GOLD FOIL OPERATIONS

By
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PREFACE

THE MATERIAL in this book appeared originally as a chapter of Dr. C. N. Johnson's book Operative Dentistry, published in 1938 by the National Medical Book Company, Inc., New York. That volume is no longer in print. To meet the need of having readily available the knowledge and technique of the gold foil operation as refined and taught by Dr. Walden I. Ferrier, this monograph has been published.
We are deeply indebted to Dr. Ferrier for granting permission to have this work republished.

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GOLD FOIL OPERATIONS

THE treatment of decayed and eroded teeth with gold foil requires a most exacting technic and we must approach the subject from that standpoint. A filling material of such proven value is worthy of an exacting technic and once proficiency is gained or technic mastered the operator has at his command a means of restoring lost tooth structure that will serve in 50% of the decayed and eroded teeth that present in the average well established practice. This figure is not a guess, but has been arrived at after a compilation of data by the author and others over periods embracing ten years time in the practices of many men of known gold foil inclinations. It is true that in compiling such data a lower average was reported, but in some practices an actual count of the various fillings inserted in the teeth that presented over a ten year period, revealed the fact that gold foil served to restore over one half their number. We may well ask why has a method of restoring teeth that is applicable in such a high percentage of cases, and productive of the best results known, fallen into disuse by a majority of the profession?

It is not an uncommon thing in any line of human endeavor where there is a ceaseless search for perfection, to discard known and proven methods and adopt new and seemingly simpler ways of accomplishing like or better results. Operative Dentistry has been engaged in this search for over a quarter of a century, searching for some method or

material to displace gold foil and nothing has been revealed that will take its place or even approach its excellent qualities as a filling material for decayed and eroded cavities. It would have been far better to have recognized the sterling qualities of gold foil and no attempt made to displace it; the efforts made should have been directed toward producing material and developing technic as an adjunct to gold foil, to meet conditions where its use was contra-indicated.

In this search for newer and better things, gold foil lost most of its popularity. The cast gold inlay came into being and was received enthusiastically by both the profession and the laity. It was to be the rival of gold foil and was to completely eliminate it from dental practice. In the light of present day experience, it did neither the one nor the other. The cast gold in. lay was never a true rival for gold foil and never will be, as each has its separate and distinct indications, and therefore there should be no conflict between the two—and there is none in the practice of men who are versatile in the technic of both.

The cast gold inlay could not eliminate gold foil from dental practice unless the age-old law that governs man and matter be reversed—the survival of the fittest. Foil survives because it is best fitted for the purpose for which it is used. Recognizing this fact were a few men in various parts of the country who could not follow the popular wave. Their conception of what constituted a perfect marginal adaptation of filling material to tooth structure was higher than could be obtained by an inlay. Their experience and skill in manipulating gold foil enabled them to place no undue hardship upon themselves, the patient, or the tooth. In short, their ideals could not be approached with any other substance compatible with tooth structure. Their numbers were few, but this handicap was easily compensated by their ardor, zeal, enthusiasm and sincerity of purpose and for this latter attribute there is no substitute. The demand for their lectures and clinics, while not overwhelming, was consistent and at most large dental meetings gold foil was on the program and, although the audience might be small the lecturer was none the less convincing in presenting his subject. It is interesting to observe the size and note the attention of the audience today and compare it with that of twenty years ago. It is decidedly in the favor of gold foil.

Gold foil operators of this earlier date referred to, did not have the simplified technic nor the refined cavity preparation of today. The criticism of the large outline form and the deep retention and resistence form given to their cavities was well founded; the large cavity encroached on the horns of the pulp in the occlusal surfaces of bicuspids and molars; large masses of gold were necessary to fill them, prolonging the operating time and rendering the tooth highly sensitive to thermal changes. Indeed many pulps were lost and many cusps fractured due to the extreme retention form thought advisable to withstand the stress of mastication and resist dislodgment of the filling. In the incisors and cuspids large and inharmonious outline form almost precluded the use of gold foil in the mouths of discerning patients.

Those in the profession, of inlay tendencies, lost no time nor opportunity in calling attention to these unfavorable factors and their criticism was not only justified, but served to awaken the gold foil operators to the weakness of their position. Of what use was there to build a filling of unsurpassed marginal adaptation, only to lose the pulp or a cusp subsequently? Why disfigure a patient with large and inharmonious fillings to cure a small area of decay in an anterior tooth?

I like to think of this period of time as the turning point in the existence of gold foil as a filling material for the human tooth. It was being weighed in the balance and the balance was not any too favorable. Gold foil operators must sink or swim. In my own case, I decided to swim and I was not alone in this decision. The criticism was just; my own experience justified it. I could not forget that and I was not permitted to forget it; wherever I went in the interests of gold foil, I was reminded of these facts that were, to say the least, not complimentary to my favorite method of restoring lost tooth structure.

I learned through trial and error, through the work of others who were confronted with the same problems, through Study Club work where I could direct the preparing of cavities, that gold foil operations could be made with less sacrifice of tooth structure than any other material of a permanent nature and no fundamental principle laid down by Dr. G. V. Black be violated. I learned that through refined cavity preparation, exacting technic, and systematized operative procedure that gold foil fillings could be made in less time than inlays could be made in the same Situation, less conspicuous and with no more inconvenience to the patient and operator, providing the indications that are to follow were adhered to. Furthermore, that by means of a harmonious outline form, gold foil may be placed in the anterior teeth without offending the esthetic sensibilities of many people; and for those whose esthetic requirements are exacting, there still remained a wide field of application for gold foil in their anterior teeth.

This technic which has proven valuable to a large group of men over a long period of time will be here presented in some detail. There will be nothing fundamentally new; there could not be, as the fundamental principles of filling teeth have long ago been laid down for our guidance, and time has proven them to be well founded; but most of the objectionable features incident to the placing of foil, and to foil itself as a filling material, have been removed.

INDICATIONS AND CONTRA- INDICATIONS FOR GOLD FOIL

Inflexible rules for the indications for gold foil cannot be made. The extent of decay is probably the principal guiding factor.

Foil is best adapted to teeth in which decay has just begun, incipient decay, and to most of the eroded areas we find on the labial and buccal surfaces of teeth.

The position of teeth in the arch is a determining factor. To men of experience, all teeth with beginning decay, that may be isolated with the rubber dam, may be filled with gold foil. But so many obstacles may present, such as the temperament of the patient, the flexibility of the lips, the occlusion, inaccessibility, that it is best to confine our work to those teeth anterior to the second molar in all cavities involving the proximal surfaces. Pit and fissure cavities on the occlusal surfaces of all the teeth may be filled with gold foil, if a good operating field is obtainable.

It is not advisable to make gold foil fillings for children or those in early adolescence, where the time consumed would make the operation so fatiguing as to be looked up on with dread by both the patient and the operator. The teeth of these patients, or rather the peridental membranes and alveolar processes do not offer the resistance to the hand pressure and mallet blows necessary to insure a well condensed mass of gold. The same may apply to those who have undergone a long period of treatment by the orthodontist and whose teeth have not as yet become firmly fixed in the alveolar process

as they will in adult life. This is not an inflexible rule. Many children's teeth may erupt earlier than the average age and often the children themselves are more mature than the average, permitting us to begin our gold foil work earlier in life. Lingual pits in the incisors and cuspids may be filled at any age where the tooth may be isolated with the rubber dam. I have frequently filled the distal surfaces of lower cuspids and the mesial surfaces of lower first bicuspids with gold foil as early in life as 12 years and observation in subsequent years has proven the advisability of this procedure.

Patients suffering from pyorrhea to the extent that they have lost considerable of the alveolar process and supporting tissues, are not to be classed with those for whom gold is indicated. Here again there are exceptions, as many teeth that have lost much of the supporting structures, after treatment become very firm and lend themselves admirably to gold foil work.

Temperament in a small percentage of cases will prevent the use of gold foil. There is that class of nervous individuals who, for some unknown reasons, are unable to tolerate the continuous blow of the mallet; no attempt should be made to place gold foil in their teeth once this condition is determined. We must bear in mind that we are treating people as well as teeth and compromise our work accordingly, in the best interests of the patient. The direct opposite of an equal number of patients is true; they are of a sanguine type and peacefully slumber under the rhythmic blow of the mallet. Most gold foil operators have experienced many such patients and personally I wish their numbers were more; for them, temperamentally, gold foil has a decided indication.

These few indications and contra-indications must be taken as general directions for selecting cases suitable for gold foil work. To give specific directions would require an average sized paper and that has been written and published in the past.

Only by experience and the exercise of good judgment may the operator select the cases that are best suited to gold foil work and to his ability to perform the technic. To the operator of experience this leaves a broad field for gold foil work, so broad that he may spend the major portion of his lifetime efforts in dentistry, making gold foil operations. Those who have studied the subject and have mastered the technic desire no happier occupation.

INSTRUMENTS

The instruments necessary to prepare cavities for the reception of gold foil and those for building and finishing the filling are well known, and nothing of an elementary nature in their description will be included in this chapter.

The cutting instruments of two decades past were better suited to our purpose than those in general use today. The principal cause for the decadence in instrument design, as I see it, is the lack of standardization in measurements and careful consideration of instruments so shaped that all the desirable qualities possible would be assured for shaping cavities for the reception of fillings and eliminating undesirable features. (Fig. 1.) With this in mind, I have recently, that is, about four years ago, assembled a set of instruments suitable to my own needs, selecting them from existing forms and redesigning them in sizes, shapes and angles more applicable to modern cavity preparation. The design was intended to eliminate all the spring possible from the instruments consistent with strength, and this is mainly accomplished in the shaping of

the shank, the angle and the upper part of the blade. The diameter of the instruments at the necks and angles varies according to the purposes for which they were made; for example, a Black's binangle chisel would be greater in diameter at the angle than a small hoe, the chisel being called upon for heavier work in larger openings than the hoe. All of the hatchets and hoes are made small enough from the shank down to the cutting edge to enter the smallest cavity we are called on to make with them and yet so shaped as to eliminate all spring consistent with the strength necessary to resist breakage from the force commonly exerted by good operators.

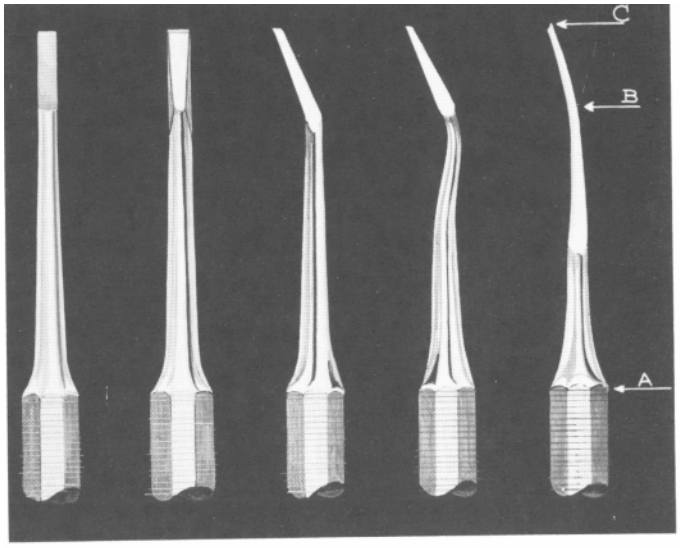


FIG. 1. Cutting instruments redesigned to better meet requirements of modern cavity preparation.

I found in designing these instruments that the thickness of the blades at their cutting edge was the most important measurement as it is with this part of the instrument that most of the work is done. I therefore standardized this dimension, giving it a thickness of 0.012 inch for all the instruments of the set except the spoons and the 3-2-28 hatchet. Thus, it is possible for the instrument maker to have a standard measurement from which to shape the blade in addition to the formula of Dr. Black or such variations of these formulas as I have seen fit to make for my own use.

The blades of practically the entire set of forty-two are slightly beveled from the face to the back so as to present sharp angles on each side, this giving three useable edges to each instrument so that they all may be used as hoes in addition to the special requirement for which each was made. When pairs are used, the handles have a small flat indentation on the side directed toward the cutting edge and the contra bevels are marked with small grooves cut around the shank. With these distinct markings, in addition to a serial number placed on the handles, no confusion is experienced in selecting the instruments required at the moment, if they are filed in the cabinet in numerical order. The selection merely suits my individual requirements; the principles of design may be incorporated in any instrument used for cutting tooth structure.

While it is not necessary that all teeth in which we place gold foil be separated by mechanical means to gain access for operation, all those upon whose proximal surfaces

we operate should be separated at some time during the building of the gold or the finishing of the filling.

The set of six separators, as originally designed by Dr. Perry, were best suited to the purpose; but for the past 17 years they have not been available.

To fill an urgent need, I spent considerable time in redesigning these separators and making them available to the profession. Extensive use over the past four years has convinced me that an improvement has been made. They are more widely applicable than in the original design and give far more working space and freedom from interference. (Fig. 2.)

