EDUCATIONAL STANDARDS FOR EXPANDED FUNCTIONS TRAINING TASK FORCE

AGENDA

March 28, 2014, 1:00 P.M.

Location*: Iowa Dental Board, 400 SW 8th St., Suite D, Des Moines, Iowa

Members: *Nancy Slach, R.D.H., Chair; Lynn Curry, D.D.S.; Steven Fuller, D.D.S., Board Member; Tom Jeneary, D.D.S., Board Member; Michael Kanellis, D.D.S.; George North, D.D.S.; Steven Thies, D.D.S.; Diane Meier, Board Member; Denise Bell, R.D.A.; Elaine Peterson, R.D.A.; Jane Slach, R.D.A.*

I. CALL MEETING TO ORDER & INTRODUCTION OF TASK FORCE MEMBERS

II. 1st OPPORTUNITY FOR PUBLIC COMMENT

III. CHARGE OF TASK FORCE

a. Make Recommendations to the Board Concerning:
   i. Determine Minimum Educational Standards for All (Existing & New) Expanded Functions
   ii. Review Courses for Expanded Functions to Determine if They Meet Those Standards

IV. CONSIDERATION OF REQUESTS

a. Consideration of Request to Change Minimum Clinical Practice Requirement to Train in and Perform Expanded Functions Duties
   i. Dr. Rabedeaux Requested Change from Two Years to One Year
   ii. Iowa Dental Association Has Requested No Waiting Period Following Registration – Leave This to the Discretion of the Dentist

V. ADMINISTRATIVE RULES

a. Proposed Amendments to Ch. 10, "General Requirements"; Ch. 20, "Dental Assistants"; Ch. 23 (new chapter), "Expanded Functions for Dental Auxiliaries" (RE: Current and Newly-Proposed Expanded Functions)

VI. EXPANDED FUNCTIONS COURSES

a. Overview of Courses Approved to Date
b. Course Requests for Review

VII. 2nd OPPORTUNITY FOR PUBLIC COMMENT

VIII. ADJOURN

*Committee members may participate by telephone or in person.

If you require the assistance of auxiliary aids or services to participate in or attend the meeting because of a disability, please call the Board office at 515/281-5157.

Please Note: At the discretion of the committee chair, agenda items may be taken out of order to accommodate scheduling requests of committee members, presenters or attendees or to facilitate meeting efficiency.

EXPANDED FUNCTIONS COURSES FOR REVIEW

1. Fleur Dentistry – Applying Cavity Liners and Bases, Desensitizing Agents and Bonding Systems
2. Fleur Dentistry – Placement and Removal of Gingival Retraction
3. Matthew Beattie, D.D.S. – Monitoring Nitrous Oxide
4. Joseph P. Tesene, D.D.S. – Taking Occlusal Registrations*
5. Joseph P. Tesene, D.D.S. – Placement and Removal of Gingival Retraction*
6. Joseph P. Tesene, D.D.S. – Taking Final Impressions*
7. Joseph P. Tesene, D.D.S. – Fabrication and Removal of Provisional Restorations*
8. Aspen Dental, Scott Hansen, D.D.S. – Taking Occlusal Registrations
9. Aspen Dental, Scott Hansen, D.D.S. – Placement and Removal of Gingival Retraction
10. Aspen Dental, Scott Hansen, D.D.S. – Taking Final Impressions
11. Aspen Dental, Scott Hansen, D.D.S. – Fabrication and Removal of Provisional Restorations
12. Aspen Dental, Scott Hansen, D.D.S. – Applying Cavity Liners and Bases, Desensitizing Agents and Bonding Systems

*The courses submitted by Dr. Tesene are based off of the curriculum developed by Dr. Hal Harris; however, Dr. Tesene would be providing the training. Dr. Harris' expanded functions courses previously received approval from the Board.

Please Note: At the discretion of the committee chair, agenda items may be taken out of order to accommodate scheduling requests of committee members, presenters or attendees or to facilitate meeting efficiency.

Expanded Function Dental Auxiliary Taskforce
Report to Iowa Dental Board
July 18, 2013

Background

In 2012, the Iowa Dental Association leadership proposed that the Iowa Dental Board consider increasing the number of expanded functions that appropriately trained and certified dental auxiliaries are allowed to perform. Specifically, they requested that the following procedures be considered:

1. Forming, placing, or shaping amalgam and composite materials following the preparation of a tooth by a dentist
2. Forming and placement of stainless steel crowns
3. Taking final impressions
4. Taking records for the fabrication of dentures and partial dentures
5. Cementation of final restorations along with removal of adhesives

The Iowa Dental Board appointed a task force (EFDA Task Force) to consider this recommendation and to make recommendations to the Board. Task force members included:

Michael Kanellis, DDS – Chair
Steve Bradley, DDS
Eileen Cacioppo, RDH
Lori Elmitt
Mary Kelly, RDH
Mary Mariani, DDS
George North, DDS
Jane Slach, RDA

The EFDA task force met in Iowa City on five separate occasions to discuss the merits and logistics of creating a new level of expanded function auxiliary. Meeting dates for the task force were: 11/16/12, 1/4/13, 2/8/13, 4/5/13, 6/28/13.

Discussions among EFDA Taskforce members was broad-based and included conversations on the following topics:

1. Potential merits of increasing the number of expanded functions that dental auxiliaries can perform.
2. Background of EFDA's in Iowa (Historical perspective by Dr. North)
3. Quality of care provided by EFDA's
4. Procedures considered for inclusion

5. Would Iowa dentists utilize restorative expanded function dental auxiliaries?
6. What other states are doing
7. Mechanism for training and competency-based evaluation/certification

Members of the EFDA Taskforce requested a survey of Iowa Dentists to find out how many dentists might utilize Expanded Function Dental Auxiliaries to perform additional procedures. To obtain this information, several questions were added to Dr. Peter Damiano's "Medicaid Survey of Iowa Dentists", conducted as part of the Dental Safety Net in Iowa Project (DSNI). Detailed information about the DSNI Project can be found at: http://ppc.uiowa.edu/health/study/dental-safety-net-iowa-dsni-project.

The "Medicaid Survey of Iowa Dentists" was mailed to all private practice dentists in Iowa, including specialists. Dentists from the University of Iowa College of Dentistry were not surveyed. A brief statement describing EFDA's was included in the survey, as follows:

> *The Iowa Dental Board has convened a task force to look at the possibility of increasing the number of procedures that EFDAs(Dental Assistants and Dental Hygienists) can perform under the supervision of a dentist. Auxiliaries would be required to receive additional education and demonstrate competency in order to provide each procedure. The following questions are intended to explore Iowa dentists' attitudes about additional expanded functions.*

The survey response rate was 58% (n=776/1389).

The first EFDA related question included in the survey was intended to determine how many dentists in Iowa were utilizing EFDAs to provide currently allowed expanded functions. 55% of respondents indicated they were utilizing an EFDA to provide at least one of the currently allowed expanded functions. Responses broken down by specific functions follows:

Do you ever delegate these duties to an EFDA in your practice?	
Remove temporary crowns	42%
Take final impressions	22%
Fabricate temporary crowns	44%
Apply cavity liners, bonding systems, etc.	18%
Test pulp vitality	15%
Take occlusal registrations	42%
Place/remove gingival retraction	26%

The second EFDA related question was intended to determine how many dentists would consider utilizing an EFDA to provide the additional recommended procedures. 68% of respondents indicated

they would consider utilizing an EFDA to provide at least one of the proposed additional expanded functions. Responses broken down by specific functions follows:

If the practice act was changed, would you consider using an EFDA to provide the following services?	
Remove cement following permanent cementation of crowns/bridges	61%
Place/shape amalgam restorations following tooth prep by a dentist	21%
Place/shape composite restorations following tooth prep by a dentist	17%
Fit/cement stainless steel crowns on primary teeth	31%
Take final impressions/records for dentures	32%
Cement final restorations	21%

The final EFDA related question on the survey was intended to determine if dentists would be willing to cover the costs to send one of their auxiliaries to a course where they could become certified to provide additional EFDA procedures. 43% indicated they would either moderately or extremely consider covering this cost:

How seriously would you consider covering the costs to send one of your own auxiliaries to a course where they could become certified to provide the services listed in the previous question?	
Not at all	38%
Slightly	19%
Moderately	22%
Extremely	21%

Task Force members were charged with investigating and reporting on restorative expanded functions allowed in other states. States were selected based on data from the Dental Assisting National Board (DANB) website: http://www.danb.org The DANB website has a comprehensive list on a state by state basis describing titles for dental assistants who are allowed to provide expanded functions, and many different groupings of what expanded functions are allowed. Examples of states that allow EFDA's to place and contour amalgam and composites and to place stainless steel crowns includes Kentucky, Maine, Massachusetts, Michigan, Minnesota, Missouri, Ohio, Pennsylvania, Virginia and Washington.

At the final meeting of the EFDA task force, a list of consensus statements was agreed upon that guide the task force's final recommendations to the Iowa Dental Board:

Consensus Statements Regarding Expanded Function Dental Auxiliaries

Members of the Expanded Function Dental Auxiliary Task Force appointed by the Iowa Dental Board are in agreement with the following statements related to Expanded Function Dental Auxiliaries. These background consensus statements are presented in support of the Task Force's final recommendations to the Board.

1. The EFDA Task Force is confident that the recommended additional expanded functions can be performed by appropriately trained dental auxiliaries under the direct supervision of a dentist.

2. The EFDA Task Force believes that if the recommended additional expanded functions are approved, a significant number of Iowa Dentists will be willing to employ auxiliaries who have received the appropriate training to provide these procedures.

3. The EFDA Task Force believes that employing EFDAs will improve the efficiency and increase the capacity of dental practices to treat patients, and as a result, more patients in Iowa will be able to access dental care.

4. The EFDA Task Force believes that increasing the number of expanded functions dental auxiliaries can perform will provide career advancement opportunities for dental auxiliaries in Iowa.

5. The EFDA Task Force believes that a training program for EFDAs can be established at no additional cost to the State of Iowa.

List of Recommended Procedures

Following review of the IDA recommendations, and consideration of multiple other procedures, members of the Expanded Function Dental Auxiliary Task Force recommend the following procedures be added to what appropriately trained and certified EFDA's can perform in Iowa. These procedures refer to both primary and permanent teeth.

1. Removal of adhesives (hand instrumentation only)
2. Placement and shaping of amalgam following preparation of a tooth by a dentist
3. Placement and shaping of composite following preparation of a tooth by a dentist
4. Forming and placement of stainless steel crowns
5. Taking final impressions and records for the fabrication of dentures and partial dentures ("records" component is a new function)
6. Denture tissue conditioning reline (soft reline only, where denture is not relieved or modified)
7. Preliminary charting of existing dental restorations and teeth

Additional Recommendation

Considerable discussion took place among EFDA Task Force members related to including procedures that could be done by hygienists in nursing home settings. These additional procedures were not included in the list of final recommendations because some of them were not reversible, and most/all of them would be performed under indirect supervision. However, due to the opportunities presented through these discussions, the EFDA Task Force makes the following recommendation to the Iowa Dental Board:

1. The Iowa Dental Board is encouraged to appoint a separate task force to look at "best practices in oral health care delivery in nursing homes" in Iowa.

If the Iowa Dental Board decides to move forward with the recommendations of the EFDA Task Force, the following "next steps" are recommended:

Next Steps

1. Approval by the Iowa Dental Board to proceed
2. The Iowa Dental Board should charge the College of Dentistry with proposing a final curriculum for the additional EFDA procedures
3. The University of Iowa College of Dentistry would assign faculty to create/finalize a curriculum for training (estimate 6 months to have curriculum finalized)
4. EFDA task force, working with the Dental Board and the College of Dentistry would propose a method for competency-based assessment and certification
5. Final approval by Iowa Dental Board and Implementation of training
6. Announcement in IDA Journal

Respectfully submitted on behalf of the EFDA Task Force,

Michael Kanellis, DDS, MS
Chair, Expanded Function Task Force
7/23/13

650—20.3(153) Scope of practice.

20.3(1) In all instances, a dentist assumes responsibility for determining, on the basis of diagnosis, the specific treatment patients will receive and which aspects of treatment may be delegated to qualified personnel as authorized in these rules.

20.3(2) A licensed dentist may delegate to a dental assistant those procedures for which the dental assistant has received training. This delegation shall be based on the best interests of the patient. The dentist shall exercise supervision and shall be fully responsible for all acts performed by a dental assistant. A dentist may not delegate to a dental assistant any of the following:

a. Diagnosis, examination, treatment planning, or prescription, including prescription for drugs and medicaments or authorization for restorative, prosthodontic or orthodontic appliances.

b. Surgical procedures on hard and soft tissues within the oral cavity and any other intraoral procedure that contributes to or results in an irreversible alteration to the oral anatomy.

c. Administration of local anesthesia.

d. Placement of sealants.

e. Removal of any plaque, stain, or hard natural or synthetic material except by toothbrush, floss, or rubber cup coronal polish, or removal of any calculus.

f. Dental radiography, unless the assistant is qualified pursuant to 650—Chapter 22.

g. Those procedures that require the professional judgment and skill of a dentist.

20.3(3) A dentist may delegate an expanded function duty to a registered dental assistant if the assistant has completed board-approved training pursuant to rule 650—20.16(153) in the specific expanded function that will be delegated. The supervising dentist and registered dental assistant shall be responsible for maintaining in the office of practice documentation of board-approved training. In addition to the other duties authorized under this rule, a dentist may delegate any of the following expanded function duties:

a. Taking occlusal registrations;

b. Placement and removal of gingival retraction;

c. Taking final impressions;

d. Fabrication and removal of provisional restorations;

e. Applying cavity liners and bases, desensitizing agents, and bonding systems;

f. Placement and removal of dry socket medication;

g. Placement of periodontal dressings;

h. Testing pulp vitality; and

i. Monitoring of nitrous oxide inhalation analgesia.

20.3(4) A dental assistant may perform duties consistent with these rules under the supervision of a licensed dentist. The specific duties dental assistants may perform are based upon:

a. The education of the dental assistant.

b. The experience of the dental assistant.

650—20.15(153) Expanded function training approval. Expanded function training shall be eligible for board approval if the training is offered through a program accredited by the Commission on Dental Accreditation of the American Dental Association or another program prior-approved by the board, which may include on-the-job training offered by a dentist licensed in Iowa. Training must consist of the following:

1. An initial assessment to determine the base entry level of all participants in the program. At a minimum, participants must meet one of the following:

- Be currently certified by the Dental Assisting National Board, or
- Have two years of clinical dental assisting experience as a registered dental assistant, or
- Have two years of clinical dental assisting experience as a dental assistant in a state that does not require registration;

2. A didactic component;

3. A laboratory component, if necessary;

4. A clinical component, which may be obtained under the personal supervision of the participant's supervising dentist while the participant is concurrently enrolled in the training program; and

5. A postcourse competency assessment at the conclusion of the training program.

[**ARC 0265C**, IAB 8/8/12, effective 9/12/12; **ARC 0985C**, IAB 9/4/13, effective 10/9/13]

These rules are intended to implement Iowa Code chapter 153.

Expanded Functions for Dental Assistants (and Dental Hygienists)

Delegable Procedure	Level of Suggested Supervision	How should it be taught -at U of I COD -at the DA programs -at dental offices	How will it be evaluated -written test -clinical test
Taking Occlusal Registrations			
Placement & Removal of Gingival Retraction			
Fabrication and Removal of Provisional Restorations			
Applying Cavity Liners and Bases, Desensitizing Agents, and Bonding Systems			
Placement and Removal of Dry Socket Medication			
Placement of Periodontal Dressings			
Testing Pulp Vitality			
Monitoring of Nitrous Oxide Inhalation Analgesia			

Removal of adhesives (hand instrumentation only)			
Placement and shaping of amalgam following the preparation of a tooth by a dentist			
Placement and shaping of composite following the preparation of a tooth by a dentist			
Forming and placement of stainless steel crowns			
Taking final impressions and records for the fabrication of dentures and partial dentures			
Denture reline (soft reline only, where denture is not relieved or modified)			
Preliminary charting of existing dental restorations and teeth			

Arjes, Janet [IDB]

From: Steve Rabedeaux [drrab@pcpartner.net]
Sent: Friday, January 10, 2014 3:02 PM
To: Arjes, Janet [IDB]
Subject: Dental assisting
Attachments: Iowa Dental Board Exp Func.doc

Janet, thanks for all your help with our assistants, registration and training materials. The box with all the stuff came yesterday. The two new gals are gaining value each day. I sent the attached note to the board members to consider and wanted to keep you in the communication loop. Thanks again for all you do! We appreciate it! Dr. Rab

Iowa Dental Board:

It is my understanding that you are considering the duties that can be delegated to dental assistants. As you do so, I would like to share some thoughts and experiences.

I am from Newton, a smaller more rural community. It has proven difficult to attract assistants that have expanded function training and for that matter any formal training. Very few live in Newton and fewer still are willing to commute.

This limits our ability to provide patient care. We have on many occasions trained our own assistants and they are excellent. We have developed the resources to do this efficiently.

The troubling part is that the board rules don't allow for expanded function training until 2 years after an on the job trained assistant has been issued a certificate. The earliest they can get that is 6 months after employment starts. That means 2.5 years before they are eligible for expanded function training.

That limits the advancement of many very capable assistants and limits our ability in rural areas to deliver care. The role of the dental assistant is critical to the way dental care is delivered and our patients benefit from their skills and care.

I would like to encourage you to consider reducing the time to perhaps 1 year after a certificate is issued to be eligible for further training. That would still be 1.5 years of employment in the field before further training. That would be a game changer for many rural dentists.

I also support the additional tasks that the Iowa Dental Association leadership is advocating that expanded function assistants be allowed to perform. Further that we be able to find an efficient common ground to allow for training to largely take place in an "on the job" fashion.

Sincerely,

S. G. Rabedeaux, DDS, MAGD

IDA
Iowa Dental Association

P.O. Box 31088
Johnston, IA 50131
(515) 986-5605 or (800) 828-2181
(515) 986-5626 (Fax)
info@iowadental.org (e-mail)

February 7, 2014

Phil T. McCollum
Interim Executive Director
Iowa Dental Board
400 SW 8th Street Suite D
Des Moines IA 50309

Phil:

The Iowa Dental Board of Trustees is aware of Dr. Steven Rabedeaux's inquiry related to the waiting period currently required by the Iowa Dental Board for a RDA to be eligible for expanded function training. We understand the basis for Dr. Rabedeaux's inquiry and wish to expand upon his request.

The IDA Board members wish to request that all waiting period requirements be removed and decisions about readiness of auxiliary staff for expanded function training be left to the discretion of the supervising dentist.

It is my understanding that Dr. Rabedeaux's inquiry will be considered and a recommendation forwarded to the Iowa Dental Board by the expanded function task force. Please add the IDA's expanded inquiry to the agenda of the task force.

Thank you.

Lawrence F. Carl, CAE
Executive Director
Iowa Dental Association
5530 West Parkway, Suite 100
Johnston IA 50131-9428

Dr. Mary Mariani, President ♦ Dr. Bruce Cochrane, President-Elect ♦ Dr. Thomas Ludwig, Vice-President ♦ Dr. Daniel Kegler, Immediate Past President
Mr. Larry Carl, CAE, Executive Director

STATE OF IOWA

IOWA DENTAL BOARD

TERRY E. BRANSTAD, GOVERNOR
KIM REYNOLDS, LT. GOVERNOR

PHIL MCCOLLUM
INTERIM DIRECTOR

March 18th, 2014

During the October 31st, 2013, Iowa Dental Board meeting the Board directed staff to proceed with drafting rule amendments in the following areas:

- *Fees – Iowa Administrative Code 650—Chapter 15.* Amend the rules to increase fees to cover projected costs for FY 2015 by increasing dental renewal fees from $315 to $365, an increase of $25 per year for dentists only.
- *EFDA Task Force Recommendations -- Iowa Administrative Code 650—Chapters 10, 20, and newly proposed 23.* Amend the rules to implement the proposed expanded functions for dental auxiliary as recommended by the EFDA Task Force.
- *Allow dental hygienists to perform current expanded functions -- Iowa Administrative Code 650 — Chapters 10 and newly proposed 23.* Amend the rules to authorize dental hygienists to perform the expanded function duties listed in chapter 20, provided they receive the same expanded function training required of a registered dental assistant.
- *Allow PALS certification in lieu of ACLS -- Iowa Administrative Code 650—Chapter 29.* Amend the rules to accept PALS certification in lieu of ACLS for moderate sedation permit holders who sedate children.
- *Require capnography for Moderate Sedation permit holders -- Iowa Administrative Code 650—Chapter 29.* Amend the rules to require capnography for all moderate sedation permit holders. *(*The Anesthesia Credentials Committee has not made a formal recommendation supporting this change as of this date. The Committee will meet to consider this issue prior to the next Board meeting)*

Fees

The members of the Budget Review Committee met on September 20th, 2013, to review the final budget numbers of the previous fiscal FY13, the current fiscal FY14, and the proposed FY15 projections. Following review, the members recommended to the full Board during the October 31st, 2013 meeting that the Board consider raising dental renewal fees in order to prevent a possible budget shortfall during FY15.

Using current projections as of March 2014, it appears that such a budget shortfall in FY15 may not exist provided that Board staff levels remain unchanged. Revenue has come in slightly higher than originally projected and expenses have been less than anticipated. This is partly due to the unfilled Executive Director position.

400 SW 8th STREET, SUITE D, DES MOINES, IA 50309-4687
PHONE:515-281-5157 FAX:515-281-7969 http://www.dentalboard.iowa.gov

Current projections will be reviewed by the members of the Budget Review Committee prior to the April 10th, 2014, Board meeting so that an updated recommendation can be made to the full Board.

EFDA Task Force Recommendations & Allowing dental hygienists to perform current expanded functions

Dental assistant registration became effective in July 2001. 650 IAC 20.2(153) states that the term "dental assistant" does not include persons otherwise actively licensed in Iowa to practice dental hygiene or nursing who are engaged in the practice of said profession. Rules related to expanded functions for dental assistants became effective in October 2003.

Board rules have been interpreted to allow a licensed dental hygienist to work as a dental assistant under the scope of their dental hygiene license. When dental assistant registration became effective in 2001, there were no duties that dental assistants could perform that a dental hygienist could not also perform.

Since the expanded function rules became effective in 2003, the Board office has received multiple inquiries as to whether dental hygienists were also eligible to take expanded function training and perform those same duties.

The rules related to the current expanded function duties was placed in chapter 20, which regulates the scope of practice for dental assistants. Chapter 20.3(3) states that a dentist may delegate an expanded function duty to a "registered dental assistant" and makes no reference to any other persons. Since dental hygienists are excluded in that chapter from being consider a dental assistant, no provisions existed to allow a dental hygienist to perform those expanded function duties. Because of this, Board rules have been interpreted to exclude dental hygienists from being able to perform those expanded function duties not already allowed within their scope of practice.

In 2011, the Iowa Dental Board considered revising the current rules to allow dental hygienists to perform those same expanded function duties provided that they meet the same educational requirements, as it was imposing a hardship on many hygienists who were previously registered as expanded function dental assistants and lost the ability to continue to perform some duties once they became licensed as a dental hygienist. The adoption of those rules was delayed at that time.

In 2012 the Iowa Dental Board appointed a task force (EFDA Task Force) to consider increasing the number of expanded functions that appropriately trained dental auxiliary personnel could perform. The EFDA Task Force released its final report to the Board in July 2013.

The Iowa Dental Board met and considered those recommendations during their October 31st, 2013, meeting and directed staff to draft proposed rules based on the recommendations of the Task Force. The Board also directed staff to draft rules that would allow dental hygienists to perform the current dental assistant expanded functions that currently fall outside the scope of practice of dental hygiene.

The attached draft creates a new chapter 23 to regulate all expanded function duties that can be delegated to either dental assistants or dental hygienists and the educational and training requirements associated with them. Should rules change in the future that would expand the scope of practice of only one of those professions, such rules would be placed in their respective governing sections.

The draft removes the current expanded functions from the dental assistant chapter 20.3(3) and places them in a new chapter 23.4, removes the Expanded Function Training Approval from 20.15 and places them in a new chapter 23.5, and removes the 2 year or DANB certification requirement. It also adds clarification to 20.3(2)a and 23.3(2)a by adding “removable appliances”, amends both 20.3(2)e and 10.3(1)e to remove the word “synthetic”, and renumbers 20.3(4) to 20.3(3).

The EFDA Task Force recommendations expand the scope of duties that dental auxiliaries can perform related to removable appliances as it allows auxiliary the ability to both take final impressions and records for the fabrication of dentures and partial dentures. I have added clarification to both 20.3(2)a and 23.3(2)a making it clear that neither dental assistants nor dental auxiliary can authorize the fabrication of removable appliances, that responsibility remains with the dentist.

The EFDA Task Force recommendations would allow expanded function dental auxiliary to remove adhesives with hand instrumentation only. I have amended both 20.3(2)e and 10.3(1)e to remove the word “synthetic” to allow such procedures to be delegated to dental assistants.

The Board has also received one request from Dr. Steve Rabedeaux and one request from the Iowa Dental Association (IDA) asking that the Board reduce the waiting period before registered dental assistants are allowed to perform expanded function duties.

Current Board rules under 20.15 require that dental assistants either be DANB certified or have 2 years of clinical experience before being eligible to participate in an expanded function program.

Dr. Rabedeaux is requesting that the Board consider reducing that waiting period to one (1) year, and the IDA is requesting that all waiting period requirements be removed and the decision be left to the discretion of the supervising dentist.

Since all attached rules are draft versions for discussion, I have removed all waiting periods for all expanded function duties in 23.5. The decision would be left up to the discretion of the supervising dentist.

Allow PALS certification in lieu of ACLS

Iowa Administrative Code 650—Chapter 29.4(4) requires dentists administering moderate sedation to maintain current certification in Advanced Cardiac Life Support (ACLS) which is focused on the management of emergencies occurring in adults.

Iowa Administrative Code 650—Chapter 29.4(8) requires dentists utilizing moderate sedation on pediatric patients to have completed an accredited residency program that

includes formal training in anesthesia and clinical experience in managing pediatric patients. Graduates of such programs are typically certified in Pediatric Advanced Life Support (PALS) which is focused on the management of emergencies occurring in infants and children.

Both ACLS and PALS standards are set by the American Heart Association.

The proposed rule change would allow moderate sedation permit holders who sedate pediatric patients to maintain PALS certification in lieu of ACLS certification.

Require capnography for Moderate Sedation permit holders

The Iowa Dental Board previously amended rules in 2013 which required all general anesthesia/deep sedation permit holders to use capnography at all facilities where they provide sedation beginning January 1, 2014. This was to remain consistent with the practices of the American Association of Oral and Maxillofacial Surgeons (AAOMS).

The Board is now considering requiring all moderate sedation permit holders to use capnography as an added measure of safety. Currently, pulse oximetry is the only measure of oxygen levels required for moderate sedation permit holders.

Pulse oximetry measures the oxygen saturation in blood and a 30 second delay can exist in the reporting of pulse oximetry results, so it is slow to indicate change in ventilation. Capnography measures expired carbon dioxide in the airway (exhaled breath), and provides a breath-to-breath status of ventilation in the patient in real time.

Such a delay in reporting is particularly concerning when sedating children who do not have the same oxygen reserve capacity as adults.

The members of the Board's Anesthesia Credentials Committee have not made a formal recommendation supporting this change as of this date. The Committee will meet to consider this issue prior to the next Board meeting and provide a recommendation at that time.

The intent of this document is to serve as a 'staff draft' for a basis of discussion and is not a Notice of Intended Action. These drafts are being provided in advance of the upcoming April 10th, 2014, Board meeting in order to seek input that can be presented during that meeting to assist the members should they decide to start the formal rulemaking process.

Phil McCollum
Interim Director Iowa Dental Board

Attachments

Proposed rule amendments to Chapter 10.3
Proposed rule amendments to Chapter 15.4
Proposed rule amendments to Chapter 20.3
Proposed rule amendments to Chapter 20.15
Proposed NEW CHAPTER 23 Expanded Functions for Dental Auxiliaries
Proposed rule amendments to Chapter 29.4
Proposed rule amendments to Chapter 29.5
Final EFDA Task Force report to the Board

650—10.3 (153) Authorized practice of a dental hygienist.

10.3(1) "Practice of dental hygiene" as defined in Iowa Code section 153.15 means the performance of the following educational, therapeutic, preventive and diagnostic dental hygiene procedures which are delegated by and under the supervision of a dentist licensed pursuant to Iowa Code chapter 153.

a. Educational. Assessing the need for, planning, implementing, and evaluating oral health education programs for individual patients and community groups; conducting workshops and in-service training sessions on dental health for nurses, school personnel, institutional staff, community groups and other agencies providing consultation and technical assistance for promotional, preventive and educational services.

b. Therapeutic. Identifying and evaluating factors which indicate the need for and performing (1) oral prophylaxis, which includes supragingival and subgingival debridement of plaque, and detection and removal of calculus with instruments or any other devices; (2) periodontal scaling and root planing; (3) removing and polishing hardened excess restorative material; (4) administering local anesthesia with the proper permit; (5) administering nitrous oxide inhalation analgesia in accordance with 650—subrules 29.6(4) and 29.6(5); (6) applying or administering medicaments prescribed by a dentist, including chemotherapeutic agents and medicaments or therapies for the treatment of periodontal disease and caries.

c. Preventive. Applying pit and fissure sealants and other medications or methods for caries and periodontal disease control; organizing and administering fluoride rinse or sealant programs.

d. Diagnostic. Reviewing medical and dental health histories; performing oral inspection; indexing dental and periodontal disease; making occlusal registrations for mounting study casts; testing pulp vitality; analyzing dietary surveys.

e. The following services may only be delegated by a dentist to a dental hygienist: administration of local anesthesia, placement of sealants, and the removal of any plaque, stain, calculus, or hard natural ~~or synthetic~~ material except by toothbrush, floss, or rubber cup coronal polish.

