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President-Elect's Message

In 1931, James Mark Prime stated:

> "As an aid to unify thought on gold foil technic, to bring operators together from all over the country to compare work, to discuss instruments and instrumentation, golds, cavity preparation, etc., and to assist if possible, in bringing about a more uniform teaching in our schools, I suggest that we organize an academy to meet at the same time and place as the American Dental Association."

From this nucleus of an idea, a group of dedicated men began exploring the interest in and desirability of creating such an Academy. Through the efforts of Doctors Bruce Smith, Gerald Stibbs, Ralph Plummer, Miles Markley, Harry True, Lester Myers, Charles Stebner, Avery Spears and others, the American Academy of Gold Foil Operators came into being in September 1952. Now, some 21 years later, it is fitting to review the accomplishments of this organization and evaluate the degree to which their aspirations have been fulfilled.

Scientific programs and clinical demonstrations have been given throughout the length and breadth of this country with academy members sharing their knowledge and skills with students, faculty, private practitioners, and military dental personnel. There is no doubt that these programs have had a marked influence on the attitude and approach to quality dental procedures throughout the United States. Not only has this proven to be a real motivating influence on students but also has served to inspire the improvement of teaching programs and the development of study club activities.

As the Foil Academy grew in stature and prominence, it began to take an active part in helping the Operative Section of the American Association of Dental Schools become a vital and viable body in the development of a cooperative attitude between Operative departments throughout the country. As a result of these efforts, Project Acorde was developed. Acorde has served to bring faculty from more than 50 schools together to reach agreement on concepts of cavity preparation, instrumentation and restoration. This has never been done on such a large scale by any other discipline and the field of education in operative dentistry has been well served by this monumental task.

As interest in the area of Operative Dentistry was being rekindled, it became obvious to the members of the American Academy of Gold Foil Operators that something would have to be done on a National scale to foster this interest and channel it constructively to the benefit of the progression. There was considerable discussion relative to the desirability of changing the name and image of the Foil Academy to be more all inclusive. It was decided that any efforts along this line would only tend to dilute the loyalty and interest in the Academy which had served its objectives so well over the years. Nothing could be done that would possibly disrupt the active participation of those many dedicated men who have been drawn together every year by the common bond of interest in the highest quality of dental service. The Foil Academy lent its active support and encouragement for the formation of the new Academy of Operative Dentistry. This new Academy is now well established and serving the needs of the profession in an admirable fashion. There is no conflict of interest in these two groups but rather they are working harmoniously in a symbiotic relationship for the good of the profession.

There is probably no other organization that has so completely fulfilled the dreams of its founders, and the members of this respected group can be justifiably proud of their accomplishments. However, in the true spirit and tradition of the Academy, it will not rest on its laurels, since there is still much to be done. With increased emphasis on mass produced dentistry, reduced educational programs, and delegated responsibilities, it is more important than ever that a strong force be maintained encouraging quality in all aspects of dentistry. Compromise cannot be condoned and the Foil Academy must continue its efforts to motivate and instill the desire for excellence in dentistry in the mind and heart of the profession. This Journal represents an excellent vehicle for the dissemination of information and technical knowledge. It requires the active support and participation of the membership through the submission of original manuscripts. We cannot allow our Journal to cease being published because of a lack of material or apathy in the ranks of the membership. With the great talents of this Academy, we should have a wealth of material awaiting publication. Your cooperation in supporting the continuation of this publication by submitting papers, manuscripts, and newsworthy items will be greatly appreciated.

David B. Law, D.D.S., M.S.

Rubber Dam Application for Children

The advantages of using the rubber dam for the adult patient apply equally to the child. In addition, there are several areas of special concern to the dentist who treats children, in which use of the dam contributes specific aid.

1. The rubber dam is a positive behavior control measure.
2. Protection against aspiration of foreign objects is provided, especially in analgesia or general anesthetic cases.
3. A better operating field is provided in children with cerebral palsy who have less control of involuntary movements.
4. Parent education is enhanced since the rubber dam limits the field of observation.

To successfully apply the rubber dam to children one must first accept the fact that there are certain basic differences between the technique as applied to adults and that as applied to children. These differences are:

1. The operator should spend more time telling the patient what a rubber dam is and why it is used. A descriptive name could be a "rubber raincoat." Time should be spent in teaching the patient to speak, to swallow, and to breathe through the nose.
2. A Young's rubber dam frame is suggested because:
   a. It holds the rubber off the face.
   b. It is light and does not require the use of weights.
   c. There are no head straps needed.
   d. The dam can be easily applied without the use of an assistant.
3. The number of teeth isolated is limited only to those which have a bearing on the operation. For instance, an occlusal cavity on a lower first permanent molar would require only one hole. A proximal cavity between the primary molars would require only two holes.

