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**1973**

ods, etc.) results showed that most of the patients reported some degree of relief, that even the placebo palatal splint showed some effectiveness, and that the full coverage bite plane was most effective by bringing relief to 29 of the 44 patients not made comfortable by the first two types.

### Materials

Although materials such as vulcanite, hard and soft rubber, soft plastics, and rubber like synthetics have been tried in bite planes, they can have many disadvantages including lack of durability, bulkiness, odor, difficult fabrication and adjustment, distortion, change in composition when in the presence of oral fluids, and poor retention. The hard heat cured acrylics can easily be formed with a flat occlusal and seem to circumvent most of the disadvantages, though they can wear when placed in occlusion with natural teeth. Any soft material usually will not allow elimination of contact in excursions or establishment of effective splinting, and therefore can enhance the very condition we are trying to remedy.

### Construction

The waxup can be made from a facebow mounting of the casts in centric relation, or just from a single unmounted cast, the latter associated with the need for more adjustment in the mouth (unless the waxup is tried in the mouth). The appliance is processed in clear heat cured acrylic and is finished to provide flat plane occlusions as previously described, the thickness kept to the minimum possible without grinding through the plastic.

### Adjustment

The appliance should be adjusted weekly after insertion to compensate for condylar movement and for any wear into the plastic. Once the jaw relationship

has stabilized and any pain-spasm cycle is broken, then the occlusion can be adjusted. At this point the use of the bite plane only at night can be initiated on a trial basis. If symptoms return, full time use is again instituted and treatment of emotional factors can be considered.

### Summary

Bite planes are valuable diagnostic and therapeutic tools in the treatment of bruxism, of TMJ dysfunction, and of various habits. The hard plastic types provide optimal effect. Bite plates are of limited value and the use of pivots is not indicated or necessary.

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*Editor's Note:* Dr. Shulman is an instructor at the Department of Periodontics, School of Dentistry, University of Michigan. His article appears here through the courtesy of the *Virginia Dental Journal*, in which it originally appeared.



"I'D RATHER HAVE ALL MY TEETH FALL OUT!"

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## MIRROR, MIRROR, ON THE WALL



By Maurice J. Teitelbaum, D.D.S.

Something very strange has been happening in the dental profession in recent years. More and more, dentists are standing before the mirror in their offices and saying, "Mirror, mirror, on the wall, is not this office the most beautiful of all?"

Well, maybe things are not quite that bad, but a mania for having the most beautiful, most striking, most unusual dental office has taken hold of a great many dentists. And they are being encouraged in this lunacy—lunacy because the value of what is important in the practice of dentistry is certainly not in the interior decorating—by the equipment manufacturers, designers, architects, et al.

It goes without saying, but we'll say it anyway to clear the air, that a dentist should have a clean, modern, functional, and attractive office. The plaster on the wall shouldn't be peeling, the reception room seats shouldn't be soiled, the office colors shouldn't be dull or garish, and the equipment should be update, easy to use, and satisfy the working needs of the dentist. In general, the atmosphere should be pleasant and comforting. But apparently the equipment manufacturers and office designers have other things in mind, and, whatever it is, the end result is more money from the dentist.

### Decor: Medical and Dental

Before beginning this article we visited a number of medical offices, the offices of busy practitioners with fine reputations, and nowhere did we see a reception room or business office to compare with the dozens pictured in the dental magazines. They were neat, attractive, and professional looking, but, compared with the reception rooms of the dentists, they looked like Tobacco Road. Let's face it: when you go to a physician, does it really make any difference in your judgment of his professional skill or your confidence in him if his reception room looks as if it were lifted out of *House Beautiful*?

Recently a dental magazine ran an entire issue on office design and among the useful suggestions was an array of room decor ideas that would satisfy any tenant on Park Avenue. Does a dentist's waiting room have to have the exquisite appointments of a stately dwelling? Does it have to have plush carpeting, finely carved furniture, art, bric-a-brac, thirty-dollar-a-roll wall paper,

and expensive drapes? Some dentists may feel that such sumptuous furnishings may enable him to get higher fees with less effort. But many patients, who don't mind paying for top drawer dentistry, have second thoughts about paying for an expensively furnished office. A medical specialist in New York—who gets one hundred dollars for the first visit—has a simply furnished reception room with straight-backed chairs. Is there something different about the psyche of the dentist, as compared to the physician, that requires a more affluent appearance in his office? Does he have an inferiority complex? Does he believe that an elaborately expensive office makes him a better dentist, or a better man?

### Built-in Obsolescence?

We in the dental profession are thankful to the equipment manufacturers for constant progress in the functional design of the dental units and accessories. But some of the "extras" and "fru-fru" introduced in recent years add nothing to the dispensing

of better dentistry or make it easier for the dentist to operate. It just adds to the income of the manufacturer. In fact, like the chrome trim and extras on our automobiles, one can almost sense an attempt at planned obsolescence—at least as far as design is concerned. A dental unit should operate efficiently and satisfy the needs of the dentist, period. It doesn't have to be a piece of sculpture with attendant costs. One of the finest crown-and-bridge operators in the East, who had a rich clientele and did beautiful work with fees to match, used basic simple units in his office.

We need to devote more time and spend more money on learning how to do better dentistry and how to advance the status of dentistry and promote better dental health, not to put together more glamorous offices. The next time you look into the mirror try:

"Mirror, mirror, on the shelf, how can I make a better dentist of myself?"

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"YOUR NEW DIET WILL BE SIMPLE, MY DENTIST-FRIEND. IF IT TASTES GOOD, SPIT IT OUT."

which completely cover the biting surfaces of all the teeth in an arch, and which are flat and smooth on the occluding side providing centric contacts for all the occluding teeth. There should be no contact in excursions excepting on the cuspids. They may be worn only at night in the treatment of bruxism or in maintaining TMJ treatment results, but should be worn at all times when striving for stabilization of teeth, for breaking muscle spasm and hypertonicity, and for erasing muscle memory to allow for jaw manipulation. Horseshoe design bite planes can be made for either or both arches, but when made for mandibular use are often troublesome and uncomfortable to wear. Full palatal coverage, clasping, and varying degrees of extension onto labial surfaces can be included depending on operator preference and the need for retention.