10.3(2) All authorized services provided by a dental hygienist shall be performed under the general, direct, or public health supervision of a dentist currently licensed in the state of Iowa in accordance with 650—1.1(153) and 650—10.5(153).

10.3(3) Under the general or public health supervision of a dentist, a dental hygienist may provide educational services, assessment, screening, or data collection for the preparation of preliminary written records for evaluation by a licensed dentist. A dentist is not required to examine a patient prior to the provision of these dental hygiene services.

10.3(4) The administration of local anesthesia or nitrous oxide inhalation analgesia shall only be provided under the direct supervision of a dentist.

10.3(5) All other authorized services provided by a dental hygienist to a new patient shall be provided under the direct or public health supervision of a dentist. An examination by the dentist must take place during an initial visit by a new patient, except when hygiene services are provided under public health supervision.

10.3(6) Subsequent examination and monitoring of the patient, including definitive diagnosis and treatment planning, is the responsibility of the dentist and shall be carried out in a reasonable period of time in accordance with the professional judgment of the dentist based upon the individual needs of the patient.

10.3(7) General supervision shall not preclude the use of direct supervision when in the professional judgment of the dentist such supervision is necessary to meet the individual needs of the patient.

This rule is intended to implement Iowa Code section 153.15.

650—20.3 (153) Scope of practice.

20.3(1) In all instances, a dentist assumes responsibility for determining, on the basis of diagnosis, the specific treatment patients will receive and which aspects of treatment may be delegated to qualified personnel as authorized in these rules.

20.3(2) A licensed dentist may delegate to a dental assistant those procedures for which the dental assistant has received training. This delegation shall be based on the best interests of the patient. The dentist shall exercise supervision and shall be fully responsible for all acts performed by a dental assistant. A dentist may not delegate to a dental assistant any of the following:

a. Diagnosis, examination, treatment planning, or prescription, including prescription for drugs and medicaments or authorization for restorative, prosthodontic, orthodontic, or removable appliances.

b. Surgical procedures on hard and soft tissues within the oral cavity and any other intraoral procedure that contributes to or results in an irreversible alteration to the oral anatomy.

c. Administration of local anesthesia.

d. Placement of sealants.

e. Removal of any plaque, stain, or hard natural ~~or synthetic~~ material except by toothbrush, floss, or rubber cup coronal polish, or removal of any calculus.

f. Dental radiography, unless the assistant is qualified pursuant to 650—Chapter 22.

g. Those procedures that require the professional judgment and skill of a dentist.

~~**20.3(3)** A dentist may delegate an expanded function duty to a registered dental assistant if the assistant has completed board-approved training pursuant to rule 650—20.16(153) in the specific expanded function that will be delegated. The supervising dentist and registered dental assistant shall be responsible for maintaining in the office of practice documentation of board-approved training. In addition to the other duties authorized under this rule, a dentist may delegate any of the following expanded function duties:~~

~~*a.* Taking occlusal registrations;~~

~~*b.* Placement and removal of gingival retraction;~~

~~*c.* Taking final impressions;~~

~~*d.* Fabrication and removal of provisional restorations;~~

~~*e.* Applying cavity liners and bases, desensitizing agents, and bonding systems;~~

~~*f.* Placement and removal of dry socket medication;~~

~~*g.* Placement of periodontal dressings;~~

~~*h.* Testing pulp vitality; and~~

~~*i.* Monitoring of nitrous oxide inhalation analgesia.~~

~~**20.3(4)**~~ **20.3(3)** A dental assistant may perform duties consistent with these rules under the supervision of a licensed dentist. The specific duties dental assistants may perform are based upon:

a. The education of the dental assistant.

b. The experience of the dental assistant.

~~**650—20.15 (153) Expanded function training approval.** Expanded function training shall be eligible for board approval if the training is offered through a program accredited by the Commission on Dental Accreditation of the American Dental Association or another program prior-approved by the board, which may include on-the-job training offered by a dentist licensed in Iowa. Training must consist of the following:~~

~~1. An initial assessment to determine the base entry level of all participants in the program. At a minimum, participants must meet one of the following:~~

~~● Be currently certified by the Dental Assisting National Board, or~~

~~● Have two years of clinical dental assisting experience as a registered dental assistant, or~~

~~● Have two years of clinical dental assisting experience as a dental assistant in a state that does not require registration;~~

~~2. A didactic component;~~

~~3. A laboratory component, if necessary;~~

~~4. A clinical component, which may be obtained under the personal supervision of the participant's supervising dentist while the participant is concurrently enrolled in the training program; and~~

~~5. A postcourse competency assessment at the conclusion of the training program.~~

~~[**ARC 0265C**, IAB 8/8/12, effective 9/12/12; **ARC 0985C**, IAB 9/4/13, effective 10/9/13]~~

Proposed NEW Chapter

Chapter 23 Expanded Functions for Dental Auxiliaries

650—23.1 Expanded Function training required. A registered dental assistant shall not perform any procedures listed in this chapter unless the assistant has successfully met the educational and training requirements of 650—23.5. A licensed dental hygienist shall not perform any procedures listed in this chapter which are not within the scope of practice of dental hygiene unless the hygienist has successfully met the educational and training requirements of 650—23.5. The following procedures are considered within the scope of practice of dental hygiene: taking occlusal registrations; applying cavity liners and bases, desensitizing agents, and bonding systems; placement of periodontal dressings; testing pulp vitality; and monitoring of nitrous oxide inhalation analgesia.

650—23.2 (153) Definitions.

"Dental Auxiliaries" as used in this chapter include persons licensed as a dental hygienist or persons registered as a dental assistant in the state of Iowa. Dental assistant trainees are not eligible to perform procedures listed in this chapter.

650—23.3 (153) Scope of practice.

23.3(1) In all instances, a dentist assumes responsibility for determining, on the basis of diagnosis, the specific treatment patients will receive and which aspects of treatment may be delegated to qualified dental auxiliary personnel as authorized by this chapter.

23.3(2) A licensed dentist may delegate to dental auxiliary only those procedures for which the dental auxiliary has received the required expanded function training pursuant to 650—23.1 of this chapter. This delegation shall be based on the best interests of the patient. The dentist shall exercise direct supervision and shall be fully responsible for all acts performed by dental auxiliary. A dentist may not delegate to dental auxiliary any of the following:

a. Diagnosis, examination, treatment planning, or prescription, including prescription for drugs and medicaments or authorization for restorative, prosthodontic, orthodontic, or removable appliances.

b. Those procedures that require the professional judgment and skill of a dentist.

650—23.4 (153) Expanded function procedures.

A licensed dentist may delegate any of the following expanded function procedures to qualified dental auxiliary personnel:

1. Taking occlusal registrations;
2. Placement and removal of gingival retraction;

3. Fabrication and removal of provisional restorations;
4. Applying cavity liners and bases, desensitizing agents, and bonding systems;
5. Placement and removal of dry socket medication;
6. Placement of periodontal dressings;
7. Testing pulp vitality;
8. Monitoring of nitrous oxide inhalation analgesia;
9. Removal of adhesives (hand instrumentation only);
10. Placement and shaping of amalgam following preparation of a tooth by a dentist;
11. Placement and shaping of composite following preparation of a tooth by a dentist;
12. Forming and placement of stainless steel crowns;
13. Taking final impressions and records for the fabrication of dentures and partial dentures;
14. Denture reline (soft reline only, where denture is not relieved or modified);
15. Preliminary charting of existing dental restorations and teeth

These procedures refer to both primary and permanent teeth.

650—23.5 (153) Educational and training requirements.
Expanded function procedure training shall be eligible for board approval if the training is offered through a program accredited by the Commission on Dental Accreditation of the American Dental Association or another program prior-approved by the board, which may include on-the-job training offered by a dentist licensed in Iowa. Training must consist of the following:

1. An initial assessment to determine the base entry level of all participants in the program.
2. A didactic component;
3. A laboratory component, if necessary;
4. A clinical component, which may be obtained under the personal supervision of the participant's supervising dentist while the participant is concurrently enrolled in the training program; and
5. A postcourse competency assessment at the conclusion of the training program.

APPLICATION FOR PRIOR APPROVAL OF EXPANDED FUNCTION TRAINING

Iowa Board of Dental Examiners
400 SW 8th St., Suite D
Des Moines, IA 50309-4687
http://www.state.ia.us/dentalboard
515-281-5157

Note: A fee of $10 is required to process your request. PLEASE TYPE OR PRINT.

Name of organization or person requesting approval: Fleur Dentistry, LLP

Address: 4551 Fleur Drive, Des Moines, IA 50321

Phone: 287-2493 Fax: 287-7948 Email: _____

Signature: Carol L Cleaver DDS Date: 6-2-05

Expanded function course you are submitting for review:

- ☐ Taking Occlusal Registrations
- ☐ Placement and Removal of Gingival Retraction
- ☐ Taking Final Impressions
- ☐ Fabrication and Removal of Provisional Restorations
- ☒ Applying Cavity Liners and Bases, Desensitizing Agents and Bonding Systems
- ☐ Placement and Removal of Dry Socket Medication
- ☐ Placement of Periodontal Dressings
- ☐ Testing Pulp Vitality
- ☐ Monitoring Nitrous Oxide

Name of instructor providing training: Carol Cleaver • John Kearns

Educational background: (Attach a copy of curriculum vitae) _____

Course objectives: See attached sheet

1. Plan for initial assessment: RDH & currently all our assistants are certified

2. Resources used for didactic materials. Include a copy of the didactic materials for Board review.

Enclosed -
Assistants will read didactic materials prior to clinical component.

3. Will lab training be provided? YES ☒ NO ☐ If yes, detail lab experience:

Practice placing cavity varnish, bases, + bonding agents on a prepared typodont.

4. Describe your plan for the clinical component of training. Be specific.

As the clinical situation arises with a prepared tooth, the appropriate bonding agent or base, desensitizing agents, will be placed by the RDA. Following application, Dr. Kearns or Dr. Cleaver will evaluate proper placement of material.

5. Plan for post-course competency assessment: Written Test for didactic portion
Competency will be evaluated at placement
of each individual patient experience.

6. Provide a detailed breakdown of the dates and times for the entire course: The time schedule
depends on if + when this outline + materials are approved.
Date ? : 6-8 pm at our office
6-7:15 - Didactic - lecture - answer questions
7:15-8:00 - Lab training + Post Op Written Test
Ongoing clinical experience per patient experiences

7. Where do you intend to offer the course? At our office -
Fleur Dentistry - 4551 Fleur Drive, Des Moines

8. Who are the intended recipients of the course? Our RDA who are currently
certified by the Dental Assisting National Board.

9. How many credit hours of continuing education are you requesting? 2

If available, please include a copy of the course brochure.
A copy of the didactic materials must also be included with your request.

You will be contacted after the Iowa Board of Dental Examiners has reviewed your request.

MAIL COMPLETED APPLICATION, ALONG WITH A FEE OF $10 FOR PRIOR APPROVAL OF CONTINUING EDUCATION HOURS, TO:

Iowa Board of Dental Examiners
Expanded Function Committee
400 SW 8th St., Suite D
Des Moines, IA 50309-4687

Cavity Liners, Bases, Desensitizing Agents and Bonding Systems

Continuing Education Credit Hours Awarded: 4

General Instructions

According to the Board rule, training programs MUST consist of all of the following:

1. An initial assessment to determine the base entry level of all participants in the program. At a minimum, participants must be currently certified by the Dental Assisting National Board or must have 2 years of clinical dental assisting experience;
2. Didactic component;
3. Laboratory component, if necessary;
4. Clinical component, which may be obtained under the personal supervision of the participant's supervising dentist while the participant is concurrently enrolled in the training program; and
5. A post-course competency assessment at the conclusion of the training program.

Conduct an initial assessment to determine base entry level of all participants in the program.

Didactic

Required Reading

Phinney & Halstead, Dental Assisting, A Comprehensive Approach, published by Delmer (Thompson) ISBN 1-4018-3480-9, p 586-591, 692-697

Suggested reference to supplement didactic component:

Bird & Robinson: Modern Dental Assisting, Published by Torres & Ehrlich

Objectives

1. Identify cavity preparations and how they relate to the need for cavity liners, bases and bonding systems.
2. Identify cavity liners- Uses, examples of and how to utilize and manipulate materials
3. Identify Cavity Varnishes- Uses, examples of how to utilize and manipulate the material
4. Identify Cement Bases- Uses, examples of how to utilize and manipulate the materials
5. Identify Bonding Agents-Uses, examples of how to utilize and manipulate the materials
6. Understand dentin vs. enamel bonding
7. Identify desensitizing agents-Uses, examples of how to utilize and manipulate material

Criteria for rule 650-20.16(153) for Cavity Liners, Bases and Desensitizing Agents and Bonding Systems

4 Hours

1. **Initial Assessments: All dental assistants are registered and certified.**

2. **Didactic Component: Assistants will be required to read didactic and required reading prior to Dr. Cleaver presenting didactic portion of training.**
   2 HOURS

3. **Lab component: Dr. Kearns will be presenting the lab component of this training.**
   2 HOURS

4. **Clinical Component: Dr. Kearns and Dr. Cleaver will be monitoring this portion of training.**

5. **Post Course competency: A written test will be administered by Dr. Cleaver.**

Cavity Liners, Bases, Desensitizing Agents and Bonding Systems

Cavity Preparation/Pulpal Involvement-

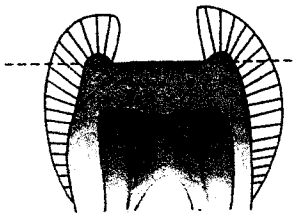
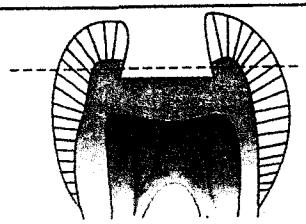
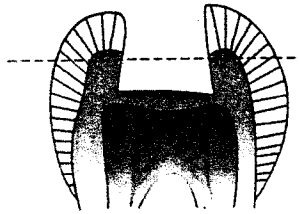
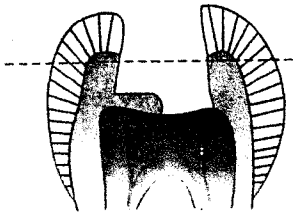
A. Ideal Level- Preparation does not involve the pulp but is through the enamel and just in the dentin.
   - A base in not required.
   - If a composite is going to be placed, a bonding agent can be placed. Some dentists place a glass ionomer liner or calcium hydroxide over the exposed dentin.
     If an amalgam is placed, bonding agents can be placed. Some dentists will place cavity varnish over the dentin.

B. Beyond Ideal- More enamel and dentin are removed, but the preparation is not close to the pulp.
   - If a composite is going to be placed, a bonding agent can placed.
   - The level of the dentin can be restored with a cement base.
   - With an amalgam, bonding agents can be placed. Some dentists would place varnish to seal the dentin tubules and then place a layer of a cement base. Another option is to place a reinforced ZOE base, a glass ionomer.

C. Near Exposure- This involves a large amount of enamel and dentin being removed, but the pulp is not exposed.
   - The closer the cavity preparation comes to the pulp, the more precautions are needed.
   - When a cavity liner is placed over a near pulp exposure, it is referred to as a indirect pulp cap
   - If a composite is going to be placed, a bonding agent can be placed. A cavity liner like a polycarboxylate or glass ionomer cement can be used to cover the near exposure.
   - If amalgam is to be placed, a bonding agent can be placed. A cavity liner like calcium hydroxide, glass ionomer, or ZOE can be placed first over the deepest portion of the prep in dentin, and then varnish.

D. Pulp Exposure- Enough enamel and dentin have been removed to expose a portion of the pulp. There could be blood in the cavity preparation.
   - The dentist must decide if endo is indicated at this point, or if an attempt to save the vitality of the tooth is appropriate. A direct pulp cap is the performed if vitality of the tooth is attempted.
   - Calcium hydroxide, glass ionomer , or a polycarboxylate can be placed to see if the pulp is going to heal followed by a bonding agents, and then a restoration.

TABLE 28-5 Depth of Cavity Preparations and Pulpal Relation

Pulpal Involvement	Illustration
1. Ideal level This preparation does not involve the pulp but is through the enamel and just in the dentin. It is large enough to retain a restoration.	
2. Beyond Ideal More enamel and dentin are removed, but the preparation is not close to the pulp.	
3. Near exposure This cavity preparation involves a large amount of enamel and dentin being removed, but the pulp is not exposed. The floor of the preparation may be slightly pink due to the proximity of the pulp.	
4. Pulp exposure Enough enamel and dentin have been removed to expose a portion of the pulp. There will be blood in the cavity preparation.	

Cavity Liners-

- Examples of cavity liners are calcium hydroxide, zinc oxide eugenol and glass ionomer.
- Cavity liners are placed in the deepest portion of the cavity preparation. They are designed to protect the pulp from chemical irritations and provide therapeutic effects to the tooth.

Procedure: The tooth is prepared by the dentist.
The dental assistant will maintain a dry field:

1. Examine the preparation. Determine the deepest portion of the cavity.
2. Clean and dry the preparation.
3. Prepare the liner to be used. Dispense and if needed mix according to directions.
4. Place the liner in a thin layer in the deepest portion of the preparation using a ball-ended instrument. Be careful not to touch the sides of the preparation. Use an explorer to remove excess material off of walls of the tooth preparation.
5. Use the curing wand if the material is light cured, or give the liner adequate time to set up if not light activated.

Cavity Varnish-

- Varnish is used to seal the dentin tubules to prevent acids, saliva and debris from reaching the pulp.
- It is used under amalgam restorations to prevent microleakage and under zinc phosphate cements to prevent penetration of acids to the pulp.

Procedure: The tooth is prepared by the dentist.
The dental assistant will maintain a dry field:

1. Wash and dry the tooth
2. Using 2 small cotton pellets, dip them in the varnish and remove excess varnish in a piece of gauze.
3. Using cotton pliers pick up one cotton pellet and paint a thin layer of varnish on the dentin.
4. Allow varnish to dry for 30 seconds
5. Apply another coat using the second cotton pellet.
6. Never re-dip the cotton pellet in the bottle of varnish
7. If excess varnish was placed on the enamel surface, remove it with varnish solvent and a small applicator.

Cement Bases-

- Cement Bases are used to protect the pulp and are usually thicker than cavity liners.
- Examples are glass ionomers, zinc phosphate and polycarboxylate.

Procedure: The dentist will prepare the tooth:
The dental assistant will maintain a dry field:

1. Decide where and the size of area to place base using the guidelines previously discussed .
2. Rinse and dry the tooth.
3. Prepare the cement according to manufacturers instructions.
4. Using a small condensing end of an instrument or a ball burnisher, place the base in the appropriate area of preparation.
5. Evaluate placement. The base should cover the floor of the cavity preparation .
6. Remove any excess material with a spoon excavator or explorer.

Bonding Agents

-

Bonding Agents are also known as **adhesives and bonding resins**. These materials are used to improve the retention between the tooth structure and the restoration. These materials bond enamel and dentin to porcelain, resins, precious and non-precious metals, composites, and amalgams.
Bonding agents are low-viscosity that may or may not contain fillers, and some contain fluoride. These materials can be light cured or dual cured.
Bonding agents vary with manufacturer. Some need an acid etch prior to placement of the bonding system. Some materials are self etching. Follow manufacturer's instructions.

Enamel Bonding- Adhesion of dental materials to enamel is accomplished by using 30-40% phosphoric acid. The etch alters the enamel and creates microscopic undercuts between the enamel rods. Low-viscosity unfilled resin bonding agents then penetrate into undercuts and mechanically lock into them. The restorative material then bonds to this layer and becomes a solid unit.

Dentin Bonding- It is more difficult to bond dentin than enamel because

- Dentin has a high water content, which interferes with bonding
- Composition of dentin is more organic than inorganic and contains water.
- When dentin is cut with a bur, it forms a smear layer. This layer of debris lies on the cavity floor and prevents contact between the intact dentin and the bonding agent, and so that is why an etchant is used to remove a smear layer. When this smear layer is removed, when an adhesive is used it creates a mechanical bond with the dentin.

Procedure- The dentist prepares the tooth.
The dental assistant maintains a dry field.

- If etch is required, dentist places it, and the assistant rinses it off for specified amount of time.
- If the bonding system involves both the enamel and dentin, a primer step is included. The primer is placed with small applicator tips. This material wets the dentin and penetrates the dentin tubules.
- The bonding resin is then applied using a different applicator tip and the curing light is used to harden the material.

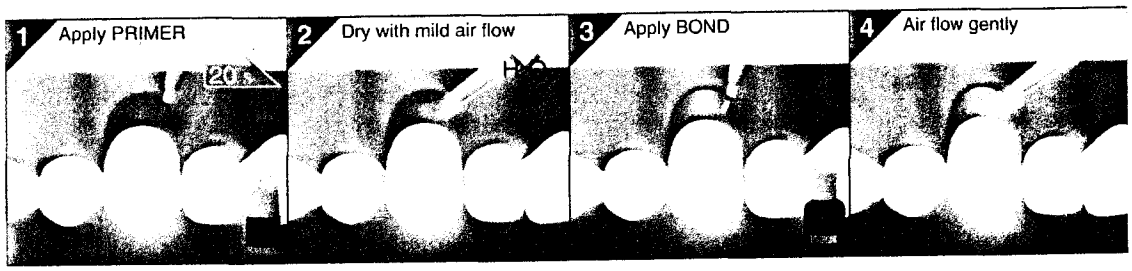
CLEARFIL™ SE BOND Flow Chart Sheet

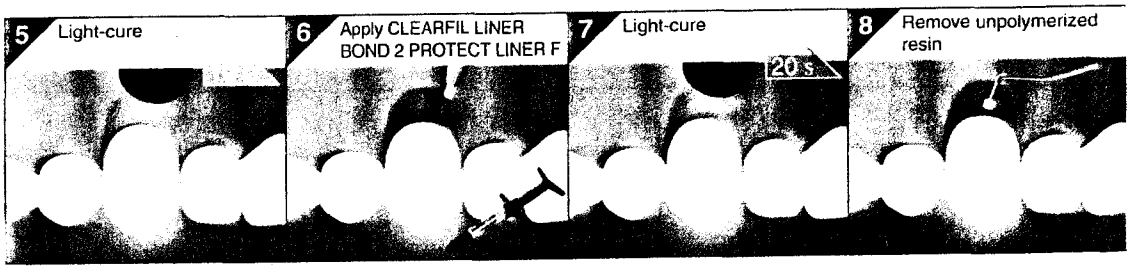
RESIN-BASED DENTAL ADHESIVE SYSTEM

KURARAY MEDICAL INC.
1621 Sakazu, Kurashiki,
Okayama 710-8622, Japan

See Instructions for Use

Case C **Treatment of hypersensitive and/or exposed root surfaces**





Desensitizing Agents-

HOW SUPERSEAL™ WORKS

SuperSeal™ is a unique formula that removes the smear layer, seals the tubules and desensitizes in one step. No pumice cleaning or rinsing required.

Because of its acidic nature **SuperSeal™** demineralizes the smear layer (both organic and mineral debris) and the peritublar dentin (outermost ring of very hard mineralized dentin of each tubule complex).

Reacts with the calcium hydroxyapatite to form a fine granular calcium oxalate precipitate within seconds both within the dentinal tubules and on the surfaces of the vital dentin, enamel and cementum.

This precipitate is an acid-resistant liner that is biologically and chemically complexed with the underlying substrate of the vital dentin.

SuperSeal™ guarantee.

If you are not completely satisfied, just return the unused portion for a complete refund.

Directions for Use

Note: For best results Super Seal™ should be placed onto the entire area to be treated prior to any other agents.

1. Place 1 to 2 drops of SuperSeal™ in the small end of a clean Dappen dish. More may be needed depending on the area to be treated.
2. Using cotton forceps, take a new, very small sterile cotton pellet and saturate the cotton pellet with SuperSeal™.
3. Gently rub or dab the saturated cotton pellet onto the entire preparation for at least 30 seconds. (DO NOT BRUSH) Be sure to saturate the area well. Super Seal™ may be applied to a damp or dry surface. It may be dabbed around the crown margins following use of astringents, onto root cementum, and onto exposed roots that are sensitive to cold or air stimuli. **Do not rinse.** Super Seal™ will **not** harm soft tissue.
4. Use gentle air to evaporate the solution from the treated area. Do not use a hard blast of air because it will remove the material from the site. When dry, you may note a frosty-white surface or precipitate. This is the acid-resistant mineral layer that blocks fluid movement and dentin sensitivity to cold and air stimuli.

NOTE:

Studies have shown that with most bonding systems, etching is required before applying Super Seal™.
Call for details.

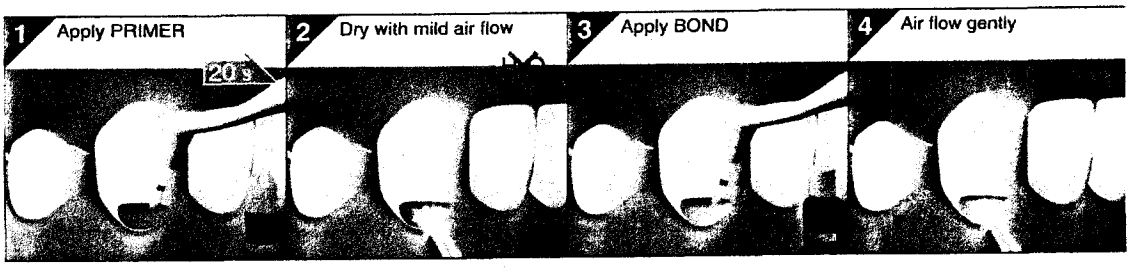
CLEARFIL™ SE BOND Flow Chart Sheet

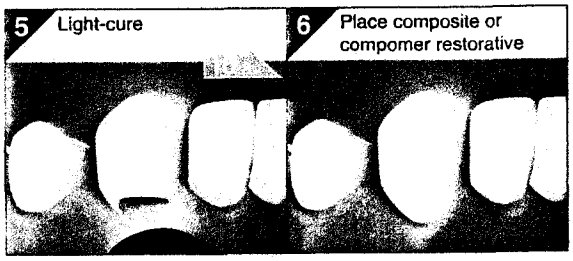
RESIN-BASED DENTAL ADHESIVE SYSTEM

KURARAY MEDICAL INC.
1621 Sakazu, Kurashiki,
Okayama 710-8622, Japan

See instructions for Use

Case A Direct filling restorations using light-curing composite or compomer





S1970EU-02

10/2001

are reduced to create low viscosities for cementation purposes.

Properties. Most resin cements are radiopaque and exhibit adequate strength and wear resistance for luting. These materials are insoluble in oral fluids but are irritating to the pulp; thus, a protective cement is required. Some of the products contain fluoride.

Manipulation Considerations. Resin cements do not adhere directly to metal or ceramic materials; these materials must be roughened with etchants to produce mechanical bonding or the tissue surfaces of ceramics are treated with a silane coupling agent to produce a chemical bond with the resin cements. Sometimes, a wire mesh or undercuts may be added to the tissue side of the prosthesis to aid in retention.

Self-cured materials come with an initiator and an activator. These are mixed on a paper pad for twenty to thirty seconds. Excess cement must be removed before the material is set completely to prevent any marginal leakage. Light-cured materials come in syringes and must be cured for at least forty seconds. Dual-cured materials come in two component systems that are mixed together for twenty to thirty seconds. Once mixed, these materials begin to set slowly, allowing for placement of the cement on the prosthesis and the prosthesis to be seated in the oral cavity. Once in position, the visible light unit is activated to harden the cement.

Resin-Reinforced Glass Ionomer Cement

Resin-reinforced glass ionomer cement has been modified to include resin. This cement is stronger and more water insoluble and adheres to the tooth structure better than conventional glass ionomer cement. Like glass ionomer cement, it releases fluoride to protect the enamel against decalcification and demineralization.

Compomer Cement

Compomer cements are basically polyacid modified composites. They are like composites and do not contain water and have properties similar to resin cements. Compomers release fluoride, have self-adhesive properties, and come in light-cured and self-cured versions. They are used to cement all types of dental restorations.

Bonding Agents

Bonding agents are also known as **adhesives** and **bonding resins**. These materials are used to improve the retention between the tooth structure (enamel and dentin) and the restoration. These materials come in many forms and are often complete systems (Figure 26-17). These materials bond enamel and dentin to porcelain, resins, precious and non-precious metals, composites, and amalgam.

The bonding materials are low-viscosity resins that may or may not contain fillers. Some of the bonding agents contain additives with adhesive enhancers, and some contain fluoride. These materials are mainly light cured or dual cured.

Enamel Bonding

Adhesion of dental materials to enamel is accomplished by acid etching with phosphoric acid. This solution alters the surface of the enamel and creates microscopic undercuts between the enamel rod (Figure 26-18). Low-viscosity, unfilled resin bonding agents then penetrate into these undercuts and mechanically lock into them. The restorative material then bonds to this layer and becomes a solid unit. Bonding to enamel is required before placement of composite restorations, pit and fissure sealants, veneers, resin-cemented crowns and bridges, and orthodontic brackets.

The acid etching process involves the use of thirty to forty percent phosphoric acid solution. The etchant comes in liquid or gel form and is supplied in bottles or syringes. The liquids are placed with small cotton pellets, sponges, brushes, or disposable applicators.

Dentin Bonding

Dentin bonding is more of a challenge than enamel bonding. Some of the obstacles include:

- Dentin has a high water content, which can interfere with the bonding to the tooth.
- The composition of the dentin is more organic than inorganic and contains water. These factors make dentin difficult to bond to.
- Dentin is directly above the pulp, so the operator must take care not to injure the pulp.

