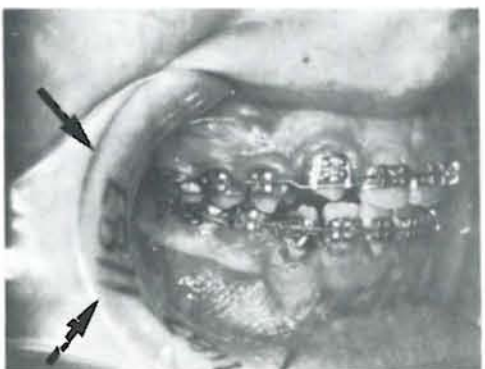
The four basic photos taken on each patient. (Fig. 6)



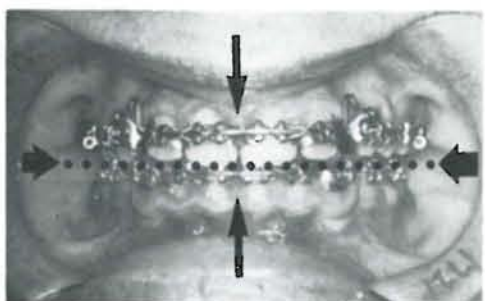
saliva and food should not be allowed to show on the photograph. Usually the use of an air syringe will accomplish the freeing of such material from the teeth. The first photograph taken is the frontal view of the anterior teeth in full centric occlusion. These teeth should be centered in the view finder with the mid-line of both maxillary and mandibular central incisors at the middle of the picture (fig. 8). The occlusal plane from this point should be on a line parallel to the horizontal middle line in the view finder. The lips and vestibules should be uniformly contoured when they are retracted by the cheek retractors and the labial vestibule in the maxilla and mandible should be of equal depth. The main concern is to center the central incisors and to take extra care to establish the occlusal plane parallel to the horizontal plane of the view finder. Once the composition of the picture is established, the camera is focused by maneuvering it to and from the subject until the dental structures show in sharp focus and are perfectly clear.

#### Lateral Views

The right and left lateral views are taken from a 40 to 50 degree angulation from the buccal segments. These photos should show the mesio-distal relation of the posterior segments and it can give some idea of the extent of the overbite and overjet that is present. The cheek retractors are retracted more on the side where the picture is to be taken. Relaxing the opposite cheek retractor allows the picture side to be more fully retracted for complete viewing of the buccal segment. The camera should be focused on the first bicuspid area with attention given to make sure that the first molar is in good view. This type viewing will give you a sharp focused view of the buccal segment from the distal of the first molar to the opposite central incisor. The opposite side central incisor should show only the labial surface if the occlusal plane is kept parallel to the horizontal plane and the picture taken at a 40 to 50 degree angle from the buccal segment (fig. 9). Once again the cheek retractors should be kept equal from the vestibules of the maxilla and mandible to allow the teeth to stand out in contrast to the soft tissue. The last photograph taken is with the teeth apart to show the extent of arch length, curve of spee, tooth size, and tooth form. The patient will have the teeth apart 5 to 10 mm with the photo taken directly at the occlusal plane. Once these 4 photo views are taken and recorded routinely on the patient, a useful series of treatment progress pictures can be made. By taking photos in a definite sequence, it allows the photos to be uniform for viewing at a later date (fig. 10). When they are sorted and placed in the patient's folder, the sequences will be similar at each time lapse. The changes that take place will show more accurately, and with some substance of dimensional perspective. It will give a permanent time lapse sequence of each stage of treatment (fig. 11).



Cheek retractors are marked with the patient's treatment number to help identify slides. (Fig. 7)



Frontal view of anterior teeth with occlusal plane parallel to horizontal plane and mid-lines centered in view finder. (Fig. 8)



Lateral view taken at 40 to 50 degree angulation from buccal segment keeping occlusal plane parallel to horizontal plane. (Fig. 9)

The frontal and profile extra-oral pictures of a patient are used mainly in orthodontics more so than any other field of dentistry. These views are used for diagnostic evaluation of general facial proportions, symmetry of the face, muscular tonicity and lip contour (fig. 12). (Editor's Note: Figs. 12 and 13 on Page 12.)