**BITE PLATES** are usually similar to a Hawley<sup>6</sup> appliance with or without a labial arch wire. The difference is that the acrylic behind the front teeth is built up to form a flat platform for the lower teeth to contact, effectively disoccluding the posterior teeth. Springs can be added for minor movement.

The Sved<sup>7</sup> appliance is a modified bite plate with the acrylic extended over the incisal edges of the anterior teeth, thereby lessening the potential for gingival trauma while stabilizing the anterior teeth.

The advantages of these bite plates are ease of fabrication and adjustment, while disadvantages with prolonged use can include intrusion of the lower anterior teeth, extrusion of posterior teeth, possible periodontal and hard tissue alterations, and the tendency to traumatize soft tissues while allowing for posterior extrusion. In addition, the Sved type incisal

guidance holds the potential for interference with Bennett movement and therefore may not be maximally effective for use in relief of muscle hypertonicity.

**PIVOTS<sup>8,9</sup>** are small prominences placed bilaterally in posterior areas (either in the form of onlays or additions to bite planes), this aimed at relieving pressure on the joints by increasing the vertical occluding distance and by changing condylar position downward. Short term use is reported to be successful, but longer use can be associated with the intrusion of occluding molars and with extrusion of all other teeth with resultant new, and possibly traumatic, occlusal relationships. Added to these deterrents is the theoretical possibility that ligaments could be strained, and that the cause of discomfort is not permanently removed. All things considered, this does not seem to be a necessary or indicated type of appliance while the full coverage bite plane exists.

### Studies

One of the few reported recent studies<sup>5</sup> comparing various appliances tested three types on 71 patients with the TMJ pain-dysfunction syndrome. First all subjects used a full palatal acrylic "splint" with no occlusal coverage (as a control placebo). If great or complete relief was not evident by the 14th day, the patient was given a Sved type full acrylic palate with a flat anterior platform which covered the incisal edges from cuspid to cuspid. If great or complete relief was not forthcoming in another 14 days, a full coverage flat occlusal bite plane was inserted. Though there are many problems in this type of study (short duration, psychological testing factors, scoring meth-

## COMMUNICATIONS

(continued from page 10)

morally responsible for the restorations in his patients' mouths, it is mandatory that he keep complete control over the fabrication procedures done by auxiliary personnel. In the case of laboratory technicians, this requires from the dentist a well written work authorization, accurate working dies, and any other material which the dentist feels will enhance and clarify his desires to the technician. It remains the responsibility of all concerned to constantly strive for better methods of communication.

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# BITE MODIFICATION APPLIANCES

## —Planes, Plates, and Pivots

By Jeremy Shulman, D.D.S.

**B**ite modification appliances are removable prostheses constructed to cover occlusal surfaces of teeth in either arch. They can be of several varieties and can serve various purposes. Nomenclature can be most confusing with designations including bite plane, bite splint, mandibular autorepositioning appliance, provisional splint, pivot, temporary splint, bite guard, and bite plate. This paper will summarize current opinion as to uses, types and construction of the various appliances.

### Uses

Many bite appliances are constructed with the intention of disoccluding teeth in order to circumvent occlusal interferences which may be contributing to TMJ dysfunction. The dysfunction syndrome includes many symptoms and is most often caused by faulty occlusal relationships in combination with psychic tension. In severe cases it can be manifest as a vicious cycle of pain and muscle spasm, occurring when the neuro-muscular system acts to circumvent and/or eliminate those premature occlusal contacts or interferences which disrupt normal physiologic movements, this resulting in condylar displacement and the TMJ dysfunction syndrome. By preventing occlusal contact between the teeth it is hoped that the "muscle memory" and "splinting" will be eliminated, thereby relieving the symptoms<sup>1</sup> and allowing for manipulation of the jaw for diagnostic and therapeutic purposes. Thus, any appliance which prevents occlusal contact may eliminate at least part of the cause of the muscle spasm, thereby reducing pain and allowing relaxation and repositioning of the jaw into a more physiologic posture. In this situation alteration of the pain pattern can, in itself, be diagnostic for the TMJ involvement.

A second possible use is in patients with high muscle tonus but without the pain or other dysfunction symptoms. Here the appliance can aid in erasing muscle memory to facilitate relaxation in order to allow the operator to manipulate the jaw and to place it in centric relation for prosthetic and/or operative and/or occlusal adjustment procedures.<sup>2</sup>

Bite appliances can be useful in several ways in the treatment of bruxism. Clinical and electromyographic studies have demonstrated almost immediate decrease in muscle tonus and bruxism following the insertion of a bite plate.<sup>3</sup> Interferences (along with tension) have been shown to be the main cause of

the bruxing habit and by circumvention of the interferences with subsequent muscle relaxation to facilitate occlusal adjustment, the appliance can be extremely helpful in altering the habit. Even in those cases where the habit cannot be eliminated by occlusal adjustment, the bite plane acts to protect the teeth against excessive wear. Lastly, some operators feel that the appliances are useful in restricting jaw motion as a method of breaking the habit on a more conscious level.

Various appliances can be used as splints to stabilize mobile teeth and thereby to prevent secondary trauma from occlusion and/or pathologic mobility associated with traumatic occlusion. However, splints have as their primary purpose the stabilization of teeth and though bite modification appliances can serve this end, they are not usually constructed solely for splinting purposes.

In patients with clenching habits and associated muscle soreness and fatigue, appliances can be effective in opening the bite to reduce the amount of force the clenching muscles can exert.

In orthodontics, they can be used in an effort to change tooth and/or jaw relationships, and also as temporary splints to maintain desired results.

Habits such as nail biting or tongue thrust can sometimes be treated effectively by specially designed bite appliances.<sup>4</sup> They can also be useful in prevention of lateral drift and of wedging of lower incisors into uppers, to provide function during bridge construction, as a substitute for a unilateral partial denture. Too, they are useful as guides in determination of whether or not vertical dimension can be altered and if so, to what extent.