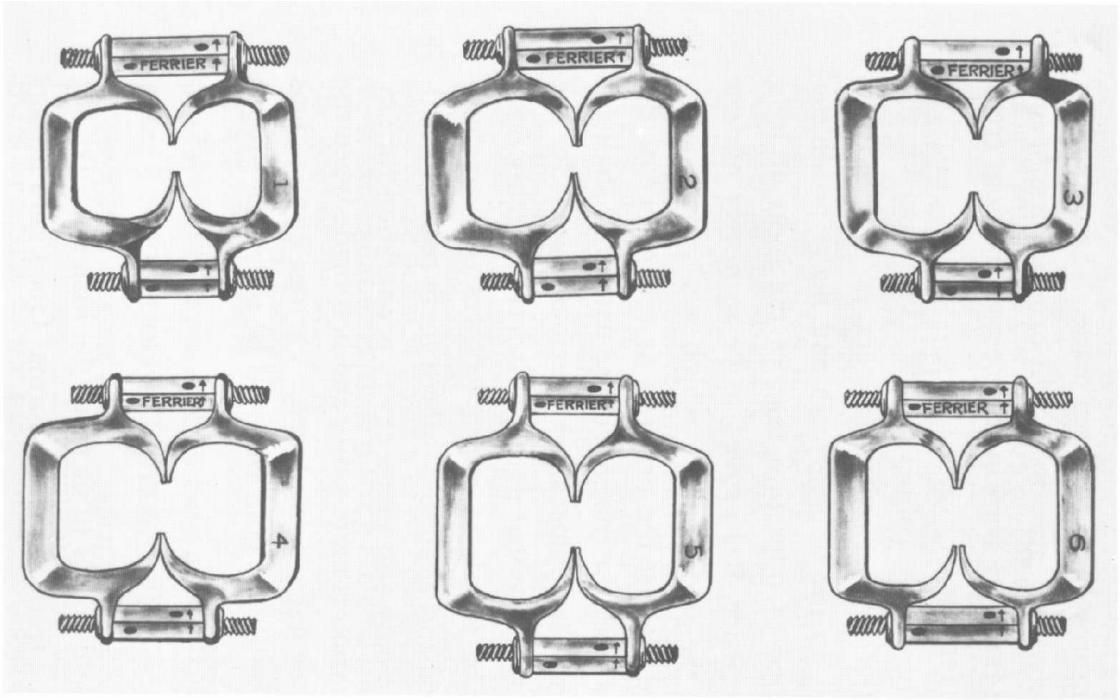


FIG. 2. Separators designed for more nearly universal application with minimum of operative interference.

The day the rubber dam was introduced to the profession marked a new era in the study of decay in the human teeth and made possible a method of operation that, in the light of long experience, has proved to be so nearly perfect that the surface upon which we operate is insured against the progress or recurrence of the disease for the lifetime of the patient. I shall not attempt to enumerate the various reasons for the use of the rubber dam. This has been ably done by Dr. Prime in recent lectures that are published and available—about forty reasons in all. I can only add that a cavity preparation for any operation is more easily and best made when the rubber dam is employed. Various applications as applied to gold foil will be shown in proper sequence.

PREPARATION OF GOLD FOIL

Gold comes to us from the manufacturer for filling teeth in various forms. Good gold fillings may be made with any of these forms that are pure; but the preponderance of

opinion is so greatly in favor of Number 4 Non-cohesive gold foil that none other will be here considered.

The book of gold, either 1/8 or 1/10 of an ounce, is ruled off as shown in Fig. 3. The sizes shown are cut with scissors, the cut being made through the entire book including the gold and the leaves of paper that is interposed between each sheet of foil. As we are to use gold foil in both its cohesive and non-cohesive state, it is desirable that it come to us in a non-cohesive condition that protects it from the contamination of gasses that would render it permanently non-cohesive.

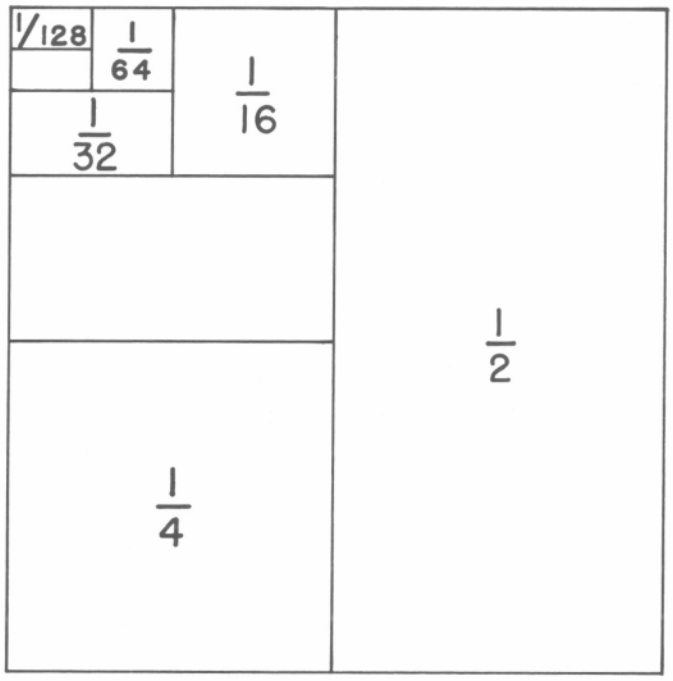


Fig 3. Sheet of No. 4 noncohesive foil divided into various sizes for most convenient use.

The book is divided into such sizes as will represent 1/2, 1/4, 1/8, 1/16, 1/32, 1/64 and 1/128 of a sheet of gold that weighs 4 grains. Any size that suits the individual requirements of the operator may be made, but those enumerated are suitable and sufficient for all types of foil work.

To prepare the larger sizes of the gold for non-cohesive work each is laid upon a napkin and folded into a ribbon whose width would average about 2 1/2 mm. This is accomplished by means of a paper knife, bisecting the sheet lengthwise and folding it over upon itself; the procedure is continued until such a ribbon is formed that if it be divided into thirds and the outer thirds folded over the center third, a ribbon of the width we desire is formed with no edge of the original sheet exposed. One end of the ribbon is caught up with a jeweler's broach and rolled over and over until the other end is reached, thus obtaining a cylinder of gold that is now removed from the broach and the ends more symmetrically formed between beaks of cotton pliers with light pressure as the cylinder is

rotated a little at a time. Cylinders comprising 1/4 and 1/8 of a sheet of gold are those most commonly used; but we occasionally find use for sizes 1/2, 1/16 and rarely 1/32. Now these cylinders of non-cohesive gold are used in the non-cohesive state and never annealed for cohesive use. Their application will be described in the technic that is to follow.

The gold that is to be subsequently made cohesive consists of the smaller pieces—1/128, 1/64, 1/32, 1/16. The forming of these into convenient pellets for use is a simple matter. With the foil pliers a piece is placed in the palm of the hand and each corner folded toward the center; this partially formed pellet is now shifted to a position between the thumb and index finger and the forming completed. Bottles of these pellets are stored away for future use. As an added protection against contamination, a small ball of cotton is soaked in ammonia and placed in the tightly corked bottle. A shallow box lined with chamois and partitioned into several compartments for the pellets and cylinders of various sizes makes a convenient receptacle to use at the chair.
It has been stated that the cylinders are always used in the non-cohesive state, but the pellets are with few exceptions made cohesive before use. Many annealors have been devised, but the most practical seems to be the uncontaminated blue flame of an alcohol lamp. As each piece is required, it is freshly annealed by passing it through the flame in such a manner as to bring it to a cherry red heat and almost immediately placed in the cavity for condensing. A small bi-angle explorer, the point of which has been broken off, makes a very satisfactory instrument with which to pass the gold through the flame and into the tooth. Whether it is desirable or not, we must admit that the gold so treated is sterile.

METHODS OF CONDENSING GOLD FOIL

There are many methods of condensing gold foil into a cavity in a tooth and good fillings may be made by any of the methods in use today if the operator is familiar with the technic required. But, for various reasons, there is a method of choice, and this consists of the application of blows of sufficient force to condense the gold by means of a mallet in the hands of a competent assistant. The blows are applied to the end of a condensing instrument or gold plugger directed by the operator who exerts hand pressure upon the mass of gold with each step of the instrument. This force not only aids the mallet in condensing the gold, but holds the tooth firmly against the alveolar wall and tightly in its socket; a tooth thus stabilized while the blow is delivered receives no shock and no pain is felt by the patient if the conditions are normal. The assistant delivers a rhythmic blow in a cadence consistent with the stepping of the plugger by the operator and there is no lost motion. The speed attained by this method can not be surpassed by any other yet known; the fine team-work of two well-trained people is a perfect example of skill and efficiency, and is a delight to behold.

Dr. G. V. Black has written that “Of the different plans of applying mallet force, the hand mallet used by an assistant is by far the best, as it will produce the desired result with the least wear and tear on both patient and operator. The next best, but much inferior, method is by the use of the automatic mallet. Of these instruments there are a variety on the market of equal merit. The poorest method practiced is the use of the hand mallet by the operator himself”. I think most experienced operators will agree with his

statement. However good and useful the hand mallet used by an assistant may be, I can see a place for an angled instrument of an automatic type that would deliver a similar blow with a similar hand pressure, that would extend the field of gold foil to inaccessible places. We have these instruments, but they deliver a rapid blow without the hand pressure and are quite severe upon the tooth. As this is written, word comes to me that such an instrument that will deliver a series of rapid blows when hand pressure is applied has been designed by Dr. George M. Hollenback. With this, I have as yet had no experience.

TECHNIC FOR CLASS I CAVITIES IN THE PITS AND FISSURES OF BICUSPIDS AND MOLARS

Dr. G. V. Black's classification of cavities will be used throughout this chapter. His classification was of such a scientific nature that prepared cavities in teeth are known by numbers rather than by names and this numerical classification is still used, though many years have passed since it was introduced. It is a tribute to the man that his fundamental principals on cavity preparation were so sound and logical that no major changes have been made.

Class I cavities in the pits and fissures of bicuspids and molars usually make their appearance in young people, and gold foil operations are limited to those teeth that will bear the mallet force necessary to good condensation without injury. The youth and temperament of the patient must be taken into consideration. I find that young patients, as young as 9 years, are better controlled if a rubber dam is adjusted and the operation completed in the same manner as for an adult. It is surprising how amenable children are to the use of rubber dam, instruments and mallet force. An otherwise intractable child usually becomes an ideal patient as soon as the rubber is applied, and remains so unless the work is prolonged to a degree not in keeping with his age. (Fig. 4.)

For these young people, gold foil fillings in the pits and fissures of teeth create a pride of possession too often absent in the adult. In them, the vain, unreasonable antipathy frequently found in adults to the color of gold does not exist and the finish and neatness of the operation is appealing. To them, it is an experience and an education that they will probably carry through life, and it will be difficult indeed in future years to induce them to tolerate anything inferior to these childhood operations.

The excellent qualities of gold foil apply to these cavities as well as to any other, and there is a large field for its use. I realize that economic necessity, temperament, expediency and many other excuses may be found for not using gold foil in the pits and fissures of posterior teeth, but I am not looking for these excuses. Instead I am looking for the indications for use of gold foil and I find them to be many.

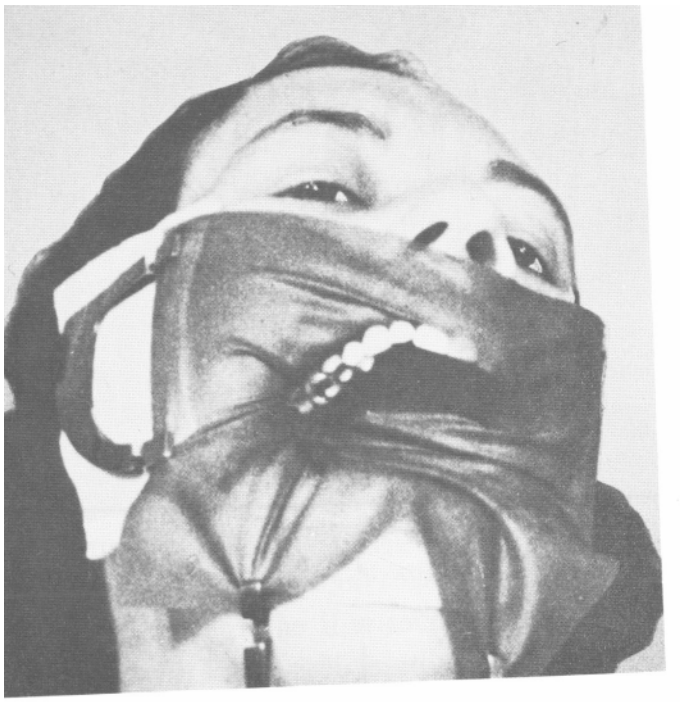


FIG. 4. Rubber dam application from median line to tooth posterior to the one that is to be operated upon.

The technic for Class I cavities is probably more easily mastered than for any other cavities, but their filling requires extreme care. They are usually small and frequently inaccessible. Great care must be used to protect the margins and a proper line of force in placing the gold is imperative.

The fissures are extended to the point of immunity, but this does not always mean to the marginal ridges. These surfaces are always immune, and it is the faults in the enamel that we are correcting. When that has been accomplished, the cavity need be extended no further. It is the intention to remove the least possible amount of tooth structure to accomplish our purpose and small burs and instruments are necessary. As cleavage of the enamel rods with hatchets and hoes will enlarge the cavity more than we anticipate, it is good practice to cut most of the cavity with small fissure burs and plane and slightly bevel the walls with chisels and hoes used parallel to the occlusal surface of the tooth. (Fig. 5.)

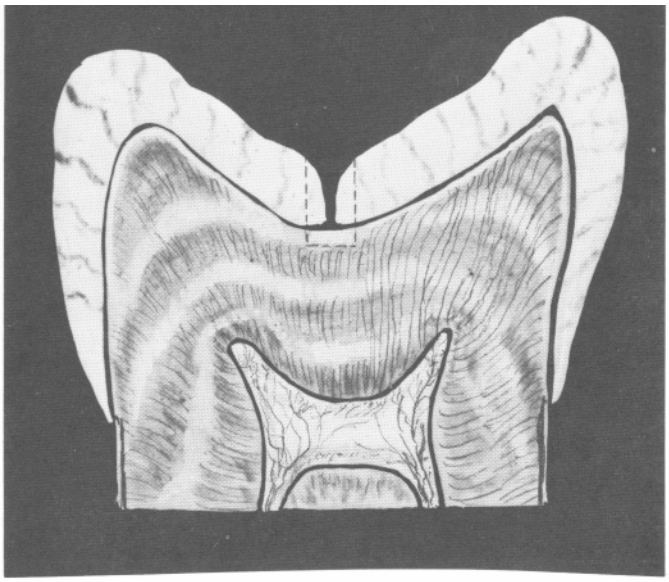


FIG. 5. Vertical section through molar showing small amount of tooth structure sacrificed for filling the fissure.