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Illustrations of this article were published by courtesy of W. B. Saunders, Co. Philadelphia and London. (Law, Lewis and Davis: Atlas of Pedodontics)

Figure 1 *The rubber dam in place on a child patient. The Young's Frame provides more freedom for the child and is rapidly applied for short procedures.*

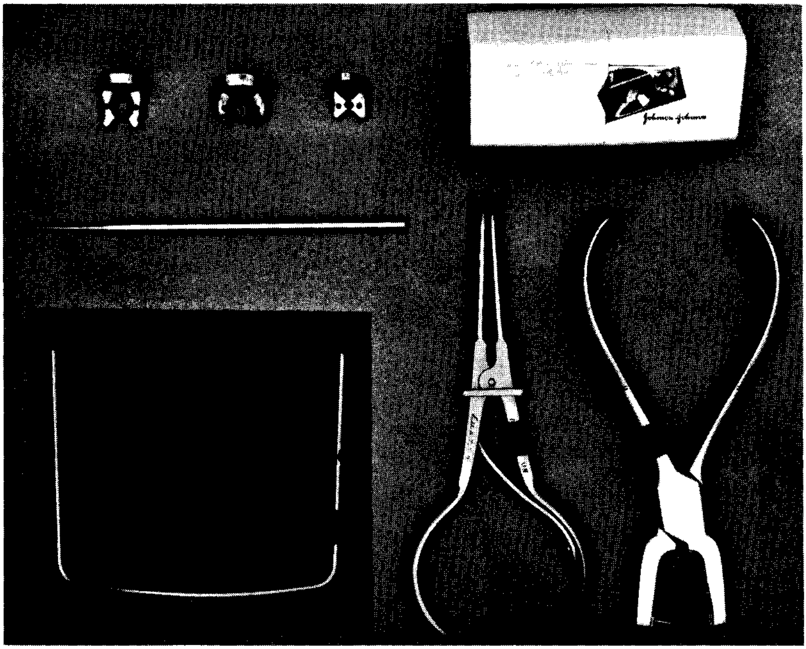

Figure 2 *Usual tray setup for rubber dam application on children.*

4. Wings are left on clamps because:
   a. They hold back the rubber affording better vision.
   b. They can be used to carry the rubber to the tooth.
   c. They can be used as a finger rest to push the clamp below the height of contour of a tooth which is partially erupted. This is very important.
5. The holes in the rubber dam are punched more closely together for children than adults and no effort is made to cover the interproximal gingival tissues. See Figures 3 and 4. Leakage does not occur because the exposed tissue between young teeth is of such bulk that it bulges into the area not covered by the dam and acts as a plug.

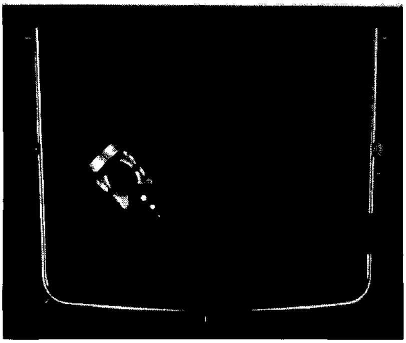

Figure 3 *Typical hole punching for routine operative treatment in mandibular arch. Tooth to be clamped is largest hole. All holes punched approximately 2 mm apart, and at 45° angle.*

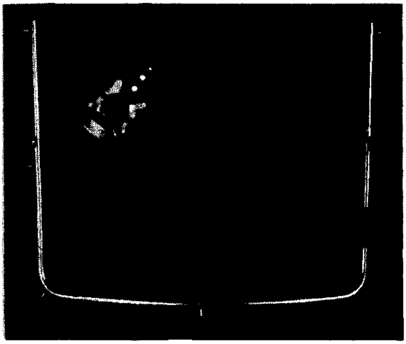

Figure 4 *Routine placement of holes for maxillary arch in child patient. 5 x 5 rubber dam is recommended. Dam is turned over for use on opposite side of arch.*

6. Mouth napkins and saliva ejectors are not necessary in most cases, although in the older child they may be desirable.
7. Five-inch dark, heavy-weight rubber dam is used since it provides maximum tissue retraction.
8. Anesthesia is not necessary in all cases, but is usually desirable.

Technique of Application

1. **Instruments:**

Clamps	**Use**
Ivory #14 or ASH #14	(Carbor Steel preferable to S.S.) All second primary molars, maxillary or mandibular, first permanent molars (Ivory #14, ash #14)
Ivory #00	First primary molars Primary cuspids and anteriors (Ivory #100)
Ivory #14 A	Partially erupted first permanent molars (Ivory #14A)

Young's Rubber Dam Frame

Beaver-tail Burnisher

Five-inch dark rubber, heavy weight

2. **Clamps:**

The clamps for children are used in a slightly different way than those for adults. Since the Young's rubber dam frame does not retract the rubber as does conventional type holders, the wings — if left on the clamps — will provide a wider operating field. The wings, however, interfere with rubber adaption to the tooth unless a groove is cut in each wing. These grooves provide a slot so that the operator can get a beaver-tail burnisher under the rubber and flip it off the wings.