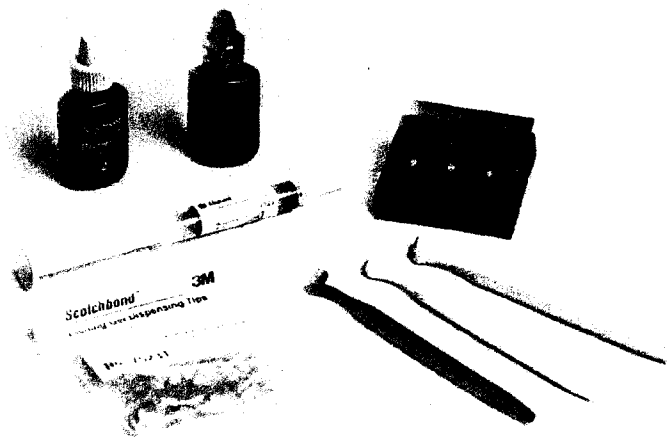


FIGURE 26-17 Bonding agents and systems.

Cavity Liners, Bases, Desensitizing Agents + Bonding Systems

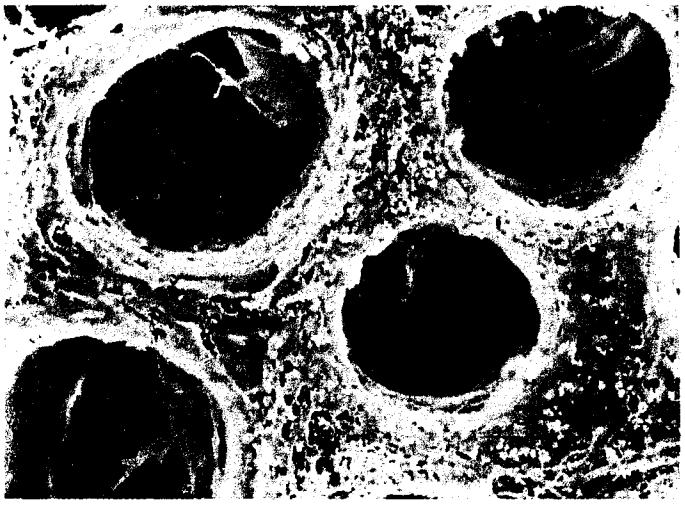


FIGURE 26-18 Microscopic view of etched dentin. *(Courtesy of Kerr Corporation)*

- When the dentin is cut with a bur during the cavity preparation, it forms a **smear layer**. This layer of debris lies on the cavity floor and walls and prevents contact between the intact dentin and the bonding agent/adhesive.

The current dentin bonding materials use an etchant to remove the smear layer, because the smear layer is not attached firmly and is unreliable. When the smear layer is removed, the adhesives achieve a mechanical bond with the dentin. Many of the bonding agents are suitable for both enamel and dentin surfaces because of the application of the acid etchant.

Restorative Dentistry

Restorative dentistry, also known as operative dentistry, involves various materials and techniques. There are many reasons a tooth needs to be restored, including decay, fracture, abrasion, esthetics, and attrition. Restorative materials such as amalgam and composites are used to restore the tooth. These materials are called direct restorative materials because they are mixed and placed directly in the cavity preparation in one appointment.

Reasons for restoring teeth include:

- Arresting the loss of tooth structure. Stopping the decay process early allows the preparation to be conservative and small restorations to be stronger.
- Preventing the recurrence of decay by placing margins that can be reached easily for cleaning. This is known as **extension for prevention**.

PROCEDURE 26-9

Placing Etchant

The dental assistant prepares the materials and isolates the area. The dentist places the etchant. When the allotted time has passed, the dental assistant thoroughly rinses the tooth.

EQUIPMENT

- Acid etchant, usually a thirty to forty percent solution
- Isolation materials (rubber dam or cotton rolls)
- Applicator (syringe, cotton pellets, or small applicator tips)
- Dappen dish
- Air-water syringe
- Timer

PROCEDURE STEPS *(Follow aseptic procedures)*

1. Isolate the area.
2. Clean the surface thoroughly.
3. Prepare the etchant applicator or syringe.
4. Place the etchant on the surface for fifteen to thirty seconds depending on manufacturer directions.
5. Rinse the tooth after the designated time for fifteen to twenty seconds with the air-water syringe and evacuate thoroughly for ten to twenty seconds.

NOTE: The etched surface will have a frosty appearance. This surface needs to be isolated until the cementation is complete. If saliva or other fluids contact the surface, the etching process must be repeated.

PROCEDURE 26-10

Placing Bonding Agent

Steps in the application of bonding agents vary with manufacturers, so follow the directions that come with the product. The dental assistant prepares the materials for each step and keeps the area dry and free of debris (sometimes, cavity cleaners are used).

EQUIPMENT AND SUPPLIES

- Bonding system that contains acid etchant, primer or conditioner, adhesive material
- Applicators (disposable tips or brushes)
- Dappen dish
- Isolation means
- Air-water syringe
- Curing light and shield
- Timer

PROCEDURE STEPS (*Follow aseptic procedures*)

1. If the cavity preparation is near the pulp, place calcium hydroxide or glass ionomer lining cement over the area.
2. The etchant is placed on the enamel and the dentin for the specified amount of time, usually fifteen to twenty seconds. Usually, the etchant is placed on the enamel first and then the dentin, because the dentin is more sensitive to the etchant.
3. Rinse the tooth as soon as the time is up. Continue to rinse for at least five to ten seconds. Move quickly to prevent bacterial contamination of the dentin.
4. If the bonding involves both the enamel and dentin, a primer step is included. The primer or conditioner is placed with a brush or an applicator. This material wets the dentin and penetrates the dentin tubules.
5. The bonding resin is then applied, and the curing light is used to harden the material.
6. Cleanup involves disposing of applicator tips or brushes.

- Restoring the contour of the tooth (the shape and design of the crown of the tooth). The proper contour prevents food impaction and gingival irritation.
- Restoring the function of the tooth and establishing occlusion with opposing teeth for mastication of food.
- Restoring or improving the esthetic look of the teeth.

Classification

Dental caries are classified to simplify the examination, charting, diagnosis, and patient communication. There are several ways to classify cavities and restorations (see Chapter 7, Dental Charting). The classifications include Black's classification, which identifies areas of decay according to the surfaces they are located on, such as Class I for occlusal caries on the posterior teeth and Class III for dental caries on the mesial or distal of anterior teeth where the incisal edge is not involved. Another classification is according to the number of surfaces involved, for example simple, compound, and complex. A third method of classifying dental caries is according to whether the caries are pit and fissure areas or smooth surface areas.

Cavity Detection

Cavities can be detected with radiographs, probing with an explorer, or the use of a special dye. This dye detects caries by distinguishing between good, sound, hard dentin and dentin that is infected with bacteria and softened. The dye is placed in the preparation early in the procedure to keep from removing too much tooth structure. The dye is applied for about ten seconds and then rinsed off. Burs and spoon excavators usually remove all the stained dentin. This process is repeated until no caries remain. This material also can be used to identify cracks and root canals.

Cavity Cleaners/Disinfectants

Cavity cleaners/disinfectants can be used in the cavity preparation. Like any body wound, the cavity should be

PROCEDURE 28-12 *(continued)*

with the spray from the air-water syringe and the evacuator.

- Apply disclosing solution to detect any areas of plaque or stain that were missed.
- Using the mouth mirror and the air syringe, inspect each surface for any remaining soft deposits and/or stains. Note these areas on the patient's chart or paper for future reference.
- Polish the areas missed with a prophy cup and/or brush.
- Rinse the patient's mouth to remove all the abrasive agent.
- Inspect the teeth for a lustrous shine showing no debris or extrinsic stains. The soft tissues should be free of abrasion or trauma. The patient is ready for a fluoride treatment. The dentist may want to see the patient before he or she is dismissed.

6. Chart the coronal polish. It is the dental assistant's responsibility to record the coronal polish completely and accurately on the patient's dental chart. The entry is recorded in ink, dated, and signed or entered into the computer system. Include any comments about the condition of the patient's mouth and the type(s) of material(s) used.

PLACING CAVITY LINERS, CAVITY VARNISH, AND CEMENT BASES

OUTLINE

Introduction
Cavity Preparation/Pulpal Involvement
Treatment of Cavity Preparations
Cavity Liners
Cavity Varnish
Cement Bases

▸ OBJECTIVES

The student should strive to meet the following objectives and demonstrate an understanding of the facts and principles presented in this chapter:

1. Classify cavity preparations according to their relationships with the pulp.
2. Explain the different options for protecting the pulp with cavity liners, cavity varnish, and cement bases.
3. Describe the purpose of using cavity liners. List types of materials that can be used and explain the placement procedure.
4. Describe the purpose of using cavity varnish and explain the placement procedure.
5. Describe the purpose of using cement bases. List types of materials that can be used and explain the placement procedure.

▸ KEY TERMS

axial walls
cavity liners
cavity preparation
cavity varnish
cement bases
direct pulp capping (DPC)
high-strength bases
indirect pulp capping
low-strength bases

Introduction

The dental assistant should be familiar with and knowledgeable about the properties and preparation of cavity liners, varnishes, and cement bases (refer to Chapter 26, Chairside Restorative Materials). Cavity preparation and terminology also should be familiar so that the dental assistant can plan ahead and be ready to prepare and place the materials the dentist asks for. Not all states allow dental assistants to place bases, liners, and cavity varnish, but the dental assistant does assist the dentist during this step of restorative procedures.

Cavity Preparation/ Pulpal Involvement

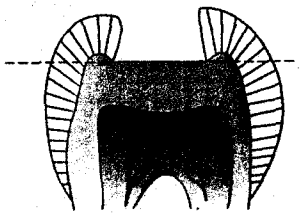
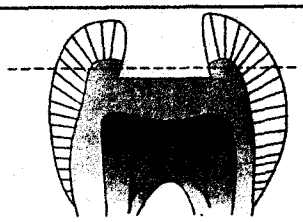
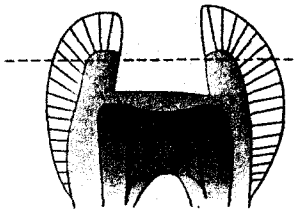
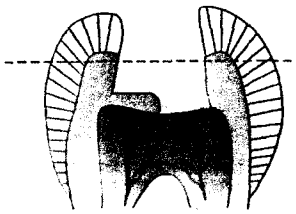
The **cavity preparation** for a restoration depends on the amount of decay, the location of the decay, and the type of materials used to restore the tooth. If the dental assistant is placing the liners, base, or varnish, he or she should examine the cavity preparation to assess pulpal involvement (Table 28-5).

Treatment of Cavity Preparations

The treatment of the cavity preparations varies with the amount of enamel and dentin removed and how near the prep is to the pulp. Using the categories from Table 28-5, possible treatments are as follows:

1. Treatment of the ideal cavity preparation:
   - A base is not required because only a minimal amount of enamel and dentin has been removed. Some dentists place only the restoration, while others prefer to place a fluoride-releasing liner. If an amalgam restoration is going to be placed, two thin layers of cavity varnish are often placed over the dentin.

TABLE 28-5 Depth of Cavity Preparations and Pulpal Relation

Pulpal Involvement	Illustration
1. Ideal level This preparation does not involve the pulp but is through the enamel and just in the dentin. It is large enough to retain a restoration.	
2. Beyond ideal More enamel and dentin are removed, but the preparation is not close to the pulp.	
3. Near exposure This cavity preparation involves a large amount of enamel and dentin being removed, but the pulp is not exposed. The floor of the preparation may be slightly pink due to the proximity of the pulp.	
4. Pulp exposure Enough enamel and dentin have been removed to expose a portion of the pulp. There will be blood in the cavity preparation.	

- If a composite restoration is going to be used, a glass ionomer liner or calcium hydroxide is placed over the exposed dentin.

2. Treatment of the beyond-ideal cavity preparation:
   - With a beyond-ideal preparation, the level of the dentin is restored with a cement base.
   - With an amalgam restoration, there are several options. One option is to place two thin layers of varnish to seal the dentin tubules and then place a layer of a cement base, such as zinc phosphate.
   - Another option is a reinforced ZOE base, which has a soothing effect on the pulp. Varnish is not used with this material.
   - Other options include polycarboxylate or glass ionomer base, which also do not require varnish.
   - Under composite restorative materials, use a glass ionomer base or calcium hydroxide.
3. Treatment of the near-exposure cavity preparation:
   - The closer the cavity preparation comes to the pulp, the more precautions that are needed. There are also several options of treatment of the near-exposure preparation.
   - With preparations that are going to be restored with amalgam, a liner of calcium hydroxide, glass ionomer, or ZOE is placed first over the deepest portion of the prep in the dentin. Once this layer is placed, two thin layers of varnish may be inserted over the exposed dentin. Then, a layer of cement base is applied. Zinc phosphate, polycarboxylate, or glass ionomer cements can be used for this layer.
   - Another option for amalgam restorations is to place a liner over the deepest portion of the preparation, then a layer of reinforced ZOE, polycarboxylate, or glass ionomer cement. This is then sealed with cavity varnish.
   - With some preparations, the dentist may choose not to place cavity varnish.
   - When composite materials are going to be used to restore the tooth, a liner is placed first, then a layer of either polycarboxylate or glass ionomer cement. Varnish is not placed and a ZOE base liner is not used because they inhibit the setting of the composite.
   - When a cavity liner is placed on a near exposure, the procedure is often referred to as an indirect pulp capping.
4. Treatment of the exposed-pulp cavity preparation:
   - In an exposed pulp, the dentist must decide whether endodontic treatment is indicated or attempt to save the vitality of the tooth. If the treatment of choice is to save the pulp, a procedure called a **direct pulp capping (DPC)** is performed.
   - One treatment involves the placement of calcium hydroxide or glass ionomer liner and then reinforced ZOE as a temporary restoration. This gives the dentist time to see whether the pulp is going to heal.
   - Another treatment involves the placement of a liner, followed by a layer of ZOE cement, two thin layers of varnish, and a cement base.
   - Some dentists prefer to place a liner and then a layer of polycarboxylate or glass ionomer cement base.

Cavity Liners

Cavity liners are placed in the deepest portion of the cavity preparation on the **axial walls** or pulpal walls. After the liners are hardened, they form a cement layer with minimum strength. They are placed on the dentin or on an exposed pulp and protect the pulp from chemical irritations and also provide a therapeutic effect to the tooth. Examples of cavity liners are calcium hydroxide, zinc oxide eugenol, and glass ionomer. Liners also are often called **low-strength bases**.

Cavity Varnish

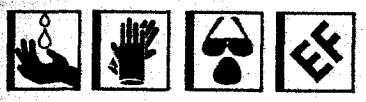
Cavity varnish is used to seal the dentin tubules to prevent acids, saliva, and debris from reaching the pulp. Cavity varnish is used under amalgam restorations to prevent microleakage and under zinc phosphate cements to prevent penetration of acids to the pulp. If cavity liners or medicated bases are used, varnish is placed after or on top of these materials.

Cement Bases

Cement bases are mixed to a thick putty consistency and placed in the cavity preparation to protect the pulp and provide mechanical support for the restoration. These cement bases are placed on the floor of the cavity

PROCEDURE 28-13

Placing Cavity Liners



This procedure is performed by the dentist or an expanded-function dental assistant. The preparation of the cavity has been completed, and this procedure begins the restorative process.

EQUIPMENT AND SUPPLIES

- Cavity liner (calcium hydroxide, glass ionomer, zinc oxide eugenol)
- Application instrument—small, ball-shaped instrument or explorer
- Gauze sponges and cotton rolls
- Mixing pad and spatula, if material is mixed
- Curing light (if material is light cured)

PROCEDURE STEPS *(Follow aseptic procedures)*

1. Examine the cavity preparation. Determine the deepest portion of the cavity preparation and access to that area.
2. Clean and dry the cavity preparation. Remove any debris from the cavity preparation. Wash and dry the area with the air-water syringe.
3. Prepare the liner to be used. Dispense and mix according to directions. ***Note:*** Usually, light-cured materials do not have to be mixed but are placed directly in the preparation.
4. Place the liner in the cavity preparation. Using a small, ball-ended instrument, place the material in the deepest portion of the cavity preparation in a thin layer. Be careful not to touch the instrument to the sides of the preparation. The material will flow into the area and can be spread by pushing the liner in the direction desired with the small ball of the instrument.
5. Complete the placement. Remove the instrument, wipe it clean with a gauze, and repeat this procedure until the liner covers the deepest portion of the cavity preparation (Figure 28-53).
6. If the liner is self-curing, the material must be allowed to harden. If the liner is light curing, the light is held over the tooth and activated to cure the material for the appropriate time (usually ten to twenty seconds).
7. Examine the cavity preparation. After the liner has cured, examine the preparation. If any material is on the enamel walls, remove it with an explorer.

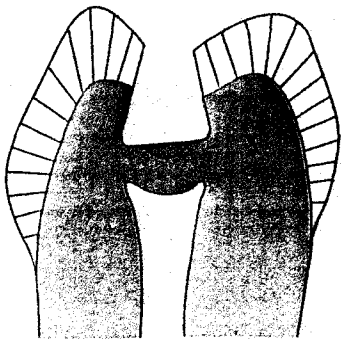


FIGURE 28-53 Placement of the cavity liner in the preparation.

preparation to raise the level of the floor of the preparation to the ideal height. There are several different types of cements that can be used for bases. These include glass ionomers, hybrid ionomers, reinforced zinc oxide eugenol, zinc phosphate, and polycarboxylate. The preparation, sensitivity of the pulp, and type of restoration indicate which cement to use (See Chapter 26, Restorative Materials, for specific uses of each material mentioned). These materials are often referred to as **high-strength bases**.

PROCEDURE 28-14

Placing Cavity Varnish

This procedure is performed by the dentist or the expanded-function dental assistant. The preparation of the cavity has been completed, and this procedure is part of preparing the tooth for the restoration.

EQUIPMENT AND SUPPLIES

- Cavity varnish (varnish and solvent)
- Cotton pliers
- Application instruments (cotton balls or cotton pellets, sponge applicators, brush applicators)
- Gauze sponges

PROCEDURE STEPS *(Follow aseptic procedures)*

1. Prepare two very small cotton balls or pellets about 2 mm in size to look like small footballs.
2. Evaluate the cavity preparation to determine access, visibility, and placement of liners or bases.
3. If the tooth has not been washed and dried, do so at this time with the air-water syringe.
4. To prevent contamination of the varnish, pick up both cotton pellets or balls with the sterile cotton pliers and place in the varnish. Then, place the cotton on gauze to remove excess varnish.
5. Using the cotton pliers, pick up one cotton ball or pellet and paint a thin layer of varnish on the dentin in the cavity preparation. A sterile disposable brush or sponge may also be used (Figure 28-54).
6. Allow the cavity to dry for thirty seconds. Place a second coat of varnish. Using the cotton pliers, pick up the second cotton pellet or ball from the gauze and apply a second layer of varnish (this prevents any voids). To prevent contamination, never place an applicator that has been used in the mouth back in the bottle of varnish.
7. Clean up after the procedure. If any excess varnish was placed on the enamel surface, remove it with varnish solvent and a small applicator.

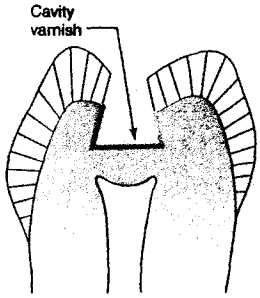


FIGURE 28-54 Placement of cavity varnish in the preparation.

PROCEDURE 28-15

Placement of Cement Bases

This procedure is performed by the dentist or the expanded-function dental assistant. The preparation of the cavity has been completed, and this procedure is part of preparing the tooth for the restoration.

EQUIPMENT AND SUPPLIES

- Cement base materials, usually powder/liquid
- Mixing pad
- Cement spatula
- Gauze sponges
- Plastic filling instrument
- Explorer or spoon excavator

(continues)

PROCEDURE 28-15 *(continued)*

PROCEDURE STEPS *(Follow aseptic procedures)*

1. Determine the previous treatments and decide where to place the base and the size of area. Evaluate access and visibility.
2. Prepare the preparation area. Remove any debris with the air-water syringe and HVE.
3. Prepare the cement base materials according to manufacturer's instructions. Mix the cement base to a thick putty consistency and gather into a small ball.
4. Collect the base on the blade of the plastic filling instrument. Place the base in the cavity preparation.
5. Using the small condensing end of the plastic filling instrument, condense the base into place on the floor of the cavity prep (Figure 28-55). If the material is sticky, place a small amount of powder on the mixing pad and dip the end of the condenser as needed. Continue until a sufficient base layer is placed.

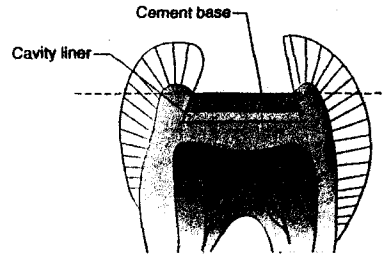


FIGURE 28-55 Placement of cement base in the cavity preparation.

6. Evaluate the placement. The base should cover the floor of the cavity preparation, leave enough room for the restorative materials, and should not be on pins or in retentive grooves.
7. Remove any excess materials with a spoon excavator or an explorer.
8. Clean up the mixing materials. Remove cement from the spatula as soon as possible and remove the paper from the pad.

SUTURE REMOVAL

• OBJECTIVES

The student should strive to meet the following objectives and demonstrate an understanding of the facts and principles presented in this chapter:

1. Explain the function of sutures and when they are placed.
2. List the equipment and supplies needed for suture removal.
3. Determine and identify the location and number of sutures and how to evaluate the healing process.
4. Identify the following suture patterns: simple, continuous simple, sling, continuous sling, horizontal, and vertical mattress.
5. List the basic criteria for suture removal.
6. Explain the steps of removal for identified suture patterns.
7. Explain postoperative patient care.

• KEY TERMS

continuous simple suture
continuous sling suture
debride
horizontal mattress suture
simple suture
sling suture
vertical mattress suture

OUTLINE

Introduction
Procedures Prior to Removal of Sutures
- Prepare Suture Removal Equipment and Supplies
- Review the Patient's Chart
- Examine the Suture Site
- Consult with the Dentist

Types of Suture Patterns
- Simple Suture
- Continuous Simple Suture
- Sling Suture
- Continuous Sling Suture
- Mattress Sutures

Suture Removal Criteria
Suture Removal
Post Suture Removal

TEST FOR CAVITY LINERS, BASES, DESENSITIZING AGENTS AND BONDING SYSTEMS

1. T or F In an ideal cavity preparation a cement base should always be used?

2. T or F With all bonding agents, you have to use a 30-40 % phosphoric acid?

3. T or F Cavity varnishes are used with amalgam restorations?

4. T or F A direct pulp cap is when the pulp is exposed and you place cavity varnish over the exposed nerve to seal it before an amalgam is placed?

5. T or F It is easier to bond dentin than it is enamel?

6. T or F Before placing a bonding agent, you need to dry the tooth as much as possible? (dessicate the tooth)

7. T or F Bonding Agents main purpose are to keep the amalgam from shrinking?

8. T or F Desensitizing agents are used to help generalized sensitivity throughout a patients mouth!

9. T or F If desensitizing agents touch the gingival tissue they can cause burning of the tissues.

APPLICATION FOR PRIOR APPROVAL OF EXPANDED FUNCTION TRAINING

Iowa Board of Dental Examiners
400 SW 8th St., Suite D
Des Moines, IA 50309-4687
http://www.state.ia.us/dentalboard
515-281-5157

Note: A fee of $10 is required to process your request. PLEASE TYPE OR PRINT.

Name of organization or person requesting approval: Fleur Dentistry, LLP

Address: 4551 Fleur Drive, Des Moines, IA 50321

Phone: 287-2493 Fax: 287-7948 Email: _____

Signature: Carol L Cleaver DDS Date: 6-2-05

Expanded function course you are submitting for review:

- ☐ Taking Occlusal Registrations
- ☒ Placement and Removal of Gingival Retraction
- ☐ Taking Final Impressions
- ☐ Fabrication and Removal of Provisional Restorations
- ☐ Applying Cavity Liners and Bases, Desensitizing Agents and Bonding Systems
- ☐ Placement and Removal of Dry Socket Medication
- ☐ Placement of Periodontal Dressings
- ☐ Testing Pulp Vitality
- ☐ Monitoring Nitrous Oxide

Name of instructor providing training: Carol Cleaver, DDS · John Kearns, DDS

Educational background: (Attach a copy of curriculum vitae) _____

Course objectives: See Attached Sheet

1. Plan for initial assessment: RDA and currently all our assistants are certified

2. Resources used for didactic materials. Include a copy of the didactic materials for Board review.
Enclosed - Assistants will read didactic materials prior to clinical component

3. Will lab training be provided? YES ☑ NO ☐ If yes, detail lab experience:

Assistants will cut and pack retraction cord on a typodont prior to any clinical component.

4. Describe your plan for the clinical component of training. Be specific.
As the clinical situation arises with a prepared tooth, the dentist will decide which retraction cord to be placed and while direct supervision is being done, the assistant will pack the retraction cord.
At least 4 patients under direct supervision prior to assistant doing procedure on their own without direct supervision.

5. Plan for post-course competency assessment: Written test completed & didactic materials read, Clinical - all prescribed criteria must be met.

6. Provide a detailed breakdown of the dates and times for the entire course: The time schedule depends on if + when this outline and materials are approved.
2 hours didactic + lab component
2 hours - 4 patients for clinical exposure

7. Where do you intend to offer the course? Our Office

8. Who are the intended recipients of the course? Our RDA who are currently certified by the DANB.

9. How many credit hours of continuing education are you requesting? 4

If available, please include a copy of the course brochure.
A copy of the didactic materials must also be included with your request.

You will be contacted after the Iowa Board of Dental Examiners has reviewed your request.

MAIL COMPLETED APPLICATION, ALONG WITH A FEE OF $10 FOR PRIOR APPROVAL OF CONTINUING EDUCATION HOURS, TO:

Iowa Board of Dental Examiners
Expanded Function Committee
400 SW 8th St., Suite D
Des Moines, IA 50309-4687

Placement and Removal of Gingival Retraction Cord

Continuing Education Credit Hours Awarded: 4 Hours

General Instructions

According to the Board rule, training programs MUST consist of all of the following:

1. An initial assessment to determine the base entry level of all participants in the program. At a minimum, participants must be currently certified by the Dental Assisting National Board or must have 2 years of clinical dental assisting.
2. Didactic component.
3. Laboratory component, if necessary;
4. Clinical component, which may be obtained under the personal supervision of the participant's supervising dentist while the participant is concurrently enrolled in the training program; and
5. A post –course competency assessment at the conclusion of the training program.

Conduct an initial assessment to determine base entry level of all participants in the program.

Didactic

Required Reading

Phinney & Halstead, Dental Assisting, A Comprehensive Approach, published by Delmer(Thompson) ISBN 1-4018-3480-9, p. 704-707

Suggested reference to supplement didactic component:

Bird & Robbinson: Modern Dental Assisting, Published by Torres & Ehrlich ISBN 0-7216-9529-9, p 493-495

Objectives

1. Identify different types of retraction.
2. Identify uses of different types of retraction.
3. Identify purposes of retraction.
4. Describe procedure for placing retraction cord.
5. Describe procedure for removing retraction cord.

Placement and Removal of Gingival Retraction Cord

The purpose of gingival retraction is to ensure that an impression can be obtained with clear margins and/or tissues are displaced so a margin for a restoration can be placed.

Tissues must be retracted horizontally to allow room for sufficient impression material and displace vertically to expose the margin completely. Caution must be taken though, because over packing may cause tearing of the gingival attachment leading to irreversible recession.

Retraction can be done by:

1. chemically
2. mechanically
3. surgically
4. combination of any of the above

Retraction Cords- Retraction cords come in a variety of sizes, configurations can be twisted, braided or woven and some even have small wires in them to help them hold their shape. Some cords are impregnated with chemicals.

Chemical Retraction: -

Chemical retraction can be obtained by using a topical hemostatic solution that has astringent and is dispensed using a plastic lure lock syringe. The solution is placed around the margin of a crown preparation by using a bent disposable metal tip. It stays in place for a few minutes and then it is washed away. The solution causes a temporary coagulum seal that doesn't allow any seepage of blood. An example of this type of material is Espasyl.
Retraction cord can also be impregnated with aluminum chloride or astringent of aluminum salts for chemical retraction. This causes a shrinking of the tissues or ischemia. Epinephrine is the substance that causes this ischemia and is a vasoconstrictor. It provides hemostasis and shrinks the tissues by constricting the blood vessels. Epinephrine is contraindicated for a patient with heart disease, diabetes, or hyperthyroidism or a patient taking certain drugs.

Mechanical Retraction -

Mechanical retraction can be obtained with the use of retraction cords. If the retraction cord doesn't have drugs impregnated in them, tissue shrinkage or hemostasis will not occur, but the tissue will be pushed back to allow access to the margin. A non-impregnated cord needs to be placed in the sulcus of a healthy and inflamed free gingival tissue. It is left in place for 10-15 minutes(instead of the 5 minutes as the chemical retraction cord would be left in place).

Surgical-

There are 3 ways to obtain surgical retraction-

1. Surgical Knife
2. Electro-Surge
3. Lasar

Surgical Knife- The dentist will excise the tissue and expose the margin of the preparation. This usually causes bleeding and area may need additional treatment to get a good impression or even another appointment to let tissue heal prior to a final impression.