### Types

There are numerous recommendations for design, materials, and fabrication of bite appliances. Unfortunately most of these are substantiated only by opinion, clinical impression, and case reports, all of which do have value, but none of which constitute scientific evidence. Therefore, conclusions must be based largely on an assessment of the reporting author's credibility as tempered by the reader's experience and understanding of the problem and treatment aims.

For our purposes, bite modification appliances will be discussed in the three categories of bite planes, bite plates, and pivots.

*BITE PLANES* generally refer to those appliances

# How To Make Your Wife A Widow

By Joseph Arkin

**A**re you so intent on making a success that you put aside all other considerations and are leading your wife to widowhood without even knowing it? If you are not yet a candidate for membership in the Coronary Club you can become one very soon if you assume the role of the following characters:

*The Workhorse* This part is a snap; all you have to do is try to get to the top of the heap in the shortest possible time, and put your work ahead of all personal considerations. Go to the office evenings, Saturdays, Sundays, and holidays. Or, at least take home some work with you; it's a good opportunity to review all the worries of your working day. It's also wise to keep your practice going every night, because too much sleep may dull your senses.

Never say no to a request—no matter how beat you are; and never delegate responsibility. You're the only one that can be counted on, so carry the ball yourself at all times—from the reception room to the lab. And remember—it's also a poor policy to take a vacation of more than a day or two.

*The Weekend Athlete* When you assume this role, you'll be joining thousands of others who are on their way to the Happy Hunting Grounds at top speed! It's far easier to kill yourself having a good time than you realize—especially if you've spent all week doing sit-down dentistry. Tempt the fates by lifting weights, running a mile or two before Sunday breakfast, or by indulging in a fast game of basketball or handball with the kids. And if you feel that lack of supervised exercise is the reason for that spare tire around your middle, join a three-hour calisthenics class at a local gym—but be sure to indulge *only* on the weekends.

*The Jet-Setter* When you travel, make sure you wear yourself to a frazzle. One good way is to get up at the crack of dawn, catch a plane to your destination, keep frantically busy all day, then late at night jet back home—to save the few bucks a hotel or motel would cost you. If you drive on business or pleasure trips, instead of flying, drive all day and night to see your professional associates or your friends, then head back immediately to the office or home.

If you sometimes feel that you can't catch up with yourself and that you're out of tune with your surroundings, you're probably a victim of Jet Age Fatigue—a very common VIP occurrence. But don't bother listening to medical opinions saying that jet

travel, which crosses back and forth over time zones, upsets the body's metabolism. And don't follow the advice of the American Hotel and Motel Association, which says that adequate rest and comfortable lodgings are important to your health during a long trip. After all, it's your life and their advice is a lot of self-serving business propaganda anyhow.

*The Meal Misser* Here's another easy ticket to the Coronary Club; just forget about good eating habits. A balanced diet at three regular meals is great for kids, but you're a busy grown man. A restful meal is a waste of time for the Big Man-on-the-go. You'd probably get more done by working at your office, cramming in that extra patient into the meal hour. Missing meals has a way of making you hungry between regular meal times. So keep plenty of sweets around to nibble on during the day—even if you are a dentist and know better. In the process of feeding your frustrations, you may get yourself into a hospital—if not a grave!

*The Teacher* When you go on the road make sure you're the fellow who teaches the other guys a lesson on how to drive. It's really important. After all, the teacher should feel that he alone has the job of protecting the public—and that's a great service. On the highway, zoom out around the offending driver to sound off, or refuse to dim your lights if the other guy doesn't. After all, he is often a knight in an older model, for new-car owners rarely do this. The teacher's common curse is, "I'll teach those dopes." He's busy working himself, and others, into a wreck.

Doctor, if you find yourself falling into any of these five roles, get out your shovel and start digging. The standard size for graves, by the way, is nine feet by 30 inches.

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## Dr. Mahlon Loomis: Genius and Born Loser

For all those who have seen the sour side of fate, there is a kinship with Dr. Mahlon Loomis, the American dentist of a century ago who suffered more than most from the over and over and over again denial of the success his genius earned but lost to the misfortune he could not foresee or forestall.

The greatest denial was the renown for discovering wireless telegraphy—a discovery that was recorded as his by Congressional legislation and patent approval 30 years before the world acknowledged Marconi as the inventor of the radio.

A Nobel Prize and an immutable place in history could have easily been his

—If a Congressional bill in 1869 pledging funds to finance highly-promising experiments had not been referred to the wrong committee;

—If the great Chicago fire two years later had not burned out the resources of newly-found financiers for his project;

—If his wife of many years did not leave him, complaining of him as being “insane”;

—If the great panic of 1873 had not denied the Congressional charter and patent approval given his wireless the attention and the support of fiscally-harried government and business leaders.

Dr. Loomis, a practicing dentist for 20 years, had abundant credentials as an inventive genius in electricity; he owned a series of eight “firsts” discoveries on how electricity worked—discoveries that became the components of the wireless telegraphy he was to develop.

The equation of skill with success in the degree that was due the discoveries never came to Dr. Loomis. He was not, like so many other inventive genius, “ahead of his time.” His misfortune, instead, was being victim of bad timing.

Repeatedly at the threshold of great success, a constellation of adverse circumstances came together to frustrate opportunity.

It is a disquieting fact of life that genius is not a be-all guarantee of achievement. Dr. Loomis is a case in point: a giant talent especially vulnerable to misfortune—a circumstance that conspired to cast him in the role of a born loser.

The impact of his discoveries and the unkindness of fate were not lost on him. He died, some say, from a broken heart, without ever enjoying the acclamation and acknowledgement he felt was owed him. But nonetheless, all was of value. As he put it:



“I know that I am by some, even many, regarded as a crank—by some perhaps a fool—for allowing myself, to the sacrifice of material advantages, to abandon a lucrative profession and pursue this *ignis fatuus*, but I know that I am right, and if the present generation lives long enough its opinions will be changed—and its wonder will be that it did not perceive it before. I shall never see it perfected—but it will be, and others will have the honor of the discovery.”