After the clamp is in place on the tooth, the operator should *always* test the security of the clamp by applying firm but gentle finger pressure. When applying clamps to mandibular teeth, the jaw should be supported from below with thumbs.

The clamp is placed in the rubber at the same angle as the holes are punched. See Figure 5.

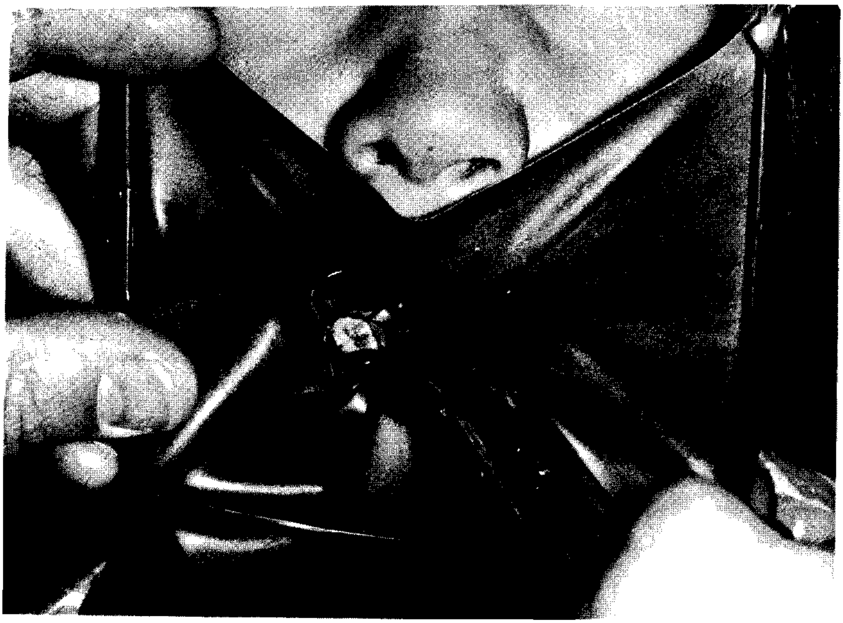

Figure 5 *Carrying the rubber dam with the Young's Frame into the child's mouth. Wings are utilized to engage the dam during placement. This is done to avoid accidental loss of the clamp and aspiration by the child.*

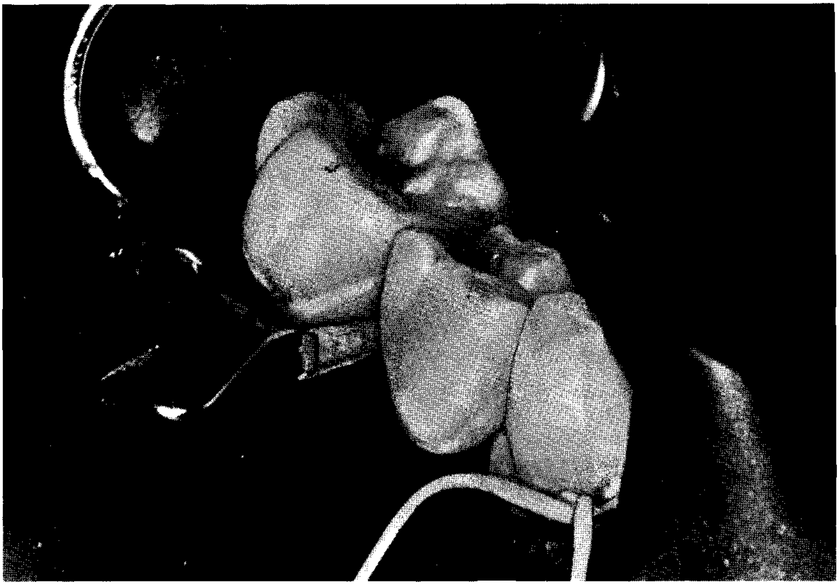

Figure 6 *Typical rubber dam application in mandıbular quadrant. Ligatures may be necessary on some deciduous teeth. Use of the interproximal wedge helps depress the gingival tissues in preparing Class II cavity preparations.*