To fill these cavities requires care as they are usually so small that a false step of the plugger will chip the margins. It is my practice to use cohesive gold throughout unless the cavity assumes larger proportions. Then the walls are lined with noncohesive cylinders pressed very thin and the operation is completed with cohesive gold. (Fig.6)
If the cavity is small, and they frequently demand mere threads of gold, a burnished finish is best. In somewhat larger cavities, the gold is brought to its margins with burs and stones and finally finished with some abrasive and polishing material. (Fig.7)
In filling pit cavities, the outline form may be round or oval, and if the cavities are small, a plugger may be used that is slightly less in diameter than the cavity. A point of the Royce type that has a tendency to force the gold to the axial walls gives the best results, as the space is too small for much stepping of the instrument.
In connection with pit cavities, it is well to mention the fillings made to prevent wear on the abraded points of cusps that have been given so much attention by Dr. Prime. His technic, as I understand and use it, consists of sinking a round bur half its depth into the abraded area, and following with a very small bur that cuts a slight retention pulpally. When the operation is complete, a section would show a piece of gold resembling a tack, its head toward the occlusal aspect.

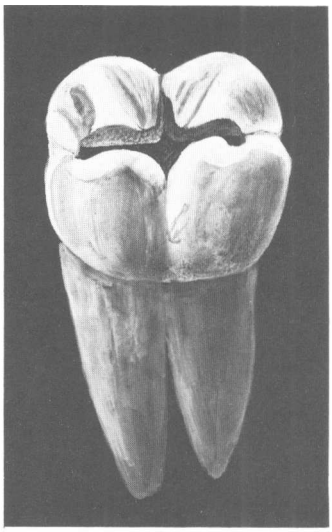


FIG. 6. Occlusal cavity in lower molar.

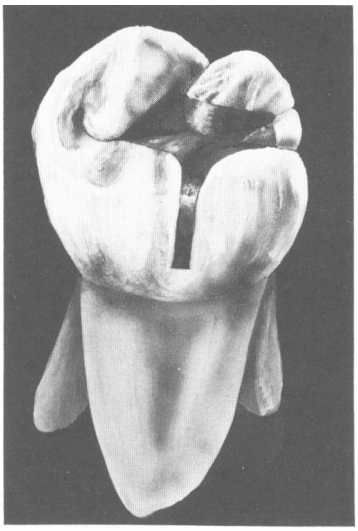


FIG. 7. Class I cavity filled with gold foil. Note narrow lingual step.

CLASS II CAVITIES IN THE BICUSPIDS AND MOLARS

We will approach the discussion of Class II cavities in bicuspids and molars, not only with the thought of the excellence of gold foil as a filling material, but also as a means to conserve tooth structure which in a broad sense should be the highest aim in dental practice. There are many ways to conserve tooth structure; the whole theory of our cavity preparation for any type of filling has this end in view, but the most direct way is to avoid cutting the tooth to meet the requirements of our technic rather than make our technic meet the conditions found in the tooth and the mouth itself.

It is certain that convenience form is essential to a well placed filling, but the convenience form for the placing of gold foil in cavities involving the proximal surfaces of bicuspids and molars requires far less cutting than for a gold inlay.

I had hoped to refrain from comparisons of filling materials, but the gold inlay and gold foil are so widely used in Class II cavities that to clearly state the indications for gold foil would be impossible without reference to the gold inlay.

Many inlay operators use no foil whatever, while most foil operators use inlays wherever indicated; for each has separate and distinct indications and there need be no conflict between gold foil and gold inlays, generally speaking, and there is none in the practices of those who are sufficiently versatile to make creditable operations by either method.

We must admit that gold foil fulfills more nearly the requirements of a filling material than any other substance known. To me this statement does not admit of intelligent and unprejudiced debate. While this opinion may be taken as entirely personal, it is substantiated by the writings of foremost educators and practitioners of the past and those of the present who are proficient in the use of all the filling materials common to present day practice. To disregard the qualities of any of our filling materials that may make them most suitable for a given case is shortsighted policy indeed. They all have properties that recommend them to certain indications, and, in the absence of an ideal

filling material, the approach to which we are but little nearer now than thirty years ago, we should apply them to these indications without prejudice and should develop the operative technical requirements that are peculiar to some and common to all of them.

Operative dentistry has been sadly neglected the past two decades by the profession at large. The tendency has been to center attention upon restoring lost teeth rather than lost tooth structure. It would seem that the highest attainment that dentistry could reach was the construction of large fixed and removable pieces to restore lost teeth that could have been saved by intelligent and skilled operative procedure at the inception of dental decay or peridontal lesions.

Unwise and faulty operative procedure has forged all too often an unbroken chain of destruction that finally and prematurely results in the loss of teeth through pulp complications, periodontal disease and systemic disturbances. Dentures are constructed and the very thing we had hoped to obviate has come to pass.

Dentistry has more to offer humanity than the seemingly inevitable results just recited.

Gold inlays have suffered more from inefficiency than has gold foil. The inlay lends itself to a slovenly technic if the operator is so disposed. Some sort of a filling may be easily made from a wax pattern and, for a time the cement will fill in the discrepancies and the uninformed patient has no reason to suspect that other than an excellent operation has been performed. But, if the ultimate is sought in an inlay operation, then as much time and effort must be expended as for the insertion of gold foil, within cavity limits. The results obtained by a carefully made inlay where indicated fully justify any necessary amount of time and effort.

Gold foil does not lend itself to anything but a careful technic. Carelessness and inefficiency will not produce an operation that deceives the patient; in fact, it will not produce an operation of any kind, and this is perhaps the reason that the inlay came into such wide use and threatened the existence of gold foil. One might get by with a gold inlay, but not with a gold foil. Human nature is the same the world over and its eccentricities are not peculiar to dentists alone.

Gold foil and gold inlays, having such distinct and separate indications in the general practice of dentistry, should not conflict. I realize that which may be an indication for the experienced operator may not be an indication for one of less practice and skill. To draw a hard and fast line of distinction and to cover all closely overlapping indications is, of course, impossible.

Class II Cavities, especially those that present in their incipiency, offer ideal situations for gold foil. The most susceptible areas for the recurrence of decay are the lingo-gingival and bucco-gingival angles and these angles may be extended well out into areas of immunity without a corresponding extension of the buccal and lingual walls as they approach the occlusal portion of the step. The form of the bicuspids and molars, having a greater diameter bucco-lingually at the middle third than at the occlusal third, together with a rounding off at the lingual cusps that forms an embrasure, opening occlusally as well as lingually, calls for a lingo-gingival angle that is decidedly acute. (Fig. 8.) This may be applied in a limited degree to the bucco-gingival angle. As the lingual and buccal walls approach the occlusal surface, they converge toward each

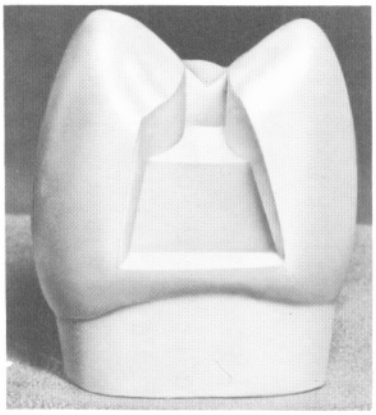


FIG. 8. Class 2 cavity in upper bicuspid. Proximal walls converge toward occlusal.

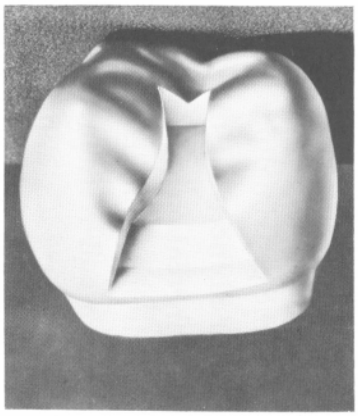


FIG. 9. Occlusal view showing narrow step blending in fine proportion with proximal portion of cavity.

other, forming a proximal cavity that is much narrower at the occlusal third than at the gingival third. This permits of a narrow step (Fig. 9) across the occlusal surface that blends in fine proportion with the proximal part of the cavity. A cavity so outlined meets all the requirements of extension for prevention; when the interior is formed, fulfills all the essentials necessary to convenience, retention and resistance. Much tooth structure is saved by such a preparation; the horns of the pulp have greater protection and the strength of the tooth is impaired a minimum amount.

Thus, we suit our technic to the conditions met with instead of making the preparation to suit our technic, as is necessary in preparing a cavity for the withdrawl of a wax pattern. Let us assume that the operator is skilled in both technic, that he can make, in a given case, a good foil operation or a good inlay operation. Is it not apparent that in the interests of tooth conservation alone, he should use gold foil as his filling medium rather than a gold casting? Disregard for the moment the advantages of each as a material for restoring lost tooth Structure and consider only the tooth as an organ not capable of regenerative processes, such as bone, muscle and mucous membrane, that, once any part of it is lost, it can never be restored in kind; and that any restoration in any material falls far short of the original. Is it not further apparent that the logical thing to do is to restore the lost part with as little sacrifice of the remaining structure as possible? Then, why should there be any conflict between gold foil and gold inlays in Class II cavities that present with incipient decay? To the discerning and versatile operator, there is no conflict, excluding a limited number of patients whose temperament, age, or health conditions preclude the use of gold foil. The reason so many Class II cavities are restored with inlays is due to the fact that the large majority of the profession is not skilled in the use of gold foil, and the human tooth loses its best remedial agent. A lack of consistency in many men who are shocked at the appearance of gold foil in the anterior teeth is manifest in the conspicuous manner in which their gold inlays are placed in the mesial surfaces of the bicuspids. The cavity here shown is a good example of conservative preparation. Its buccal wall will scarcely be visible from any point of view, yet the bucco-gingival angle is immune to further decay; the lingual wall converging toward the occlusal permits a narrow step, a strong lingual cusp and an immune linguo-gingival

angle. Compare this with the outline form of an inlay preparation whose gingival wall has an equal bucco-lingual dimension, and note the tooth structure saved by the former. (Fig.10.)

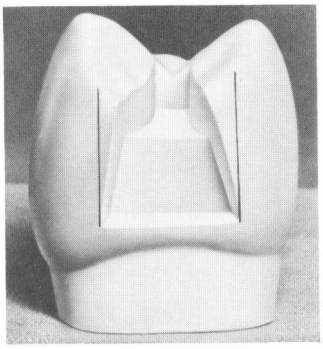


FIG. 10. Same as Figs. 8 and 9. Black lines show extension necessary for removal of wax pattern if inlay were made, and necessary bucco lingual extension of gingival wall retained.

Let us examine this cavity further and observe wherein it differs from older forms of this class. I realize that any departure from the orthodox will be received with some skepticism. But this form, with minor variations, has been used for over a quarter of a century by various men throughout the country and in a number of the colleges. Indeed, among gold foil operators, it has become the orthodox or standard preparation for this class—minor variations to suit the individual excepted. It was used by Wedelstaedt in a form that was wider and deeper in every dimension, as I recall and understood his teaching. It differs from older forms in greatly reducing the amount of tooth structure lost where the walls of the proximal portion were made parallel. These parallel buccal and lingual walls called for a wider step in the occlusal portion, if the cavity was to be in good proportion. The wider the step the weaker the tooth becomes and the closer the pulpal wall encroaches upon the horns of the pulp. If, for any reason, the step must be made wider than here shown, the buccal and lingual walls of the middle third of the step are made at an obtuse angle with the pulpal wall, resulting in this portion of these walls diverging toward the occlusal. By this procedure we protect the horns of the pulp and there still remains sufficient retention form in the remainder of step to retain the filling. Such preparation of the step is scarcely apparent in the cavity here shown and can be disregarded in those of like size.

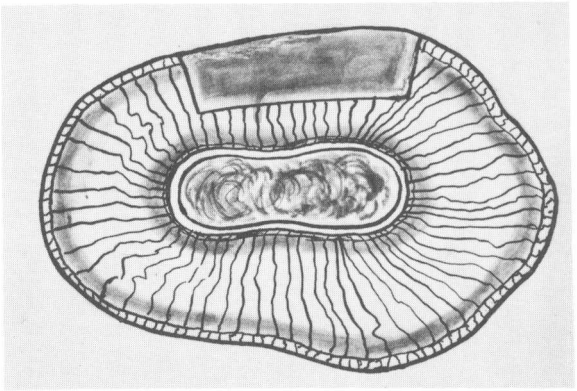


FIG. 11. Cross section through middle third of tooth shown in Fig. 8. To visualize retention in cavity as a whole see Fig. 9.

Let us examine the interior of the proximal portion of this cavity. The buccal and lingual walls do not meet the axial wall at a right angle nor do they lie in the same plane. A cross section of the middle third (Fig. 11.) would reveal these walls meeting the axial wall at an obtuse angle, offering no retention to the filling; but a view of the proximal portion of the cavity as a whole shows sufficient retention for our purpose. The bucco-gingival and linguo-gingival angles are acute and the buccal and lingual walls meeting the gingival wall at acute angles forms a lock that securely holds the non-cohesive gold, with which the gingival third of this cavity is filled, until it is safely anchored by the cohesive gold coming down from the step.