### Professional Profile

Born in 1826 in the small town of Oppenheim, N.Y., he attended the district school. Most of his education, however, he acquired in the libraries of his grandfather and his father, and from the men themselves, for both were cultivated, of New England stock, and possessed a remarkable aptitude for imparting knowledge. Mahlon was always interested in the science of mechanics; he so often “invented something,” as somebody put it, that his father advised him to become a dentist. At the age of 20 he went to Cleveland and entered the office of an old friend of his father, Dr. M. L. Wright, a successful dentist.

When he began to practice on his own, he made a tour of the neighboring communities, as was still the custom a hundred years ago, when the American Dental Association was founded. A tall, wiry man, with a thin, intense face, he set himself up in Earlville, N.Y. Then, after a short time, moved to Cambridgeport, Mass., where he practiced very successfully for several years. In 1856 he married, moved to Philadelphia, but very soon left and went on to Washington, D.C., where he opened an office on Pennsylvania Avenue and practiced for 20 years.

### BURNING MOUTH

The sensation of burning that denture patients often complain about may not be pressure on the palatal nerves or allergy to acrylic. It may very well be related to psychological stress. A group of physicians and dentists in New York found that 17 of 21 patients they studied with burning mouth were depressed. The state of depression may be caused by weight loss, fatigue, unresolved grief, anorexia, etc. The burning sensation is a symptom rather than a disease; therefore, attention should be focused on the total individual once local irritants have been eliminated. Reassurance, patience, and tolerance can be comforting to the patient and help him in minimizing the discomfort.

### REPORT ON ACUPUNCTURE IN DENTISTRY

The president of London’s Acupuncture Society has reported that although acupuncture is making inroads in dentistry one should consider the advantages and disadvantages before applying it to daily practice. The advantages are:

- (1) No unpleasant numbness following dental treatment.
- (2) No possibility of any allergic reaction sometimes caused by local injection.

- (3) The entire mouth can be anesthetized at one time so work on various segments of the mouth can be performed during the same visit.
- (4) Patient can be more cooperative since only sense of pain is affected.

The disadvantages seem to be that the degree of anesthesia is usually not as deep as a nerve block or local infiltration. (In China, however, they claim that it is deep enough to perform most major surgery.) Furthermore, extra hands are required to manipulate the acupuncture needles.

### DENTAL DILEMMA

There once was a patient named Hackett,  
Who made such a terrible racket  
That the dentist was prevented  
From working on this patient demented,  
So he made her a simple straight jacket.

A young man in the hill country was getting ready to enter dental school and told his father that he thought he would major in periodontics. “What do you want to do that for?” asked his father. “By the time you graduate, like as not some other dentist will have found a cure for it.”



“THE DOCTOR IS HOPING TO BREAK EVEN.”

# ANGLES & IMPRESSIONS



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

## BUT YOU'RE THE DOCTOR

The next time you're constructing a full denture for a patient and you're about to select the color and form of the teeth, don't be pushed into making the selection yourself by the patient who says, "But you're the doctor. . . ." Experiments by a group of California dentists showed that when patients play a part in the selection of their teeth they are more apt to respond favorably to their new dentures. Esthetics may very well be a matter of individual taste and, within certain bounds, as long as there is no interference in function, color selection is highly subjective. Therefore, these dentists recommend that you allow the patient to join in the selection of teeth. Patient involvement, they found, brings greater success and satisfaction.

## THISA AND DATA

Manufacturers of over-the-counter denture reliners have been notified by the A.D.A. that Food and Drug laws require labeling of their products as follows: "Warning—for temporary use only. Long-term use of the product may lead to faster bone loss, continued irritation, sores and tumors. For use only until a dentist can be seen." . . . Chronic soreness in the tissues of full-denture wearers and inflammation that does not respond adequately to occlusal adjustment and denture trimming may be relieved by the use of porcelain upper teeth in occlusion with acrylic lowers, a dentist reports on over 100 such cases. . . . In 1665, the fifth most important cause of death in London was listed as "teeth"—believe it or not! . . . Records show that it cost \$3.00 to have teeth cleaned a hundred years ago, which at that time was equal to a month's wages for a laborer. Imagine getting over \$300 for a prophy today! . . . Czechoslovakian nutritionists report that vitamin C helps remove cholesterol, which may make it as much of a heart disease combatant as it is a preventive factor in

the common cold. . . . Dentists from the University of Michigan are attempting to prove that ancient Egyptian rulers were really Cretans who came from the sea to take over the land. The research team will attempt to x-ray the mummified remains of the citizens of ancient Crete and compare them with x-rays taken of the mummies from Egyptian tombs of 1500 B.C. and earlier. . . . As the battle of the bulge continues and diet fads sweep the country, many health authorities now say that the *best way to lose weight* (1 or 2 pounds per week) is to eat as usual but cut down on the portions. . . . California, Illinois, and New York dentists continue to be the leaders in the A.D.A. Relief Fund program. . . . Conversation piece: More English words start with the letter "s" than any other one in the alphabet.

## MEDICAL HISTORY ADDENDA

The importance of taking a medical history of new patients is self-evident. Have you ever had heart trouble, diabetes, or rheumatic fever? Are you allergic to any drugs or medication? These are the usual questions dentists pose. However, many dentists often neglect to ask questions about blood disorder. It is not enough to ask "Have you ever had any blood disease?" A few more pertinent questions will tell us more about possible bleeding problems. Among the questions suggested by Dr. Morris Kotler of Sinai Hospital in Baltimore are:

- (1) Have you ever cut yourself?
- (2) If so, did you bleed for a long time?
- (3) Have you ever had a blood transfusion? What for?
- (4) How many days do you have a menstrual flow?
- (5) Has anyone in your family been a "bleeder?"

If there is any doubt as to the possibility of the patient being a bleeder, the patient's physician should be consulted before treatment is instituted.