Electro- Surge- An electrosurgery unit passes high-frequency current to a small electrode that passes through the tissue. Usually a metal wire or loop tip is used on the tissue. As the tissue is removed it is cauterized and so there is no bleeding.

Laser- This is the newest form of surgical retraction. The soft tissue is removed via the laser without any bleeding and so an impression can be taken immediately.

Procedure for Placing Retraction Cord

The dentist prepares the tooth for a crown and selects the retraction cord(s) to be used:

1. Rinse and dry the tooth-do not over dessicate tooth as it may cause tooth sensitivity.
2. Isolate the tooth with cotton rolls
3. The length of the retraction cord is determined by the circumference of the prepared tooth
4. Use cotton pliers to loop the cord around the margins of the prepared tooth and tighten slightly. Normally the ends of the cord are toward the buccal/facial surface for easy access.
5. The retraction cord is packed around the cervical area starting in the interproximal area. The packing instrument should be angled towards the tooth.
6. If excess cord is present, cut it.
   *If a one cord technique is used, leave the tip of the cord showing out of the sulcus in order for easy removal just before taking the impression.
   *If a two cord technique is used, pack the first cord completely into the sulcus. The dentist will re-marginate the prep and then a second cord will be placed.
7. The cord is left in place for 5 minutes if using a chemical retraction cord. If using a mechanical retraction cord, leave in place for 10-15 minutes.

Removal of Retraction Cord

The end of the retraction cord is grasped and removed in a circular motion just before the impression material is placed.

If doing a 2 cord technique – the last cord placed is removed just prior to the impression material being placed. After the impression has set up, the first cord is removed. Make sure all pieces of the cord are accounted for.

Post Suture Removal

If there was bleeding when the sutures were removed, apply pressure with gauze sponge for a few minutes until the bleeding stops. Check the patient's mouth for any debris, and wipe around the outside of the patient's mouth if necessary. After the sutures are removed, the dental assistant should instruct the patient to continue with a soft diet and rinse with warm saltwater for several days. Before the patient is dismissed, the dental assistant should document the procedure on the patient's chart. The chart entry should include any complications encountered and the degree of healing of the suture site. The dentist should examine the patient after the sutures are removed.

Summary of Steps of Suture Removal

1. Review patient's chart and medical history.
2. Prepare armamentarium.
3. Seat the patient.
4. Explain the procedure and ask whether the patient has had any problems or has any questions.
5. Examine the suture site for healing.
6. Check the number and type of sutures.
7. Consult with the dentist.
8. Debride the suture site to prepare for suture removal.
9. Evaluate the sutures to determine where to make the cuts.
10. Gently secure and lift the sutures to position for cutting.
11. *Using suture scissors or sharp, pointed surgical scissors, cut the sutures.*
12. Remove the sutures and place on a gauze.
13. Blot the suture area if there is blood.
14. Count the sutures on the gauze.
15. Instruct the patient regarding care of the suture area.
16. Document the procedure on the patient's chart.
17. Call the dentist to check the patient.
18. Dismiss the patient.

GINGIVAL RETRACTION

OUTLINE

Introduction
Types of Gingival Retraction
Mechanical Retraction
Chemical Retraction
Surgical Retraction

▸ OBJECTIVES

The student should strive to meet the following objectives and demonstrate an understanding of the facts and principles presented in this chapter:

1. Explain the function of gingival retraction.
2. Describe the different types of gingival retraction.
3. Explain the steps of placing and removing gingival retraction cord.

▸ KEY TERMS

electrosurgery unit **ischemia**
gingival retraction

gingival retrac-
sion with clear
·ocess, all hem-
ırd and soft tis-
st be clean and
ıl, or above the
· below the gin-
ɔntally to allow
and displaced
ely. Retraction
surgically, or a

of sizes, config-
ıre 28-64). The
easy use. The
hold its shape.

d. (B) Tissue

Types of Gingival Retraction

Mechanical Retraction

Mechanical retraction can be accomplished in a number of ways. Without the use of drugs, tissue shrinkage or hemostasis will not be accomplished; however, the tissue can be displaced to allow access to the margin. Retraction cord is placed in the sulcus of healthy and inflamed free gingiva. The cotton cord is left in place for ten to fifteen minutes (instead of the five minutes as it would be with the chemical retraction cord).

If any of the cords is placed too deep, the crevice opens at the bottom but is narrow at the top (Figure 28-65A). The operator may be able to get the impression material

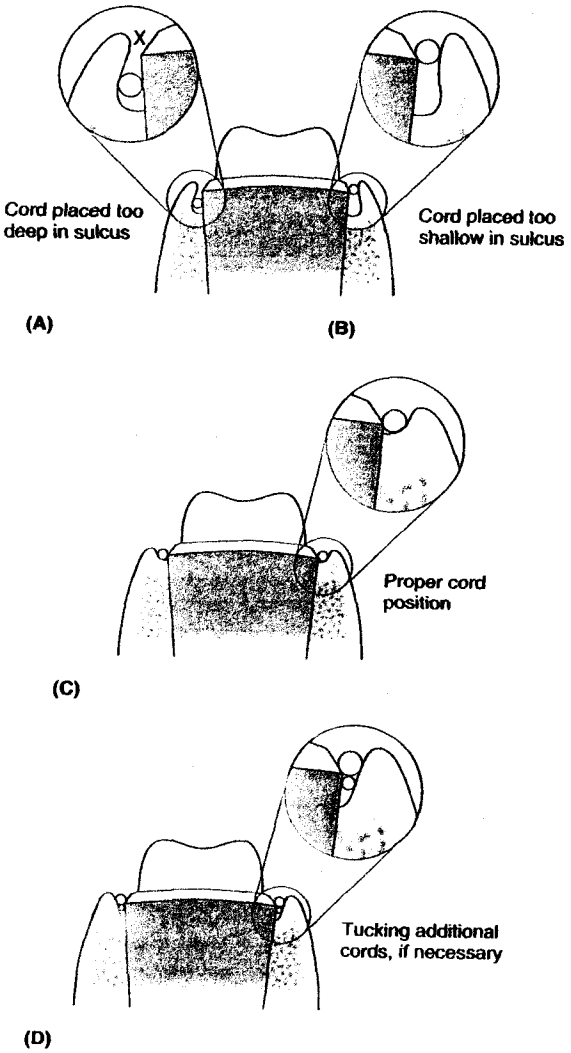


FIGURE 28-65 (A) Retraction cord placed too deep. (B) Retraction cord placed too shallow. (C) Retraction cord placed properly. (D) Double retraction cords placed properly.

Introduction

After a tooth is prepared for a crown, **gingival retraction** is done to ensure that an impression with clear margins can be obtained. During this process, all hemorrhage must be arrested and all the hard and soft tissue the operator wants to reproduce must be clean and dry. The margins ideally are supragingival, or above the gingiva, but many may be subgingival, or below the gingiva. The tissue must be retracted horizontally to allow room for sufficient impression material and displaced vertically to expose the margin completely. Retraction may be done chemically, mechanically, surgically, or a combination of these.

Retraction cord is available in a variety of sizes, configurations, and chemical treatments (Figure 28-64). The cord comes in a dispensing package for easy use. The cord may be twisted, braided, or woven to hold its shape.

FIGURE 28-64 (A) Various types of retraction cord. (B) Tissue management gel kit. *(Courtesy of Pascal, Co., Inc.)*

Types of Gingival Retraction

Mechanical Retraction

Mechanical retraction can be accomplished in a number of ways. Without the use of drugs, tissue shrinkage or hemostasis will not be accomplished; however, the tissue can be displaced to allow access to the margin. Retraction cord is placed in the sulcus of healthy and inflamed free gingiva. The cotton cord is left in place for ten to fifteen minutes (instead of the five minutes as it would be with the chemical retraction cord).

If any of the cords is placed too deep, the crevice opens at the bottom but is narrow at the top (Figure 28-65A). The operator may be able to get the impression material

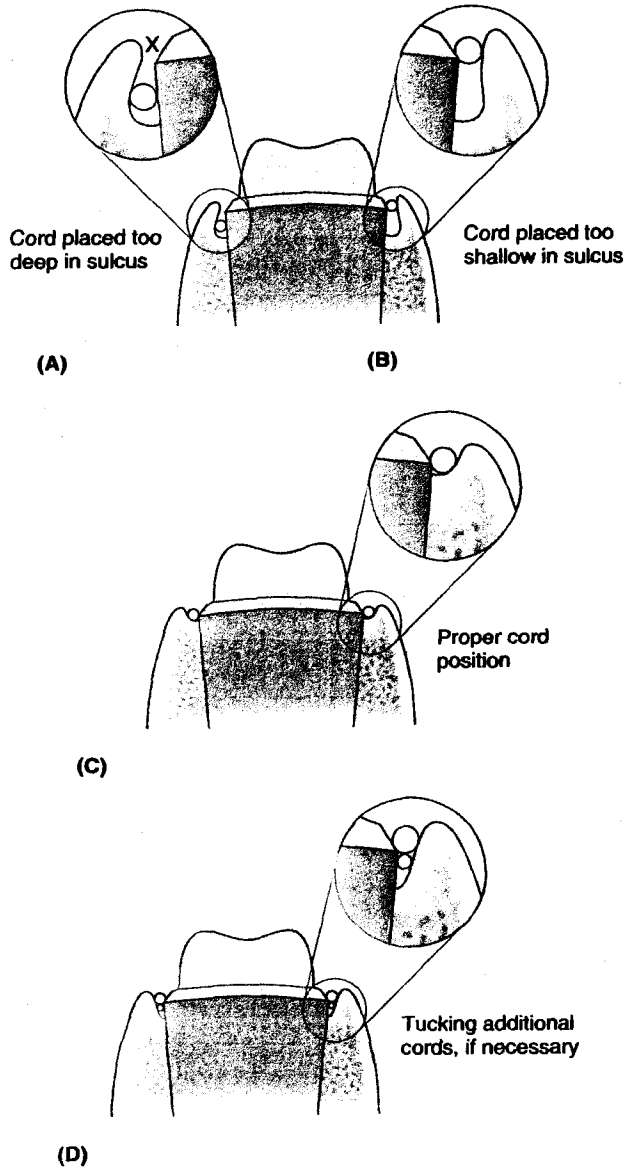


FIGURE 28-65 (A) Retraction cord placed too deep. (B) Retraction cord placed too shallow. (C) Retraction cord placed properly. (D) Double retraction cords placed properly.

into the crevice after the cord is removed, but the material has a tendency to fracture near the edge of the preparation. If the cord is placed too shallow in the crevice, the space is inadequate to allow an accurate reproduction of the margin of the preparation (Figure 28-65B). The proper position of the tucked cord is 1 to 3 mm into the V-shaped crevice (Figure 28-65C). The dentist may want two cords placed to retract the gingival tissues. The crevice is V shaped, and this dictates the size of cords to use. The smaller cords are placed at the depth of the crevice, and the larger cord is placed on top (Figure 28-65D).

Another means of mechanical retraction is accomplished by lengthening a temporary crown form to cause tissue displacement and taking the impression at a later date. Another method uses a dental dam clamp and rubber dam to displace the tissue. The clamp and rubber dam are placed and then removed just before taking the final impression. Both of these techniques may cause the tissue to bleed and the impression to be distorted.

PROCEDURE 28-19

Placing and Removing the Retraction Cord

This procedure is performed by the dentist or the expanded-function dental assistant. After the tooth has been prepared, the retraction cord is placed. The equipment and supplies are included as part of the crown/bridge tray setup. The specific items needed to place and remove the retraction cord are listed.

EQUIPMENT

- Basic setup: Mouth mirror, explorer, cotton pliers
- HVE tip and air-water syringe tip
- Scissors
- Hemostat
- Retraction cord(s)
- Retraction cord placement instrument or plastic instrument
- Cotton rolls, 2 × 2 gauze sponges

PROCEDURE STEPS *(Follow aseptic procedures)*

1. The dentist prepares the tooth for the crown.
2. Rinse and dry the area in preparation for placement of the retraction cord.
3. Cotton rolls are placed on the facial and, if mandibular, on the lingual surface. The area is carefully dried.
4. The dentist selects the retraction cord(s) to be placed around the tooth.
5. The length of the cord needed is determined by the circumference of the prepared tooth. *Note:* The desired length is determined by wrapping the cord around the small finger for an anterior tooth and around a larger finger for a molar.
6. The cord is cut to the appropriate length.
7. Twist the cord ends to compress the fibers together.
8. The cord is looped and placed in a hemostat or cotton pliers.
9. The cord is looped around the margin of the prepared tooth and tightened slightly (Figure 28-66). This aids in slipping the cord into the sulcus area. Normally, the ends of the cord are toward the buccal surface for easy access.
10. The hemostat or cotton pliers is/are released, leaving the cord in the sulcus.

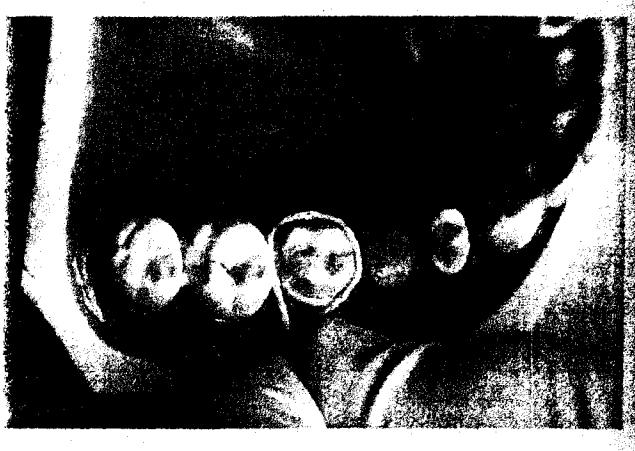


FIGURE 28-66 Retraction cord looped around the prepared tooth for placement in the gingival sulcus.

(continues)

PROCEDURE 28-19 *(continued)*

11. The retraction cord is packed into position with a packing instrument or a plastic instrument.
12. The cord is gently packed around the cervical area, apical to the preparation.
13. The cord is packed around the tooth and overlaps, usually on the facial surface.
14. A tip of the cord is left showing out of the sulcus in order for easy removal just before taking the impression (Figure 28-67).
15. The retraction cord is left in place for five minutes when chemical retraction cord is used and for ten to fifteen minutes for mechanical retraction.
16. The end of the retraction cord is grasped and removed in a circular motion just before the impression material being placed.

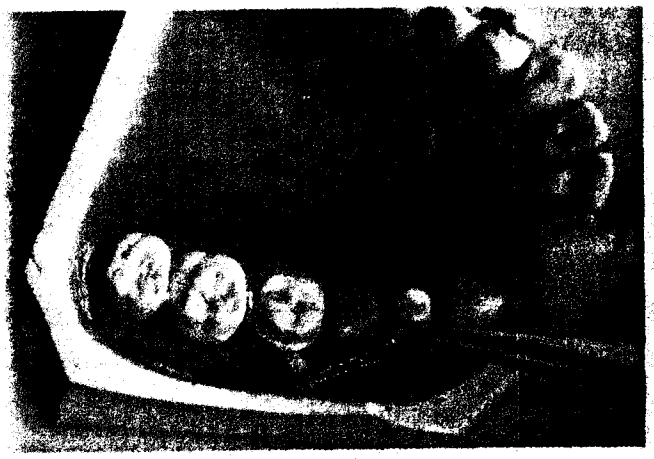


FIGURE 28-67 Retraction cord around the prepared tooth with a tag left out for easy removal.

Chemical Retraction

Chemical retraction may be done prior to the placement of the cord or by impregnating the cord and then placing it, or both ways. One of the newer ways is to use a topical hemostatic solution, astringent with dento-infusion tubes, and a plastic lure lock syringe. The solution is placed using a disposable metal tip bent to the desired area. As the solution is placed, the blood and the solution merge together and are washed away with the air-water syringe. What is left in the tissue is a temporary coagulum seal that does not allow any seepage. The tissue may appear slightly darkened, but this technique allows hemorrhage to be arrested. A retraction cord of interwoven cotton with or without solution is packed vertically to expose the prepared margin. This packing of the cord allows for horizontal retraction to allow for sufficient bulk of impression material to flow around the margin.

The retraction cord could also be impregnated with aluminum chloride or astringent of aluminum salts for chemical retraction. This technique causes a shrinking of the tissues, or **ischemia**, to obtain clear access to the margin of the preparation. A substance used to obtain this result is epinephrine, which is an astringent and a vasoconstrictor. It provides hemostasis and shrinks the tissues by constricting the blood vessels. Epinephrine brings on an increase in the heart beat, or **tachycardia**, for the patient. The epinephrine definitely is contraindicated for a patient with heart disease, diabetes, or hyperthyroidism or a patient taking certain drugs.

Note: The dental assistant should watch for patients who exhibit hypertension, knowing that most hyperthyroid and diabetic patients are usually hypertensive. Normally, the dentist prefers to use chemical retraction cord, so the patient's medical history should be reviewed carefully.

Surgical Retraction

Instead of retraction, the dentist may choose to remove the tissue around the preparation. This approach is accomplished by using a surgical knife or by performing electrosurgery. With the surgical knife, the dentist excises the tissue and exposes the margin of the preparation. The area where the tissue has been removed may bleed and cause additional treatment in order to get a good impression of the area.

The dentist may decide to use an **electrosurgery unit**, which cauterizes the tissues as it removes them. Therefore, the tissue is removed without bleeding. The unit passes high-frequency current to a small electrode passing through the tissue. The tip of the unit appears as a metal wire or loop. As the tip touches the tissue, the unit is activated to remove the tissue. It is especially important with this treatment that soft tissue anesthesia is maintained. Electrosurgery is not used with patients who are receiving radiation therapy, have cardiac pacemakers, or have any diseases that slow healing.

Constant use of a non-metal HVE tip during the surgery is important due to the odor given off as the tissues are cauterized. The evacuator reduces the odor if it is placed near the surgical site. After the tissue is removed, the sulcus is cleaned with a hydrogen rinse. Immediately following the procedure, the final impression is taken.

Test for Placement and Removal of Retraction Cord

1. T or F **The electosurge is a chemical means of retraction?**

2. T or F **Mechanical retraction uses aluminum chloride or astringent of aluminum salts on the retraction cord?**

3. **Retraction can be done by?**
   a. **Chemical**
   b. **Mechanical**
   c. **Surgical**
   d. **Vodoo**
   e. **a,b,c**

4. **Which type of retraction should a patient NOT have if they are at high risk for cardiac arrest and use nitroglycerin on a daily basis and shouldn't have epinephrine for their anesthetic?**
   a. **Chemical**
   b. **Mechanical**
   c. **Surgical**
   d. **Any of above**

5. T or F **Chemical retraction is usually left in place for 5 minutes whereas mechanical retraction is left in place for 10-15 minutes.**

6. T or F **Tissues must be retracted horizontally to allow room for sufficient impression material and displaced vertically to expose the margins completely.**

7. T or F **You want to push the retraction cord as far down in the sulcus as you can.**

8. **What could cause gingival recession?**
   a. Overpacking of retraction cord
   b. Repeated use of cord in sulcus
   c. None of the examples
   d. Both of the examples

RECEIVED

OCT 25 2013

IOWA DENTAL BOARD

APPLICATION FOR PRIOR APPROVAL OF EXPANDED FUNCTION TRAINING

IOWA DENTAL BOARD
400 S.W. 8th Street, Suite D
Des Moines, IA 50309-4687
Phone: 515-281-5157; Fax: 515-281-7969
IDB@iowa.gov
www.dentalboard.iowa.gov

Note: A fee of $10 *per course* is required to process your request. PLEASE TYPE OR PRINT.

Name of organization or person requesting approval: Matthew Beattie DDS

Address: 1544 W. Kimberly Rd. Davenport IA 52804

Phone: 563 3866910 Fax: 563 3866967 E-mail: drmbeattie@yahoo.com

Signature: Matthew Beattie Date: 10/23/13

How many credit hours of continuing education are you requesting? 1

Expanded function course you are submitting for review:

- ☐ Taking Occlusal Registrations
- ☐ Placement and Removal of Gingival Retraction
- ☐ Taking Final Impressions
- ☐ Fabrication and Removal of Provisional Restorations
- ☐ Applying Cavity Liners and Bases, Desensitizing Agents and Bonding Systems
- ☐ Placement and Removal of Dry Socket Medication
- ☐ Placement of Periodontal Dressings
- ☐ Testing Pulp Vitality
- ☒ Monitoring Nitrous Oxide

Name of instructor providing training: Matthew Beattie DDS

Educational background: (Attach a copy of curriculum vitae or other relevant information):

#6653
#10

entered 12/16/13

Nitrous Oxide Monitoring Training

Instructor: Matthew Beattie D.D.S.

Educational Background: 1995 B.A. Augustana College, Rock Island, IL

2000 D.D.S. University of Iowa College of Dentistry, Iowa City, IA

2000-2002 – Private Practice General Dentist, Family Dental Center, Coralville, IA

2003-present: Private Practice General Dentist, Beattie Family Dental, Davenport, IA

Course Objectives: Upon completion of this course, the student will be able to:

- Understand the history and background for Nitrous Oxide as an anesthetic agent.
- Identify indications for use in clinical dentistry.
- Identify contraindications for use in clinical dentistry.
- Evaluate patients suitable for nitrous oxide sedation.
- Know the basic equipment and its use in the dental operatory.
- Understand best clinical practices for nitrous oxide sedation.
- Implement workplace monitoring and safety guidelines per OSHA guidelines.
- Identify signs and symptoms of exposure.
- Understand nitrous monitoring systems, i.e. Laudauer Monitoring Badge.
- Maintain absolute safety for patients in the clinical setting.

Plan for Initial Assessment: A pre-test will be given to the students. See attached.

Didactic Materials: See attached. "Nitrous Oxide Sedation: Clinical Review and Workplace Safety"

Lab Training: No lab training to be provided.

Plan for Clinical component of training:

- Clinical demonstration of proper application of nitrous oxide nasal mask.
- Demonstration of pulse oximeter
- Nitrous equipment trouble shooting
- Demonstration of emergency protocols during nitrous oxide sedation

Plan for Post-Course Competency

- Oral review questions
- Clinical demonstration of skills
- Administration of written post-test. See attached.

Times and Dates for entire course and location: This course will be offered to the qualified staff of Beattie Family Dental, P.C. only. It will be offered after course approval during an office in-service training date, yet to be determined.

Intended Recipients: The intended recipients of this course will be Iowa Registered Dental Assistants Donna Bick and Carrie Jacobsen. Hygienists Tracy Elliott and Wendy Anderson will also participate in the course.

Nitrous Oxide Monitoring: Pre-test

1. What is the molecular formula for nitrous oxide?
    a. N0
    b. N20
    c. N02
2. Which of the following is a contraindication for the use of nitrous oxide?
    a. First Trimester Pregnancy
    b. Hypertension
    c. Diabetes
    d. Asthma
3. Which of the following is not a common side effect to nitrous oxide sedation?
    a. Uncontrollable fits of laughter
    b. Heavy feeling in extremities
    c. Tingling in face
    d. Diarrhea
4. What is the device used to monitor pulse and blood oxygen saturation called?
    a. Sphygmomanometer
    b. Pulsonomer
    c. Pulse Oximeter
    d. Finger Do-dad
5. What is the range of percent oxygen saturation acceptable during nitrous oxide sedation?
    a. 10%-20%
    b. 50%-60%
    c. 65%-75%
    d. 90%-100%
6. Which of the following should a patient NOT do during nitrous oxide sedation?
    a. Talk excessively
    b. Breath through their mouth
    c. Snore
    d. All of the above
7. What should the assistant monitoring nitrous oxide do if the patient becomes nauseated?
    a. Call 911
    b. Tell the patient to hold their breath for 15 seconds
    c. Quickly turn off the nitrous oxide/oxygen gasses
    d. Call for the doctor, and prepare an emesis basin, and have patient turn to their right side.

Nitrous Oxide Monitoring: Post-test

1. What is the color of the compressed gas tank for nitrous oxide?
    a. Blue
    b. Green
    c. Black
2. Which of the following are potential indications for the use of nitrous oxide?
    a. History of difficulty obtaining anesthesia with local anesthetic
    b. Anxiety with dental treatment
    c. Patient with strong gag response
    d. All of the above are potential indications
3. Which of the following are common side effects to nitrous oxide sedation?
    a. Uncontrollable fits of laughter
    b. Heavy feeling in extremities
    c. Tingling in face
    d. All of the above
4. What is the device placed over the patient's nose and used to administer nitrous oxide called?
    a. Nasal hood
    b. Elephant nose
    c. Laryngoscope
    d. Nitro-nose
5. What pulse rate listed below (beats per minute) would be concerning during nitrous oxide sedation?
    a. 75
    b. 60
    c. 130
    d. 30
    e. c and d
6. How long should a patient remain on oxygen only after nitrous oxide sedation?
    a. 0 minutes
    b. 30 seconds
    c. 5 minutes
    d. 10 minutes
7. What condition may result if a patient is rapidly taken off a N2O/O2 mixture without a recovery period of O2?
    a. Hyperbaria
    b. Diffusion Hypoxia
    c. Pnuemothroax

The Academy of Dental Learning & OSHA Training
1101 Sibley Memorial Hwy Ste. 211
St. Paul, MN 55118
(800) 522-1207
CESupport@DentalLearning.org

Nitrous Oxide Sedation: Clinical Review & Workplace Safety

Updated March 2013

4 credit hours (4 CEs)

Health Science Editor:
MaryLou Austin, RDH, MS

Publication Date: March 2013
Expiration Date: February 2016

ADA C·E·R·P® | Continuing Education Recognition Program

Academy - Dental Learning & OSHA Training is an ADA CERP Recognized provider.

ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry.

Concerns or complaints about a CE provider may be directed to the provider or to ADA CERP at www.ada.org/cerp.

Provider Disclosure: Dental Learning or its authors have no commercial interest in the content of this educational activity.

Cancellation/Refund Policy: Any participant not 100% satisfied with this course may request a full refund by contacting:

COURSE AND EXAMINATION INSTRUCTIONS

1. Review the Objectives

Objectives provide an overview of the entire course and each chapter. Read the Course Description and focus on the Learning Objectives listed.

2. Study the Chapters in Order

Each chapter contains information essential to understanding subsequent sections. Keep your learning 'programmed' by reviewing the materials in order.

3. Complete the Post-Examination Online or by Fax

After studying the course take the test. You can access the exam by clicking on the **red exam box** which is located in the upper right corner of this page and at the end of the last chapter.

Answer each question by clicking on the button corresponding to the correct answer. All questions must be answered before the test can be graded. There is no time limit on the test. You may refer back to the course at any time with the back arrow on your browser.

You may also choose to print the exam and complete it manually. If you choose this option, please FAX your answer sheet to (703) 935-2190.

4. Grade the Test

If you completed the test online, click on 'Grade Test'. You will then have the option to Register your name and license number or Login if you have previously registered. Finally, you will be required to provide a credit card number for secure transmission to pay the exam processing fee.

If you completed the test manually and faxed it to us, someone from our office will grade it and contact you with the results and your certificate.

A score of 70% or more is required to pass the test. If your score is less than 70%, you may try again.

5. Fill out the Evaluation Form

Your opinion matters! After you pass the online test our evaluation form will be displayed on-screen. Please answer the questions, enter the amount of time spent completing the entire course and post-examination, and submit the form.

6. CE Certificate

Your CE Certificate will be displayed for you to print for your records.

THANK YOU FOR CHOOSING THE DENTAL LEARNING NETWORK!

If you have any questions, please email us at CESupport@DentalLearning.org or call our friendly customer service department at 1-800-522-1207

TABLE OF CONTENTS

LEARNING OBJECTIVES 1

INTRODUCTION 1

HISTORY OF NITROUS OXIDE AND USE IN DENTISTRY 2

CHEMICAL AND PHYSICAL PROPERTIES 4

- Formula 4
- Synonyms 4
- Identifiers 4
- Appearance and Odor 4
- Physical Data 4
- Reactivity 5
- Flammability 5

EXPOSURE LIMITS 6

- OSHA 6
- NIOSH REL 6
- Rationale for Limits 6

HEALTH HAZARD INFORMATION 6

- Routes of Exposure 6
- Summary of Toxicology 6

SIGNS AND SYPTOMS OF EXPOSURE 7

- Acute Exposure 7
- Chronic Exposure 7

OSHA EXPOSURE SOURCES AND CONTROL METHODS 8

- Emergency Medical Procedures with Exposure 8

WORKPLACE MONITORING AND MEASUREMENT 9

PROPERTIES AND MECHANISM OF ACTION 9

USES IN CLINICAL DENTISTRY 11

- Indications 11
- Contraindications 11

EQUIPMENT 12

- Engineering Controls / Maintenance Procedures 13

SAFETY IN THE DIGITAL AGE 16

- Safety Features Incorporated into Modern Inhalation Sedation Units 17

CLINICAL WORK PRACTICES 17

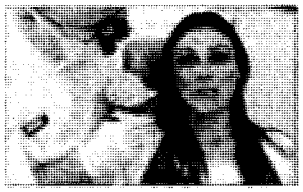
CLINICAL ADMINISTRATION PROTOCOLS 18
Monitoring the Patient 19
Side Effects of Nitrous Oxide / Oxygen Inhalation 19
Metabolism of Nitrous Oxide 20
Pressure/Volume Toxicity 20
Oxygen Toxicity 20
Post-inhalation Hypoxia (lack of oxygen) 21
DOCUMENTATION 21
ADDITIONAL WORKPLACE SAFETY INFORMATION 22
Health Effects 22
Workers Exposed 22
General Workplace Controls 22
Occupational Exposure Limits 23
Guidelines for Minimizing Exposure 23
NITROUS OXIDE BADGE MONITORS 23
Advantages and Disadvantages 24
Signs and Symptoms of Exposure 24
ABUSE OF NITROUS OXIDE 24
CONCLUSION 25
EXAM – NITROUS OXIDE OSHA FOCUS 26
REFERENCES 30
GLOSSARY OF TERMS 32

LEARNING OBJECTIVES

Upon completion of this course, the student will be able to:

- Understand the history and background for Nitrous Oxide as an anesthetic agent.
- Identify indications for use in clinical dentistry.
- Identify contraindications for use in clinical dentistry.
- Evaluate patients suitable for nitrous oxide sedation.
- Know the basic equipment and its use in the dental operatory.
- Understand best clinical practices for nitrous oxide sedation.
- Implement workplace monitoring and safety guidelines per OSHA guidelines.
- Identify signs and symptoms of exposure.
- Understand nitrous monitoring systems, i.e. Laudauer Monitoring Badge.
- Maintain absolute safety for patients in the clinical setting.