Those not familiar with this preparation may doubt the retention, but we must not lose sight of the fact that the step of the cavity is so formed that it securely retains the proximal portion from dislodgment and this is its principal function. In considering the retention form the cavity must be taken as a whole, not in parts. With such a preparation the ultimate in tooth conservation is achieved, and years of experience has shown sufficient retention to dislodgment of the filling and ample resistance to the forces of mastication.

Another departure from older forms will be observed in the treatment of the buccal and lingual walls of the proximal portion of this cavity.

I cannot subscribe to the theory that these enamel walls be made in a plane with the cleavage of the enamel rods, beveled at another fixed angle, and the dentinal wall assume still another. I prefer to make the entire wall in one plane with a chisel of the proper width. The bevel of the cavo-surface angle comes with the finishing of this angle into a straight and true line. To finish this angle, it must of necessity be beveled—it would be most difficult to finish without a bevel even if one so desired. As a bevel we may give it little concern because it will be there if the cavosurface angle is straight and true, unless a deliberate and laborious attempt is made to prevent it. This is true of all the peripheral wall, except the gingival where more care must be used as it is less accessible and the enamel rods are shorter.

Now, if in the treatment of the buccal and lingual walls as suggested (not the bevel), some short enamel rods remain, they will be so well supported by the tightly wedged gold that there is no danger of their loosening and creating a defective margin later on. Any short peripheral rods are taken off by the cavo-surf ace bevel. If this danger

existed, surely it would have been observed during the long period of time this cavity form has been in use, by some of the many operators who use it.

I would not recommend this detail of cavity preparation for any other material than gold foil.

INSERTION OF FOIL

The rubber dam which is adjusted before the cavity preparation should include all those teeth from the median line to the tooth posterior to the one upon which we are operating.

A non-cohesive cylinder of gold of suitable size, usually1/8 or 1/4, is placed in the buccogingival angle, the ends of the cylinder against the axial wall, with the foil pliers. It is forced buccally-gingivally and axially with the point and the sides of one of the pair of binangle parallelogram pluggers (6 x 12-6-10) or (12 x 6-6-10) against these walls; another cylinder is placed in the linguo-gingival angle and treated in the same manner. This leaves a space between the two and the middle third of the gingival wall is exposed. Into this space another cylinder usually size 1/4., that has been shaped like a wedge with the pliers, is introduced and driven firmly to place by blows from the assistant's mallet upon a bayonet-shaped plugger about 1 1/2 mm. in diameter. This central cylinder wedges the others tightly against buccal, lingual and gingival walls. Now the entire surface of the gold is malleted with the large plugger, followed by a Wedelstaedt plugger, 6 mm. in diameter, until it is thoroughly condensed. During this malleting process the plugger is inclined toward the axial wall at an angle of about 12 centigrades driving the gold into the cavity and toward the gingival wall. If this has been properly done the non-cohesive gold will be wedged so tightly that there need be no fear of displacement before it is tied in by the cohesive gold coming down from the step. We now have a well condensed mass of non-cohesive gold that fills the proximal portion of the cavity nearly up to the floor of the step or the pulpo-axial angle, and extends beyond the cavity margins well into the embrasures. Thus at least one third of the gold required to cornpletely fill the cavity has been placed in 3 or 4 minutes of time. (Fig. 12.)

Cohesive gold is started along the distal wall of the step and built toward the non-cohesive gold, keeping the distal part of the mass higher at all times. A Wedelstaedt plugger 5.5 mm. is used for this work throughout the filling. (Fig. 13.) When we have extended this mass of gold to the pulpo-axial angle, a 1/32 pellet is placed half on the cohesive gold and half on the non-cohesive with the idea in mind of uniting the two masses together. Care must be exercised here as to line of force as an improper inclination of the plugger would tip the non-cohesive

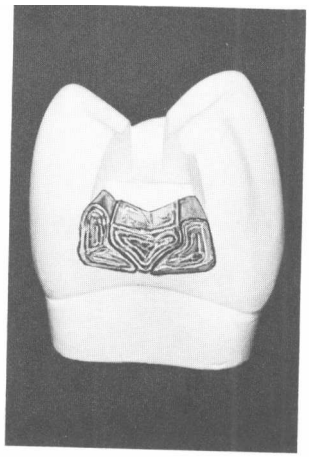


FIG. 12. Three cylinders of noncohesive gold placed and partially condensed.

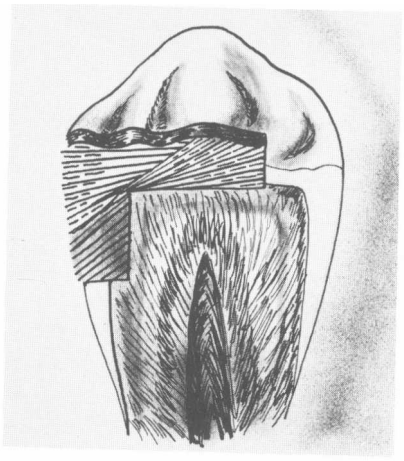


FIG. 13. Vertical section through Class II cavity showing method of building the gold foil.

gold from the cavity. Successive pellets of cohesive gold are added and well malleted into the non-cohesive mass until it is entirely covered and securely tied in. The remainder of the filling is built to tooth form with suitable pieces of gold until a slight surplus is obtained. In building the entire filling the plugger point should be always inclined toward the wall we are approaching, if we expect to spring the dentine slightly and secure a tight joint between gold and cavity wall. The contact point must receive particular attention as we wish to separate the teeth with the gold and have a hard, dense mass to finish into a well-shaped contact point. In some teeth it is best to adjust the separator from the beginning to stabilize the tooth and distribute the shock of the mallet blows over the teeth adjacent. (Fig. 14.)

To properly adjust the separator so that it will not impinge on the soft tissues, it must be stabilized by placing modeling compound between the bows and the adjacent teeth; adjusted in this manner it functions in three ways: separates the teeth, stabilizes them, and acts as a good finger rest. These instruments were so designed that they exert a spring pressure in function;

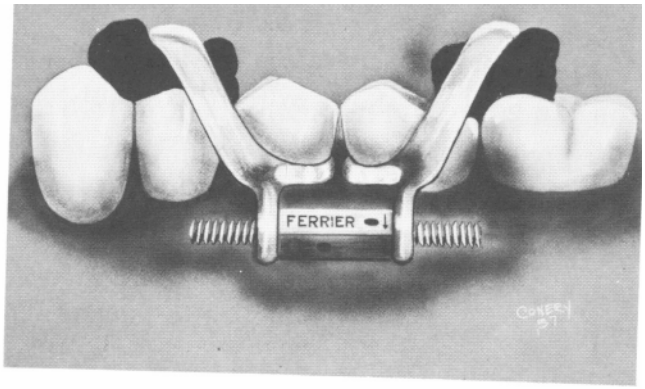


FIG. 14. Separator adjustment. Note method of stabilizing the instrument with compound.

therefore they should be tightened but little at first as the spring pressure is continuous and separates the teeth throughout the operation. A little separation gained at first will be much increased before the building of the gold is completed, without further movement of the bolts of the instrument.

We will assume in the case we are describing that mechanical separation was not necessary and the gold was built to form without its use. The non-cohesive gold that covers the gingival wall and extends into the embrasures are further condensed toward the axial wall by means of large quadrangle gold condensers, the toe of which should reach fully to the bucco-lingual center of the gingival margin. A thin bladed spatula-like instrument, known as a swager, follows the same path as the quadrangle condensers and is driven between the adjoining tooth and the non-cohesive gold, bucco-lingually. This instrument is kept gingival to the contact and still further condenses the non-cohesive gold and clears a path for further instrumentation.

We formerly used a thread-like saw, mounted in a Black's saw frame, to remove the surplus non-cohesive gold, but our cavities are so much smaller now that a sharp gold knife and garnet strips is all that is required to finish the gold at the gingival margin and I have repeatedly demonstrated that this may be done in five minutes time.

This gingival margin in Class II cavities made with well condensed non-cohesive gold and finished as described is the best margin known to dental practice.

We now turn our attention to the occlusal surface. Round finishing burs of both right and left cut will quickly bring the gold to its margins and partially make the occlusal tooth form. The surplus gold is removed from the buccal and lingual walls with gold files and the proximal tooth form partially shaped. This is as far as we can do without separation and we should do all we can toward finishing the filling before the separator is adjusted, as it is more convenient to work on a tooth unobstructed by mechanical appliances. The separator is now adjusted as described above and enough space gained to permit the passage through the contact of a thin crescent-shaped saw mounted upon a rigid handle, known as a Gordon-White saw. This is followed by a steel strip that has abrasive on one side. The garnet strip comes next and further shapes and finishes the proximal tooth form. The gold knife is again employed to finally shape the proximal tooth form and shape the marginal ridge. A fine strip follows, discs of fine grit are cautiously used to finish the buccal and lingual margins.

We again return to the occlusal surface and, if a better form is desired than that given by the finishing bur, it is best done by carving with small discoids and cleoids. If the cavity preparation here shown is used, there is very little tooth form to make on the occlusal surface. Rubber wheels charged with pumice and a small brush wheel to carry whiting finishes and completes the operation.

We cannot always make a Class II cavity such as has been just described. Decay, susceptibility to decay, position of the tooth in the arch, all have a bearing on the size and shape of the cavity. As an example the mesial surface of a lower first molar calls for a preparation whose buccal and lingual walls converge more acutely toward the occlusal surface. It is surprising how small this cavity in the lower first molar may be made and yet fulfill all the fundamental requirements.

There are many variations from type, a notable one being the mesial surface of the lower first bicuspid. (Fig. 15.) This tooth resembles a cuspid whose cingulum has been over developed. The stress comes on the buccal cusp from the distal angle of the upper

cuspid when the jaw is moved in a lateral excursion. A gold foil operation placed in the mesial surface of this tooth is subjected to no stress and an exceedingly conservative preparation may be made. In fact, we may here violate a principle of cavity preparation that applies to all other Class II cavities, namely the retention must be placed in the step or occlusal portion. Here, we may place the retention entirely in the proximal cavity as it has no step for retention and none is required. The buccal and lingual walls converge toward the occlusal decidedly, due to the tip of the buccal cusp occupying a position at or near the center of the tooth and the cusp itself comprises four-fifths of the occlusal surface. To cross the triangular ridge of the buccal cusp to form a step, weakens the tooth and is not essential to the retention of the filling; therefore, we undercut the buccal and lingual dentinal walls, but not the enamel at the occlusal opening of the cavity. (Fig. 16.) This, together with the convergence of the buccal and lingual walls toward the occlusal surface, affords ample retention. This is a very small cavity, its gingival wall very narrow mesio-distally, and requires a careful technic to insert the foil which I will describe briefly.

A separator is placed usually at the beginning of the cavity preparation, as we desire only enough buccal extension to permit a self-cleans in margin, and this minimum cannot be ob tame without separation. By the time the cavity is prepared, the spring of the separator has gained sufficient space in which to manipulate the foil with the assurance that a proper contact may be made with the distal surface of the cuspid. Place three small cylinders of non-cohesive foil (usually 1/16 of a sheet of gold each) on the gingival wall in the manner that has been described in connection with typical Class II cavities, and mallet securely to place. If too much soft foil is used, the retention for the cohesive foil is reduced to an unsafe degree and care must be taken that the cylinders are not too

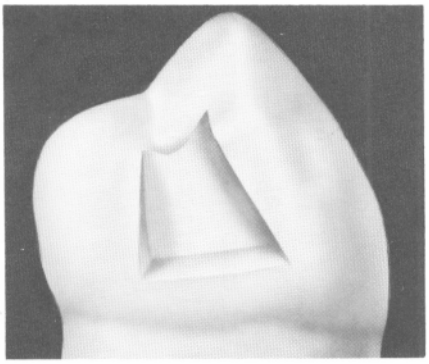


FIG. 15. Class 2 cavity in mesial surface of lower first bicuspid. Variation from type.

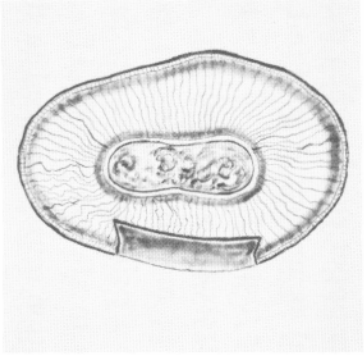


FIG. 16. Cross section through middle third of Fig. 15. Retention made between buccal and lingual walls.

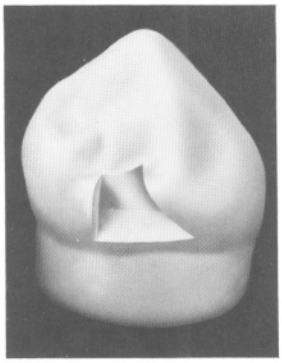


FIG. 17. Occlusal view of Fig. 15. Extremely small amount of gold visible in finished filling.

large. Start the cohesive foil with small pellets in the point angle formed by the buccal or lingual wall with the axial wall and the soft gold on the gingival wall, stabilizing with a holding instrument until the cohesive foil is anchored. Successive pieces of gold are placed and condensed until the cavity is full and the filling contoured. Gold foil is capable of great wedging properties, and more care must be used here than ordinarily to prevent fracture or undue strain on the undercut buccal and lingual walls. The filling is finished in the usual manner, the soft foil facilitating the finish of the gingival margin.

(Fig. 17.) These cavities are of frequent occurrence in the bicuspids of young people and the technic is adaptable to practically all of them. In fulfilling all of the requirements of a filling operation, this is the most conservative and the neatest of all that are made on the proximal surfaces of teeth. To those who make inlays for these cavities and who are most concerned for the esthetic appearance of the human teeth, let me recommend this small, inconspiciuous example of the foil operator's art.