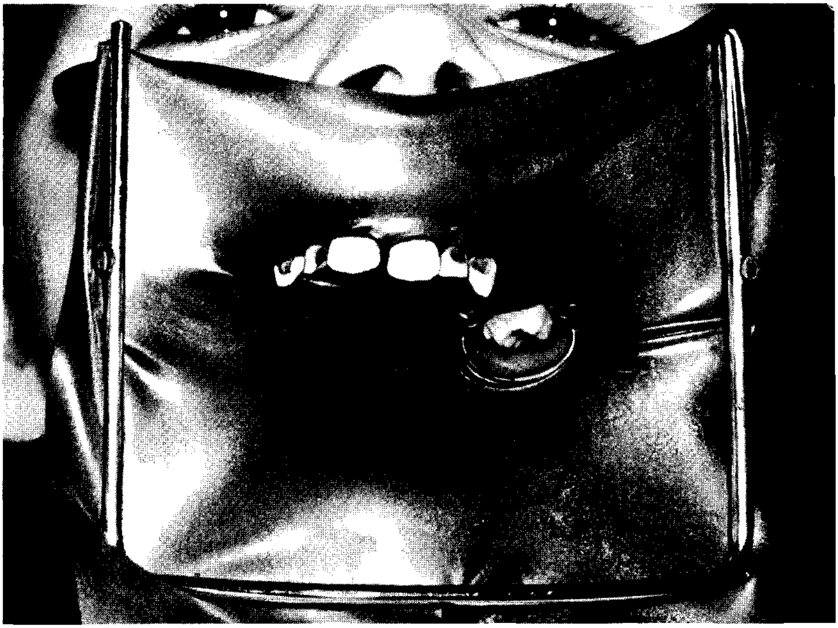

Figure 7 *Rubber dam application in anterior region in child with mixed dentition. A molar is clamped and ligatures and wedges may be necessary to retain the dam.*

3. **Ligatures:**

It has been found that a ligature of dental floss often helps greatly in holding the rubber down on a primary first molar or primary cuspid. This should be tied on the buccal with a surgeon's knot, as described by Black. The ligature should be left long to facilitate future manipulation and removal. See Figure 6. Ligatures are not recommended on permanent teeth.

4. **Order of procedure:**

a. Punch holes in rubber.
b. Put clamp into hole.
c. Attach frame to rubber
d. Carry clamp, rubber and frame to tooth and apply clamp to tooth.
e. Test for security of clamp.
f. Flip rubber off wings.
g. Adjust rubber over remaining teeth.
h. Ligate.

5. **Wood Wedge.**

A wooden wedge is sometimes placed in the interproximal of areas being operated in order to depress the tissue and rubber and prevent tearing by the bur in cutting the gingival floor of the cavity. This is especially indicated where caries has progressed gingivally to a greater extent than usual.

Joseph Kanter

Idiopathic internal resorption

Report of a Case

Idiopathic internal resorption is an interesting as well as a puzzling condition that continues to appear in case reports from year to year. The following is yet another report of a case which follows closely other case reports of internal resorption as far as similarity in site of origin and causative factors.

Medical History

The patient was a 54-year-old male Caucasian. Four years previously he had broken his left foot and several months after its healing a painful condition of gout developed. Laboratory tests revealed a high blood uric acid for which Benemid was prescribed. Other than these physical factors, the patient was healthy with no other systemic or local abnormalities.

Oral Examination

The patient's dentition gave evidence of bruxism. The occlusal surfaces of the maxillary and mandibular molars were heavily worn. There were six amalgam fillings which had been placed 25 years previously. The upper right first bicuspid had a porcelain faced veneer crown fabricated when the patient fractured the buccal cusp to the gingival margin. The tongue, palate, buccal mucosa and gingiva appeared a normal tone and color. No calculus was present and periodontal pockets did not exceed 2.5 mm.

Roentgenographic Examination

Roentgenographic examination (Fig. 1) revealed a missing lower right second bicuspid and several amalgam restorations of long standing. Also present was a porcelain veneer crown on the upper right 1st bicuspid. The occlusal

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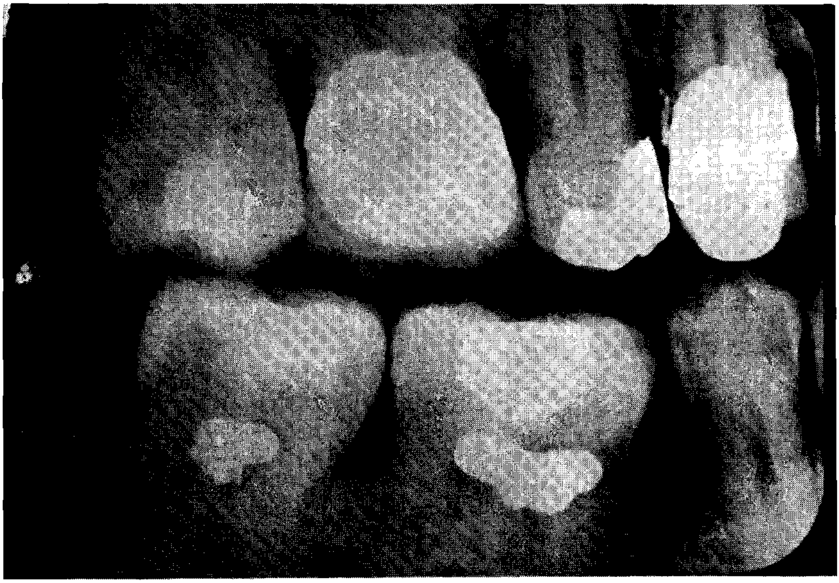

Figure 1: *Pre-treatment Radiograph. No pathology evident*

amalgam on the lower right first molar was about 1.5 mm from the pulp without evidence of a base. Bony support was good and all restorations had occasioned no pain or discomfort in the years they were in use.