## The Kaolin Project

In Cambridgeport, as a very young man Loomis experimented with kaolin and, as he says, invented a new and useful improvement in the manufacture of "artificial teeth." This consisted of teeth and plate, made out of one piece of porcelain, and was patented in the United States and Great Britain.

Eighty years before, in 1774, a similar method had been used by the Paris dentist Dubois de Chemant, but it had never attained any importance because of the great difficulties involved, including the almost impossible task of properly governing shrinkage of the material in firing. Loomis solved the problem with ease. His invention is typical of his period—inventive genius and mechanical ingenuity in American dentistry outstripping theory.

## The Telegraphy Experiment

One of his early experiments in electricity was to force the growth of plants by buried metal plates connected to batteries. At about the same time he became interested in the electrical charges which could be obtained from upper air by means of kites carrying metal wires.

In one of his experiments, Loomis discovered that a kite wire sent aloft in one region would affect the flow of electricity to ground in another kite some distance away.

In his notebook, he wrote on February 20, 1864: "I have been for years trying to study out a process by which telegraphic communications may be made across the ocean without wires, and also from point to point on the earth, dispensing with wires."

In 1868 he conducted a second and more practical kite demonstration "in the presence of some U.S. Congressmen, electricians, and eminent scientists." He proved that telegraphy without wires was possible, sending messages between Bear's Den Mountain in the Blue Ridge and Point of Rocks, Maryland, a distance of 18 miles.

He reported on the experiment: "The signals sent back were a perfect duplication of those sent. A solemn feeling seemed to be impressed upon those who witnessed the little performance, as if some grave mystery hovered there around that little scene."

Senator Samuel C. Pomeroy of Kansas and U.S. Representative John A. Bingham of Ohio witnessed the inventive dentist's experiment. Dr. Loomis had wanted them as witnesses in hopes they would help him get from Congress \$50,000 he needed for more experiments.

In 1869 he petitioned Congress for financial aid. In answer to his petition, legislation was introduced (H.R. Bill 2390) to incorporate the Loomis Aerial Telegraph Company. However, the bill was sent to the Committee on Patents instead of the Committee

on Appropriations, and no action was taken in that session of Congress.

Though his request for funds died in committee, Dr. Loomis continued with his experiments. In 1870 he communicated between two ships two miles apart on Chesapeake Bay.

## Talk About Bad Luck . . .

The determined dentist finally went broke. His wife left him, asserting that he was insane.

It seems as though he were a born loser—or at least the victim of bad timing. In 1871 he received a promise of financial aid from a group of Chicago capitalists. They agreed to underwrite, for \$20,000, a venture in the Rocky Mountains which would have enabled Dr. Loomis to erect two stations at Mt. Hood and Mt. Shasta. In addition, the money would pay his workers and help to support him while he undertook to make his dreams a reality.

But once again fate stepped in. The great Chicago fire of 1871 burned out his potential backers. The fury of the fire wiped out Chicago but it did not destroy the hopes of Dr. Loomis. Congress granted him the first radio patent in the United States, No. 129,971, titled "Improvements to Telegraphing."

In 1873 the Congress passed legislation authorizing incorporation of the Loomis Aerial Telegraph Co. and President U. S. Grant signed it. However, the \$50,000 called for in the bill was not appropriated.

Nevertheless, Dr. Loomis, now armed with a Con-

## UNITED STATES PATENT OFFICE.

MAHLON LOOMIS, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN TELEGRAPHING.

Specification forming part of Letters Patent No. 129,971, dated July 30, 1872.

To all whom it may concern:

Be it known that I, MAHLON LOOMIS, dentist, of Washington, District of Columbia, have invented or discovered a new and improved Mode of Telegraphing and of Generating Light, Heat, and Motive Power; and I do hereby declare that the following is a full description thereof.

The nature of my invention or discovery consists, in general terms, of utilizing natural electricity and establishing an electrical current or circuit for telegraphic and other purposes without the aid of wires, artificial batteries, or cables to form such electrical circuit, and yet communicate from one continent of the globe to another.

To enable others skilled in electrical science to make use of my discovery, I will proceed to describe the arrangements and mode of operation.

As in dispensing with the double wire, (which was first used in telegraphing,) and making use of but one, substituting the earth instead of a wire to form one-half the circuit, so I now dispense with both wires, using the earth as one-half the circuit and the continuous electrical element far above the earth's surface for the other part of the circuit. I also dispense with all artificial batteries, but use the free electricity of the atmosphere, co-operating with that of the earth, to supply the electrical dynamic force or current for telegraphing and for other useful purposes, such as light, heat, and motive power.

As atmospheric electricity is found more and more abundant when moisture, clouds, heated currents of air, and other dissipating influences are left below and a greater altitude attained, my plan is to seek as high an elevation as practicable on the tops of high mountains, and thus penetrate or establish electrical connection

with the atmospheric stratum or ocean overlying local disturbances. Upon these mountaintops I erect suitable towers and apparatus to attract the electricity, or, in other words, to disturb the electrical equilibrium, and thus obtain a current of electricity, or shocks or pulsations, which traverse or disturb the positive electrical body of the atmosphere above and

between two given points by communicating it to the negative electrical body in the earth below, to form the electrical circuit.

I deem it expedient to use an insulated wire or conductor as forming a part of the local apparatus and for conducting the electricity down to the foot of the mountain, or as far away as may be convenient for a telegraph-office, or to utilize it for other purposes.

I do not claim any new key-board nor any new register or recording instrument; but what I claim as my invention or discovery, and desire to secure by Letters Patent, is—The utilization of natural electricity from elevated points by connecting the opposite polarity of the celestial and terrestrial bodies of electricity at different points by suitable conductors, and, for telegraphic purposes, relying upon the disturbance produced in the two electro-opposite bodies (of the earth and atmosphere) by an interruption of the continuity of one of the conductors from the electrical body being indicated upon its opposite or corresponding terminus, and thus producing a circuit or communication between the two without an artificial battery or the further use of wires or cables to connect the co-operating stations.

MAHLON LOOMIS.  
Witnesses:  
BOYD ELLIOT,  
C. C. WILSON.