Class two foil operations should not be placed where the size or position in the mouth puts an unreasonable strain on the patient or the operator. To define these locations or dimensions is impossible. All operators are proficient in varying degrees and patients exhibit tolerance and endurance in like degree. Where indicated, they may be

made with less loss of tooth structure, made less conspicuous and more in harmony with the form of the tooth, than with inlays.

CLASS III CAVITIES IN INCISORS AND CUSPIDS

The treatment of proximal cavities in the anterior teeth requires a most exacting technic regardless of what filling material may be indicated.

The carious area to be restored is comparatively small and difficult of access. It is triangular, the apex terminating between two rather fragile plates of enamel supported by a minimum amount of dentin in which to secure anchorage. Frequently, with the third lingual wall entirely broken down, a greatly weakened incisal angle is left on which the operator must depend for strength to form one point of anchorage to stabilize the operation. The base of the triangle, or gingival wall, forming the remaining and principal area of anchorage is fortunately in a sufficient amount of dentin to give resistance to dislodgement, and the restoration and cure of the diseased surface are made possible. To add to the difficulties, the area to be restored is closely hemmed in and guarded from approach by its approximating neighbor on one side and the vital organ of the tooth on the other side.

Considering these difficulties, and urged on by the exacting demands of an uninformed public for a restoration that harmonizes with the tooth structure in hue, is it any wonder that the great majority of our profession have turned to the use of a plastic that, for a time, harmonizes with its surroundings?

The frequency of occurrence of cavities in the proximal surfaces of anterior teeth is perhaps greater than is commonly recognized. I have not exact data, but the following will give some sta tistical authority for the presumption that they are to be classified as cavities that most frequently occur. To determine the frequency of occurrence of eroded areas in the human teeth, I requested a study club of twelve men with whom I have been associated for a number of years to compile data on their gold foil operations for the past ten years. The results gave me a good basis on which to make an estimate as these men use gold foil in the restoration of nearly all eroded areas on the gingival third of teeth. The same compilation will serve to give a somewhat less accurate estimate of the percentage of cavities that occur on the proximal surfaces of anterior teeth as cornpared with the percentage that occur on the other surfaces of the teeth. (Fig. 18.)

RECORD OF TWELVE THOUSAND GOLD FOIL OPERATIONS

I	II	III	IV	V
10.0	5.0	50.0	0.0	3.50
9.4	23.5	27.3	5.4	34.4
4.0	5.0	52.0	3.0	36.0
6.3	9.6	40.5	9.7	33.9
35.0	5.0	40.0	5.0	15.0
20.0	14.0	27.0	3.0	36.0
15.0	4.0	43.0	4.0	34.0
12.0	4.0	30.0	2.0	52.0
54.0	7.0	14.0	5.0	20.0
6.8	14.6	50.0	4.6	24.0
172.5	91.7	373.8	41.7	320.3
17.25%	9.17%	37.3%	4.17%	32.03%

Figure 18.

Following is an accurate record of 12,000 gold foil operations made in the past six to ten years. Some of these reports covered six and some ten years: Class I, 17.25 per cent; Class II, 9.17 per cent; Class III, 37.3 per cent; Class IV,4.17 per cent; Class V, 32.03 percent. It is evident that 37.3 percent, or the largest number of fillings, were placed in Class III cavities; and 4.17 per cent in Class IV, a total of 41.47 per cent in cavities in the proximal surfaces of the anterior teeth. The inaccuracy of these data lies in the fact that many cavities not here recorded were probably filled with some material other than gold foil, thus unbalancing the record. It does serve to show the comparative number of gold foil fillings placed in the anterior teeth by a group of men who give particular attention to operative dentistry and whose practices would afford a cross-section of the type of work that comes to most practitioners of this day. It should serve to emphasize that not all have lost sight of the excellent and unexcelled qualities of gold foil as a filling material and that the public is not so adverse as it may seem to be to the presence of gold foil in the proximal surfaces of the anterior teeth.

Our judgment as to what filling material to use in the human tooth should be and is better than that of the patient; but there is no denying the fact that many people will not tolerate the use of gold foil in the anterior teeth. In some cases, I am unable to understand this aversion to a material of such proven quality. In others, the modern conception of esthetics as applied to the teeth makes it necessary to use a material more compatible in color with the tooth, though it cannot compare in permanency or in any of the other requirements of a filling material, except color.

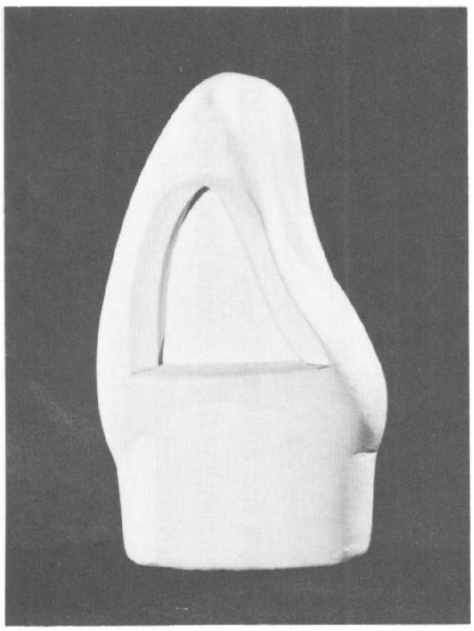
Despite the fact that gold foil has fallen into disfavor in the anterior teeth, there are many who have no objection to its use. These patients, who are usually in middle and late adult life, desire the best material that we have to save their teeth. For these very practical people, gold foil is indicated. I do not wish to convey the idea that this is the only class of patients for whom gold foil is indicated, but rather to emphasize the indication. In fact, gold foil may and should be used in the proximal surfaces of all the anterior teeth, upper and lower, where its size, shape and color does not make it so

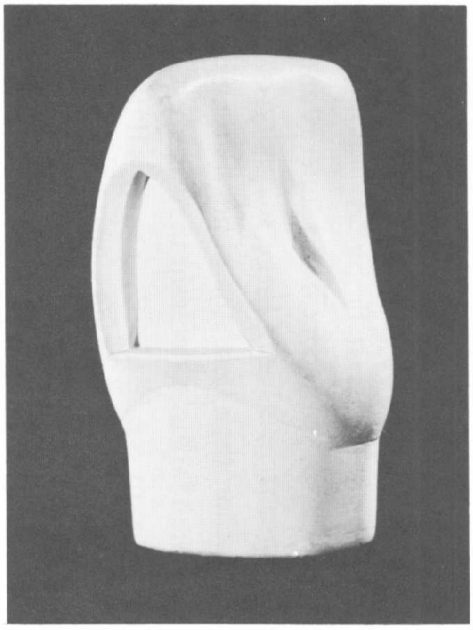
conspicuous as to offend the esthetic sensibilities of the patient; the operator bearing in mind the contra-indications before given.

With the unsatisfactory experience that so many of our patients have had with other types of operations, it is gratifying to note the rapidly increasing numbers that come under this classification. Whatever may be the cause, it is evident that there is an increasing demand from the public for this type of operation; and to substantiate this fact, I need only to call attention to the increasing interest in the dental profession, and the demand for instruction in advanced technic by serious-minded men who wish to be prepared to render the best service.

I could go on indefinitely enumerating my many reasons for believing that gold foil is coming back into its own, to occupy the high position and rank it held in earlier dental practice before the advent of methods that have been abused and never were intended to displace gold foil, but to be used as aids in the preservation of the human teeth. The demand of the colleges for instructors to render service limited to this type of work; the large number of study clubs organized for, and functioning exclusively in, the use of gold foil technic—all attest to these facts. While it is not necessary that all teeth in the anterior region be separated by mechanical means in order to gain access for operation, it is advantageous in a very large majority of cases; and rather than lose the time that any change in a standardized technic may cause, I prefer to separate mechanically nearly all the cases that are in normal or nearly normal relation.

With the rubber dam adjusted, the field of operation is inviting. The septal gum tissue between the teeth is retracted by the continuous pull of the elastic rubber, which excludes all moisture. By the inclusion of the six anterior teeth, freedom from interference by the rubber is assured, and a typical cavity is prepared in the distal surface of an upper central incisor. (Fig.19.) If the decayed area is small, a small round bur is used for opening up and making room for the hoe 6 ½-2 ½-9. This instrument is used to break down the enamel and partly form the labial and gingival wall. A small inverted cone bur is now introduced and a cut is made from the center labially and then lingually to outline and roughly form the gingival wall and definitely establish the linguo-gingivo-cavo-surface angle to the form of a slight shoulder. Usually this is the only need that we have for a bur in this preparation. The 6 ½-2 ½-9 hoe is now used both as a chisel and as a hoe to establish the remainder of the outline form. With the same instrument, the resistance, retention and convenience form is made, by removal of the carious dentin and finishing of the enamel wall. In fact, the entire cavity preparation may be made with this useful little instrument, which has been designed to lie in the cavity at such positions as are necessary to cut and shape the walls and the angles. It is probably more convenient to use other instruments specially designed for various parts of the cavity, unless one is very familiar with the use of the hoe. The small angle formers may be used to make the point angles. The 3-2-28 hatchet may be used to form the incisal angle,
and the 3-2-23 hoe to form the labio-axiogingival point angle and the axiogingival line angle. Convenience points may be made with a very small spear pointed drill. The outline form may be completed and the enamel wall finished with a small contra-bevel Wedelstaedt chisel. To give a detailed technic of the instrumentation in this cavity preparation is not within the scope of





FIGS. 19 and 20. Class 3 cavity proximal surface of upper central incisor showing straight gingival wall at right angles to long axis of tooth. The square cut at the linguogingival angle forms the linguogingival shoulder.

this chapter; but, in actual practice, a technic has been developed each step of which follows the preceding one in a logical sequence, that is seldom varied.

Let us examine the completed cavity in some detail, emphasizing the salient points of advantage that make it approach the ideal for the purpose for which it was intended. (Fig. 20.) The labial outline form presents a straight line for the extent of its gingival two-thirds to such a point that its labiogingival angle is placed under the free gingiva, if this be in normal relation. On the incisal third it presents a curve that blends in with this line symmetrically. This outline, when completed, closely approaches the mesiolabial angle of the tooth, this depending on the size and shape of the tooth and its position in the arch. Here, it will reflect the light and not appear as a dark stain if it is held in too closely to the center of the tooth. Here it parallels and is in conformity with the lobe of the tooth, which is the only distinctive marking adjacent. It is in pleasing harmony with the size and shape of the tooth and it not nearly so conspicuous as one might think before the completion of the operation.

The lingual outline form closely follows the labial and meets the gingival in a square and sharp angle, forming what I term, for the sake of euphonic description, the "gingival shoulder". Owing to the many failures in Class III Operations, I have long felt that a more convenient linguo-gingivo-cavosurface angle should be adopted than the one that is held in closer to the center of the tooth. Into this angle, we may mallet the foil most conveniently; if not to our satisfaction from the labial approach, then from the lingual, where we have a direct drive that insures close adaptation of the foil. I could compromise on any other feature of this cavity p reparation should I be convinced that

such compromise was an advantage to the patient, but not on the "Gingival shoulder", which is indispensable to my technic. It is not new, in a comparative sense.

The gingival outline form is cut straight across at about right angles to the long axis of the tooth, not curved with its convexity toward the incisal as formerly. As this convexity is not so easy to form as a straight line and offers no especial advantages, in the interest of simplicity and an ever-increasing tendency in the past few years to a smaller and more conservative cavity preparation, the curved gingival line has been abandoned in most cases. It calls for a longer labial and lingual wall, obstructs the view of the lingual third of the cavity and presents an obstacle around which to mallet. The gingival cavosurface angle meets the labial in a definite manner, but the severity of the sharp angle is relieved by a slight rounding made in the enamel when these walls are made true in the finish of the cavity preparation.

Much of the resistance form and nearly all the retention form are made between the gingival wall or base of the cavity and the incisal angle. This wall and angle meet the axial wall at a right or slightly acute angle and give all the stability and resistance to stress necessary. The labial and lingual walls meet the axial walls at an obtuse angle and offer little resistance and less retention. These walls remain much stronger when shaped this way. (Fig. 21.)

This cavity preparation presents no unusual difficulties to the experienced operator. The foil is easily and quickly placed if a careful technic is observed. A 1/64 pellet of a No. 4 cohesive gold, prepared after the accepted manner of

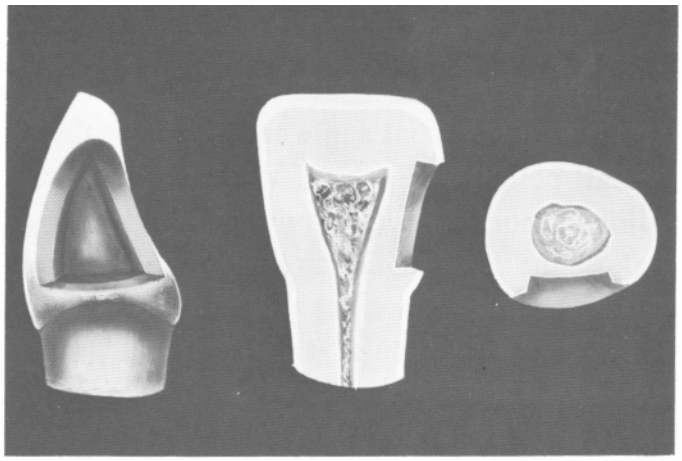


FIG. 21. Left: View direct into cavity and at right angles to axial wall. Center: Vertical section through center of tooth mesiodistally, illustrating retentive form at incisal angle and gingival wall (not to be confused with outline form). Right: Cross-section through middle third of tooth and cavity labiolingually.

gold-foil operators, is placed in the linguogingivo-axial angle and malleted to place with a small round plugger 0.4 mm. in diameter with a mallet in the hands of an assistant. Successive pieces are placed until the angle is filled up to its cavosurface bevel. (Fig. 22.) The foil is now carried along the gingivo-axial angle to the labio-gingivo-axial angle and tied in with a few small pellets. (Fig. 23.) We now return to the lingual portion of the cavity and build the gold along the axio-lingual angle almost down to the incisal angle,

using care to keep the foil highest toward the lingual and gingival walls. (Fig. 24.) The gold is now carefully worked along the axial wall and into the incisal angle, completing most of the anchorage that the filling is to have. A Ferrier separator or some other separating device must be applied to gain better access and insure a proper contact point. (Fig. 25 and Fig. 26.)