Discussion

Upon an oral examination, the Class V amalgam on the lower right first molar was found to be disintegrating and leaking; therefore, at a study club meeting, it was decided to replace it with a gold foil. The patient was given a mandibular block with Lidocaine 2% and epinephrine 1:100,000. A primary rubber dam clamp was placed on the lower right second molar and a rubber dam placed from the second molar to the cuspid. The primary clamp was then removed and a 212 cervical clamp placed on the first molar and stabilized with black compound. The old amalgam was removed and the cavity was found to have no caries and was of minimal depth except at the distogingival where the preparation went ½ mm deeper than the width of a #34 inverted cone burr (1 mm). A gold foil preparation was cut using intermittent blasts of air to remove debris and to cool the tooth. The depth of the gold foil preparation was retained at approximately the depth of the pre-existing amalgam; i.e., about 1 mm, except at the site where it was ½ mm deeper in the original amalgam preparation. Because of the overall size of the completed preparation, it was decided to use mat gold, which would allow coverage of the entire axial wall rapidly with minimal trauma from the condensation with a Hollenback pneumatic condenser. Gold foil was used to veneer the

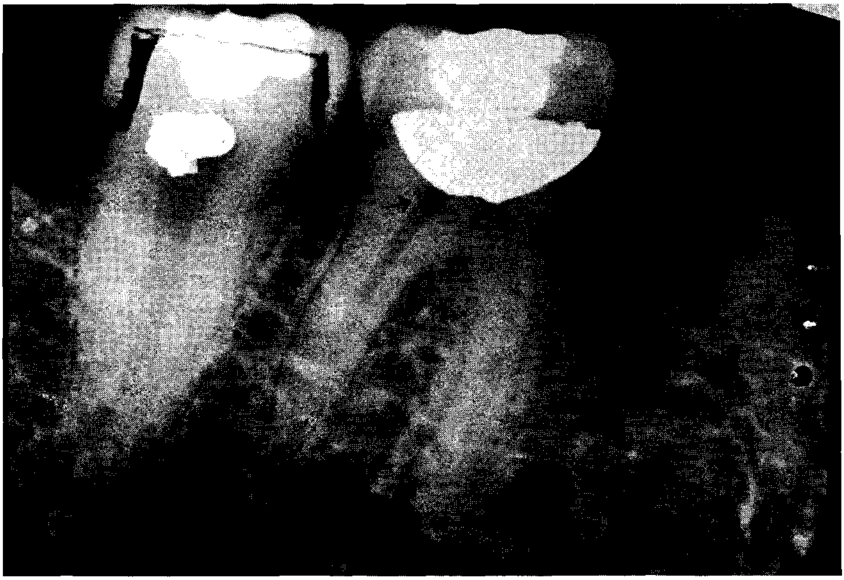

Figure 2: *Radiograph eleven months after placent of gold foil restoration (arrows indicate site of resorption)*

remainder of the filling and care was used that no more than two trips at a time of the condenser be applied to the restoration as it was brought to contour. Finishing of the gold foil was achieved by the use of disks impregnated with garnet and cuttle. The disks were coated with vaseline and rotated at slow speed (approximately 800 rpm) with an assistant delivering a gentle but regular stream of air on the tooth to keep it from over-heating during the finishing process. Crocus disks and tin oxide on a rubber cup gave the final polish. The rubber dam was removed and the tissue beneath the rubber dam clamp was found to be free from trauma.

The next day the patient complained of mild pain, which could be expected after such an operation. The pain persisted in this mild form for about two weeks but was controlled with two Anacin twice a day. Eventually the pain ceased and the tooth remained quiescent for eleven months, at this time the pain recurred in severe form. The patient's tooth was sensitive to percussion and a radiograph (Fig. 2) showed thickening of the lamina dura and periodontal membrane of the mesial root. Most significantly, there appeared a radiolucent area below the distal gingival margin of the foil superimposed on the distal root canal of the molar. A pulp test with a Burton Vitalometer registered two, or hypersensitive. Endodontic treatment was advised to save the tooth; however, the patient elected to have the tooth extracted and a bridge constructed. After the extraction, healing was normal. It is important to note that Tiecke *et al*[1] have observed that "Thermal and electric pulp tests of teeth with internal resorption are of little value. A response indicating tooth vitality indicates only that the process of resorption is currently active. A response of nonvitality suggests that the resorptive process occurred some time previously or else is a current function of periodontal tissue which has invaded the pulp." In reference to internal resorption, this information should be of value in preventing a false diagnosis.