This simple highway marker near Bluemont, Va., tells the story, at once inspiring and disheartening, of the dentist-inventor.

gressional charter and a patent, sought investors. But neither the charter nor the patent impressed financiers. Finally, the great panic of 1873 ruined his chances, once and for all, of funding further research of telegraphy.

#### He Hung On

Dr. Loomis continued to create—in other fields. In 1881 he was granted patents for a convertible

valise and for a cuff-and-collar fastening. In 1886 he obtained a patent for an electrical-thermostat improvement, his last accomplishment.

With his ideas and his experiments in actual practice, he anticipated not only wireless telegraphy, but also the wave theory, which laid the foundation for radio, television, and radar! All these ultra-modern apparatuses operate on the same principle of electromagnetic waves traveling through the ether at the speed of light. These electromagnetic waves were described much later on, in 1892, by the German physicist Heinrich Hertz, a pupil of the famous Hermann Helmholtz, and are now called "Hertzian waves."

Ideas spread, as everyone knows, from mind to mind like contagious diseases; once they break out, no one can say who had them first.

But Mahlon Loomis, a prophet of great vision, was the first to give these important findings practical application. Thus he obeyed the unwritten law of the Royal Society of London, whose members—as Robert Boyle, the "Father of Chemistry," once wrote to a friend in Paris—thought highly only of knowledge which leads to practical results.

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## Martin's Postal Panorama:

# Stamping Out Dentistry

By M. W. Martin

Recent postal contributions to "visible" dentistry: one stamp—the New Zealand commemorative of the golden jubilee of the New Zealand School Nursing Service, the first of its kind in the world [1].

The only other strictly dental entry seems to be the 1972 Iranian commemorative issued for the 10th annual congress of the Iranian Dental Association [2].

However, in going back to the older issues, we've unearthed a most interesting couple—the Yemen stamps of 1968 which show the heart transplant operation performed by Dr. Barnard on Dr. Philip Blaiberg, the South African dentist who was the recipient of the world's first transplanted heart.

The first stamp [3] shows Dr. Blaiberg being examined by Dr. Barnard, while the other shows a mock-up of the operation and "the" heart [4]. Unfortunately, the Yemeni artist who put these clever combinations together does not tell us whose heart it is—Blaiberg's or the donor's. The Yemeni Post Office got so carried away with the idea of selling stamps showing this famous operation that they neglected to check on Dr. Blaiberg's background and, thus, became the only Arab nation to depict a Jew on their postage stamps!

Another stamp that fits well into a collection of postal dentistry is the Canadian issue of 1968, which depicts a male narwhal [5]. The narwhal's "tusk" is interesting—it's not a tusk, but a tooth. The tooth develops in the upper left jaw of the male. It's elastic because it consists of ortho dentine and cementum and has no enamel cover.



[1]



[2]



[3]



[4]



[5]

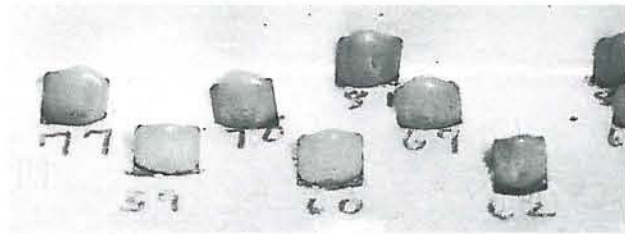


Fig. 2. Custom shade guides.

#### Color

This one area has probably caused more grief to dentist, technician, and patient alike than any other, and with good reason. Casting techniques, anatomy, and periodontal considerations can all be taught, clearly written, and illustrated; but it is most difficult to teach a person to perceive color. As a matter of fact, a recent research project has found that not only is there disagreement between different dentists matching shades to the same tooth, but that one dentist may disagree with himself when the tooth is matched under similar conditions, but on different days.<sup>8</sup> Furthermore, there are variations in shade guides for the same material, not to mention that most shade guide buttons are solid porcelain. These buttons reflect light differently from porcelain that is fused to gold.

When a dentist specifies a pre-made facing, he and his technician are at the mercy of the standardization procedure of the manufacturer; but the following suggestions may help a dentist and his technician to achieve more unity in their color matching for porcelain fused to gold.

1. *Custom shade guides:* Once a working relationship has been reached, most laboratories will be glad to supply a custom shade guide of porcelain on special fusing strips (Fig. 2). If custom shade guides are not available, the shade guide button used by the dentist should be sent to the laboratory with the models.
2. *Standardized light source:* The custom of many dentists is to match shades under daylight,

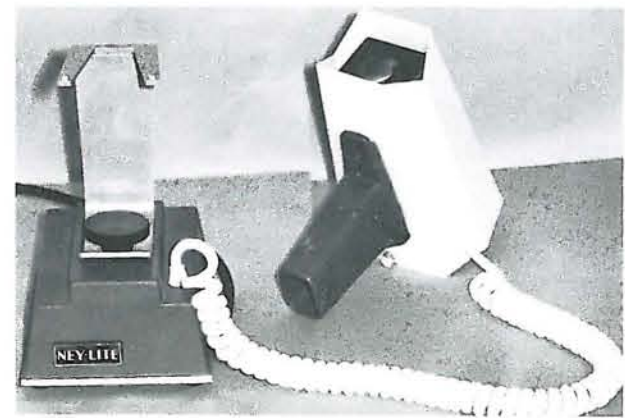


Fig. 3. Color balanced light source for color selection.

fluorescent, and incandescent lights in order to arrive at a shade which appears most natural under a variety of lighting conditions. All too often, though, the porcelain itself is built up under a strong fluorescent bench light. This problem could be eliminated by use of a standardized light source. There are several specialized, color balanced light sources available such as the one illustrated in Figure 3, and these probably offer the greatest accuracy in color selection. The author has found that a shade selected with a color balanced light will also be acceptable under other lights. The problem, of course, lies in the fact that the laboratory must also possess a similar light.