#### Camera Set-up

The camera set-up used in our office is governed by the ability to change from extra-oral photos to intra-oral photos with only a matter of using a drop-in lens. The distance from subject to camera should be one of the factors that governs the image size on the film. A good profile or frontal photo should include the entire patient's head to approximately below the shoulder edge height. With most cameras having 50 to 55 mm lens, this will be about 2½ to 3½ feet away (fig. 13). The floor may be marked at a specific distance for general purposes, or the camera distance set on the lens and the focusing done by bringing the camera to and from the patient. This allows the dentist to accurately compose the picture so the head size is the same on both frontal and profile pictures. If when using a standard lens distance closer than 2½ feet the facial proportion will be distorted. An example will be enlargement of the nasal area of the frontal view. The portion of the head that is closest to the lens will appear disproportionately large.

#### Camera Level Noted

The camera should be on a level with the patient's mouth because any view from above or below this level will result in a facial distortion. The head should be placed with the patient's Frankfort plane horizontal or parallel to the floor for both profile and frontal views. This parallel placement will give the same plane of reference from which comparison of facial morphology can be made. Frankfort horizontal plane is defined as the infra-orbital point to the tragus of the ear. These can be seen on both frontal and lateral views. This importance of uniform head posture cannot be overstressed if we hope to make valid comparisons of facial profiles in orthodontics, prosthodontics or surgery. The mouth and dental arch should be in a position of centric occlusion.

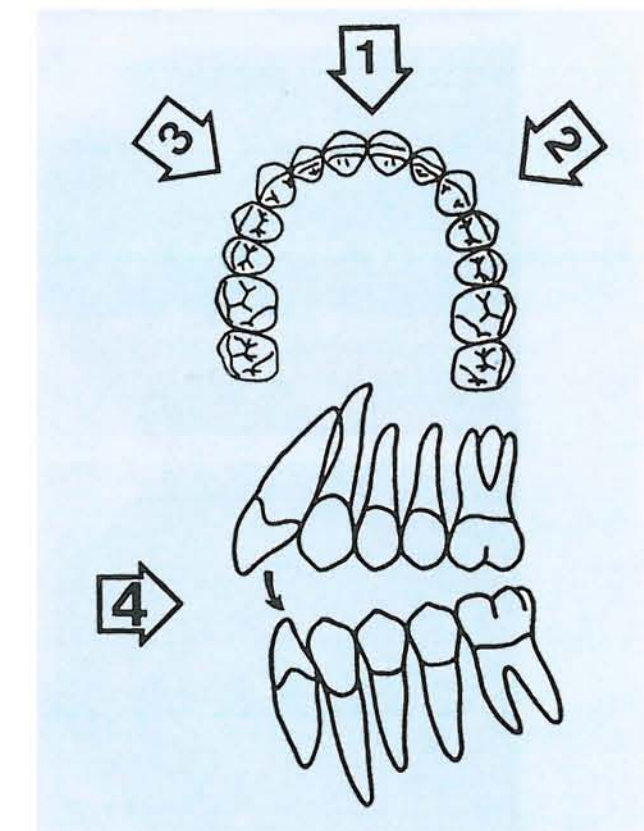
Upon taking the profile photo it is necessary to have the patient look straight forward at a fixed spot on the opposite wall. Usually, a spot can be picked at approximately the eye level of the patient, and this will help maintain the Frankfort horizontal plane parallel to the floor (fig. 14).\* The patient's head should be slightly to his right so that the left side of the face shows. Then have him turn toward the left until the left eyebrow disappears from the camera view. This gives the view of the upper lip to nasal septum or mid-

\*Editor's Note: Figs. 14 through 17 on Page 11.

facial plan. The frontal picture is more difficult to orient because of the use of the lateral structures to align with. The infra-orbital ridges are kept at a level parallel to the floor and are 5 mm above the ear canals (fig. 15). Using these three points as reference points, the patient's head will be centered with equal portions of right and left sides of the face showing. A major clue to proper positioning is the ears because of only one ear lobe or part of an ear lobe shows, the face is not centered to the camera. If the head is tilted upward or backward, the appearance of the mandible is elongated or shortened. (fig. 16). The three points of reference must be used to get a true picture of facial harmony or disharmony.

#### Good Clinical Pictures

It may be necessary to dispense with the more established normal appearance of a patient in order to achieve good clinical pictures. Eyeglasses should be removed to eliminate flash reflection and to give the full facial appearance. Many times, the patient's hair will cover the ears and part of the cheek or jaw areas. Therefore, in order to completely see the facial area, the patient should place his hair behind the ears. The patient should be instructed to close the lips with the teeth in centric occlusion. If lip closure is badly dis-



The sequence for taking the four intra-oral photos. (Fig. 10)