After the tooth was extracted, it was sectioned longitudinally (Fig. 3) through the bifurcations. It revealed a receded pulp chamber with 1.5 mm of dentin between the occlusal amalgam and the pulp. A passage was revealed which communicated from the pulp chamber buccally to the disto-gingival margin of the gold foil restoration, which stopped just short of the gold and 1 mm from penetrating through the buccal surface of the tooth below the restoration. There were 2.5 mm of sound dentin between the pulp chamber and the gold foil restoration. This lesion, communicating from the pulp chamber to the restoration, is a clear case of internal resorption.

Figure 3: *Sectioned extracted tooth with exposed pulp chamber and outlines of cavity preparation and internal resorption*

Because the author had done hundreds of gold foil restorations without experiencing the results described above, there followed the question, "Why did this occur?" If trauma from the preparation was the cause, it should be remembered that there was a deeper occlusal restoration unbased and comfortable for many years without adverse pulpal effect. Moreover, the author had observed hundreds of gold foil restorations placed by inexperienced dental students without producing internal resorption.

A review of the literature on idiopathic tooth resorption reveals that it is by no means a new or unreported phenomenon. It was observed and reported by Bridgman (1862), Tomes (1872), Gąskil (1894), Fothergill (1899), and Mummery (1920).[2] The etiology of idiopathic resorption, as the name denotes, is from an unknown or obscure cause or it arises spontaneously. Internal resorption is evidenced by a chronic inflammatory hyperplasia of the pulp [1,3] with eventual destruction of the tooth due to osteoclastic activity.[1,2,4] By itself, internal resorption is asymptomatic.[1,4] Clinical symptoms become evident because of a chronic pulpitis or by perforation of the tooth.

Bernier[5] has given an interesting explanation of events leading to spontaneous intermittent resorption of teeth. He contends that ". . . as a rule this capacity for care of the calcified product is not seriously affected by the usual traumatic and inflammatory events associated with disturbed occlusion or pulpal and periodontal inflections. On occasion, however, this positive maintenance force is lacking in ability to operate in the face of these everyday occurrences, so that formation and contouring of the product are incomplete. It is then that excessive and irregular resorption and repair occur . . ." He concludes that ". . . the process may begin externally as well as internally, or simultaneously in both locations."

Internal resorption can be on anterior teeth[2] or on posterior teeth, as detailed in the pulp chamber or root canal. Osteoclastic activity enlarges these areas until it reaches enamel and shines through as a pink spot or is picked up in a roentgenogram of the tooth and shows as an enlargement of the root canal or as a spot in the pulp chamber. What actually causes internal resorption is not known but a history of trauma [1,3,4] or bruxism[5] or even trauma from a bur,[3] have been the recorded reasons.

Summary

A case of internal resorption in a mandibular right first molar has been recorded. The patient exhibited signs of bruxism, had had a previous restoration, and had undergone trauma from a dental bur and accompanying operative procedures. There were no other etiologic factors brought out in the patient's medical or dental history that could have produced the condition of internal resorption of an idiopathic nature. This bears out previous case reports.

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Leslie E. Smith, D.D.S.

Reliability of Electric Annealers for Gold Foil

Introduction

This study considers in detail one of the factors relative to the inability to produce and maintain cohesion in the placement of gold foil restorations — a major difficulty which has resulted in much loss of time and considerable frustration as well as a lack of interest in the use of the material, especially among students.

Sometimes, the non-cohesiveness of the foil is evident at the outset of the placement operation. This situation is easy to remedy by simply discarding that particular batch of foil and proceeding with a new lot, which can, however, be costly, depending on the amount of material to be disposed of.

On the other hand, the lack of proper or complete cohesion is often not noted either until the restoration is partially or entirely completed and is being finished or until later, when it fails as a result of pitting, flaking, or partial or complete loss of the foil.

When the foil of a partially completed or completed restoration in which cohesion was lost is removed and examined, it will be found to consist of a series of laminations which are not completely welded, although the reason for this loss of cold weldability will not be obvious.

Materials and Methods

To cope with this problem, consideration has to be given to the following known variables (assuming that the gold foil left the place of manufacture in usuable condition):

1. The place and length of storage time of the gold foil prior to distribution to the operator.
2. The place of storage and the length of time the operator has had a given batch of foil in his possession.

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3. The method of handling and annealing the foil.
4. The procedures followed in placement.

For some time, bulk annealers of the electric type, mainly the models of two manufacturers*, have been used. Both products are of similar design and seem, clinically, to give about the same performance as far as heat delivery is concerned.

In their literature, both companies state that their instruments provide adequate annealing temperatures, and one** claims that its units reach and remain constant at the latter after ten minutes. Both also say that the foil can be used six minutes after it has been placed on a cold annealer whose current can be turned off after twelve minutes.