3. *Custom Characterization:* In many instances, there simply is not a shade guide button that adequately matches the patient's tooth. There are three ways to approach this problem. A characterization "map" can be sent to the laboratory, showing where craze lines, color shifts, and so on are to be located. This, of course, has the disadvantage that the technician must visualize the dentist's desires from written instructions. A better method is to custom stain the shade guide button to be sent with the models. This can quickly and easily be done at chairside using a kit such as illustrated in Figure 4. If a greater degree of accuracy is



Fig. 4. Custom staining kit for porcelain shade guide buttons.

desired, the dentist can request that the restoration be returned in the bisque bake stage to be stained and glazed in the office, or a Stain-Set\* can be applied and the restoration returned to the laboratory for final glazing.

#### Summary

If the final result in a crown or bridge restoration is to be of high quality, each step must be given meticulous attention. Since the dentist is ethically and

\*Ceramaco, Inc.

(continued on page 15)

Part four of a four-part series:

# Better Dentist-Laboratory Relations

## Dentist-Laboratory Communications

by Smith R. Armstrong, III, D.M.D.

Considering the accent today on preventive dentistry and the control of plaque for the maintenance of the natural dentition for a lifetime, excellence in restorative dentistry is even more important than in the past. This is especially true in crown and bridge procedures, where a well-placed restoration, given proper care, may well serve for a lifetime. It is the purpose of this chapter to examine one cause of early failures of these restorations: lack of communication between the dentist and his laboratory technician.

The best communications exist between a dentist and the laboratory technician based in the dentist's own office, and a close second occurs when the dental office is located close to a commercial laboratory. But, since most practicing dentists must depend upon a distant laboratory for all or part of the fabrication in crown and bridge procedures, the problem of communication is most serious.

A recent report on a comprehensive survey of crown and bridge failures concludes that the largest single cause of restoration failures is recurrent caries, with marginal discrepancies and periodontal breakdown prominent in the list of factors.<sup>1</sup> In the case of failure due to caries, it is almost impossible to assess whether the fault lies with inadequate home care, or with inadequate marginal fit or adaptation that makes preventive patient care impossible.\* The same is true with periodontal breakdown. Is the problem attributable to poor home care, or to inadequate occlusal planning and execution? However, in the case of failure due to marginal discrepancies, or periodontal breakdown directly attributable to overcontoured castings or iatrogenic plaque traps, only one person

can be at fault: the dentist. He has either given the laboratory inadequate materials and instructions with which to produce an accurate casting, or he has accepted inferior workmanship from the laboratory. In either case, the dentist must assume full responsibility for seating an unacceptable restoration.

If the dentist insists on maintaining the quality of his work at absolute maximum possible standards, and yet keeps his fees within reason, neither he nor the laboratory technician can afford an inordinate number of make-overs. To prevent this loss of time the dentist must make his desires explicit in his work authorization (Fig. 1A) and the laboratory must be willing and able to keep its philosophy flexible for the many dentists it serves.

There have been several articles concerning the obligation to each other of dentists and commercial laboratories for the maintenance of good business relations and the production of good dental restorations.<sup>2, 3, 4</sup> Laboratories certainly have a legitimate complaint when dentists expect quality work in too short a time, when dies are of poor quality, when hydrocolloid impressions are mailed to the laboratory wrapped in damp paper towels, and when after all this, payment for the laboratory services are not kept up to date. But if a dentist fulfills his obligation, not only to the laboratory, but to his patient, then he can expect the highest possible quality workmanship from the laboratory.

If the dentist is to improve communications with his laboratory, three things must be done:

1. The dentist must be stable in his own philosophy of what good dentistry is.
2. The dentist must define precisely which of the

Editor's Note: TIC is grateful to the distinguished DENTAL CLINIC OF NORTH AMERICA for permission to reprint this article from its Vol. 15, No. 3 (July 1971) issue.

\*For that matter, is inadequate home care always the fault of the patient, or is it the lack of supervised training of the patients by the dentist or the preventive assistant?



steps in crown and bridge construction he is to delegate to the laboratory.

3. Every effort must be made to improve and refine communications media.

### Philosophy

Barkley states that a dentist should have a written philosophy, and that if he is unable to write it down, he probably does not have one.<sup>5</sup> This is not necessarily a lengthy or complicated document, but only those principles which will act as a guide for the dentist in his relationships with his patients. The foundation of a practice can be as simple as the following statement: "I believe in the preservation of the natural dentition as being better for my patients than any replacement I might fabricate for them." This basis must then be applied to every phase of the practice of general dentistry from the simplest restoration to full mouth rehabilitation. When crown and bridge procedures are indicated as the most preservative treatment, these procedures must be intended to achieve certain goals. In order to achieve these goals, certain properties must be present in the finished restoration. These properties should be identified, listed, and a copy provided for the laboratory technician, to which he can refer during fabrication procedures. His job of providing optimum results for the dentist will then be made much easier.

### Responsibilities in crown and bridge procedures

Every dentist is familiar with the steps in the usual crown and bridge procedure, but for clarity, they will be restated.

1. Shade selection when applicable.
2. Preparation of teeth.
3. Impression and pouring.
4. Fabrication of temporary unit.
5. Articulator mounting.
6. Trimming of working dies.
7. Work authorization.
8. Wax-up.
9. Investment and burn-out.
10. Preliminary finish.
11. Mouth finish.
12. Cementation.
13. Preventive education.
14. Supervision of post-insertion maintenance.

Of these steps, the dentist should be responsible for the first seven and the last four. In the near future, the taking and pouring of impressions and the articulator mounting will be accomplished by auxiliary personnel in the dentist's office, but under the direct supervision and responsibility of the dentist. The preventive education and post-insertion maintenance may be done by the preventive assistant.

This leaves only the wax-up, investment and

burn-out, and the preliminary finish as the laboratory's responsibility; these are the areas where dentist-laboratory communications are important.

One of the best-known technicians in this country has stated that there are more areas in fixed restorations that can lead to complications unless they are clearly specified in the work authorization than in either complete or partial denture construction.<sup>6</sup> The most common problems found in the completed restoration received from the laboratory are:

1. The casting does not properly seat on the prepared tooth.
2. The cast margins are short of the prepared margins.
3. The occlusion is not desirable.
4. The gingival contours are unacceptable.
5. In the case of faced restorations, the color does not match the existing dentition.