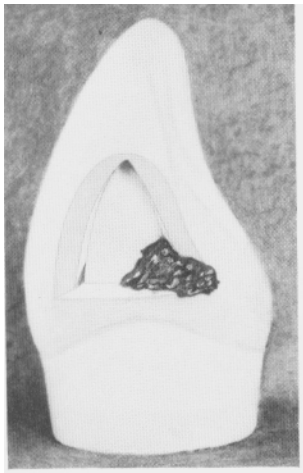


FIG. 22. Portion of gold inserted in linguo-gingivo-axial angle in beginning operation.

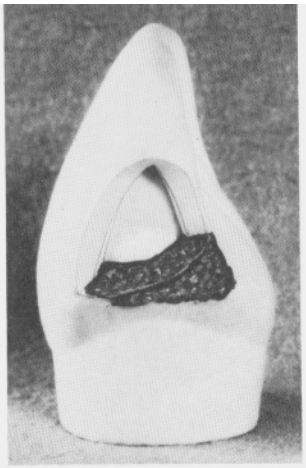


FIG. 23. Gold built across gingival wall and anchored into labiogingivo-axial angle.

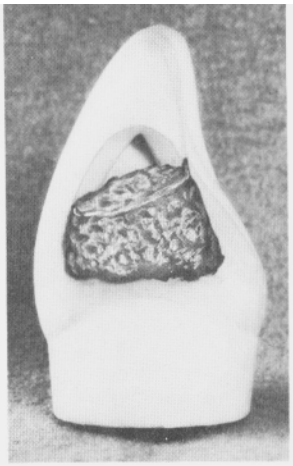


FIG. 24. Gold built up to incisal angle. The critical point of the operation is just ahead.

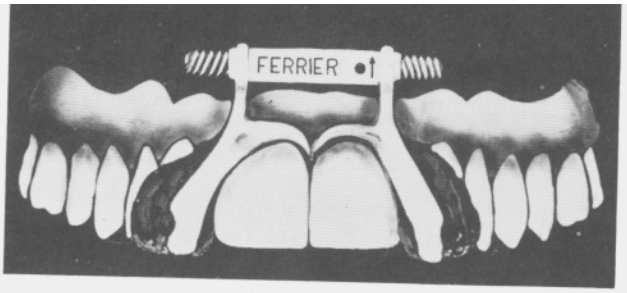


FIG. 25. Separator adjustment. The instrument is held rigidly in place with modeling compound under the bows. Thus, the force of the mallet blows is distributed over four or more teeth.

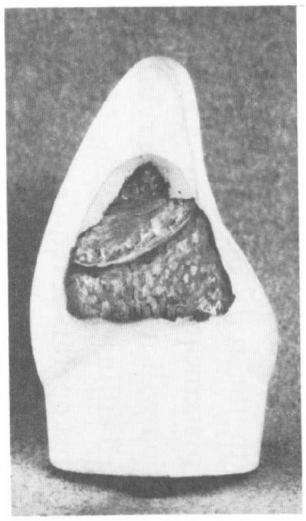


FIG. 26. Gold filling incisal angle and anchored to main body of gold already placed. The filling should now be safe from dislodgment.

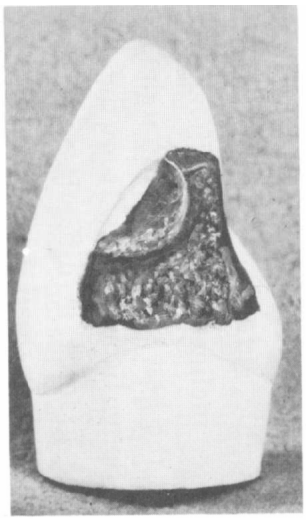


FIG. 27. Appearance of filling at making of turn. Great care should be exercised at this point.

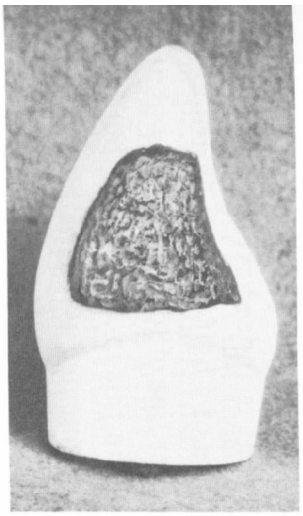


FIG. 28. Gold completely placed.

We have now reached a critical point in the operation.

That portion of the incisal fourth that remains to be built to proper contact and contour will rest on the enamel and requires delicate manipulation, yet firm enough to well condense the
gold. I have termed this procedure “making the turn”, for that is indeed what we are doing— making a turn of a half circle in instrumentation to get a proper line of force. Some hand pressure may be used in this incisal region, but it usually can be supplemented with mallet force upon a small bayonet-shaped plugger. Indirect wedging is permissible and desirable in some locations; but usually force applied at nearly right angles to the wall is best in this situation. As there is but a small bit of gold to be placed, such force is allowable, although, generally speaking, a line of force inclined toward the long axis of the tooth is the best one to use throughout the operation. Some license away from the orthodox must be granted in difficult and unusual situations. With a small bayonet plugger the “turn is made” and the remainder of the operation (Fig. 27) presents no exceptional difficulties. With an improper technic, an inoperable case is often made by cutting off the field of operation with the foil. Sufficient separation, care in the placement of the foil and proper instrumentation will insure good margins and a well-condensed filling at this point. (Fig. 28.)

To finish this operation requires a little more separation (never enough to cause any great discomfort), in order that a thin metal abrasive strip may be passed into the interproximal space. This followed by long linen strips of various grit until hard dense gold is reached to serve as the contact point. Files and knives are now used to bring the gold down to its margins, when the final finish is made with strips. A disk is rarely used, as a strip will give better contour, and more rapidly, when cooled by the compressed air blast.

The labial outline of the finished filling is in harmony with the distinctive markings and the size and shape of the tooth. (Fig. 29.) It should not offend the esthetic sensibilities of the patient or his friends, and the surface of that tooth is rendered immune to decay under ordinary circumstances for the lifetime of the individual. (Fig. 30.)

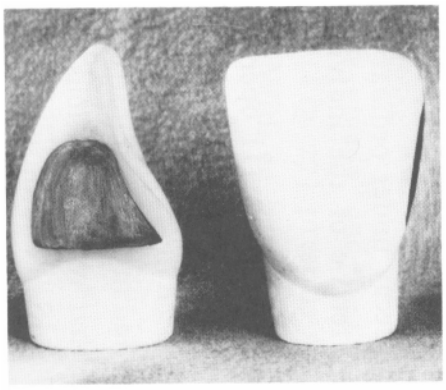


FIG. 29. Completed operation showing straight labial outline form parallel with distal lobe of tooth.

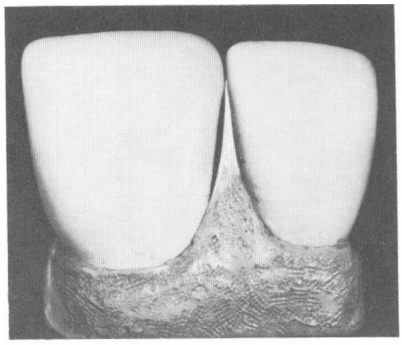


FIG. 30. Finished operation. Only a small amount of gold visible.

I have shown a typical Class III operation, and with some hesitancy I show some variations from the type. It has been my experience in lecturing on this subject and in practical instruction to graduate dentists that when variations from type were shown, confusion and misunderstanding was the result. The variation was given more important consideration than the type and was frequently substituted when the typical operation was indicated. On other occasions, if some modifications of the standard preparations were not shown, the impression was given that all cases were to be treated in a stereotyped way.

We must have a standard and modify this standard to suit the conditions met in practice. Some of the more important variations from type are here given, largely in an illustrative way, with short references in the text to the illustrations.

The distal surfaces of upper lateral incisors call for a modified and a simple preparation, when they occur with the disto-incisal angle well rounded. (Fig.31.) The contact with the opposing tooth is nearly on the curved surface that makes up the angle. These are simplified and more nearly immune and are improved esthetic all by cutting away the angle. A direct drive with the plugger can be obtained throughout the operation, and thus "making the turn", described in the typical preparation, can be avoided. A typical outline form established here would give the impression of two opposing curves, one the incisal outline form of the cavity and the other the curve of the angle of the tooth. This is out of harmony with all the distinctive markings of the tooth and does not meet the esthetic requirements.

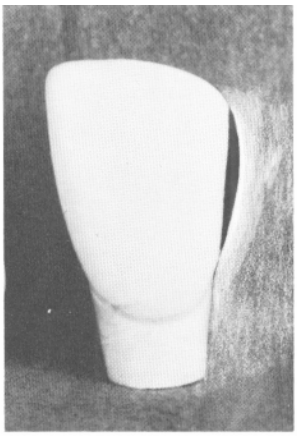


FIG. 31. Class 3 cavity in distal surface of upper lateral incisor illustrating variation from typical preparation shown in Fig. 19.

To a very limited degree, this may apply to the distal surfaces of certain central incisors and to the mesial of some cuspids, and here for an additional reason. The shape of the cuspid makes it very inconvenient to reach through from the labial or lingual approach to the opposite side of the tooth, and we experience difficulty in condensing the middle third of the filling. Where permissible, an incisal approach is desirable. For these reasons and others, the distal surfaces of upper cuspids require a similar preparation, and for this tooth, the variation becomes the type. The filling of this cavity, once considered the most difficult to fill in the human mouth, with proper cavity preparation becomes just an ordinary procedure. The distal angle is removed sufficiently to allow an accessible and adequate incisal anchorage so that gold may be placed with a proper line of force. The cavity is boxlike in its entirety with a slight incline of the strong gingival wall toward the axial wall to obtain all the retention possible. The linguogingival shoulder here frequently becomes a definite angle into which foil may be condensed with a direct line of force. The tooth is well rooted and will tolerate an extremely well condensed filling. In finishing the operation, the incisal angle is well sloped to prevent any direct stress being applied in mastication. There is but one choice in this situation and that is gold foil. I have used it in this cavity preparation for nearly 20 years and I have had just that many years of satisfaction in treating a troublesome area of decay, in a simple common sense manner, reduced to simplicity by virtue of the cavity form. (Fig. 32.)

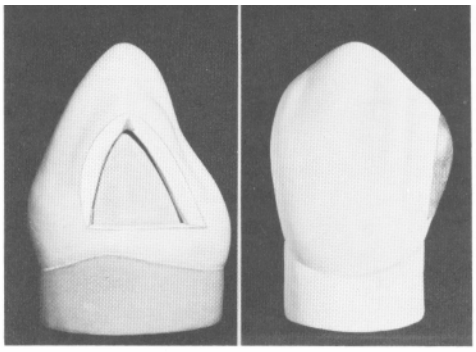


FIG. 32. Class 3 cavity preparation in distal surface or upper cuspid to be used in all cases wherein incisal angle may be cut so as to receive bayonet plugger at proper angulation to deliver force; used in large majority of cases. Here the variation becomes the type.

The distal surfaces of lower cuspids are frequently involved with decay adjacent to them in the mesial surfaces of lower first bicuspids. When they occur in pairs, the operation is much simplified, as the cuspid may be restored after the cavity in the bicuspid is partially prepared and with the aid of separation, free access to the diseased area is attained. These cavities follow the typical class three preparation and are made surprisingly small.

Extension requirements may be had without gold showing to any appreciable amount and this only at an angle of vision that must be taken to search for the filling and *never shown* in ordinary conversation.

Cavities in the distal surface of lower cuspids may occur where the mesial surface of the first bicuspid is not involved, or where there has formerly been placed a good filling that should not be removed. In this situation, it frequently is advisable to make a preparation that varies from type. The approach is gained at the expense of the labial wall, which is cut well out to give access to the linguo-gingival angle and the incisal angle. (Fig.33.) The lingual wall is left standing wherever possible, as its removal increases the difficulties of placing the gold and weakens the incisal angle that is subjected to so much stress and wear. By mechanical separation, access is gained so that a good lingual margin that is barely visible through the lingual embrasure is obtained. Such fillings are visible only with a view taken at right angles to the tooth and this line of vision is rarely taken unless deliberately.

All too often, we find decay upon the distal surface of lower cuspids where the distal angle of the tooth has been worn down to a point level with the marginal ridge of the first bicuspid. Gold foil cannot be well retained for any length of time and in such a situation some other type of operation is indicated. Foil will serve us well, better than anything else, if we confine it to its indications, but we must not expect too much and continual wear and stress on a thin angle will soon prove its undoing.