An attempt was made to determine whether the conditions specified by these manufacturers were adequate for annealing, keeping in mind that as far as gold foil is concerned, annealing simply means cleansing the surface by use of heat. Recommendations on the amount of heat and length of time it should be applied are quite varied, ranging from heating the foil to a dull red for a fraction of a second in an open flame[1] (since pure gold fuses at 1945°F. a longer time would cause fusion), to placing it on an electric tray for six minutes with a temperature of 654°C[2], to placing it on another type of electric annealer for eight to ten minutes at an estimated surface temperature of 650°F to 700°F.[3]

Since a temperature of 650°C. to 700°C. is claimed for one annealer, while a temperature of 650°F. to 700°F. is claimed for the other, something is obviously wrong. 650°F. is only 343°C., resulting in a difference between the two of 307°C. or 585°F. Which temperature is correct and necessary for proper annealing?

Morgan, Hastings and Co.,[4] one of the prime manufacturers of gold foil in the United States, states that the temperature should reach 650°C. and not exceed 700°C. Because of the discrepancy noted in the paragraph above, a letter was sent to Morgan, Hastings Company asking whether it considered the proper annealing temperature to be the one stated in its booklet. The reply was: "There is no doubt . . . that the figures of 650 to 700 degrees Centigrade are correct."

To further corroborate this, a conference was held with Drs. Parker, Gordea, and Zackay of the Department of Metallurgy at the University of California's Berkeley campus. These men confirmed the necessity for temperatures of 650-700° in the *Centigrade* range to produce proper cleansing.

After the correct temperature range (ie. 650-700°C.) was established, the next step was to see if the two models of electric annealers would operate within it and how much time would be required for the foil to be properly annealed from a cold start.

With the aid of Dr. H. Iversen, Mr. Joseph DeCosta, and Mr. F. A. Storey of the Engineering Department of the University of California at Berkeley, series of tests were run by taking, for at least one hour at approximately five minute intervals, a direct surface temperature reading with a thermo-

* McShirley Gold Foil Annealer and Naibert Electric Gold Annealer.
** Naibert: "Instructions for Using Naibert Electric Gold Annealer.

couple at five different positions on the surface of each plate; ie, the center; at a depression adjacent to the edge of the surface immediately adjacent to the power source; at a depression adjacent to the edge at the side of the annealer surface opposite its power source; at 90° to the right and 90° to the left of the power source. (These were also depressions adjacent to the edge and were designed to hold one piece of foil during the annealing process.)

Result

The unit which was supposed to reach a temperature of 650°C. in six minutes actually reached a temperature of 525°F. at the end of that time at the center position, and lesser temperatures by 125°F., 90°F., 175°F., and 150°F. at the four peripheral positions; eg. 525°F. minus 125°F., or a temperature of 400°F. after six minutes at one peripheral position. This is a discrepancy at the central position of 675°F. below that suggested as being necessary in the literature (650°C., or 1202°F.). At the end of twelve minutes, when the manufacturer claims the unit can be switched off, the temperature at the central position had reached an additional 100°F., or 625°F. with peripheral differences of 85°F., 150°F., 50°F., and 125°F. below that of the central position.

In other words, the temperature did reach approximately 650° at the end of twelve minutes, except that it was in degrees *Fahrenheit* rather than in degrees *Centigrade.*

It took approximately fifty minutes for this unit to reach its maximum temperature of approximately 780°F., after which time the temperature remained approximately constant.

The second model, for which a surface temperature of 650° to 700°F. after eight to ten minutes was claimed, produced the following results: (the positions selected for measurement were the same as those for the first model tested) after six minutes, the center reading was 325°F. with differences of plus 5°F., 58°F., 20°F., and 20°F. at the peripheral points; at the end of twelve minutes, the central reading was 460°F. with differences of plus 60°F., 0°F., 5°F., and 20°F. Therefore, like the other unit, this one did not reach the stipulated temperature at the end of twelve minutes, when according to the claim of the manufacturer, the foil should have been ready for use.

Although it was not possible to test large numbers of them, units other than these randomly selected ones might reach higher or lower temperatures at different time intervals, but they would all be in the same general range, although the actual temperatures recorded might be slightly different, because the construction of each unit for a given model is relatively the same, and each has the same electrical rating.

In the attempt to reach the 650-700°C. range, it was decided to alter the only available variable — the voltage input. This was done to see if it would be possible to continue to use these models of annealers by the addition of a transformer which would allow the needed temperatures to be reached.

By using a Variac transformer with variable voltages, higher voltages beyond the rated 110V were introduced into the units in steps of ten volt increments up to a 155 volt input, the maximum voltage tolerated by the unit. It became obvious that these units could not be used with increased voltage because they did not begin to reach the necessary temperature of 650°C. (1202°F.) until they were ready to fail. In other words, the life of a unit pushed to these higher voltages could be very short, and the cost of frequent replacement would be unreasonable.