INTRODUCTION



Patient anxiety has always been a major issue in dental offices. This course reviews guidelines for use of nitrous oxide for the dental practitioner and dental staff to manage anxiety and pain. Nitrous Oxide (N_2O), when administered properly, is safe, effective, and tends to increase patient satisfaction during some dental procedures. Since clinical dentistry often needs chemical agents to maintain patient comfort and to allay anxiety (anxiolytic properties), the ideal agent would have a fairly rapid onset of action, good therapeutic effectiveness, a wide safety margin, quick recovery time, no "hangover" effect or excessive sedative effects, and which does not require the presence of an anesthesiologist.

An anesthetic which is ideally suited to clinical dentistry is nitrous oxide or N_2O as nitrous oxide is commonly abbreviated. Nitrous oxide produces analgesic and anxiolytic effects when used correctly in a clinical setting. Nitrous oxide (N_2O on many forms or chemical symbol N_2O) gas has been available to the medical and dental community for over 150 years. The use of nitrous oxide as an anesthetic is common for anesthesiologists and dental practitioners as an adjunct to local anesthetic agents, and fulfills almost all of the criteria listed above.

Benefits of Nitrous Oxide Sedation

1. Increase patient comfort during procedures
2. Safe and effective
3. Potential practice building tool
4. Short recovery time
5. Easy to administer

After a discussion of nitrous oxide's chemical and physical properties, the course emphasizes best clinical practices to support absolute patient safety and to assure that clinicians minimize exposure to themselves in the workplace. OSHA sets forth specific guidelines for clinical and workplace safety which will be discussed in detail. Also a review of common terms is provided as an appendix, as well as information about workplace safety and monitoring systems for exposure management in the dental clinical setting. Ironically, nitrous oxide exposure issues for the patient are relatively minimal. Of more concern are the long-term health issues for clinicians, particularly child bearing age women, who may be exposed on a daily basis and therefore subject to more cumulative effects based on the frequency of exposure.

HISTORY OF NITROUS OXIDE AND USE IN DENTISTRY

Joseph Priestly

Nitrous oxide, one of the first modern anesthetics, was first manufactured in 1772 by English chemist, Joseph Priestly. About 1800, Sir Humphrey Davy experimented with the physiological properties of the gas and stated: "As nitrous oxide in its extensive operation appears capable of destroying physical pain, it may probably be used with advantage during surgical operation". The surgical world ignored his suggestion, and interest in the surgical use of nitrous oxide would have to wait another half century. After Sir Davy observed the amusing effects on people who inhaled nitrous oxide, he coined the term "laughing gas" which is also commonly used today.

Nitrous oxide was used for the first time as a dental anesthetic drug in 1844. Dr. Horace Wells, with assistance by Gardner Quincy Colton and John Mankey Riggs, collaborated successfully to use nitrous oxide on a patient for an extraction. In the following weeks, Wells treated the first 12-15 patients with nitrous oxide, and according to his own record only failed in two cases. In spite of these convincing results reported by Wells to the medical society in Boston, this new method of pain management was not immediately adopted by other dentists.

In early 1845, Wells' first public demonstration of nitrous oxide anesthesia for the medical faculty in Boston was only partly unsuccessful, leaving his colleagues doubtful regarding its efficacy and safety. Wells was booed off the stage and in the aftermath, he lost his reputation and eventually committed suicide. However, to this day, Dr. Wells is considered the "discoverer of anesthesia".

In 1863 nitrous oxide anesthesia came into general use, when Gardner Quincy Colton successfully began to use nitrous oxide in all his "Colton Dental Association" clinics. Up to the 1860's nitrous oxide was used alone as an inhalational anesthetic with 100% concentration of the gas administered to patients. Oxygen was added to the gas mix, and soon Colton and his associates successfully administered nitrous oxide to more than 25,000 patients, with over 75,000 extractions completed with the use of N_2O as an anesthetic. Now with the efficacy and safety demonstrated by large numbers of successful procedures, the use of nitrous oxide rapidly became the preferred anesthetic method in

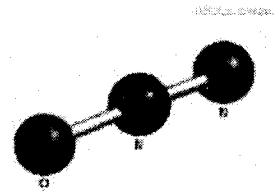
dentistry. The gas is mild enough to keep a patient in a conscious and conversational state, and in most cases is strong enough to suppress the pain caused by dental procedures. Therefore, nitrous oxide remains today as the preferred anesthetic gas used in dentistry.

Every year approximately 45 million dental patients undergo anesthesia in North America, with nitrous oxide constituting a major component in about half of these procedures. A significant percentage of general dentists use nitrous oxide sedation in their practices to manage pain, anxiety, and excessive gag reflex. Nitrous is the most used gaseous anesthetic in the world, commonly administered for the purpose of decreasing the amount of more potent and usually more toxic agents during general anesthesia cases.

CHEMICAL AND PHYSICAL PROPERTIES

Formula

N(2)O



Synonyms

- Synonyms for Nitrous Oxide include:
- Dinitrogen monoxide
- factitious air
- hyponitrous acid anhydride
- laughing gas
- nitrogen oxide

Identifiers

1. CAS No.: 10024-97-2
2. RTECS No.: QX1350000
3. DOT UN: 1070 14 (compressed); 2201 23 (refrigerated liquid)
4. DOT label: Nonflammable gas, oxidizer (nitrous oxide, compressed); nonflammable gas (nitrous oxide, refrigerated liquid)

Appearance and Odor

Nitrous oxide is a colorless gas at room temperature with a slightly sweet odor and taste.

Physical Data

1. Molecular weight: 44.02
2. Boiling point (at 760 mm Hg): -88.5 degrees C (-127.3 degrees F)
3. Specific gravity (air = 1): 1.97 at 25 degrees C (77 degrees F)

4. Vapor density: 1.53
5. Melting point: -91 degrees C (-132 degrees F)
6. Vapor pressure: 760 mm Hg at 88.5 degrees C (191.3 degrees F)
7. Solubility: Slightly soluble in water; soluble in alcohol, ether, oils, and sulfuric acid .
8. Evaporation rate: Data not available.

Reactivity

1. Conditions contributing to instability: Nitrous oxide can form an explosive mixture with air.
2. Incompatibilities: Contact of nitrous oxide with aluminum, boron, hydrazine, lithium hydride, phenyllithium, phosphine, sodium, tungsten carbide, hydrogen, hydrogen sulfide, organic peroxides, ammonia, or carbon monoxide may cause violent reactions to occur.
3. Hazardous decomposition products: Toxic gases (such as carbon monoxide and oxides of nitrogen) may be released in a fire involving nitrous oxide.
4. Special precautions: None reported.

Flammability

Nitrous oxide is a non-flammable gas at room temperature. The National Fire Protection Association has not assigned a flammability rating to nitrous oxide.

1. Flash point: Not applicable.
2. Auto-ignition temperature: Not applicable.
3. Flammable limits in air: Not applicable.
4. Extinguishant: For small fires use dry chemical or carbon dioxide. Use water spray, fog, or standard foam to fight large fires involving nitrous oxide.

Fires involving nitrous oxide should be fought upwind from the maximum distance possible. Keep unnecessary people away; isolate the hazard area and deny entry. Isolate the area for 1/2 mile in all directions if a tank, rail car, or tank truck is involved in the fire. For a massive fire in a cargo area, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from the area and let the fire burn. Emergency personnel should stay out of low areas and ventilate closed spaces before entering. Vapors are an explosion hazard indoors, outdoors, or in sewers. Containers of nitrous oxide may explode in the heat of the fire and should be moved from the fire area if it is possible to do so safely. If this is not possible, cool the fire-exposed containers from the sides with water until well after

the fire is out. Stay away from the ends of containers. Firefighters should wear a full set of protective clothing and self-contained breathing apparatus when fighting fires involving nitrous oxide.

EXPOSURE LIMITS

OSHA

The Occupational Safety and Health Administration (OSHA) does not currently regulate exposure limits of nitrous oxide.

NIOSH REL

The National Institute for Occupational Safety and Health (NIOSH) has established a recommended exposure limit (REL) for nitrous oxide of 25 parts per million (ppm) parts of air (45 milligrams per cubic meter (mg/m(3)) as a time-weighted average (TWA) for the duration of the exposure.

Rationale for Limits

The NIOSH limit is based on the risk of reproductive system effects and decreases in audiovisual performance.

The ACGIH limit is based on the risk of reproductive, hematological, and nervous system effects.

HEALTH HAZARD INFORMATION

Routes of Exposure

Exposure to nitrous oxide occurs through inhalation.

Summary of Toxicology

Effects on Animals

Nitrous oxide has central nervous system, teratogenic, bone marrow, and liver effects in animals [ACGIH 1991]. Rats exposed to an 80 percent concentration for 2 or more days showed signs of bone marrow toxicity [ACGIH 1991]. However, rats exposed to a 1 percent concentration of nitrous oxide for periods ranging from 7 days to 6 months showed no bone marrow effects [ACGIH 1991]. Exposure to nitrous oxide also causes neurotoxic (spinal cord lesions, demyelination, peripheral neuropathy) and hepatotoxic (focal inflammatory lesions) effects in experimental animals [ACGIH 1991]. In one study, pregnant rats were exposed to 50 percent nitrous oxide for 24 hours/day starting on day 8 of gestation and continuing for 1, 2, 4, or 6 days; dose-related embryolethal and teratogenic effects occurred among the offspring. The most common effects were embryonic death, resorption, and abnormalities of the ribs and vertebrae [Rom 1992]. Nitrous oxide was negative in three carcinogenicity assays in mice and rats exposed to concentrations as high as 400,000 ppm for 4 hours/day, 5 days/week for 78

weeks [ACGIH 1991]. The results of mutagenicity assays involving nitrous oxide were negative [ACGIH 1991].

Effects on Humans

Nitrous oxide is an asphyxiant at high concentrations. At lower concentrations, exposure causes central nervous system, cardiovascular, hepatic, hematopoietic, and reproductive effects in humans. At a concentration of 50 to 67 percent (500,000 to 670,000 ppm) nitrous oxide is used to induce anesthesia in humans [Rom 1992]. Patients exposed to a 50:50 mixture of nitrous oxide:oxygen for prolonged periods to induce continuous sedation developed bone marrow depression and granulocytopenia. Although most patients recover, several deaths from aplastic anemia have been reported. Neurotoxic effects occur after acute exposure to concentrations of 80,000 to 200,000 ppm and above; effects include slowed reaction times and performance decrements [Hathaway et al. 1991]. Long-term occupational exposure (dentists, dental assistants) has been associated with numbness, difficulty in concentrating, paresthesias, and impairment of equilibrium [ACGIH 1991]. In one study, exposure to 50 ppm nitrous oxide was associated with a decrement in audiovisual performance, but this result has not been duplicated in other studies Epidemiological studies, primarily of operating room personnel, have shown increased risks of spontaneous abortion, premature delivery, and involuntary infertility among these occupationally exposed populations [ACGIH 1991; Hathaway et al. 1991].

SIGNS AND SYPTOMS OF EXPOSURE

Acute Exposure

The signs and symptoms of acute exposure to nitrous oxide include dizziness, difficult breathing, headache, nausea, fatigue, and irritability. Acute exposure to nitrous oxide concentrations of 400,000 to 800,000 ppm may cause loss of consciousness.

Chronic Exposure

The signs or symptoms of chronic overexposure to nitrous oxide may include tingling, numbness, difficulty in concentrating, interference with gait, and reproductive effects.

OSHA EXPOSURE SOURCES AND CONTROL METHODS

(per OSHA Guidelines 2013)

The following operations may involve nitrous oxide and lead to worker exposures to this substance:

- The manufacture and transportation of nitrous oxide
- Use as an anesthetic gas
- Use as a propellant (foaming agent) in whipped creams
- Use as a leak detecting agent on natural gas pipelines
- Use as an oxidant for the production of organic compounds
- Use in rocket fuel formulations
- Use in the manufacture of nitrates from alkali metals

Methods that are effective in controlling worker exposures to nitrous oxide, depending on the feasibility of implementation, are as follows:

- Process enclosure
- Local exhaust ventilation
- General dilution ventilation
- Personal protective equipment

Workers responding to a release or potential release of a hazardous substance must be protected as required by paragraph (q) of OSHA's Hazardous Waste Operations and Emergency Response Standard.

Emergency Medical Procedures with Exposure

Remove an incapacitated worker from further exposure and implement appropriate emergency procedures e.g., those listed on the Material Safety Data Sheet required by OSHA's Hazard Communication Standard. All workers should be familiar with emergency procedures, the location and proper use of emergency equipment, and methods of protecting themselves during rescue operations.

Good sources per OSHA of information about control methods are as follows:

1. ACGIH [1992]. Industrial ventilation--a manual of recommended practice. 21st ed. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

2. Burton DJ [1986]. Industrial ventilation--a self-study companion. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

3. Alden JL, Kane JM [1982]. Design of industrial ventilation systems. New York, NY: Industrial Press, Inc.

4. Wadden RA, Scheff PA [1987]. Engineering design for control of workplace hazards. New York, NY: McGraw-Hill.

5. Plog BA [1988]. Fundamentals of industrial hygiene. Chicago, IL: National Safety Council.

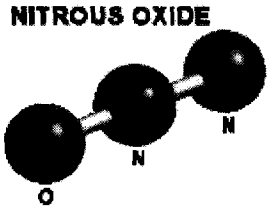
WORKPLACE MONITORING AND MEASUREMENT

Determination of a worker's exposure to airborne nitrous oxide can be made using one of the following techniques:

1. Use of a Landauer Passive Dosimeter badge, which can be used for a minimum sampling duration of 1 hour (maximum duration 40 hours). Analysis is performed by the manufacturer of the badge as described in the OSHA Computerized Information System.

2. An ambient air or bag sample with a minimum collection volume of two spectrophotometer cell volumes. Analysis is conducted using a long-path length portable infrared spectrophotometer as described in NIOSH Method No. 6600.

PROPERTIES AND MECHANISM OF ACTION



Nitrous oxide produces analgesic (pain killing) and anxiolytic (anxiety reduction) effects. Nitrous oxide is the weakest of the inhalant anesthetics used for patient sedation in dentistry or medicine. The chemical formula is N_2O. The gas is colorless, nonflammable, with a slightly sweet odor.

Nitrous oxide has low solubility in blood, diffuses rapidly across the alveolar-arterial membrane and is excreted unchanged through the lungs. As a result, nitrous takes effect rapidly and is quickly reversible on discontinuation. Nitrous oxide can induce loss of consciousness at high concentrations, typically 70% or higher. Nitrous oxide produces either no change, or a slight increase in blood pressure, while all other volatile anesthetics reduce blood pressure. There is no effect on heart rate, but high doses may cause myocardial depression.

The exact mechanism of action is unknown. However, the most widely accepted theory is that the analgesic effect is occurs by interaction with the opioid receptors. These are the same receptors activated by morphine and heroin. This stimulation occurs in the mid-brain leading to activation of the descending inhibitory pathways, which alters pain processing in the spinal cord. The anxiolytic effect is

mediated by interaction with the GABA-A receptors. The mechanism of action closely resembles that of ethanol. GABA is an inhibitory neurotransmitter that inhibits the pre-synaptic cells from transmitting thus decreasing nervous system activity.

Nitrous oxide gas is used in both the medical and dental professions to ensure patient comfort during procedures. A 40%-70% N_2O mixture (the remainder consisting of oxygen) is used as an adjunct to inhalation and IV general anesthesia. The gaseous mixture is administered using either a mask, nasal canula, or an endotracheal tube. The onset of action for N_2O is between 2-5 minutes. However, since the mean alveolar concentration (MAC) of N_2O considered the ED50 for general anesthesia (the dose at which 50% of patients will experience anesthesia) is 105%, nitrous cannot be used alone as a general anesthetic. Typically, nitrous oxide is only used to start the anesthesia process.

In dentistry, nitrous oxide is typically used as an anxiolytic or as an anxiety reducing agent. N_2O is given as a 25%-50% mixture with oxygen. Most often it is administered through a nasal mask or nasal canula.

The patient should be started out breathing 100% oxygen and then slowly allowed to breathe increasing amounts of N_2O until the desired effect is achieved. It is important that the patient be reminded to breathe through the nose in order for the gas to work. The patient should be questioned as to how they are feeling to ensure an optimal level of nitrous is being administered. Therapeutic levels will vary from patient to patient. If the nitrous level being administered is too low, the patient will not be receiving an effective anxiolytic dose. If the nitrous level is too high, unwanted side effects may occur. After the procedure is finished, allow the patient to breathe 100% oxygen again for 2-5 minutes in order to clear the nitrous from the lungs and return the patient to a pre-anesthetic state or normal feeling.

Disinfection

Disposable nose masks are available and widely used due to their convenience. However, if a reusable nosepiece is used, it is important to disinfect it between each patient. Nosocomial infections have occasionally been linked with the use of unsterile inhalation devices due to cross contamination. The recommended technique for disinfection of these masks is the use of an alkaline glutaraldehyde solution.

USES IN CLINICAL DENTISTRY

Indications

- A fearful, anxious, or obstreperous patient
- Certain patients with special health care needs
- A patient whose gag reflex interferes with dental care
- A patient for whom profound local anesthesia cannot be obtained
- A cooperative child undergoing a lengthy dental procedure

Contraindications

- Some chronic obstructive pulmonary diseases
- Severe emotional disturbances or drug-related dependencies (see abuse)
- First trimester of pregnancy
- Treatment with bleomycin sulfate
- Methylenetetrahydrofolate reductase deficiency (B12)

The contraindications for use of nitrous are important especially when considering that nitrous oxide is the only inhaled anesthetic proven to be teratogenic (causing birth defects) in animals, so is to be avoided in the first trimester of pregnancy. Patients with pulmonary hypertension or major cardiac disease should be evaluated carefully and in consultation with the medical doctor before using nitrous. Patients with severely compromised cardiac function are not candidates for nitrous oxide sedation because of the slight myocardial depressant action of the gas on the circulatory system. And patients who are claustrophobic may be unable to tolerate a nasal mask although use of a nasal canula may solve the issue. Some patients may fear "losing control" of themselves and adamantly refuse N_2O

sedation. Patients with persistent nasal congestion or obstruction or who unable to breathe comfortably through the nose, may not be candidates for nitrous oxide sedation.

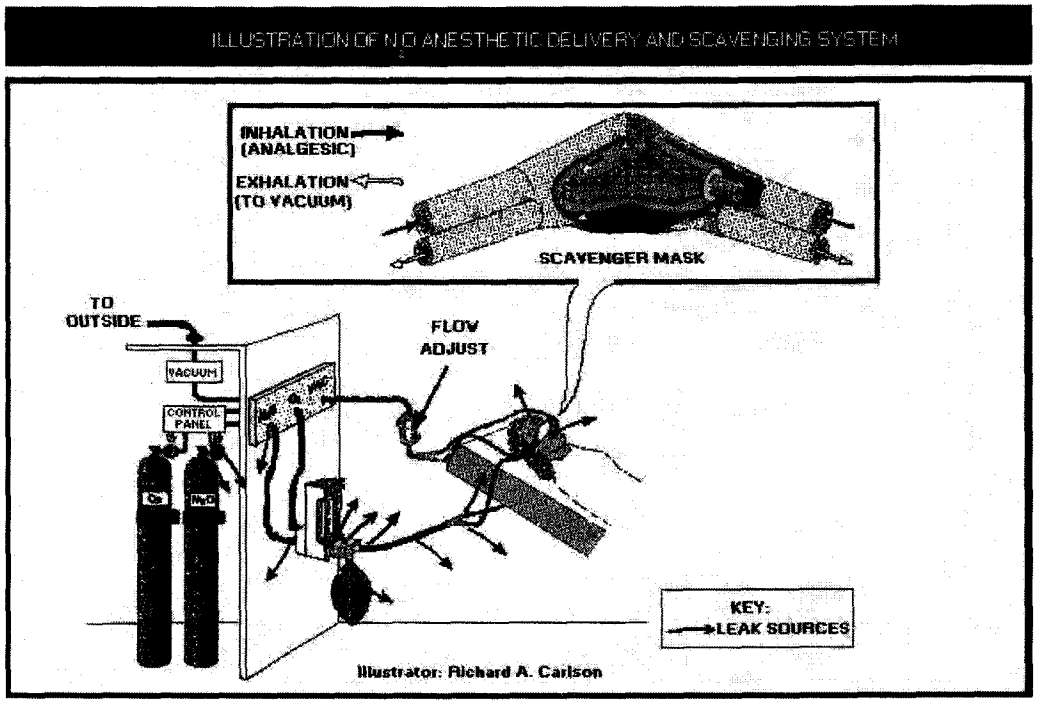
Review of patient's current medical history is critical prior to the decision to use nitrous oxide sedation and a medical consultation with the patient's physician may be necessary. This assessment should include:

- Allergies and previous allergic or adverse drug reactions
- Current medications including dose, time, route, and site of administration
- Diseases, disorders, or physical abnormalities and pregnancy status
- Previous hospitalization to include the date and purpose
- Obtain written consent from patient or the guardian of a minor patient.

EQUIPMENT

Mixtures of N_2O and oxygen have been used in dentistry as general anesthetic agents, analgesics, and sedatives for more than 100 years. The usual analgesia equipment used by dentists includes a N_2O and O_2 delivery system, a gas mixing bag, and a nasal mask or nasal canula with a positive pressure relief valve.

The illustration below shows basic N_20 equipment set up and arrows represent possible leakage areas, discussed below.



Engineering Controls / Maintenance Procedures

The following engineering controls and maintenance procedures have been shown to be feasible and effective in reducing workplace exposure to N_2O during anesthetic administration.

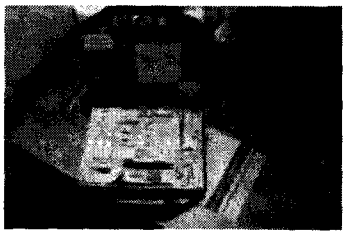
Anesthetic delivery

Excessive exposure to N_2O may occur as a result of leaks from the anesthetic delivery system during administration. The rubber and plastic components of the anesthetic equipment are potential sources of N_2O leakage because they may be degraded by the N_2O and the oxygen as well as by repeated sterilization.

These sources include leaks from the high-pressure connections present in the gas delivery tanks, the wall connectors, the hoses connected to the anesthetic machine, and the anesthetic machine (especially the on-demand valve). Low-pressure leaks occur from the connections between the anesthetic flowmeter and the scavenging mask. This leakage is due to loose-fitting connections, loosely assembled or deformed slip joints and threaded connections, and defective or worn seals, gaskets, breathing bags, and hoses.

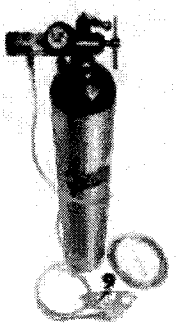
All newly installed dental facilities that deliver nitrous oxide/oxygen must be checked for proper gas delivery and fail-safe function prior to use. Inhalation equipment must have the capacity for delivering 100%, and never less than 30%, oxygen concentration at a flow rate appropriate to the child's or adult's size. Additionally, inhalation equipment must have a fail-safe system that is checked and calibrated regularly according to the dental practitioner's state laws and regulations. All nitrous oxide delivery system equipment must have an appropriate scavenging system.

The dental clinician, who utilizes nitrous oxide/oxygen analgesia for a pediatric or general practice dental patient, shall possess appropriate training and skills and have available the proper facilities, personnel, and equipment to manage any reasonably foreseeable emergency. Training and certification in basic life support are required for all clinical personnel and per state regulation. These individuals should participate in periodic review of the office's emergency protocol, the emergency drug cart, and simulated exercises to assure proper emergency management response. Ideally the dental team meets regularly to review clinical emergency management protocols. All dental personnel need current CPR and basic life support training.

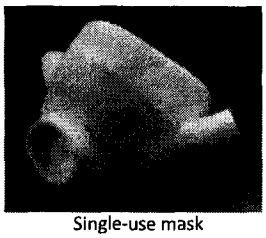


An emergency cart (kit) must be readily accessible. Emergency equipment must be able to accommodate adults and children of all ages and sizes. It should include equipment to resuscitate a non-breathing, unconscious patient and provide continuous support until trained emergency personnel arrive.

A positive pressure oxygen delivery system capable of administering >90% oxygen at a 10 liters/minute flow for at least 60 minutes (650 liters, "E" cylinder) must be available. When a self-inflating bag valve mask device is used for delivering positive pressure oxygen, a 15 liters/minute flow is recommended. There should be documentation that all emergency equipment and drugs are checked and maintained on a regularly scheduled basis. Where state law mandates equipment and facilities, such statutes should supersede this guideline.



Analgesia machines for dentistry are designed to deliver up to 70 percent (700,000 ppm) N_2O to a patient during dental treatment. The machine restricts higher concentrations of N_2O from being administered to protect the patient from hypoxia (lack of oxygen). In most cases, patients receive between 30 and 50 percent N_2O during a procedure. The amount of time N_2O is administered to a patient depends on the dentist's judgment of an individual patient needs and the complexity of the case.



Single-use mask

A newer type of mask is a frequent choice in dental practice: a single patient use nasal hood or single use nasal canula. This single use mask or canula does not require sterilization after surgery because it is used once and is disposable.

In a dental operatory, a scavenging system is part of a high-volume evacuation system used with a dental unit. The vacuum system may dispose of a combination of waste gases, oral fluid, and debris, and is not limited to waste gas removal. The exhaust air of the evacuation system should be vented outside the building and away from fresh-air inlets and open windows to prevent re-entry of gas into the operatory.

Scavenging System

A scavenging system designed to pick up excess gases consists of five basic components:

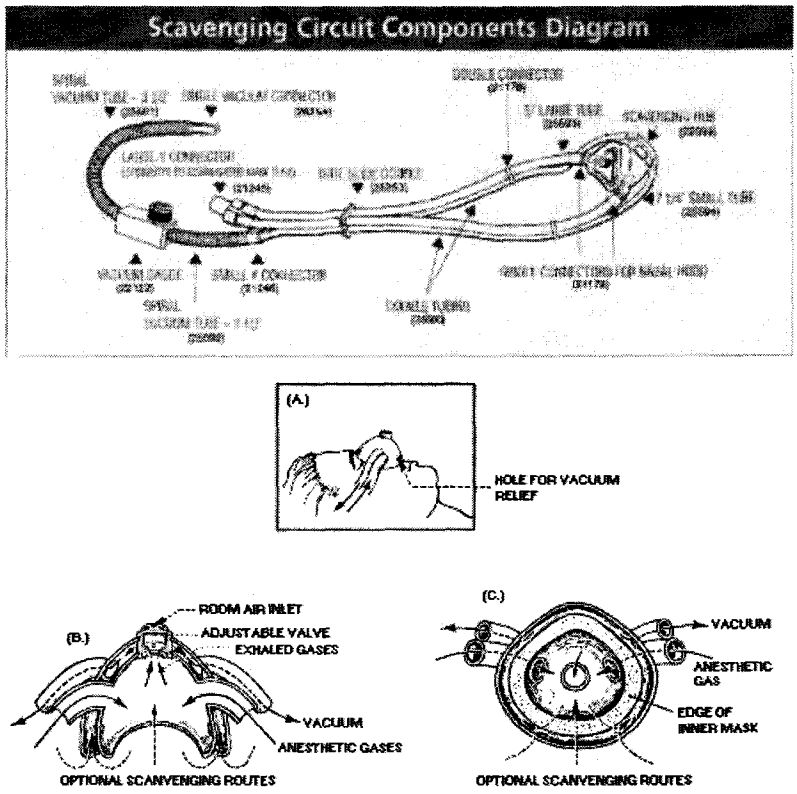
1. Gas collection assembly which captures excess anesthetic gases at the site of emission, and delivers it to the transfer tubing.

2. Transfer tubing: conveys the excess anesthetic gases to the interface.

3. The interface: provides positive (and sometimes negative) pressure relief and may provide reservoir capacity. It is designed to protect the patient's lungs from excessive positive or negative scavenging system pressure.

4. Gas disposal assembly tubing: conducts the excess anesthetic gases from the interface to the gas disposal assembly.

5. Gas disposal assembly: conveys the excess gases to a point where they can be discharged safely into the atmosphere. Several methods in use include a non-recirculating or recirculating ventilation system, a central vacuum system, a dedicated (single-purpose) waste gas exhaust system, or a passive duct system.



Circle breathing system connected to a closed reservoir scavenging interface.

The general ventilation should provide good room / air mixing. In addition, auxiliary (local) exhaust ventilation should be used in conjunction with a scavenging system and has been shown to be effective in reducing excess N_2O in the breathing zone of the dentist and dental assistant, from nasal mask leakage and patient mouth breathing. This type of ventilation captures the waste anesthetic gases at their source. However, there are practical limitations in using it in the dental operatory. These include proximity to the patient, interference with dental practices, noise, installation and maintenance costs. It is most important that the dentist not work between the patient and a free-standing local exhaust hood. Doing so will cause the contaminated air to be drawn through the dentist's breathing zone.