There is an area of decay that calls for a class three preparation that varies from type, that occurs with less frequency than in any other proximal surface of the teeth. I refer to those cavities in the proximal surfaces of lower incisors. They are usually immune to decay and cavity forms should be made with this in mind. (Fig. 34) They are

small teeth and require preparations in keeping with their size. The incisal angles must be safeguarded at the expense of all else, as once the angle is lost it is impossible to restore it esthetically. Fortunately, we may consider the point where it is safe to lay the incisal angle of the cavity within an immune area; the lingual wall is left standing to further strengthen the incisal angle and the linguo-cavo surface angle is also in areas of immunity. The cavity form may be reduced in size to a point

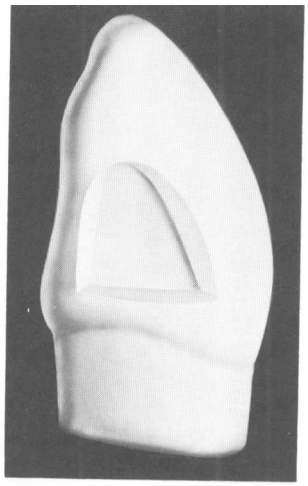


FIG. 33. Distal surface cavity in lower cuspid. Convenience form is gained at expense of labial wall. Variation from type.

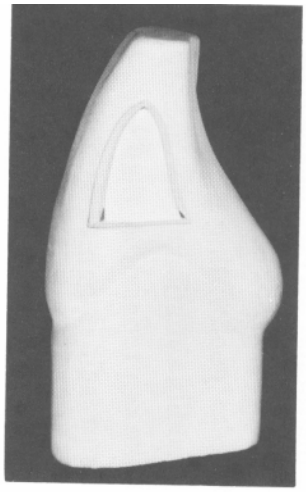


FIG. 34. Cavity preparation from proximal surfaces of lower incisors. The lingual wall is not removed and its cavosurface angle remains on the proximal surface. The cutting is reduced to the absolute minimum.

where it can scarcely be seen. I feel much liberty can be taken with the outline form, due to the general immunity these teeth enjoy. They are easily separated and the access is ample to place foil in any part of the cavity. Cements of any kind have no place in the lower anterior teeth, with the possible exception of very young people. Something enduring is essential. The teeth are so small, that not many renewals may be made without loss of the angle or the pulp or both.

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CLASS IV PROXIMAL CAVITIES IN THE INCISORS AND CUSPIDS WHICH INVOLVE THE INCISAL ANGLE

The description of Class 3 cavities included some variations from type that might be considered as Class 4 cavities. They have been included in the class given to proximal cavities in the incisors and cuspids which do not involve the angle for the reason that the angle involved is scarcely an angle at all, but a curve and the inciso-cavo-surface angle is established somewhere upon this curve; moreover the cavity preparation is identical with the exception of the outline form at the incisal fourth, and to include and classify them with class four would be confusing.

In class IV cavities an incisal or lingual step is substituted for the incisal anchorage that is used in a simple proximal cavity. The base or gingival wall is the same, but may be inclined toward the axial wall more acutely as an added safeguard in building the gold up to the incisal step. The labial and lingual walls meet the axial wall at right angles, as we desire all the retention and resistance form possible. (Fig. 35a)

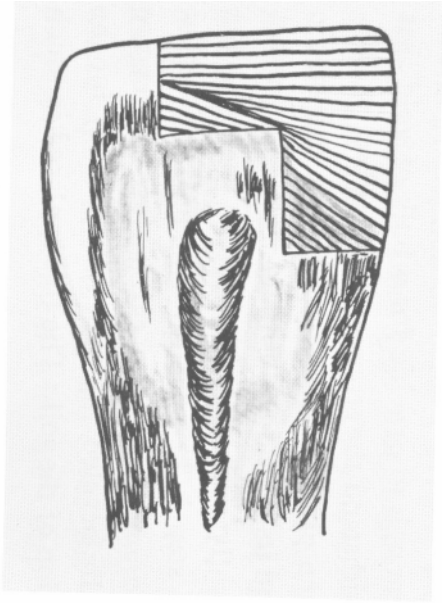

FIG. 35. Vertical section mesio-distally. Illustrating method of building the gold in a Class 4 cavity.

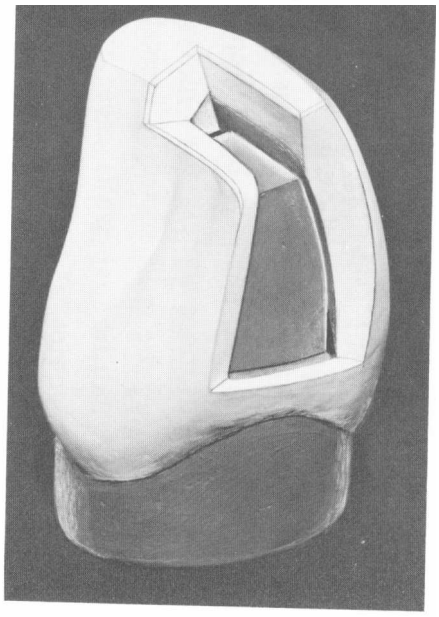

FIG. 35a. Class 4 Cavity Preparation in Upper Central Incisor.

The step is formed by cutting away the lingual enamel plate to a point that would occupy the incisal two-thirds of the tooth mesiodistally. This step is made with a small

bur and must be deep enough to provide for a bulk of gold that will withstand the stress of mastication. A convenience pit is sunk at the extreme end of the step and its incisal and lingual walls are parallel or slightly undercut. The labial enamel plate of the step is beveled toward the labial cavosurface angle. All the cavosurface angles are carefully beveled and the cavity is ready for the reception of the foil. The foil is placed in much the same manner as in a class 2 cavity, cohesive gold only being used. The diagrammatic drawing illustrates the angle at which the gold is built toward the tooth and no especial difficulties are encountered other than it takes considerable time to place the gold. (Figs. 35, 36, 37 and 38.)

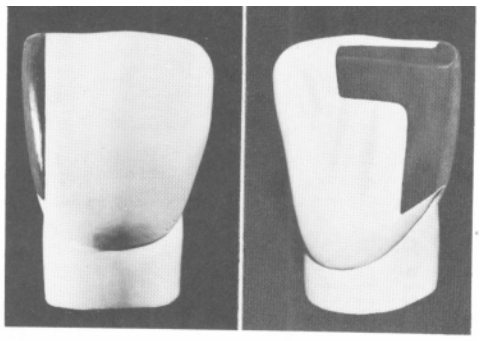

FIG. 36. Labial view in Class 4 operation. This is the only outline form used and gold foil operations are employed here in only very favorable cases.
FIG. 37. Lingual view in Class 4 operation.

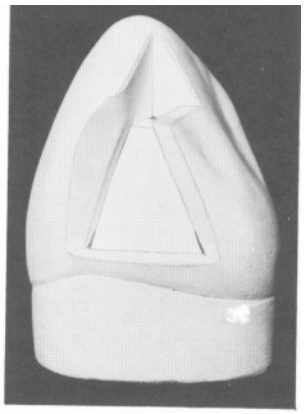

FIG. 38. Class 4 cavity in distal surface of upper cuspid advocated by Dr. J. M. Prime.

The filling here shown meets the esthetic requirements better than an older type of preparation that included in the step a portion of the labial wall in addition to the lingual wall. But this older preparation was much more resistant to the stress of mastication and made a better filling in every respect except—esthetically. So nearly universal is the objection to its appear and that I can rarely place one now.

We are also limited in the use of the type here illustrated. If the tooth be thin at the incisal edge, it is nearly impossible to form a good incisial step without endangering the pulp. If the incisal edge be of reasonable thickness and a good bulk of gold placed, the protrusive occlusion in most mouths will stretch the gold away from its margins and ruin the operation.

Therefore, we are limited in our application of gold foil in class 4 cavities to just those few cases where the bite is favorable and the thickness of the incisal edge of the tooth will permit a step in reasonable proportion to the proximal part of the filling. My own experience and that of many other foil operators with whom I have consulted will, I think, substantiate this statement. Only through personal experience over long periods of time and the observation of the work of others similarly engaged can one determine the limitations of any filling material. I freely admit that this preparation that I once thought so well suited to the restoration of incisal angles with gold foil, has not proven successful in my hands over a period of years and I now apply it only to those limited cases referred to, and to those with caution.

From this we should learn to make every possible effort to save the incisal angles of the anterior teeth; we should place gold foil in all simple proximal cavities where esthetic requirements will permit, as each renewal of something less enduring, brings us closer to the destruction of the angle that cannot be restored esthetically for any considerable period of time.

CLASS V GINGIVAL THIRD CAVITIES IN BUCCAL AND LABIAL SURFACES

We make gold foil restorations in gingival third cavities to restore lost tooth structure that has occured from decay and from erosion or abrasion or a combination of both. The procedure is the same, for regardless of the cause, with the exception that the cavity outline need not be extended so far incisally or occlusally for decay as for erosion; the decay usually progresses toward the gingival while the erosion may tend to spread toward the incisal or occlusal.

In speaking of erosion, there is a type of general wasting of the tooth structure that may occur upon any surface of any tooth. It may appear at any time in life and makes rapid progress in cupping and grooving the teeth in irregular and fantastic shapes. Its etiology is unknown and the restoration of the lost tooth structure by any type of filling is but a temporary expedient as the erosion continues, in most instances leaving an island of filling material surrounded by eroded tooth structure. There is no reference to this kind of wasting in the preceding remarks nor in those which are to follow. It is the sharp wedge-shaped areas occupying the gingival third of teeth, and those of a saucer-shaped variety whose marginal limits are clearly defined and lie within the gingival third of the tooth that are of interest here.

The frequency of occurrence of erosion is alarming, deserving more consideration than it has in the past received. It occurs with rare exception only in the best kept mouths. The etiology was fully discussed in a paper[1] published in the July 1933 issue of the Journal of the American Dental Association. The conclusions reached were briefly, that erosion (the type we have here in mind) was a self-inflicted disease, prevalent in the best kept mouths, caused by a misguided effort on the part of the patient to keep his teeth clean. That the wasting was due to the abrasion caused by the improper action of the tooth brush usually accompanied by rough and gritty powders and pastes. [1] Ferrier, W. I.: Clinical Observations on Erosions and Their Restoration. J.A.D.A., 20: 1150 (July) 1933.

To determine the frequency of occurrence of eroded areas, the statistical data given in connection with class III cavities was obtained. (Fig. 18.) You will observe from this tabulation that 32.03 per cent of these operations were made on the gingival third of teeth. Now the data was secured from the practices of men whose patients as a whole made at least an average attempt to keep their teeth clean. Certainly all were familiar with, and used the tooth brush. In this class of people decay, unaccompanied by erosion, is not nearly so prevalent as erosions alone. Therefore, I should judge that a fair estimate of the frequency with which erosion occurs in the mouths of people who care for their teeth, would be in about 20 per cent of all cavities that present for filling operations.

In my earlier practice most of the gingival third cavities that presented were decayed and occurred in about the same percentage as at the present time. While economic necessity on the part of the patients prevented me from restoring all those cavities with gold foil, yet the majority were so treated. The reason for the prevalence of

decayed areas in excess of erosions was that people were not as fixed in their habits of mouth hygiene as today. At the present time and for some years past this situation has been reversed and gingival third gold foil fillings for eroded areas by far out number those made for decay.The people for whom these fillings are now made all gave daily care to their teeth.

I think this personal experience will in a measure substantiate my former conclusions that erosion (the type we have referred to) is a self inflicted disease.

Regardless of the causes of the loss of tooth structure in the gingival third of the buccal and lingual surfaces of the teeth, the data shows a large field for the use of gold foil. Most men in the profession are convinced of the superiority of gold foil over other materials as applied to cavities in the teeth. Yet a very small percentage use it in gingival third cavities.

The reasons are not all of an esthetic nature as many would have us believe, and I must return to personal experience to illustrate my point of view.

As with all practitioners, I am confronted with the problem of esthetics and must use all filling materials known to dentistry to cope with all the situations that present in decay of the human tooth. I would dislike being deprived of any one of them. Among these materials I use porcelain inlays solely for esthetic reasons and never where esthetic influences do not enter. In a tabulation of a series of porcelain inlays, numbering 160, made consecutively, only 6 were made for class V cavities and 154 were made for class III cavities in the proximal surfaces of incisors and cuspids. This series was selected at random and ran consecutively. It will be seen that I found it necessary to use less than 4% of these 160 porcelain inlays in class V cavities for esthetic reasons.

Now I have no greater persuasive power for the insertion of gold foil in class five cavities than I have for class three cavities. If either one is objectionable, porcelain inlays are made. I coerce none and argue with few. Therefore, it would appear that the patients have not the serious objection to gold in gingival third cavities that is generally assumed.

Cavities of erosion and decay are so prevalent and gold foil is so satisfactory in their restoration that there can be but one choice if the technic is understood in the large majority of cases.

The technic, though exacting, is a simple one. A proper application of the rubber dam affords an excellent field of operation and an especially good opportunity to give the operation the fine finish necessary at the gingival margin, which usually lies in cementum. Without its use, a filling of any kind in this position cannot be properly finished.

I have but recently designed a cervical clamp that gives me a better field of operation than any I have used thus far. The labial jaw lies well below the plane of the gingival wall of the cavity and an operation may be carried out with but little interference. (Fig. 39)

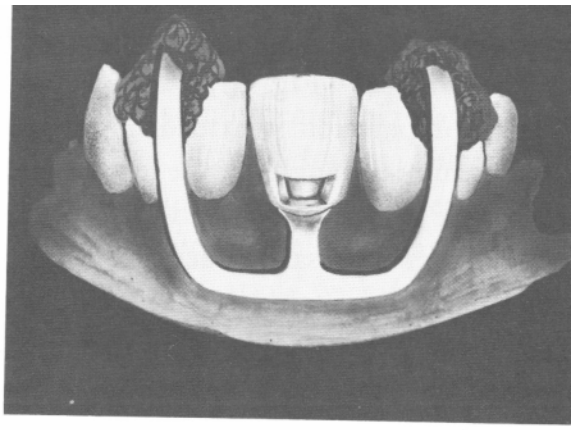

FIG. 39. Cervical clamp designed by author to retract the gum tissue and give freedom from operative interference in Class 5 cavities.