We will consider each of these problems, suggesting methods of improving the final result by means of improved communications.

**DENTAL PROSTHETIC PRESCRIPTION TO:**

[Redacted Name]

Date March 15, 1970 Case No. 270  
Construct and Deliver to the undersigned the herein described dental restoration:

|                  |                           |
|------------------|---------------------------|
| Design Case Here | Patient                   |
| UPPER            | [Redacted]                |
| LOWER            | Type Restoration          |
|                  | <u>onlay</u>              |
|                  | Shade                     |
|                  | Mould                     |
|                  | Material <u>Class III</u> |
|                  | Material <u>gold</u>      |
|                  | Date Wanted:              |
|                  | Try in:                   |
|                  | Finish <u>00 27, 1270</u> |

**SPECIAL INSTRUCTIONS:**

*Please cast class III gold onlay for teeth #2 using die enclosed. The restored occlusal surface with 3-point cuspal contact. Have no following or working contact. Burnish wax margins with warm instrument just before investing. Invest and burn-out so as to achieve 2.0% expansion. Finish gold no closer than 1mm to margins. Do the job. Dr. R. Amberg, D.D.S.*

Signature Dr. R. Amberg, D.D.S. D.D.S.  
Address 254 N. Main St., Lexington, Ky  
Original Dental License No. 3789

**MUST BE RETAINED FOR 2 YEARS.**

Fig. 1. A. Work authorization specifying how work is to be done.

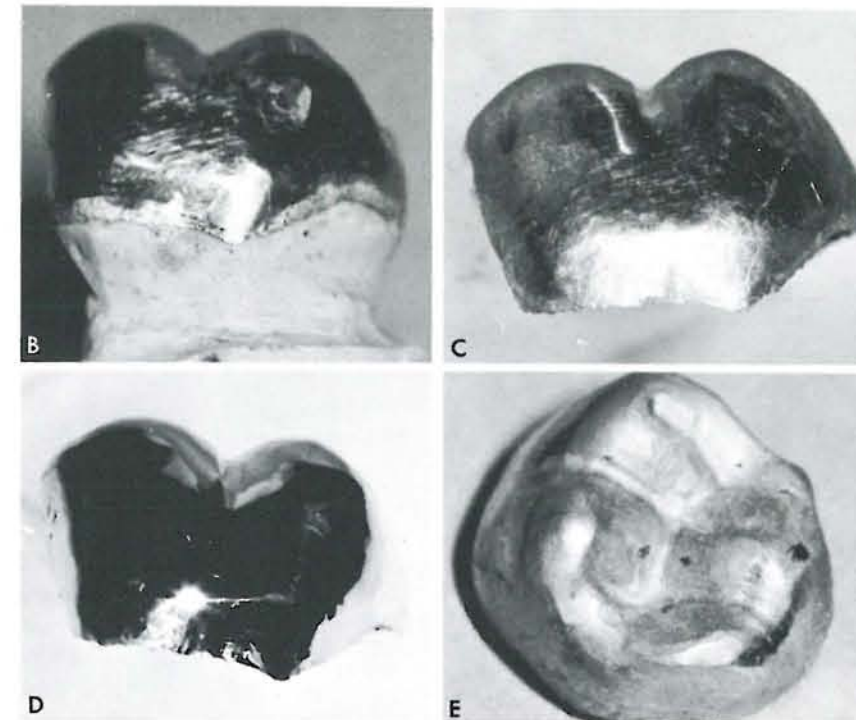


Fig. 1. (Continued) B. Casting on master die showing unfinished margins. C. Casting after mouth finish. D. Final polish. E. Three-point cuspal contact.

### Casting and Marginal Fit

These first two problems are so closely related that they are best considered together. It would be redundant to review the voluminous literature supporting the fact that any elastic impression material must be poured within a few minutes in order to recover the most accurate working die. This places a clear obligation on the dentist or his assistant to have the impression poured immediately. Beyond that, no laboratory technician should be asked to trim and mark dies accurately, especially if it has been necessary to leave a feather edge margin. The person best qualified to prepare the die for waxing is the one who prepared the tooth for the impression. But supplying the laboratory technician with a well-trimmed and marked die is only the first step. The dentist should specify the investment technique and amount of expansion desired which in his opinion will produce the best fitting casting.

Christensen has shown that evaluation of inaccessible crown margins with an explorer is not valid,<sup>7</sup> and since there is no satisfactory method of finishing interproximal margins as there is with buccal and lingual margins, the quality of these interproximal margins is controlled by the wax pattern and how accurately it is cast. The dentist should specify the type of marginal wax finish with which he can produce the best intra-oral results. The author prefers that the wax margins be burnished with a warmed instrument such as the PKT #3 and the cast margins left un-

touched for a distance of 1 mm (Fig. 1B), this area to be finished in the mouth (Fig. 1C and Fig. 1D). Many dentists desire that the margins be slightly overwaxed to prevent shortened margins. In any case, the technician must be clearly informed of the dentist's wishes.

### Occlusion and Anatomy

There are probably as many concepts of occlusion and gingival contours as there are authors, but they all agree on one point; crowns having faulty contours and poor occlusal design cause problems which can lead to tooth loss. Yet, the majority of instructions received by laboratories make no mention of either of these areas. The dentist who has his patient's best interests as the basis of his philosophy will specify whether he wants a cusp-fossa occlusion (Fig. 1E) with a canine rise protection, or a Payne technique with balanced group function; he will insist on adequate embrasure space, and inform the technician of what is and is not an acceptable gingival contour.

Again, this can sometimes best be done by giving the laboratory a statement of the dentist's desires concerning the average situation, mentioning such areas as pontic design, amount of embrasure space desired, the extent of porcelain coverage on maxillary and mandibular posterior and anterior teeth, and the type of facing desired when porcelain fused to gold is not used. This can easily be altered when the special case dictates a deviation from the usual requirement.