SAFETY IN THE DIGITAL AGE

(per ADA Guide to Dental Therapeutics, 2008)

Significant and recent changes in safety protocols relates to the technology used to control the precise flow of gasses delivered through the inhalation sedation unit. Although the old flow tube flowmeter technology is still available, it is being replaced by the state-of-the-art digital electronic flow control devices, such as the Centurion Mixer and Digital MDM. Both of these devices are percentage devices and overcome the limitations of the older flow tube technology. The devices have resolution of the gas flow in increments of 0.1 liter per minute, and the total flow and percent of oxygen are displayed digitally, eliminating the guesswork or calculations required with simple flow tube devices. The ability to clean the front panel with a disinfection wipe reduces the potential of cross patient infection, an issue associated with the crevices created by knobs and levers. Patient safety is ensured with built-in alarms for all gas depletion conditions along with servo control of the gas delivery. Continuous internal self-monitoring of all operational parameters by the device frees the practitioner to concentrate on the patient's needs. The device alerts the practitioner or staff to unusual parameters requiring attention, similar to those seen in larger hospital-based systems.

The digital units deliver pure oxygen during the "flush" function by electronically shutting off the nitrous oxide flow, as opposed to the flow tube units, which only dilute the nitrous oxide delivered. Again, the removal of extra steps in shutting down the nitrous oxide supply before pressing the "flush" button is removed and greatly simplifies the practitioner's tasks.

The units contain flashing LEDs to afford the practitioner a simple method of ensuring that the individual component gas is flowing and that the relative ratio and amount of flow is correct. Additionally, the digital unit provides the capability of displaying the flow rate of either of the constituent gasses. The non-silenceable alarm function for oxygen depletion ensures patient safety. The air intake valve located on the bag tee provides room air to the patient whenever the patient's breathing demand is greater than the combined output of the mixer head's settings and reservoir bag volume.

Various models of the electronic gas mixing head allow mounting as a wall unit, portable unit, countertop unit, or as a flush-mount unit in modern cabinetry. Digital heads have the most flexibility, especially when combined with various remote bag tee options provided by the manufacturer. The units are fully compatible with central gas supply systems such as the popular Flo-Safe Manifold, Centurion Gas Manifold, and all existing scavenging systems.

Electronic digital administration heads for delivery of conscious sedation advance the art of dentistry. The digital heads once considered the wave of the future are the standard today. The digital accuracy and exacting control is highly recommended for patient comfort and safety (Malamed, 2008, for the ADA Dental Therapeutics).

Safety Features Incorporated into Modern Inhalation Sedation Units

- Alarm
- Color coding
- Diameter index safety system
- Emergency air inlet
- Lock
- Minimum oxygen liter flow
- Minimum oxygen percentage
- Oxygen fail-safe
- Oxygen flush button
- Pin index safety system
- Quick-connect for positive-pressure oxygen
- Reservoir bag

CLINICAL WORK PRACTICES

- Prior to first use each day of the N_2O machine and every time a gas cylinder is changed, the low-pressure connections should be tested for leaks. High-pressure line connections should be tested for leaks quarterly. A soap solution may be used to test for leaks at connections. Alternatively, a portable infrared spectrophotometer can be used to detect an insidious leak.
- Prior to first use each day, inspect all N_2O equipment (e.g., reservoir bag, tubing, mask, connectors) for worn parts, cracks, holes, or tears. Replace as necessary. Connect mask to the tubing and turn on vacuum pump. Verify appropriate flow rate (i.e., up to 45 L/min or manufacturer's recommendations).

- A properly sized mask should be selected and placed on the patient. A good, comfortable fit should be ensured. The reservoir (breathing) bag should not be over or under-inflated while the patient is breathing oxygen (before administering N_2O).
- Encourage the patient to minimize talking, mouth breathing, and facial movement while the mask is in place.

- During N_2O administration, the reservoir bag should be periodically inspected for changes in tidal volume, and the vacuum flow rate should be verified.
- On completing anesthetic administration and before removing the mask, non-anesthetic gases/agents should be delivered to the patient for a sufficient time based on clinical assessment that may vary from patient to patient. In this way, both the patient and the system will be purged of residual N_2O. Do not use an oxygen flush.

CLINICAL ADMINISTRATION PROTOCOLS

Some dentists administer N_2O at higher concentrations at the beginning of the procedure, and then decrease the amount as the procedure progresses. Others administer the same amount of N_2O throughout the procedure. When the procedure is completed, the N_2O is turned off. Some dentists turn the N_2O on only at the beginning of the operation, using N_2O as a sedative during the administration of local anesthesia, and turn it off before operating procedures. Based on variations in dental practices and other factors in room air, N_2O concentrations can vary considerably for each operation and also vary over the course of the dental procedure.

In the typical dental office procedure, the nasal mask or nasal canula is placed on the patient, fitted, and adjusted prior to administration of the nitrous oxide/ oxygen gases. The mask or canula is designed for the nose of the patient since access to the patient's mouth is essential for dental procedures.

Ideal sedation has been achieved when the patient states that he or she is experiencing some or all of the following:

- feeling of warmth throughout his or her body
- numbness of the hands and feet
- numbness of the soft tissues of the oral cavity
- a feeling of euphoria, and a feeling of lightness or of heaviness of the extremities.

***Note that not all patients will experience the same symptoms.**

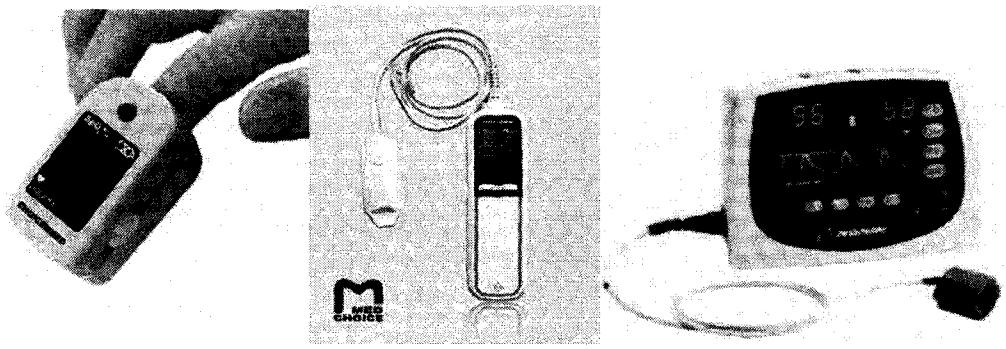
.A local anesthetic, if needed, is typically administered after the N_2O takes effect. The patient's mouth is opened and the local anesthetic is injected. The dental procedure begins after the local anesthetic takes effect. The patient opens his/her mouth but is instructed to breathe through the nose. Nonetheless, a certain amount of mouth breathing frequently occurs. The dentist may periodically stop the dental procedure for a moment to allow the patient to close the mouth and breathe deeply to re-establish an appropriate concentration of N_2O in the patient's body before resuming the procedure. Depending on the nature of the procedure, high velocity suction is regularly used to remove intra-oral debris and, when used, creates a negative air flow and captures some of the gas exhaled by the patient.

At the end of the procedure, the nosepiece is left on the patient while the N_2O is turned off and the oxygen flow is increased. The anesthetic mixture diffuses from the circulating blood into the lungs and is exhaled. Scavenging is continued while the patient is eliminating the N_2O.

Monitoring the Patient

The response of patients to commands during procedures performed during nitrous oxide anesthesia serves as a guide to their level of consciousness. Clinical observation of the patient must be done during any dental procedure. During nitrous oxide/oxygen analgesia, continual clinical observation of the patient's responsiveness, color, and respiratory rate and rhythm must be performed. Spoken responses provide an indication that the patient is breathing. If any other pharmacologic agent is used in addition to nitrous oxide/oxygen and a local anesthetic, monitoring guidelines for the appropriate level of sedation must be followed.

The use of a pulse oximeter is also indicated. The oximeter measures the amount of oxygen saturation in the bloodstream via a sensor device placed on a finger or in the case of an infant, on a foot. If the reading falls below 90%, the attending dental personnel need to increase oxygen by increasing flow by making sure the airway is unobstructed and that the patient is breathing deeply enough to maintain appropriate levels. Pulse oximeters are relatively inexpensive and are extremely helpful in monitoring the patient during nitrous oxide administration. Most pulse oximeters have a sound notification if the oxygen saturation in the blood falls below 90%.



Examples of Pulse Oximeter Devices

Side Effects of Nitrous Oxide / Oxygen Inhalation

The side effects of N_2O take three main forms:

1. Metabolic inhibition
2. Pressure/volume problems
3. Problems related to the administration of oxygen.

Metabolism of Nitrous Oxide

Nitrous oxide irreversibly oxidizes the cobalt atom of vitamin B12, inhibiting the activity of the cobalamine-dependent enzyme methionine synthase. Synthesis of the enzyme is required to restore activity and takes several days. A 50% decrease in methionine synthase activity is seen after only 2 hours of exposure. Loss of this enzyme shuts off the synthesis of methionine, a principle substrate for assembly of myelin sheaths and DNA synthesis, and leads to an accumulation of its precursor homocysteine. In adults with untreated B12 deficiency exposed to nitrous or those who chronically abuse N_2O leading to depletion of body stores of cobalamine, a myeloneuropathy is seen which is identical to subacute combined degeneration of the spinal column as seen in pernicious anemia. A high degree of suspicion is necessary for any patient who develops neurologic symptoms after nitrous anesthesia. For these reasons, patients with suspected B12 deficiency (history of B12 supplementation, post gastrectomy, ileal malabsorption) or anemia should not receive nitrous.

Pressure/Volume Toxicity

The other major cause of adverse events from nitrous oxide is due to pressure/volume complications. Compared to nitrogen, nitrous oxide is 34 times more soluble in blood. It will thus diffuse from the blood into any closed air-filled cavity in the body faster than the nitrogen can diffuse out. In a cavity with thick or noncompliant walls, the pressure inside such a cavity will immediately begin to increase. On the other hand, if the nitrous diffuses into a compliant, thin-walled air-filled space such as a pulmonary cyst or a loop of incarcerated bowel, the elevation in pressure will lead to distention of the structure. The major example of nitrous diffusing into a poorly compliant cavity is the eyeball.

Opthalmologists frequently inject inert gases, e.g., sulfur hexafluoride or perflouropropane, into the eye to treat retinal detachments. These injections are administered during retinal surgery but may also be done in an office setting. These gas bubbles can remain in the eyeball for weeks before they are reabsorbed. If a patient with an intraocular gas bubble receives nitrous oxide anesthesia, the nitrous will diffuse into the gas bubble and lead to an immediate and dangerous elevation of intraocular pressure. The elevated pressure leads to central retinal artery occlusion and irreversible vision loss. Cases of total vision loss have been reported in patients with diabetic retinopathy followed by nitrous anesthesia. Therefore, the first question to be asked of any patient before nitrous oxide anesthesia is given should ascertain whether the patient has had any ocular procedures, injections, or surgery in the previous 3 months prior to the contemplated use of nitrous oxide.

Ideally, such a patient will still be wearing their green plastic wristband, issued by the opthamologist warning against the use of nitrous oxide.

Oxygen Toxicity

Nitrous oxide administration should be avoided in patients who have received therapy with Bleomycin, an anti-neoplastic antibiotic, which is known to cause pulmonary toxicity. Acute respiratory distress

syndrome has occurred in patients who have received bleomycin and is felt to be due to fluid overload and high inspired oxygen concentrations given during the surgical procedure.

Post-inhalation Hypoxia (lack of oxygen)

In 1955, Dr. Raymond Fink published a paper documenting oxygen desaturation of up to 10% occurring after patients given N_2O /O_2 anesthesia were placed on room air, with the effect lasting up to 10 minutes. For this reason, the standard of care is to administer 100% oxygen for at least 5 minutes to all patients at the conclusion of inhalation anesthesia with N_2O /O_2. This has been shown to completely prevent this so-called post-inhalation hypoxia.

Acute and chronic adverse effects of nitrous oxide on the patient are rare. Nausea and vomiting are the most common adverse effects, occurring in 0.5% of patients. A higher incidence is noted with longer administration of nitrous oxide/oxygen, fluctuations in nitrous oxide levels, and increased concentrations of nitrous oxide. Fasting is not required for patients undergoing nitrous oxide analgesia. The practitioner, however, may recommend that only a light meal be consumed in the 2 hours prior to the administration of nitrous oxide to avoid any possibility of aspiration of vomit during a procedure.

DOCUMENTATION

Informed consent must be obtained from the parent and documented in the patient's record prior to administration of nitrous oxide/oxygen. The practitioner should provide instructions to the parent regarding pre-treatment dietary precautions, if indicated. In addition, the patient's record should include indication for use of nitrous oxide/oxygen inhalation, nitrous oxide dosage (i.e., percent nitrous oxide/oxygen and/or flow rate), duration of the procedure, and post treatment oxygenation procedure.

Documentation is critical to protect a dentist in the case of a lawsuit. All aspects of a procedure must include the percentage of N_2O administered, the length of time the patient was sedated, and the flow of gas during administration.

An acceptable example of documentation for the procedure:

> **"Pt. given 25% N20/75%O2 for 45 minutes @ 7L/min. Pt. initially given 35% N20/65% O2 and reported "slight uneasy feeling' – N2O was subsequently adjusted and comfortable level of sedation achieved". In 10:45am – Out 11:30am".**

Documentation must be consistent and accurate. If in doubt more documentation is better than less.

ADDITIONAL WORKPLACE SAFETY INFORMATION

(per OSHA & NIOSH)

Health Effects

Animal studies have shown adverse reproductive effects in female rats exposed to airborne concentrations of N_2O. Data from these studies indicate that exposure to N_2O during gestation can produce adverse health effects in the offspring.

Several studies of workers have shown that occupational exposure to N_2O causes adverse effects such as reduced fertility, spontaneous abortions, and neurologic, renal, and liver disease. A recent study reported that female dental assistants exposed to unscavenged N_2O for 5 or more hours per week had a significant risk of reduced fertility compared with unexposed female dental assistants. The exposed assistants had a 59% decrease in probability of conception for any given menstrual cycle compared with the unexposed assistants. For dental assistants who used scavenging systems during N_2O administration, the probability of conception was not significantly different from that of the unexposed assistants. Since environmental exposures were not measured during these epidemiologic studies, no dose-effect relationship could be established.

Workers Exposed

More than 600,000 workers (i.e., dentists, dental assistants, and dental hygienists) practice dentistry in the United States. In 2010, the American Dental Association (ADA) reported that 35% of all dentists used N_2O to control pain and anxiety in their patients. The ADA Survey of Dental Practice indicated that 58% of dentists reported having N_2O anesthetic equipment, and 64% of those practitioners also reported having a scavenging system.

General Workplace Controls

Occupational exposure for dental clinicians can be controlled by the application of a number of well-known principles including engineering and work practice controls, administrative controls, personal protective equipment, and monitoring.

Exposure may be controlled by some or all of the following:

- Effective anesthetic gas scavenging systems that remove excess anesthetic gas at the point of origin.
- Effective general or dilution ventilation.
- Good work practices on the part of the health-care workers, including the proper use of controls.
- Proper maintenance of equipment to prevent leaks.

- Periodic personnel exposure and environmental monitoring to determine the effectiveness of the overall waste anesthetic gas control program.

Occupational Exposure Limits

The Occupational Safety and Health Administration (OSHA) does not currently have an exposure limit standard for N_2O.

The NIOSH recommended exposure limit (REL) for N_2O is 25 ppm as a time-weighted average (TWA) during the period of anesthetic administration [NIOSH 1977b]. This REL is intended to prevent decreases in mental performance, audiovisual ability, and manual dexterity during exposures to N_2O. An REL to prevent adverse reproductive effects cannot be established until more data are available.

The American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) for N_2O is 50 ppm as an 8-hour TWA.

Guidelines for Minimizing Exposure

Exposure monitoring should be the first step in developing work practices and worker education programs, since measurements of N_2O are needed to determine the type and extent of controls that are necessary. Guidelines for this section are provided from OSHA and NIOSH websites.

http://www.osha.gov/SLTC/healthguidelines/nitrousoxide/recognition.html

Determination of a worker's exposure to airborne nitrous oxide can be made using one of the following techniques:

- Landauer Passive Dosimeter badge, which can be used for a minimum sampling duration of 1 hour (maximum duration 40 hours). Analysis is performed by the manufacturer of the badge as described in the OSHA Computerized Information System.

- Use of an ambient air or bag sample with a minimum collection volume of two spectrophotometer cell volumes. Analysis is conducted using a long-path length portable infrared spectrophotometer as described in NIOSH Method No. 6600.

- ADA (American Dental Association) approved manufacturer of various dosimeter badges for nitrous oxide exposure measurement.

NITROUS OXIDE BADGE MONITORS

The United States Department of Labor recommends healthcare workers and dental clinicians monitor exposure to N_20 by use of badges. Several manufacturers make monitoring badges. Landauer is specifically mentioned by the Labor Department and offers the information below from their website:

The Landauer nitrous oxide monitor (NITROX®) is a diffusion type air monitoring badge assembly worn in the breathing zone of personnel to evaluate potential exposure to N_2O gas. Nitrous oxide gas is

adsorbed on the selected adsorbent material (molecular sieve), sent to the laboratory and thermally desorbed and analyzed by the manufacturer using IR. Both an active cartridge sample collected by drawing air through the cartridge with a calibrated sampling pump, (referred to as "active samples" in this report), and a passive monitor sample which requires no sampling pump to collect the sample (referred to as "passive samples" in this report) were taken. Both use the same proprietary adsorbent material.

Advantages and Disadvantages

(per Dept. of Labor)

This badge monitor method, such as Landauer has adequate sensitivity for measuring workplace atmosphere concentrations of N_2O.

The sampling procedure for this method involves no liquid and mechanical pumps. A somewhat bulky direct-reading instrument is not used and pre- and post-calibration is not necessary.

One disadvantage is the requirement that the monitor is analyzed at the manufacturer's laboratory, which does not allow for immediate results as given by a direct-reading instrument. Quality control is dependent mainly on the manufacturer; this makes it difficult for those laboratories which prefer to conduct their own quality control program. It is recommended that users occasionally prepare spiked samples to assure adequate quality control.

Signs and Symptoms of Exposure

Acute exposure: The signs and symptoms of acute exposure to nitrous oxide include dizziness, difficult breathing, headache, nausea, fatigue, and irritability. Acute exposure to nitrous oxide concentrations of 400,000 to 800,000 ppm may cause loss of consciousness.

Chronic exposure: The signs or symptoms of chronic overexposure to nitrous oxide may include tingling, numbness.

ABUSE OF NITROUS OXIDE

- The substance disrupts learning ability. In a typical experiment volunteers who inhaled a low dose of the drug showed worsened reaction time, worsened ability to do arithmetic, and general sedation accompanied by nervous system depression (as opposed to stimulation).
- Interference with driving ability has been noted one-half hour after a dose.
- Short-term exposure can cause dizziness, nausea, vomiting, and breathing difficulty.

- Some recreational users quickly inhale as much nitrous oxide as possible and hold their breath. This technique causes a sudden change of pressure inside the lungs and can rupture small interior structures needed for breathing.
- Blood pressure can go up or down, depending on dosage. Users can lose consciousness, which may be hazardous in a recreational context due to falls or inability to shut off the gas source.
- The substance deactivates vitamin B12, an effect that can cause numbness and difficulty in moving arms and legs.
- Other results can be impotence and involuntary discharge of urine and feces.
- Nitrous oxide interferes with blood clotting, and long-term exposure has caused blood abnormalities.
- Persons with chronic industrial exposure have more kidney and liver disease than usual.
- Nitrous oxide can become very cold when released as a gas from a pressurized container, cold enough to cause frostbite upon meeting skin or throat.
- Breathing nitrous oxide without an adequate supply of oxygen can be fatal; a little in a closed space or a lot from a face mask can suffocate a user.
- Although nitrous oxide is called nonflammable, when inhaled it can seep into the abdominal cavity and bowels, mixing with body gases to create a flammable combination. If ignited the result would be like setting off an explosive inside the body; the danger is real enough that surgical personnel administering nitrous oxide as an anesthetic have been warned about it.

CONCLUSION

Nitrous oxide / oxygen anesthesia is used in a standard way in dentistry and medicine. And review of the standards on a regular basis is invaluable to maintain the highest standard of care. Professional use and administration of nitrous oxide is a tried and true method to manage patients' anxiety for dental procedures. The overall patient experience is enhanced by careful and professional use of this practice-building anesthetic gas. Dental team members must adhere to the best clinical protocols and know the standard of care to ensure absolute safety for the patient and to minimize exposure to themselves. Nitrous oxide is safe and effective for use by qualified dental professionals in a wide variety of situations requiring pain and anxiety management in the dental office setting.

GLOSSARY OF TERMS

The following glossary of terms relates to use of N_2O sedation. This list is abbreviated from the OSHA list. The full glossary is available by searching the OSHA website: http://www.osha.gov/dts/osta/anestheticgases/index.html

Air is the elastic, invisible mixture of gases (chiefly nitrogen and oxygen) that may be used with medical equipment; also called medical air.

Anesthesia machine is equipment intended for dispensing and delivering anesthetic gases and vapors into a breathing system.

Anesthetic agent is a drug that is used to reduce or abolish the sensation of pain, e.g., halothane, enflurane, isoflurane, desflurane, sevoflurane, and methoxyflurane.

Anesthetic gas is any gaseous substance, e.g., nitrous oxide, used in producing a state of anesthesia.

Anesthetizing location is any area in a facility where an anesthetic agent or drug is administered in the course of examination or treatment. This includes operating rooms, delivery rooms, emergency rooms, induction rooms, and other areas.

Area sample is a sample collected at a fixed point in the workplace.

Breathing system is a gas pathway in direct connection with the patient's lungs, through which gas flow occurs at respiratory pressures, and into which a gas mixture of controlled composition may be dispensed. The function of the breathing system is to convey oxygen and anesthetic gases to the patient's lungs and remove waste and anesthetic gases from the patient's lungs. Scavenging equipment is not considered part of the breathing system. The system is also referred to as breathing or patient circuit, respiratory circuit or system.

Breathing zone is defined as the area immediately adjacent to the employee's nose and mouth; a hemisphere forward of the worker's shoulders with a radius of approximately 6 to 9 inches.

Carbon dioxide (CO_2) is a colorless, odorless gas, and is a normal end product of human metabolism. It is formed in the tissues and eliminated by the lungs.

Carcinogenicity is the ability of a substance to cause cancer.

Check valves are also known as unidirectional valves, one-way valves, and inspiratory and expiratory valves (refer to definition of unidirectional valve).

Compressed gas is defined as any material or mixture having in the container an absolute pressure exceeding 40 psig at 70°F or having an absolute pressure exceeding 104 psig at 130°F.

Congenital anomaly is a structural or functional abnormality of the human body that develops before birth but is not inherited. One type of birth defect.

Cylinder supply source is a cylindrical-shaped tank that is color-coded and pin-indexed or Compressed Gas Association (CGA)valve-specific and used to contain a specified medical gas.

Cylinder pressure gauge monitors the pressure of gas within a cylinder.

Epidemiology is the study of health and illness in human populations.

Excess gases are those gases and anesthetic vapors that are delivered to the breathing circuit in excess of the patient's requirements and the breathing circuit's capacity These gases are removed from the breathing circuit by the waste gas scavenging system.

Exhalation check valve, also known as expiratory unidirectional valve, refers to that valve that ensures that exhaled gases flow away from the patient and into the waste gas absorber.

Flow control valve, also known as the needle valve, controls the rate of flow of a gas through its associated flow meter by manual adjustment.

Flowmeter is a device that measures and indicates the flow rate of a gas passing through it.

Gas is defined as a formless fluid that expands readily to fill any containing vessel, and which can be changed to the liquid or solid state only by the combined effect of increased pressure and decreased temperature.

General anesthesia is a state of unconsciousness in which there is an absence of pain sensation.

HVAC system, also known as the heating, ventilating, and air conditioning system, supplies outdoor replacement (make-up) air and environmental control to a space or building. HVAC systems condition the air by supplying the required degree of air cleanliness, temperature and/or humidity.

Medical gas is any gaseous substance that meets medical purity standards and has application in a medical environment. Examples are oxygen, nitrous oxide, helium, air, nitrogen, and carbon dioxide.

Medical gas mixture is a mixture of two or more medical gases to be used for a specific medical application.

NIOSH RELs (recommended exposure limits) are occupational exposure limits for a 40 hour work week.

Nitrous oxide (N_2O) is used as an anesthetic agent in medical, dental, and veterinary operatories. N_2O is a weak anesthetic with rapid onset and rapid emergence. In dental offices, it is administered with oxygen, primarily as an analgesic (an agent that diminishes or eliminates pain in the conscious patient) and as a sedative to reduce anxiety.

Occupational exposure to waste anesthetic gases includes exposure to any inhalation anesthetic agents that escape into locations associated with, and adjacent to, anesthetic procedures. **Oxygen (O_2)** is an element which, at atmospheric temperatures and pressures, exists as a colorless, odorless, tasteless gas. Outstanding properties are its ability to sustain life and to support combustion.

Oxygen flush valve is a separate valve designed to rapidly supply a large volume of oxygen to the breathing system.

PACU (post-anesthesia care unit) is also known as the recovery room.

Pin Index Safety System is a safeguard to eliminate cylinder interchanging and the possibility of accidentally placing the incorrect gas on a yoke designed to accommodate another gas.

Pipeline supply source is a permanently installed piped distribution system that delivers medical gases such as oxygen, nitrous oxide, and air to the operating room.

Reservoir bag is also known as the respiratory bag or breathing bag. It allows accumulation of gas during exhalation so that a reservoir is available for the next inspiration. It can serve, through visual and tactile observation, as a monitor of a patient's spontaneous respirations and acts to protect the patient from excessive pressure in the breathing system.

Respiration is the process by which a rapid exchange of oxygen and carbon dioxide takes place between the atmosphere and the blood coming to the pulmonary capillaries. Oxygen is taken up and a proportional amount of carbon dioxide is released.

Scavenging is defined as the collection of excess gases from the breathing circuit and removal of these gases to an appropriate place of discharge outside the working environment.

Scavenging system is defined as a device (assembly of specific components) that collects and removes the excess anesthetic gases that are released from the breathing circuit.

Source sample is a sample collected at the origin of contamination.

Teratogenicity is the ability of a substance to cause birth defects in offspring, as a result of maternal (before or after conception) or paternal exposure to the toxic substance.

Tracheal tube also called the endotracheal tube, intratracheal tube, and catheter is inserted into the trachea and is used to conduct gases and vapors to and from the lungs.

TWA is a time-weighted average concentration. It is a way of expressing exposure such that the amount of time spent exposed to each different concentration level is weighted by the amount of time the worker was exposed to that level.

Unidirectional valve is a valve that allows gas flow in one direction only.

Vapor is the gaseous phase of a substance which at ordinary temperature and pressure exists as a liquid.

Ventilation is (1) the physical process of moving gases into and out of the lungs. (2) It is also defined for the purposes of industrial hygiene engineering as a method for providing control of an environment by strategic use of airflow.

Waste anesthetic gases are those gases that are inadvertently released into the workplace and/or can no longer be used.

APPLICATION FOR PRIOR APPROVAL OF EXPANDED FUNCTION TRAINING

Iowa Dental Board
400 SW 8th St., Suite D
Des Moines, IA 50309-4687
http://www.dentalboard.iowa.gov
515-281-5157

RECEIVED
NOV 6 2013
IOWA DENTAL BOARD

Note: A fee of $10 is required to process your request. PLEASE TYPE OR PRINT.

Name of organization or person requesting approval: Joseph P. Tesene DDS. PC
Address: 8342 Heritage Bend Rd. West Des Moines, IA 50266
Phone: 319.400.3332 Fax: N/A Email: drtesene@aspendental.com
Signature: Joseph Tesene Date: 11/3/13

Expanded function course you are submitting for review:

- ☒ Taking Occlusal Registrations
- ☒ Placement and Removal of Gingival Retraction
- ☒ Taking Final Impressions
- ☒ Fabrication and Removal of Provisional Restorations
- ☐ Applying Cavity Liners and Bases, Desensitizing Agents and Bonding Systems
- ☐ Placement and Removal of Dry Socket Medication
- ☐ Placement of Periodontal Dressings
- ☐ Testing Pulp Vitality
- ☐ Monitoring Nitrous Oxide

Name of instructor providing training: Joseph P. Tesene DDS
Educational background: (Attach a copy of curriculum vitae) See Attached

Course objectives: See Attached

#1014
$10

1. Plan for initial assessment: See Attached

2. Resources used for didactic materials. Include a copy of the didactic materials for Board review.
See Attached

3. Will lab training be provided? YES ☒ NO ☐ If yes, detail lab experience:
See Attached

4. Describe your plan for the clinical component of training. Be specific.
See Attached

5. Plan for post-course competency assessment: See Attached

6. Provide a detailed breakdown of the dates and times for the entire course: See Attached

7. Where do you intend to offer the course? See Attached

8. Who are the intended recipients of the course? See Attached

9. How many credit hours of continuing education are you requesting? 3

If available, please include a copy of the course brochure.
A copy of the didactic materials must also be included with your request.

You will be contacted after the Iowa Dental Board has reviewed your request.

MAIL COMPLETED APPLICATION, ALONG WITH A FEE OF $10 FOR PRIOR APPROVAL OF CONTINUING EDUCATION HOURS, TO:

Iowa Dental Board
Expanded Function Committee
400 SW 8th St., Suite D
Des Moines, IA 50309-4687

Braness, Christel [IDB]

From: Braness, Christel [IDB]
Sent: Monday, December 16, 2013 9:41 AM
To: 'drtesene@aspendental.com'
Subject: Expanded Functions Courses Review

Importance: High

In looking over your request for expanded functions courses review, it appears that Dr. Hal Harris is providing much of the training. Dr. Harris has been approved by the Board to provide expanded functions training. If Dr. Harris is providing the training, there would be no need to have this course work further reviewed by the Board.