The cavity preparation is extended well out to the mesial and distal angles of the tooth, somewhat beyond the eroded or decayed area toward the incisal edge or occlusal surface and slightly beneath the gum. This includes all of the wasted area. The outline form is obtained by the use of a small inverted cone bur held endwise to the wall on which we are working. All the walls, except the occlusal, are shaped in this manner, and it is formed by the bur held at right angles to the axial wall, which is roughly formed in the same manner, the cavity being finished with a 6 ½-2 ½-9 hoe; a very simple operation.

The occlusal and gingiva walls are parallel or slightly undercut to obtain retention; but the mesial and distal walls converge toward the axial wall, as in an inlay preparation. Their angles are of assistance in the starting of the gold, but they have little to do with retention in the finished operation. They are formed in this manner to give them strength to withstand the wedging of the gold. In the outline form, the angles are sharp and definite, being so made to coincide with the outline of the eroded area with the least possible cutting. In cavities of decay, where the same preparation is used, the chalky and whitened enamel runs up along the mesial and distal angles of the tooth in fine lines, terminating in points that almost coincide with this cavity preparation. Thus, extension for prevention is obtained exactly where it is wanted, with a minimum of cutting. (Fig. 40)

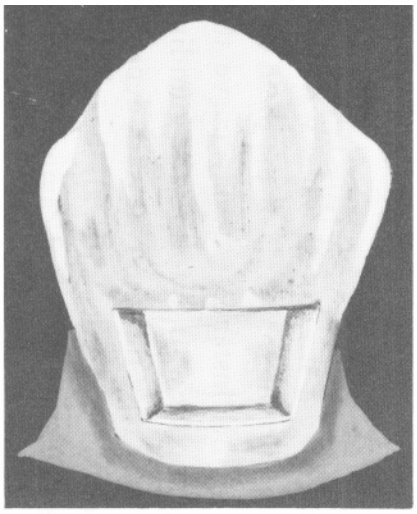

FIG. 40. Typical Class 5 preparation. There are many variations from type, but distinctly sharp interior angles are always indicated.

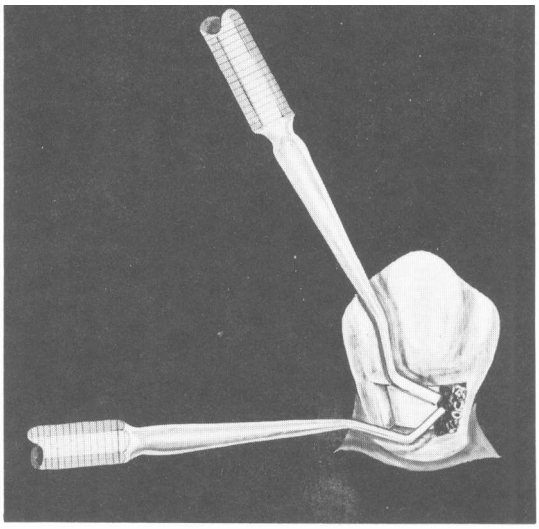

FIG. 41. Placing first cylinder of noncohesive foil along mesial wall. One instrument holds the cylinder in place while the other flattens it against the wall and into the angles.

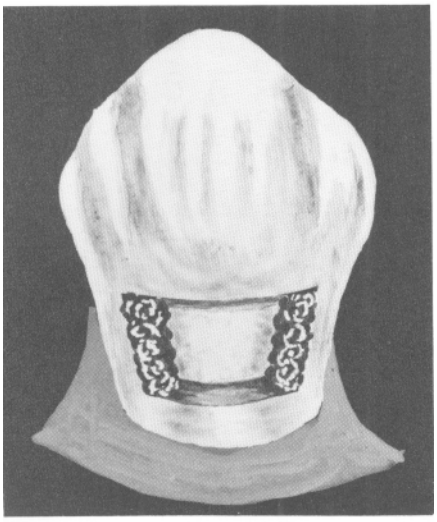

FIG. 42. Mesial and distal walls lined with noncohesive gold.

The cavity here described and illustrated is subject to many variations. In the upper incisor teeth decay sometimes takes place at and as near the gingival line. The curvature of the gum tissue would make a straight gingival wall that runs horizontal to the long axis of the tooth undesirable. In this instance we may curve the gingival and incisal wall to follow the gum line or we may curve only the gingival wall, depending upon the conditions met with; all the interior line angles shown in the typical cavity are, however, placed in the dentine of the cavity—but not always up to the cavo-surface angle—regardless of the variation.

Frequently fine chalky lines run up the mesial and distal angles of the labial or buccal surfaces of the tooth well into the embrasures much farther than in the typical

cavity just described. This calls for a decided curvature of the occlusal or incisal wall to include these lines of decay without destroying too much of the tooth structure in the middle third area. Occasionally these chalky lines will appear only in one embrasure either to the mesial or to the distal; it should be obvious that a similar extension opposite should not be made for the sake of symmetrical outline.

Some may think that the straight gingival wall is not in keeping with good esthetics—unmindful of the fact this wall is always placed well under the free gingiva, and that if recession takes place later in life it will usually not be visible.

With this cavity, as with all others, experience and judgment must decide the variation from the type with the understanding that the typical has far greater indications than the variations therefrom.

In building the gold, noncohesive foil in conjunction with cohesive foil is preferred, although the entire filling may be built in cohesive gold. I shall describe the former of the two methods.

A cylinder of noncohesive No. 4 foil consisting of one-eighth sheet is placed along the mesial wall, the end of the cylinder resting against the axial wall and wedged firmly to place with as little manipulation as possible. Care must be exercised in holding the cylinder with one instrument while wedging. (Fig. 41)

In like manner, the distal wall is covered with a noncohesive cylinder. (Fig. 42.) The gingival wall is covered by introducing a one-eighth cylinder transversely across the cavity, one end resting on the gingival wall and the other touching the occlusal wall. The occlusal half of the cylinder is now forced against the gingival wall and well into the axiogingival angle, securely locking the gold already placed. (Fig. 43.) The occlusal wall is treated in the same manner and the peripheral walls of the cavity are completely lined with noncohesive gold. (Fig. 44.)

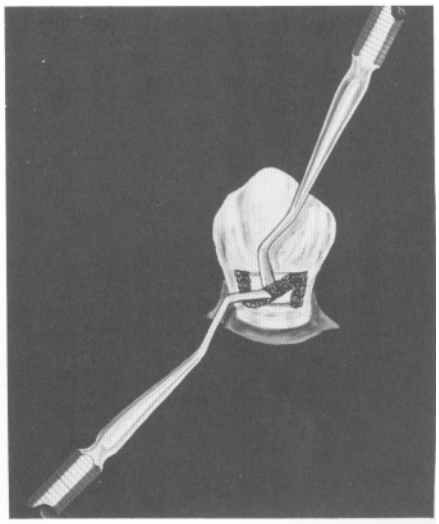

FIG. 43. Manner in which cylinder that is to cover gingival wall is introduced into cavity. It is held against the axial wall by one instrument and forced against the gingival wall with the other.

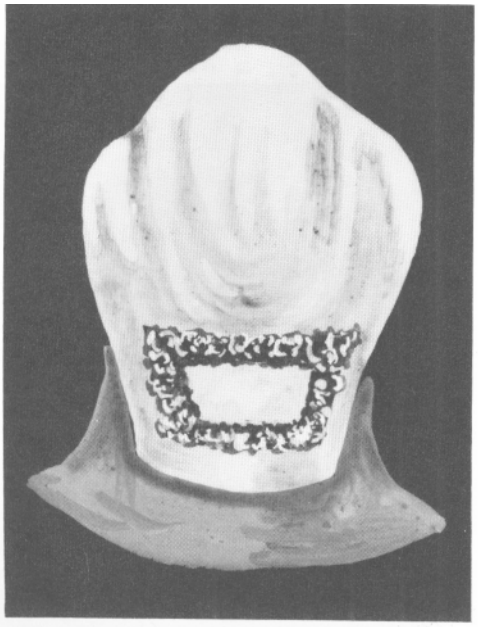

FIG. 44. Peripheral walls of cavity completely lined with noncohesive gold foil.

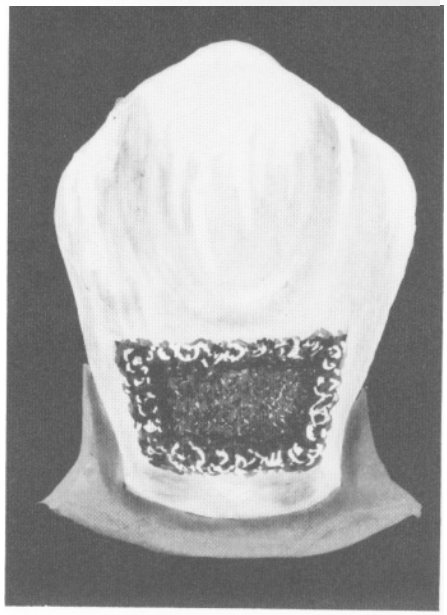

FIG. 45. Noncohesive gold anchored by few pieces of cohesive gold.

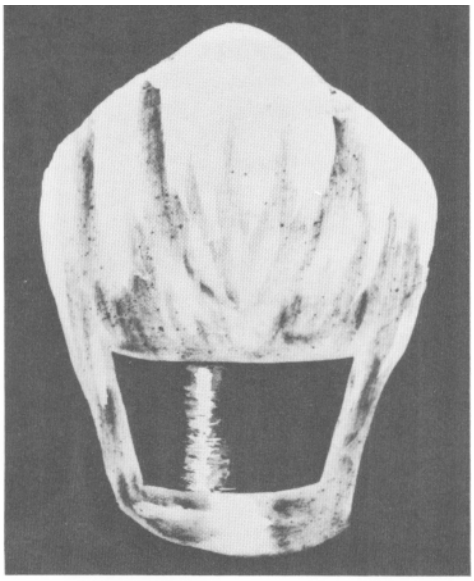

FIG. 46. Filling completed with cohesive gold covering entire surface.

The lining of these cavity walls with noncohesive gold affords a cushion to mallet the cohesive foil against, thereby protecting the margins and making it possible to complete the operation with less regard to the line of force used. Noncohesive foil is soft and has great wedging properties. A line of force slightly inclined I toward each wall is all that is necessary.

A one-thirty second pellet of annealed foil is now introduced between the cylinders and pressed lightly to place. Another is placed in similar manner, and the two

are malleted against the axial wall and into all the line angles, wedging and securing the noncohesive gold already placed. Successive pieces of various sizes are placed and malleted, care being taken to wedge the noncohesive gold against the cavity walls, pinching it off as the margins are reached, so that when the filling is built up, the noncohesive foil will be entirely covered by the cohesive foil. If some of the noncohesive is not covered - with the cohesive foil, it matters little. Cohesive gold gives a finer finish and is desirable, but not essential to a good operation. (Figs. 45-46.)

In finishing the filling, the bulk of the gold is best removed with files and the gingival overlap carefully removed with a sharp Wedelstaedt knife. At this point, great care must be used to avoid ditching the cementum below the margin of the filling. Disks must be used with caution at this point, but can be employed with more abandon on the other parts of the gold. Finally, a rubber cup charged with dry pumice is lightly rotated against the gold, and the operation is complete. The time consumed from start to finish should not be more than one hour and fifteen minutes for the average operation by a gold foil operator of average ability. An operation that has no peer in the operative field completed in one appointment and yet made use of by a comparative few. (Fig. 47.)

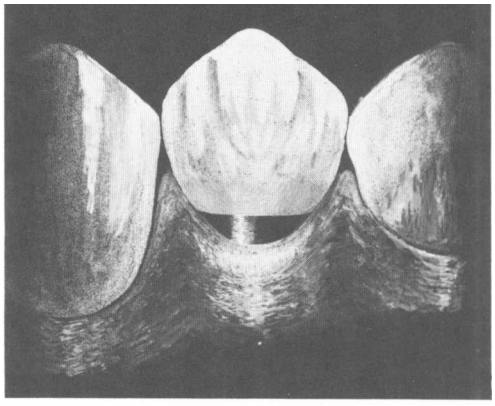

FIG. 47. Buccal view of Class 5 in lower first bicuspid as it appears in the mouth.

If I were limited in the use of gold foil to one class of cavities and deprived of its use in all others, I would choose to use it in Class V cavities. Indications for its use are so frequent and the results so satisfactory that I have no other choice in teeth that are not too conspicuous or patients too discriminating. Any other material comes so far from measuring up to the degree of excellence of gold foil in these cases that it is with reluctance that I employ anything else and then only for esthetic reasons.

CONCLUSION

THE TECHNIQUES and sequences described in this treatise have been practiced by an ever-increasing number of operators through the years. They have proved to be as applicable for the undergraduate dental student as for the long-standing member of a gold foil study club.

The basic steps in procedure are grasped rather readily. However, success in performing the meticulous detail required for an excellent gold foil restoration comes

only after a great deal of diligent application and practice. Those who have spent years in study club activity under Dr. Ferrier's direct supervision are the first to admit that the material herein sheds new light each time it is reviewed. It has been said that "knowing is seeing." As greater understanding and experience is attained, the mind can better comprehend what the eye sees. The more this volume is studied as a supplement to clinical application of its precepts, the more finished will the operator be.
G.D.S.

This digitized copy of Dr. WI Ferrier's "Gold Foil Operations" was scanned and edited by Dr. John R. Sechena May 17, 2006