At 140 volts, the lower limits of the objective were in sight: after six minutes at 140 volts, the center temperature of the first model described reached 744°F.; after twelve minutes 943°F.; after twenty minutes 1011°F.; and after thirty minutes 1023°F. However, though the change in the central temperature between twenty and thirty minute intervals was only a few degrees, the isotherm pattern had changed markedly — almost the entire surface had reached the same temperature. The maximum temperature reached was 1124°F. at twenty-four minutes with a voltage of 155, but at this voltage, the unit was destroyed.

Photographs of the surface grids were made with infrared film at each ten minute interval at 140 volts and show what the five point surface temperature readings do not; namely, the change in surface heat saturation of the grid surface at the various ten minute intervals. It was noted at a twenty minute interval with a central temperature of 1011°F. that the gold foil pellets on the grid had reached the same temperature as the grid surface, while the peripheral ones were still not up to temperature, which means that there is a lag period of probably several minutes after the surface temperature reaches the correct point before the pellets reach the same temperature as the grid.

Discussion

Since the electric annealers described and tested cannot be converted to use by increasing voltage input, a modified unit which will provide the temperatures necessary for proper annealing is under construction.

Summary and Conclusions

Therefore, electric ratings of the types of annealers tested are inadequate and contribute to the difficulty of gaining or maintaining the cohesion necessary in the placement of gold foil.

They will yield satisfactory service only if the contaminants are of low volatility, e.g. moisture or dust. Two of the common contaminants of foil however are chlorine gas and ammonia. If the surface of the foil absorbs these, they will form an ammonia-gold-chloride complex which sublimes at 520°C. These annealers, then, would not be able to cleanse the surface of this common contaminant; and the foil, if used, would not weld properly.

The purpose of conducting these tests was not to condemn either or both of the particular instruments tested. Rather, it was to restate the objectives of annealing gold foil and to investigate whether or not the available equipment did in fact meet these objectives. Unfortunately, it did not do so completely. Therefore, if electric annealers of the bulk type are used, they must be used with discretion.

Bibliography

1. Morgan, Hastings & Company: *Essentials of Annealing Gold Foil,* pub. by Morgan, Hastings & Co., 1939, p. 10.
2. *Ibid.,* p. 16 (referring to the Naibert electric annealer).
3. Ingraham, R. and Koser, J. R.: *An Atlas of Gold Foil and Rubber Dam Procedures,* 3rd ed., West Orange Co. Pub. Co., 1961, p. 23 (referring to the McShirley electric annealer, USC model).
4. *Op. Cit.,* p. 10.

1973 Academy Awards

Letters inviting nominees for the 1973 Academy Awards were sent to 58 dental schools throughout this country, Canada, and the University of Puerto Rico. Thirty schools accepted and 28 refused; of the 28 refusals, 17 did not respond. Following are the names of the recipients of the Award.

Don P. Bridge
Baylor University

James J. Carder
Georgetown University

Kejen Corsa
New York University

Michael R. DellaRosa
New Jersey College of Medicine and Dentistry

David K. Dungey
University of Minnesota

Leland Fitzgerald
Columbia University

Gregg T. Frey
Temple University

Louis F. Fronenberg
University of Western Ontario

Kathleen Gallimore
Howard University

John C. Gilmore, Jr.
University of Louisville

Steven D. Hanks
Washington University

John P. Jackson
University of Missouri at Kansas City

Harry E. Jamison
University of the Pacific

Dwight E. Kramer
University of Kentucky

Wayne W. Kearney
University of Michigan

Thomas H. Larson
Northwestern University

Daniel Lee
University of California, Los Angeles

Alan M. Kasperowski
University of Maryland

John S. Miley
Marquette University

Zane J. McFadden
State University of New York at Buffalo

James S. Prawat
Indiana University

Leonard P. Radin
Tufts University

Frank R. Serini
College of Medicine and Dentistry of New Jersey

Thomas E. Skelton
University of Texas

Paul R. Spickler
Loma Linda University

Edward A. Vanbellinghen
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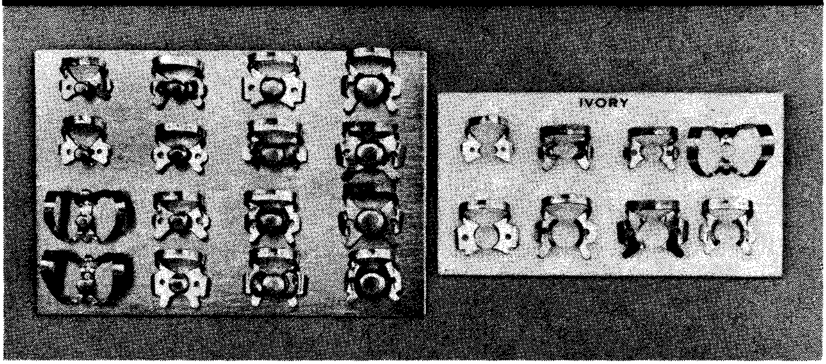

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