Is there any portion of this expanded functions training that will not be taught by Dr. Harris? If yes, what portions specifically will be taught by yourself and which portions will be taught by Dr. Harris? This information is necessary to determine if further reviewed is necessary; and if so, what portion of the information requires review.

Let me know if you have any questions. Thank you.

Christel Braness, Program Planner
Iowa Dental Board | 400 SW 8th St., Suite D | Des Moines, IA 50309
Phone: 515-242-6369 | Fax: 515-281-7969 | www.dentalboard.iowa.gov

CONFIDENTIAL NOTICE: This email and the documents accompanying this electronic transmission may contain confidential information belonging to the sender, which is legally privileged. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution or the taking of any action in reference to the contents of this electronic information is strictly prohibited. If you have received this email in error, please notify the sender and delete all copies of the email and all attachments. Thank you.

Braness, Christel [IDB]

From: POP 0493 Dr. Joseph Tesene <drtesene@aspendental.com>
Sent: Wednesday, December 18, 2013 8:53 PM
To: Braness, Christel [IDB]
Subject: RE: Expanded Functions Courses Review

Hello Christel,

Thanks for following up with my request. Yes, Dr Hal Harris I have chosen to provide for the didactic training portion of the training. I am planning to provide the clinical training in office. I assumed that I needed to submit the application for approval for the clinical portion. Please let me know if you need further information from me regarding this matter.

Best,

Joe Tesene, DDS

From: Braness, Christel [IDB] [Christel.Braness@iowa.gov]
Sent: Monday, December 16, 2013 10:40 AM
To: POP 0493 Dr. Joseph Tesene
Subject: Expanded Functions Courses Review

In looking over your request for expanded functions courses review, it appears that Dr. Hal Harris is providing much of the training. Dr. Harris has been approved by the Board to provide expanded functions training. If Dr. Harris is providing the training, there would be no need to have this course work further reviewed by the Board.

Is there any portion of this expanded functions training that will not be taught by Dr. Harris? If yes, what portions specifically will be taught by yourself and which portions will be taught by Dr. Harris? This information is necessary to determine if further reviewed is necessary; and if so, what portion of the information requires review.

Let me know if you have any questions. Thank you.

Christel Braness, Program Planner
Iowa Dental Board | 400 SW 8th St., Suite D | Des Moines, IA 50309
Phone: 515-242-6369 | Fax: 515-281-7969 | www.dentalboard.iowa.gov<http://www.dentalboard.iowa.gov/>

CONFIDENTIAL NOTICE: This email and the documents accompanying this electronic transmission may contain confidential information belonging to the sender, which is legally privileged. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution or the taking of any action in reference to the contents of this electronic information is strictly prohibited. If you have received this email in error, please notify the sender and delete all copies of the email and all attachments. Thank you.

This email message and its attachments may contain confidential information that is exempt from disclosure under Iowa Code chapters 22, 139A, and other applicable law. Confidential information is for the sole use of the intended recipient. If you believe that you have received this transmission in error, please reply to the sender, and then delete all copies of this message and any attachments. If you are not the intended recipient, you are hereby notified that any review, use, retention, dissemination, distribution, or copying of this message is strictly prohibited by law.

Joseph Patrick Tesene, DDS

8342 Heritage Bend Rd.
West Des Moines, IA 50266
319.400.3332
drtesene@aspendental.com

Professional

- Practice Owner; Aspen Dental, 4930 SE 14th St; Des Moines, IA 50320 (Aug 2010-Present)
- Associate Dentist; Stone Ridge Dental, PLC. 1008 W. Pleasant St; Pleasantville, IA 50225 (June 2009-Aug 2010)
- Associate Dentist; Emergency Dental Care USA. 4409 SW 9th St; Des Moines, IA 50315 (Dec 2009-Aug 2010)

Education

The University of Iowa, Iowa City, IA

- Doctor of Dental Surgery, *June 2009* GPA 3.7
- Master of Science in Chemistry, *July 2005* GPA 3.7
- Bachelor of Science in Environmental Science, *May 2004* GPA 3.5

Research and Teaching Experience

- Dows Institute for Dental Research, University of Iowa College of Dentistry
  Spring 2006 – Present
- Graduate and Undergraduate Electrochemical research, University of Iowa Department of Chemistry. *July 2003 – July 2005*
- Masters thesis "Magnetically-Treated Electrolytic Manganese Dioxide in Alkaline Electrolyte." *July 2005*
- Graduate and Undergraduate Teaching Assistant for Chemistry Lab
- Chemistry tutor for New Dimensions in Learning at the U of I

Educational Achievements

- Dr. R.A. Greenawalt Fund/Summer Periodontal Externship, July 2008
- AADR Student Research Fellowship Award, *March 2007*
- AADR Block Travel Grant, *March 2007*
- Dean's Recognition for academic achievement, *October 2006 and 2007*
- Dental Research Award, *2005 to 2009*
- L.B. Sims Distinguished Masters Thesis Award, *March 2006*

References

- Michael Obeng, D.D.S. Owner, Emergency Dental Care USA. Omaha, NE. (402) 597-1186
- Marco Rouman, D.D.S, Cert. in Gerodontology, Assistant Professor, College of Dentistry, The University of Iowa. (319) 335.7188
- Johna Leddy, Ph.D, Associate Professor, Department of Chemistry, The University of Iowa. (319) 335.1720

Expanded Function Training for the Dental Assistant

Joseph P. Tesene DDS

The purpose of this course is to provide the qualified dental assistant the prerequisite knowledge related to making excellent final impressions, bite registrations, and provisional restorations. At the completion of this course, the dental assistant will show academic and clinical competency necessary to begin performing these allowed operations while supervised by the training dentist.

Course Objectives

A. Final Impressions
   1. Understand the importance of accurate impressions and the common causes of inadequate impressions
   2. Define steps involved in predictable soft tissue management for fixed prosthodontics.
   3. Discuss materials available for impression-making, their indications, and limitations
   4. Show clinical proficiency in obtaining excellent impressions.

B. Occlusal Registrations
   1. Discuss the rationale for occlusal registrations.
   2. List materials and methods for obtaining occlusal records.
   3. Show clinical proficiency in obtaining accurate occlusal records.

C. Provisional Restorations
   1. Define the functions a provisional restoration should accomplish
   2. Evaluate types of resins used to create provisional restorations.
   3. Make single-unit and three-unit provisional restorations.
   4. Compare cements used for adhering provisional restorations.

Plan for Initial Assessment

A. The registered dental assistant must have at least 2 years of work experience in Iowa or be DANB certified.

B. A minimum 6 months employment period by Joseph P. Tesene DDS, PC

C. Shows good general knowledge in fixed prosthodontics and good hand skills required for performing these expanded functions.

Resources used for Didactic Portion

A. Dental assistant to attend Board-Approved didactic course offered by Dr. Hal Harris (see enclosed copy of course handout)

B. Video instruction: Alginate Impressions-Predictable and Accurate, Predictable Fixed and Removable Prosthodontic Impressions, Effective Provisional Restorations (Gordon Christensen, Practical Clinical Courses; 3707 North Canyon Road, Suite #3D; Provo, UT 84604. 800.223.6569)

Lab Training Portion

A. Fabrication of vacuum-formed matrix for provisional restorations.
B. Fabrication of custom impression trays for final impressions
C. Finishing and polishing of provisional restorations.

Clinical Component

A. Weeks 1 and 2: Watch and discuss PCC videos "Alginate Impressions-Predictable and Accurate," and "Predictable Fixed and Removable Prosthodontic Impressions." The dental assistant makes all single-unit and three-unit final impressions under personal supervision of training dentist.
B. Weeks 3 and 4: Watch and discuss PCC video "Effective Provisional Restoration." The dental assistant makes all single-unit and three-unit provisional restorations under personal supervision of training dentist.
C. Week 5: Discuss materials and methods for obtaining accurate occlusal records. The dental assistant performs all occlusal registration procedures under personal supervision of the training dentist.
D. Week 6: Lab instruction on making vacuum-formed matrix, custom impression trays, and finishing/polishing provisional restorations.

Post-Course Competency Assessment

A. In the final week, the dental assistant performs all final impressions, provisional restorations, and bite registrations for single-unit and three-unit fixed prosthodontics under personal supervision of training dentist.

B. The dental assistant shows academic proficiency by passing (80% or higher) a written essay examination.
C. Following the passage of the course, periodic assessments are made to ensure quality control and patient safety.

Course Schedule

The course is offered once per year to eligible dental assistants. The dental assistant shall complete the didactic component prior to the clinical component. The clinical component begins the second Monday in January at 12:00 PM and runs for 6 weeks as indicated above. The post-course competency exam is scheduled for 3:00-5:00 PM on the concluding Friday (6th) of the course. For 2014, the course schedule is as follows:

Jan 13-24: Soft tissue management and final impressions. Dental assistants meet on Jan 13 and 20 at 12:00 PM for video instruction and discussion. Clinical instruction and practice follows and continues through Jan 24.

Jan 27 – Feb 7: Fabrication of provisional restorations. Dental assistants will meet on Jan 27 at 12:00 PM for video instruction and discussion. Clinical instruction and practice follows and continues through Feb 7.

Feb 10 – 14: Occlusal registrations. Dental assistants will meet on Feb 10 at 12:00 PM for oral discussion. Clinical instruction and practice follows and continues through Feb 14.

Feb 17 – 20: Lab training and post-course competency. Dental assistants will meet in the dental lab for hands-on training Feb 17 at 12:00 PM. The post-course compentency exam will be held from 3-5 PM on Feb 20.

Course Location

The didactic component taught by Dr. Hal Harris is held at the Covenant Presbytarian Church in West Des Moines, IA

The clinical component taught by Joseph P. Tesene DDS PC is held at Aspen Dental, 4930 SE 14th St., Des Moines, IA 50320

Intended Recipients

Jamie Brown
Jenny Sickles

Credit Hours Requested

3

EXPANDED FUNCTIONS FOR DENTAL ASSISTANTS

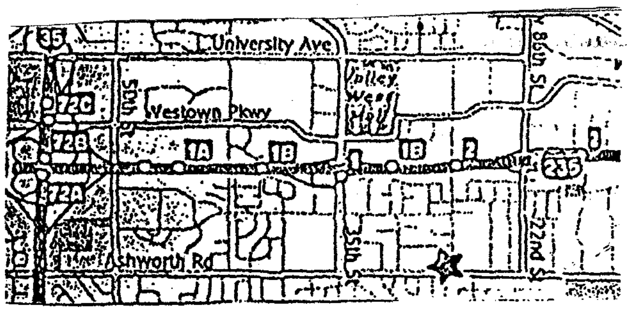
Provides an opportunity for Dental Assistants to perform
Expanded Function duties in a dental office

Didactic Portion Presented by - Dr. Hal Harris

This course is approved by the Iowa Board of Dental Examiners and DANB

Date: THURSDAY, October 17, 2013
FRIDAY, October 18, 2013

Location: Covenant Presbyterian Church
28th & Ashworth, West Des Moines



*Free parking-east side of bldg/follow signs

Cost per person: Includes tuition, handouts, and lunch each day

* Both days 1.7 CEU's (17 hrs.) - $360
* Thurs. only 0.9 CEU's (9 hrs.) - $230
* Friday only 0.8 CEU's (8 hrs.) - $230
* Additional 1.4 CEU's (14 hrs) after completion of in-office procedures (Possible total of 31 hours CEU credit)

Textbook: for Thurs. session (one book per office is recommended)
"Handbook of Nitrous Oxide and Oxygen Sedation", 3rd edition, by Clark & Brunnick
Mosby (ISBN 978-0-323-04827-9)
Available used and new at Amazon.com or at elsevierhealth.com

THURSDAY, October 17 (8:00 AM-5:30 PM)

* Pulp Testing
* Cavity Liners and Bases
* Nitrous Oxide

FRIDAY, October 18 (8:00 AM-5:00 PM)

* Occlusal Registration
* Gingival Retraction
* Final Impressions
* Provisional Restorations
* Dry Socket Treatment
* Periodontal Dressing

Objectives:

- Differentiate structure and function of pulp and related tissues
- Identify the function and use of the materials
- Explain history of nitrous oxide
- Recognize and record occlusal relationships
- Identify the minimal anatomical detail required for the fabrication of a prosthetic device
- Identify and replicate anatomical characteristics of the tooth shape and alignment that protect the periodontium and preserve the integrity of the dentition
- Define alveolitis
- State the purpose of the periodontal dressing

Dr. Hal S. Harris
1969 Graduate - University of Iowa College of Dentistry
Over 40 years private dental practice
Former Adjunct faculty member - UI College of Dentistry
Former Adjunct faculty member - DMACC (Ankeny)
PHONE: (515) 226-8391

Assistants should be a CDA or have two years experience as an RDA to be eligible to take this Expanded Functions course.

To Register for the October 17th and October 18th course -

Send the appropriate amount for both days or either one-- being certain to register for the topics you wish to complete.

Registration will be limited and all registrations must be received by Friday, October 11, 2013. Anyone wishing to drop the course and receive a refund must do so by Friday, October 11, 2013.

I make an attempt to have a comfortable temperature in the meeting room. However, everyone's comfort zone is different. Please bring a jacket or sweater in case the room is too cool for your comfort.

If you have any questions, please contact:

Dr. Harris at (515) 226-8391 or hlharris@juno.com

Complete the Form below and make check payable to Dr. Harris. Forward both to the following address:

Dr. Hal S. Harris
1720 Rio Valley Drive
Clive, Iowa 50325

(This form may be duplicated for additional registrations)

- -

Name ____

Employer's Address ___________________________________

Employer's Phone Number ______________________________

Circle the sessions you will be attending and the amount enclosed:

Both Days - $360
Thursday Only - $230
Friday Only - $230
Nitrous Oxide Only - Thursday beginning at 12:15 PM - $185

Final Impressions

Copyright – May 2004
Dr. Hal S. Harris

Oral Anatomy Review

- Tooth Structure
- Periodontium
- Oral Cavity

Tooth Structure

- Occlusal anatomy
- Amount of recession
- Third molar region
- Position of tooth in arch

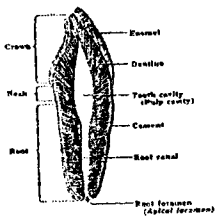
Periodontium

- Inflammation present
- Periodontal defects
- Boney defects

Oral cavity

- Soft tissue present
- Tori present
- Depth of floor of mouth
- Vestibular areas
- Frenum attachments
- Ascending ramus of mandible

Anatomy of An Incisor



601 An Incisor Tooth, longitudinal section

Impression Materials

- An impression is a negative reproduction of the oral tissue
- Main function is to accurately record the dimension of oral tissues and their spatial relationships
- Used to make a positive reproduction (replica)
- Enables us to evaluate situations better, to make restorations outside the mouth and then in the mouth
- Material must be accurate and stable

Some Definitions Concerning Impressions

- Study model
- Cast
- Die

GYPSUM

- Depending on the accuracy needed – different types of gypsum is used to pour the impression
- The more accuracy desired – the higher the cost

Properties of "ideal" impression material

- Ease of manipulation
- Reasonable cost
- Adequate flow properties
- Appropriate setting time
- Adequate mechanical strength
- Good dimensional accuracy
- Safe
- Be able to be disinfected
- Compatible with gypsum materials
- Good shelf life

At the present time, there is no ONE material that meets all of these criteria

Classification of Impression materials (many ways)

- Rigid
- Flexible
- Chemical
- Physical
- Use

Rigid

- Compound
- Impression plaster
- Zinc oxide/eugenol

Discussion

- Silicone rubber
  - Condensation
  - Addition
- Poly ethers
  - Hydrophilic
  - Stiff when set
  - Long shelf life

Poly Vinyl Siloxanes

- Very popular today
- Shorter working time and setting time
- Pleasant odor & color
- Good viscosity
- Comes in two paste system
  - Automix in cartridge
  - Two tubes – mix by hand

Impression Materials In General

- Two paste system
  - Paper pad
  - Equal lengths & spatulate
- Cartridge
  - Automix
  - Need gun & tips

Other Uses For Impression Materials

- Putty – Then a wash – Making Temporaries
- Bite registration

Hydrophilicity

- Claims made in new polyvinyl siloxane materials that they do not need a dry prep
- NO validation
- Have a surfactant added
- Still need a dry prep even though hydrophilic
- Still need moisture control

Disinfection of Impressions

- Do NOT immerse for over 2-3 minutes
- Better to spray the disinfectant on the impression and leave for 10 minutes
- Check the instructions– both for impression material and the disinfectant used

- Cost and time can be a factor in choosing the appropriate impression tray

Impression Trays

- Flexure causes distortion
- Use strong impression trays
- Use adhesive in the tray
- Custom tray the Best
- Use enough material in your tray
- Improve your injection technique
- Inject wash material to prevent separation and folds

Key Factors in Obtaining a GOOD Impression

- Prepare soft tissues
- Select an impression technique
- Select an impression material
- Impression recording procedure

Preparing The Soft Tissue

- Want healthy tissue before taking the Impression if possible
- Want to ensure that the margin of the prep is recorded accurately
- Want to ensure the entire prepped tooth is recorded accurately

Some Impression Techniques

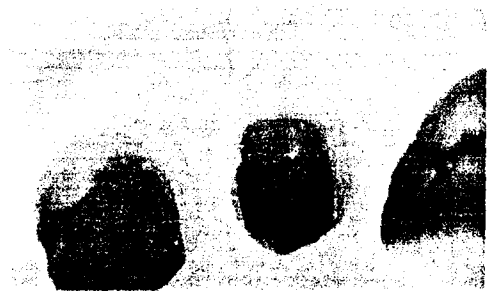
- Putty/wash
- Dual phase
- Monophase
- Triple tray
- Single arch

GOOD Procedure for Taking Impressions

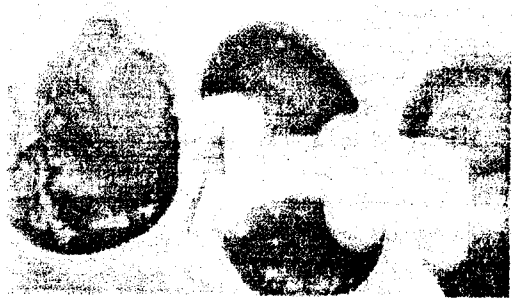
- Prepare the patient
- Select and prepare impression tray
- Prepare soft tissue
- Apply syringe material
- Load tray and seat in mouth
- Follow manufacturer's directions as to setting times
- Remove tray
- Rinse
- Inspect for accuracy – Have dentist inspect
- Disinfect

VOIDS ON MARGIN

MARGINAL TEARS

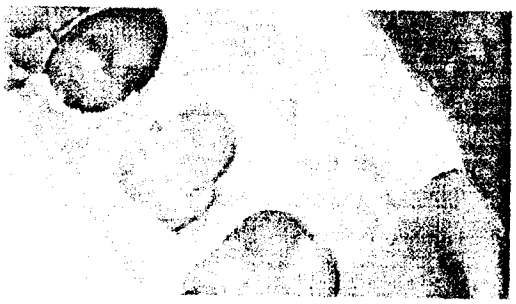


BUBBLES



DRAGS & PULLS

TRAY CONTACT / DISTORTION



TRAY SEPARATION

Other Facts About Alginate

- Shelf life of unmixed alginate is about one year
- Environmental affects
  - Moisture & humidity
- Imbibition – Absorption of additional water
  - Causes expansion
- Syneresis – Loss of moisture
  - Causes shrinkage

Altering Setting Time

- Warm water – reduces set time
- Normal set - 4-5 minutes
- Fast set - 1-2 minutes

PROCEDURE FOR ALGINATE IMPRESSIONS

- Explain procedure to the patient
- Pick out tray
- Try in tray
  - Check extension
  - Check fit around teeth
  - Check for anatomical obstructions
  - Want 2-3 mm clearance on periphery

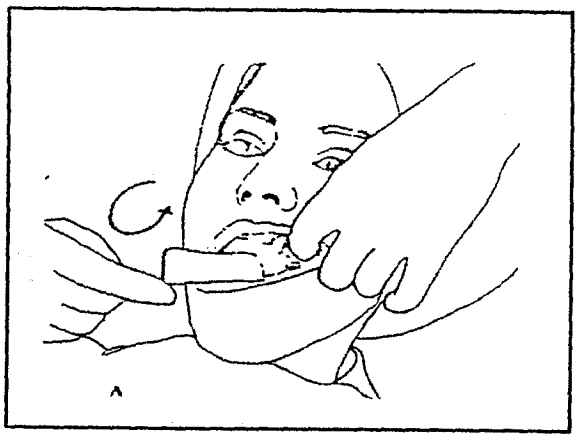
PERFORATED TRAY

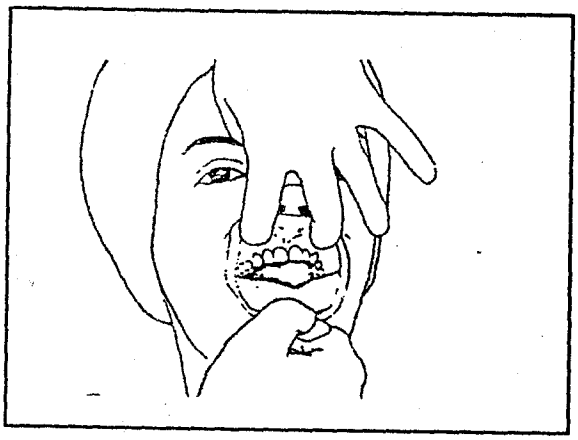
RIM LOCK TRAY

PLASTIC TRAY

Maxillary Alginate Impression

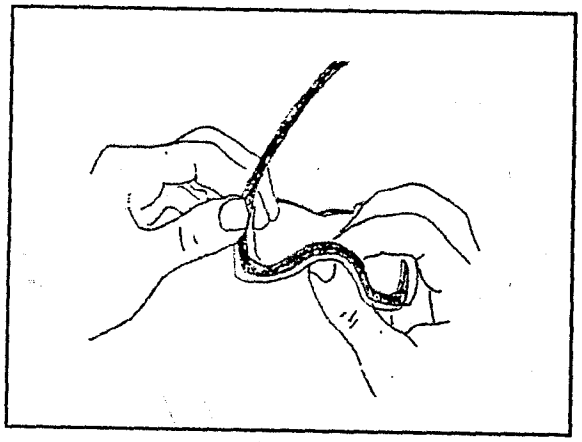
- Same as mandible
- Retract cheek
- Start in posterior and then go anteriorly
- Use finger to keep cheek away
- Check posterior for alginate flowing down throat
- Remove same as mandible
- Check patients mouth for left over alginate

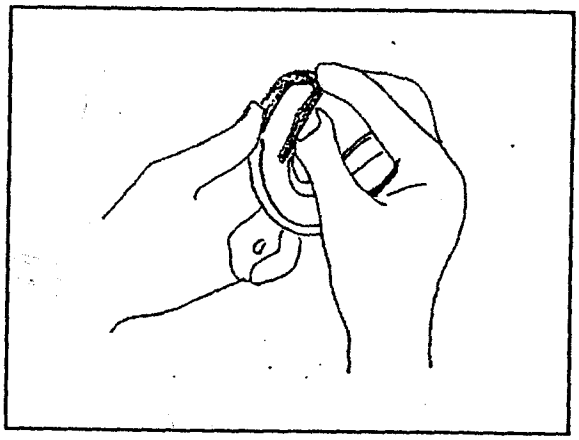


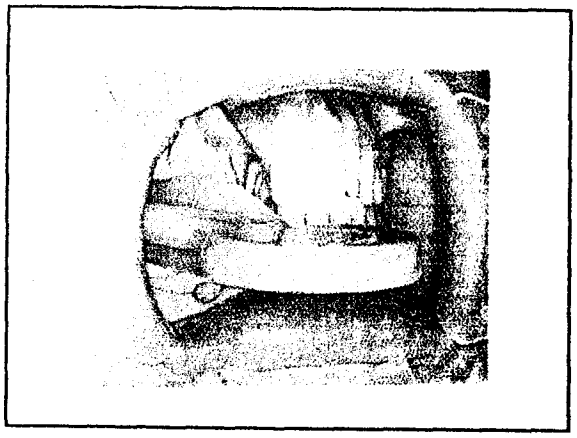


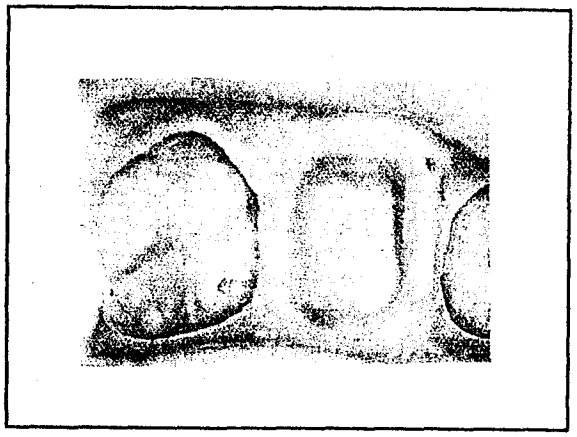
Modifying The Trays

- May use rope wax
- Post dam area – to keep alginate confined
- Anatomical abnormalities
- Retro molar area
- Helps prevent pressing tray against teeth when seating



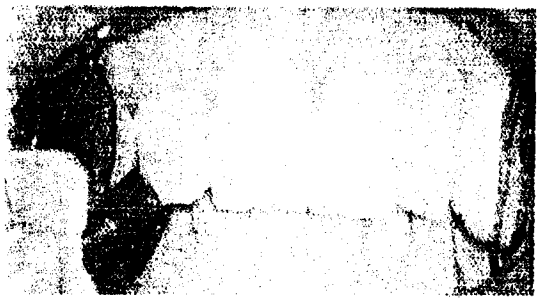






Patient Not Biting Right

Patient Biting Correctly

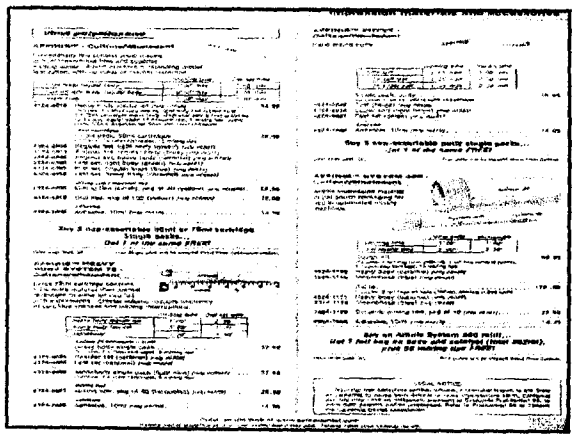


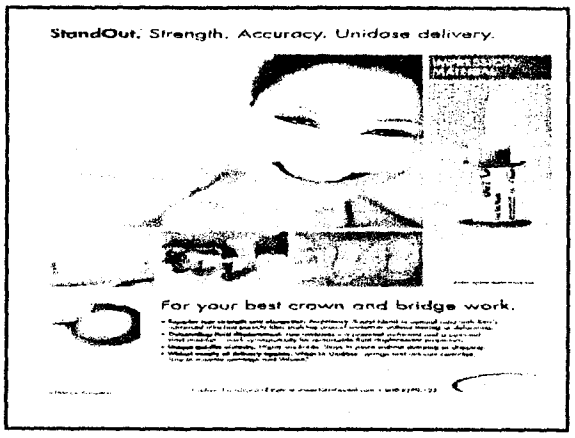
GENERAL STATEMENTS

- On MSDS sheets
  - Shelf life
  - Varies
  - Most 12 months to 3 years
  - Majority are hydrophillic
  - Different viscosities
  - Odor/taste

GENERAL STATEMENTS (Cont)

- Tells time within which impression should be poured
- Tells how long to wait to pour
- Disinfection methods
- Firmness
- Setting time & working time





NEWER IMPRESSION MATERIALS

- Colorise – Thermochromatic
  - Change color as material sets
  - Made by Zhermack
  - Alginate material
  - Polyvinylsiloxane material

Polyvinylsiloxane

Application of the 'wash' on the preparations (green).

End of the working time (yellow). Insertion of the tray. Zhermack recommends to insert the tray when the silicone is still green.

Alginate

Insertion of the impression tray into the mouth (light blue).

End of the setting time. Removal of the impression tray (white).

Facts

- 80% of fixed restorations in the United States are PFM's – according to stats from Glidewell Labs—California
- Biggest problem labs face
  - Insufficient occlusal reduction
  - Bad impressions

1 Provisional Restorations
Fabrication and Removal

Copyright – May 2004
Dr. Hal S. Harris

2 SUBJECT: MALE or FEMALE

You might not have known this,

but a lot of non-living objects are actually male or female.

Here are some examples:

3

4

5

6

7

8

9

10

11

12 Review of oral anatomy

- Function, morphology and traits of tooth classification
- Incisors
- Cuspids
- Bicuspids
- Molars

13

14

- Pulp protection

- Periodontal health

20 ## Mechanical

- Positional stability
  - Mesiodistal position
  - Opposing tooth

- Prevention of tooth fracture

21 ## Esthetics

- Self explanatory

- Want patient to look good

22 ## Psychological Implications of Provisionals

Communication of appearance
Patient's speech
Facial profile
Anxiety

23 ## Properties of Ideal Provisional Materials

- Convenient handling
- Biocompatible
- Dimensional stability
- Ease of contouring and polishing
- Adequate strength
- Good esthetics
- Good patient acceptance
- Ease of modification – Able to add to
- Compatible with cements
- Psychological implications
- Non irritating and odorless

24 ## The Make-up of Plastics

- Polymerization
- Monomers
- Polymers

25

33

34

35

36 Custom Fabricated Provisional Polyethylmethacrylate

- Direct technique
- Advantages
- Disadvantages
- Examples of materials

37

38

39 Polymethyl Methacrylate Resin

- Similar to dentin resin
- Advantages
- Disadvantages
- Examples of Materials

40

41 Epimines

- Resin Material
- Advantages
- Disadvantages
- Examples of materials

42 Composite Provisional Materials

- Bis-Acrylic resins
- Similar to Bis-GMA resin
- Silanes
- Fillers

43 Advantages of Composites

- Good for long spans
- Good for veneers
- Low curing temperature

- Spoon excavator
- Impression
  - Alginate
  - Putty
- Separating medium – vasoline
- Cotton rolls
- Self- curing resin
- Scissors

53 EQUIPMENT & SUPPLIES (Cont)

- Surgical blade
  - #15 or #12 Bard Parker blade
- Burnisher – beaver tail or ball
- Straight handpiece
- Finishing burs, diamonds, & discs
- Polishing burs or discs
- Articulating paper

54 EQUIPMENT in LAB

- Pumice
- Lathe
- Sterile rag wheels

55 PROVISIONAL CEMENTATION SET UP

56 PROCEDURAL STEPS

- Impression – Before preparation
  - Free of debris & tears
- Preparation by dentist
- Isolate & coat prepared tooth or teeth
- Shade selection
- Mix temporary material
  - Hand mix
  - Automix
- Place material in area of prepared tooth (teeth) in matrix

57 STEPS (Cont)

- Let material sit for 1 – 2 minutes
- Place loaded matrix (Impression) back into mouth
- Allow material to reach initial set
- Remove tray from mouth

72

73 ## Removal of Excess Cement

- Instrumentation
- Finger rest
- Instrument stroke
- Flossing
- Exam treatment area
- Consequences of improper or poor cement removal

74 ## Removal of Provisionals

- Usually use a spoon excavator
- Use fundamental intraoral instrumentation principles
- Want to maintain hard and soft tissue integrity
- May need to use a handpiece or ultrasonic to remove
- DO NOT CREATE AN IATROGENIC PROBLEM

75 ## Manipulation and Placement of Temporary Restoration Material in Cavity Preparation

- Materials vary
- Mix
- Incrementally place and condense
- Overfill and carve
- Restoration should meet previously described criteria

76 ## Home Care Instructions

- OHI
- Diet
- Chewing
- Color
- Size and shape
- Sensitivity

77

- THE END

- Copyright-May 2004
- Dr. Hal S. Harris

1 ☐ # Occlusal Registration

Copyright – May 2004
Dr. Hal S. Harris

2 ☐

3 ☐

4 ☐ ## Occlusion

- ☐ The relationship between all of the components of the masticatory system in normal function, dysfunction and para function.
- ☐ It is a repeatable position

5 ☐

- ☐ Occlusion is important
- ☐ It is the foundation of function
- ☐ Failures are mainly due to occlusion
  NOT materials

6 ☐ ## Mandible

- ☐ A sling with three (3) contact areas
  1. Left TMJ
  2. Right TMJ
  3. Teeth
- ☐ Three functions
  1. Swallowing
  2. Eating – chewing
  3. Talking

7 ☐ ## Muscles Involved

- ☐ Masseter
- ☐ Lateral pterygoids
- ☐ Temporalis

- ☐ Adaptablity of the patient is very important in the success of dentistry

8 ☐ ## Edward H. Angle - 1899

- ☐ Angle Classification
- ☐ Class I (neutroclusion)
- ☐ Class II (distoclusion)
  Division 1 – mandibular retrusion
  Division 2 – maxillary overbite

18 ☐ KEY POINT

- ☐ The material that sets the fastest within the operator's control is the material that should be used.

19 ☐ Procedure

- ☐ Inspect the oral cavity
- ☐ Have the patient practice
- ☐ Want the teeth slightly separated
- ☐ Impression material over posterior teeth only when using PVS or similar material
- ☐ Easier to place on the mandibular teeth first

20 ☐ Characteristics of Wax

- ☐ Using wax for bite registration
- ☐ Can use a full arch sheet
- ☐ Try in and adjust wax accordingly
- ☐ Heat wax
- ☐ Position wax
- ☐ Allow wax to cool in mouth
- ☐ Patient opens
- ☐ Remove wax carefully

21 ☐

22 ☐

23 ☐

24 ☐ BITE REGISTRATION WITH ELASTIC MATERIALS

- ☐ Can use polyvinylsiloxanes , polyethers or polysulfides
- ☐ Can be automix system(cartidges)
- ☐ Can be two paste system
- ☐ Less chance of distortion compared to wax

25 ☐ Advantages (Polyvinylsiloxanes)

- ☐ Fast setting
- ☐ Not much resistance to biting forces
- ☐ No odor or taste
- ☐ Dimensional stability
- ☐ Convenient

- ☐ Polyethers similar

26 ☐ Bite Registration with Elastic Materials

- ☐ Use special tray
- ☐ Usually auto mix system

☐ Regisil Rigid - Caulk

39 ☐

40 ☐

41 ☐

42 ☐

43 ☐

44 ☐

45 ☐

46 ☐

47 ☐

48 ☐

49 ☐

50 ☐

☐ THE END

☐ Copyright-May 2004
☐ Dr. Hal S.Harris

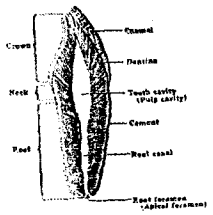
Gingival Retraction

Copyright – May 2004
Dr. Hal S. Harris

Oral Anatomy Review

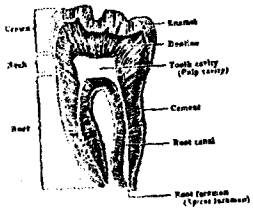
- Tooth Structure
- Enamel
- Cementum
- Cemento-enamel junction (CEJ)

Anatomy of An Incisor



601 An Incisor Tooth, longitudinal section

Anatomy of a Molar



601.1 A Molar Tooth, longitudinal section

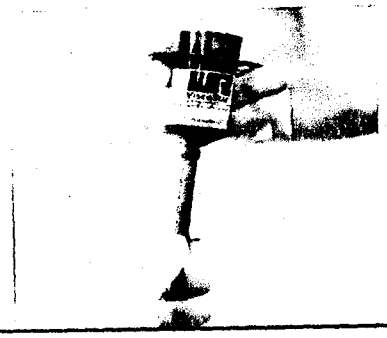
Periodontium

- Gingival Unit
- Attachment Apparatus
- *Circumferential fibers*

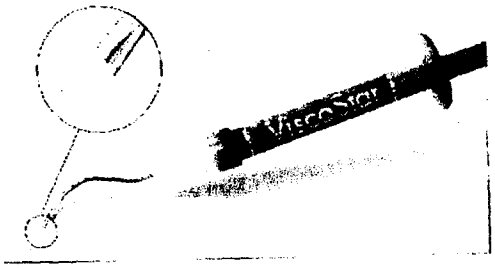
Gingival Retraction

- Gingival retraction goes hand in hand with the taking of final impressions

VISCOSTAT



INFUSOR TIP



APPLY TO PREP

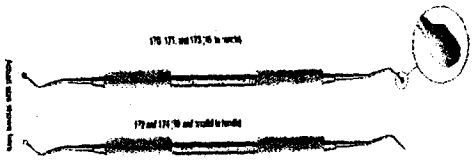
Retraction Cord Placement

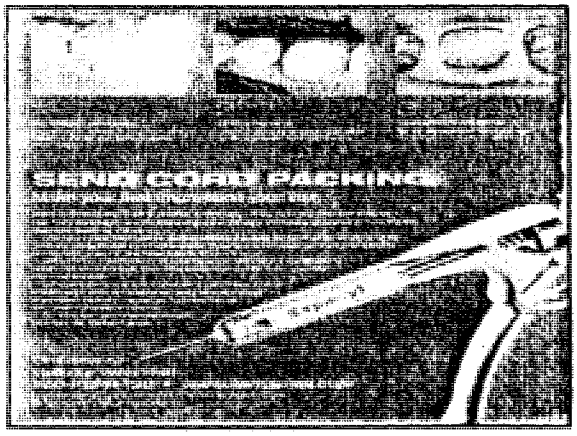
- Review patient's medical/dental health history
- Read instructions
- Isolate prepared tooth
- Cut length of appropriate diameter cord
- *Impregnate cord if indicated*
- Loop cord around tooth

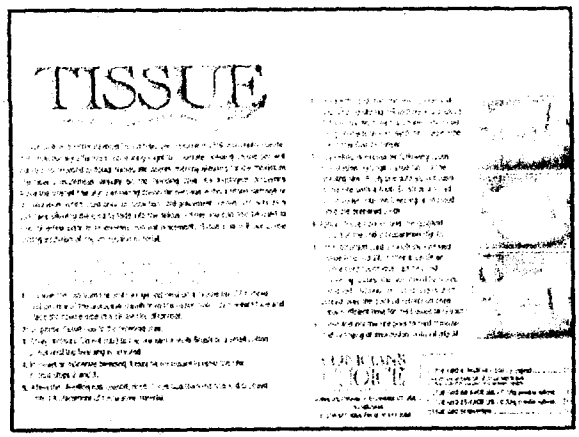
Placement

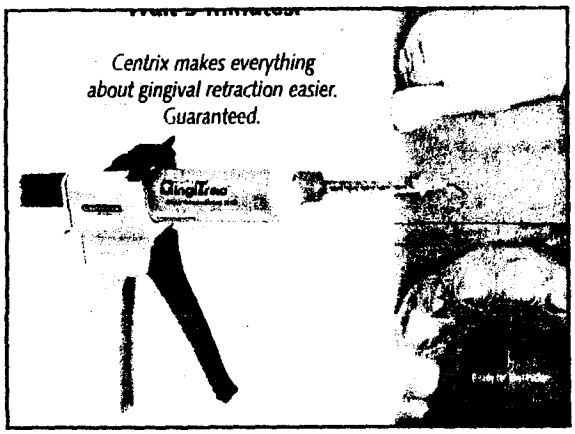
- Start in interproximal area
- Angle instrument toward tooth
- Do the labial or buccal first and then to the lingual when packing the cord
- Finish at the facial of buccal
- Leave tip showing for easy removal

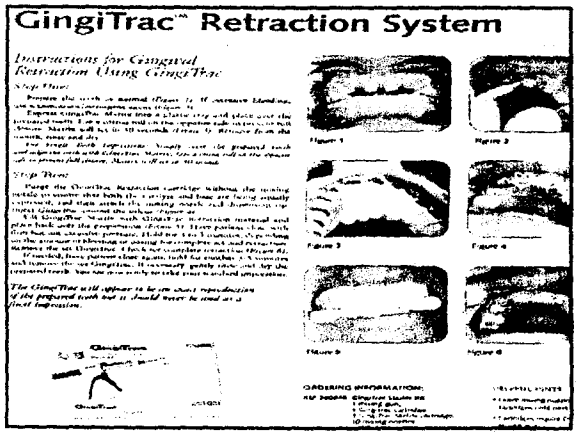
Cord Packer











Introducing GingiTrac.™ The only retraction material and technique that lets you retract the gingiva on up to 6 preps with one application, and no packing cord.

GingiTrac is the easiest way to perform gingival retraction, because it entirely eliminates packing cord and the time and discomfort associated with it. Our patented two-step procedure utilizes your patient's bite pressure to push astringent GingiTrac into the sulcus, and then it retracts the tissue in just 5 minutes. It's just that easy.

Try GingiTrac for 30 days at no risk, and see for yourself why so many dentists trust Centrix to make products that are easier for you, and better for your patients.

- No need to pack cord
- No patient discomfort
- Slips out easily, avoids tissue trauma and eliminates cleanup
- Retract up to six preps with one application

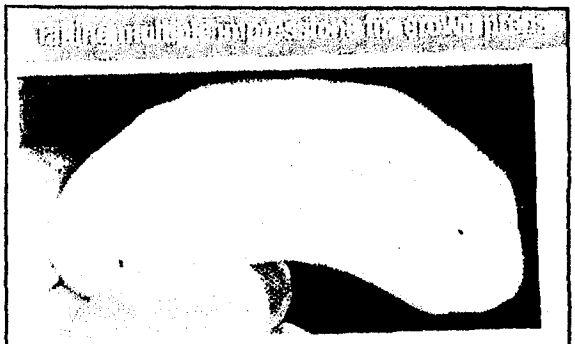


Fig. 7 Putty Fast custom retraction impression.

Fig. 8 Magic FoamCord (MFC) covering multiple crown preps.

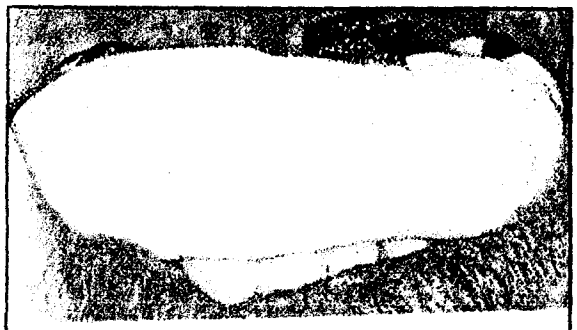


Fig. 9 Putty and MFC re-placed over crown preps.

Fig. 10 Resulting custom retraction impression.

Fig. 11 Captured impression.

Gingival Retraction In The Future

- Lasers
- Will take the place of chords

APPLICATION FOR PRIOR APPROVAL OF EXPANDED FUNCTION TRAINING

Iowa Dental Board
400 SW 8th St., Suite D
Des Moines, IA 50309-4687
http://www.dentalboard.iowa.gov
515-281-5157

Note: A fee of $10 is required to process your request. PLEASE TYPE OR PRINT.

Name of organization or person requesting approval: Aspen Dental Dr. Scott Hansen

Address: 5270 elmore Ave Suite 4 Dav IA 52807

Phone: 563-209-9000 Ext 2 Fax: 563-355-1400 Email: colsen@aspendental.com

Signature: Catherine A Johnson Date: 9-17-12

Expanded function course you are submitting for review:

- [x] Taking Occlusal Registrations
- [x] Placement and Removal of Gingival Retraction
- [x] Taking Final Impressions
- [x] Fabrication and Removal of Provisional Restorations
- [x] Applying Cavity Liners and Bases, Desensitizing Agents and Bonding Systems
- [ ] Placement and Removal of Dry Socket Medication
- [ ] Placement of Periodontal Dressings
- [ ] Testing Pulp Vitality
- [ ] Monitoring Nitrous Oxide

Name of instructor providing training: Scott E Hansen DDS

Educational background: (Attach a copy of curriculum vitae)

Course objectives: To understand limitations and effects of procedures and rational for use in the dental field.

$ 55.35
$ 10.00

1. Plan for initial assessment: following didactic learning each assessed procedure will be performed under the Dentist's Direct Supervision. Additional instruction to be given during Hands on Segments as needed

2. Resources used for didactic materials. Include a copy of the didactic materials for Board review.
See instruction inserts for (1) impression materials
- final impressions
- occluded reg. station
(2) gingival retraction
(3) Temporary Crowns

3. Will lab training be provided? YES ☒ NO ☐ If yes, detail lab experience:

Aspen Dental has an in house lab with full time lab tech. impressions will be poured up, and trimmed. Bleaching trays and wax rims will be fabricated under direct supervision of lab tech.

4. Describe your plan for the clinical component of training. Be specific. assistants will follow the following regiment:
Step 1: observe Doctor perform each procedure a min. of 3 times
Step 2: Perform Procedures under Direct Supervision of Dentist. min. of 3 times
Step 3: Perform Procedure independently followed by Doctor evaluation / critique. must be completed successfully. 3 times

5. Plan for post-course competency assessment: Competency Assessment will be evaluated through daily operations at Aspen Dental in Davenport Iowa.

6. Provide a detailed breakdown of the dates and times for the entire course: Dates and Times will be dictated by ① Available patient treatment needs ② DA'S at Aspen office requesting expanded function designation ③ frequency of required procedures.

7. Where do you intend to offer the course? Aspen Dental Davenport Iowa

8. Who are the intended recipients of the course? Certified Iowa Dental Assist. who desire expanded function recognition who work for Aspen Dental in Davenport IA.

9. How many credit hours of continuing education are you requesting? 4

If available, please include a copy of the course brochure.
A copy of the didactic materials must also be included with your request.

You will be contacted after the Iowa Dental Board has reviewed your request.

MAIL COMPLETED APPLICATION, ALONG WITH A FEE OF $10 FOR PRIOR APPROVAL OF CONTINUING EDUCATION HOURS, TO:

Iowa Dental Board
Expanded Function Committee
400 SW 8th St., Suite D
Des Moines, IA 50309-4687

CURRICULUM VITAE

Scott E. Hansen
4820 Lindbergh Drive
Bettendorf, Iowa 52722

PERSONAL

Date of Birth:	August 23, 1962
Spouse:	Georgia
Children:	Nicholas (1986) Lindsey (1991)
Telephone:	(563) 320-3183
E-Mail:	shansenddds91@gmail.com

EDUCATION

08/1980-05/1984:	B.S. Biology; University of Iowa
08/1987-05/1991:	D.D.S. Program; University of Iowa, College of Dentistry
08/2003:	Invisalign I Clinical Program, Align Technologies
11/2010:	Cerec Basic Clinical Training, Patterson Dental
04/2011:	Odyssey Diode Laser Training, Ivoclar/Vivadent

PROFESSIONAL EXPERIENCE

05/1983 – 08/1989:	Research Assistant I; Dows Institute for Dental Research
08/1991 – 05/1995:	Adjunct Clinical Instructor, Department of Operative Dentistry University of Iowa, College of Dentistry
07/1991 -03/2009:	Private Practice Dentist, Davenport, Iowa
07/2008 -06/2009:	Dentist, Illinois Department of Corrections, Dixon, Illinois
06/2009 -07/2010:	Private Practice Dentist, Burlington, Iowa
07/2010-04/2011:	Private Practice Dentist, Maquoketa, Iowa
06/2011 – Present	Managing Clinical Director, Aspen Dental, Davenport, Iowa

I have experience with Eaglesoft$_{tm}$ dental practice software, digital radiography and electronic record keeping. I have placed over 50 bonded restorations using CAD/CAM technology. I have completed over 40 orthodontic cases utilizing clear aligner therapy.

PUBLICATIONS

Clarkson, B.H., Hansen, S.E., Wefel, J.S. Effects of topical fluoride treatments on fluoride redistribution during in vitro caries-like lesion formation. Caries Research 22 (5):263-268, 1988.

Swift Jr., E.J., Hansen, S.E. Effects of new bonding systems on microleakage. American Journal of Dentistry 2: 77-80, 1989.

Hansen, S.E., Swift Jr., E.J. Microleakage with Gluma: Effect of unfilled resin polymerization and storage time. American Journal of Dentistry 2: 266-268, 1989.

Swift Jr., E.J., Hansen, S.E., Bailey, S.J. Effects of the XR-Bonding System on microleakage. American Journal of Dentistry 3: 143-146, 1990.

Swift Jr., E.J., Bailey, S.J., Hansen, S.E. Fluoride release from fast setting glass ionomer restorative materials. American Journal of Dentistry 3:101-103, 1990.

AWARDS

05/1989:	International Association for Dental Research Fellowship Award
05/1989 & 05/1990:	Dean's Leadership Award, U of I College of Dentistry
05/1991:	Academy of General Dentistry Award to outstanding senior
05/1991:	Academy of Dental Materials Award for outstanding student research

MEMBERSHIPS

American Dental Association

Iowa Dental Association

Scott County Dental Society (President 2004)

PROFESSIONAL REFERENCES

Dr. Edward J. Swift, Jr. DDS, MS

Chairman of the Department of Operative Dentistry, UNC College of Dentistry

Chapel Hill, NC Telephone (919)966-2773

Dr. John W. Reinhardt DDS, MS, PhD

Dean, UNMC College of Dentistry

Lincoln, NE Telephone (402) 472-1344

Shawn J. Bailey DDS, MD, MS

Spring Park Oral and Maxillofacial Surgeons

Davenport, Iowa 52807 Telephone (563)359-1601

Instructions for Assembly

1. Insert slide in front opening of dispenser gun.
2. Simultaneously raise metal bar on back of dispenser gun and push slide through opening.
3. Raise top hinge of dispenser gun and place MaxiTemp™ cartridge into channel.
4. Secure cartridge by snapping plastic hinge down into place.
5. Immediately prior to use of the material, remove cartridge cap and dispose.
6. Attach cannula tip by aligning notched side to cartridge and turning clockwise until fastened.

NOTE: It is important not to remove mixing tip after dispensing the material.
The used tip functions as a self-seal of the cartridge until the next use.

Instructions for Use

1. Fabricate a pre-impression of the quadrant before any preparation is done to the teeth.
2. Insert MaxiTemp™ into the dispenser gun as per assembly directions.
3. Affix a new mixing cannula when you are ready to begin a new application of the MaxiTemp™ paste.

NOTE: It is important not to remove mixing tip after dispensing the material. The function of the used tip is to provide a self-seal of the cartridge until the next use.

4. Depress your dispenser gun handle to express MaxiTemp™ into your pre-impression.
   a. Express a small amount of the material prior to extrusion into your impression to insure a proper mix.
   b. Working time to extrude paste and seat the filled matrix onto the prepared teeth is 45 seconds.
   c. Begin placement of MaxiTemp™ into your impression on the occlusal area to eliminate the formation of air bubbles.
5. Seat filled impression onto the prepared teeth and wipe away any overflow with a plastic tool.
6. After 60 seconds, detach temporary from the mouth and allow to "bench cure" for 5 minutes.
7. When curing is complete, your temporary may be trimmed and polished with low speed acrylic burs and/or high speed finishing diamond burs.

NOTE: Trimming the MaxiTemp™ will produce composite dust. The use of safety glasses is recommended.

8. The oxygen inhibition layer is easily removable with ethyl alcohol.
9. Use a non-eugenol temporary cement in placing the finished crown or bridge into the mouth.

Repairing Broken or Cracked Temporaries

1. Roughen the break area and add a few undercuts to proximate sections.
2. Cover break area with a new mix of MaxiTemp™ and press pieces together for 60 seconds.
3. Excess material is detached after total curing time of 6 to 7 minutes.

Instrucciones para el montaje

1. Colocar la guía deslizante en la abertura delantera del aplicador.
2. Levantar la barra de metal de la parte trasera del aplicador y al mismo tiempo hacer pasar la guía deslizante por la abertura.
3. Levantar la bisagra de la parte superior del aplicador y colocar un cartucho de MaxiTemp™ en el canal.
4. Sujetar el cartucho bajando la bisagra y presionándola para que quede trabada.
5. Justo antes de usar el material, saque la tapa del cartucho y tírela.
6. Adose la punta de la cánula alineando el lado con ranura con el cartucho y haciéndola girar en el sentido de las agujas del reloj hasta que quede bien sujeta.

NOTA: Es importante no sacar la punta para mezclar después de aplicar el material.
La punta usada sirve de tapa automática para el cartucho hasta la próxima vez que se use.

Instrucciones para el uso

1. Tome una impresión preliminar del cuadrante antes de preparar los dientes.
2. Coloque MaxiTemp™ en el aplicador siguiendo las instrucciones para el montaje.
3. Coloque una cánula nueva para mezclar cuando esté listo para aplicar pasta MaxiTemp™ otra vez.

NOTA: Es importante no sacar la punta para mezclar después de aplicar el material.
La punta usada sirve de tapa automática para el cartucho hasta la próxima vez que se use.

4. Oprima el mango del aplicador para poner MaxiTemp™ en la impresión preliminar.
   a. Haga salir un poco de material antes de colocarlo en la impresión a fin de cerciorarse de que esté bien mezclado.
   b. Hacer salir la pasta y colocar la matriz llena en el diente preparado lleva 45 segundos.
   c. Inicie la colocación de MaxiTemp™ en la impresión sobre el área oclusal a fin de que no se formen burbujas.
5. Coloque la impresión llena en el diente preparado y limpie el excedente con un instrumento de plástico.
6. Espere 60 segundos y después saque la pieza provisional de la boca. Espere 5 minutos para que fragüe en la mesa de trabajo.
7. Cuando la pieza provisional haya fraguado, se puede recortar y pulir con fresas de acrílico a baja velocidad o con fresas de diamante para acabado a alta velocidad.

NOTA: Durante el pulido se produce polvo de composite. Se recomienda usar gafas protectoras.

8. La capa de inhibición de oxígeno se extrae fácilmente con alcohol etílico.
9. Use un cemento provisional sin eugenol para colocar la corona o el puente terminado en la boca.

Reparación de piezas provisionales rotas o rajadas

1. Haga áspera la zona de la rotura y agregue algunas muescas a las secciones proximales.
2. Cubra la zona de la rotura con una mezcla nueva de MaxiTemp™ y mantenga las piezas apretadas durante 60 segundos.
3. El material excedente se desprende después de un tiempo total de fraguado de 6 a 7 minutos.

Mode d'assemblage

1. Insérer la glissière dans l'ouverture en avant du pistolet distributeur.
2. Lever simultanément la barre métallique à l'arrière du pistolet distributeur et pousser la glissière à travers l'ouverture.
3. Lever la charnière supérieure du pistolet distributeur et placer la cartouche MaxiTemp™ dans la rainure.
4. Fixer la cartouche en enclenchant vers le bas, la charnière en plastique.
5. Immédiatement avant d'utiliser le matériau, retirer le capuchon de la cartouche et le jeter.
6. Poser l'embout de la canule en alignant le côté à crans sur la cartouche et en tournant vers la droite jusqu'à fixation.

REMARQUE: Il est important de ne pas enlever l'embout de mélange après distribution du matériau.
L'embout usagé sert de scellement de la cartouche jusqu'à l'utilisation suivante.

Mode d'emploi

1. Prendre une empreinte du quadrant avant d'effectuer toute préparation sur les dents.
2. Insérer MaxiTemp™ dans le pistolet distributeur conformément aux consignes d'assemblage.
3. Attacher une nouvelle canule de mélange avant de commencer une nouvelle application de la pâte MaxiTemp™.

REMARQUE: Il est important de ne pas enlever l'embout de mélange après distribution du matériau L'embout usagé sert de scellement de la cartouche jusqu'à l'utilisation suivante.

4. Appuyer sur la poignée du pistolet distributeur pour exprimer la pâte MaxiTemp™ dans l'empreinte du quadrant.
   a. Exprimer une petite quantité du matériau avant l'extrusion dans l'empreinte pour assurer un mélange approprié.
   b. Le temps de travail pour exprimer la pâte et asseoir la matrice remplie sur les dents préparées

Rev. 2012/07

HENRY SCHEIN®

MaxiTemp™

TEMPORARY CROWN AND BRIDGE MATERIAL

Direct Application System

Automatically mixing 2 component system based on multi-functional (Meth-) Acrylic-esters.

MATERIAL PARA CORONAS Y PUENTES PROVISIONALES
Sistema de aplicación directa
Sistema de dos componentes que se mezclan automáticamente, basado en ésteres (met-) acrílicos multifuncionales.

COMPOSITE BIS-ACRYL POUR COURONNES ET BRIDGES TEMPORAIRES
Systèmes à application directe
Auto mélange d'un système de 2 composants basé sur (Meth-) acryliques-esters multifonctionnels.

HS-PROVISORISCHES K+B MATERIAL
Direktes Applikationssystem
2-Komponenten-Auto-Mix-System auf der Basis multifunktioneller (Meth-) Acrylsäureester.

VOOR TIJDELIJKE KRONEN EN BRUGGEN
Direct applicatiesysteem
Automatisch mengend systeem met 2 componenten, gebaseerd op multifunctionele methacrylesters.

MATERIALE PER PONTI E CORONE PROVVISORIE
Sistema di applicazione diretta
Sistema composta da due componenti che si miscelano automaticamente basato su esteri (Met-) acrilici multifunzionali.

HENRY SCHEIN SEAL OF EXCELLENCE®

MADE IN GERMANY
Fabricado en Alemania/Fabriqué en Allemagne
Hergestellt in Deutschland/Gefabriceerd in Duitsland
Prodotto in Germania

CE 0473

Distributed by: (US only)
Henry Schein Inc.
135 Duryea Road
Melville, NY 11747 USA
Henry Schein U.K. Holdings Ltd.
Medcare House, Centurion Close
Gillingham Business Park
Gillingham, ME8 0SB U.K.
www.henryscheinbrand.com

US / UK

Traxodent®

Hemodent® Paste Retraction System

Indications:
Traxodent® has been specifically formulated to provide gingival retraction and hemostasis. It is intended for use prior to taking an impression, cementation, cavity preparation or wherever hemostasis and retraction is required.

Directions for Use:
1) Remove the cap from the syringe. Be sure to retain cap for subsequent storage of the material.

2) Place annealed leur dispensing canula onto end of the syringe tip, twist-lock into place. The soft metal of the annealed canula allows bending of dispensing tip for optimal access. A mirror handle can assist in bending tip to desired angle.

3) Rinse and air dry prepared tooth. Extrude Traxodent paste slowly into the sulcus while maintaining the dispensing tip just above the sulcus and aligned approximately parallel to the axial plane of the tooth preparation. Be careful not to jam dispensing tip into sulcus.

4) Ensure you extrude sufficient material into the sulcus to achieve adequate tissue retraction.

Note: For subgingival margins and maximum deflection of soft tissue, use a Premier Retraction Cap after dispensing Traxodent. Press Retraction Cap onto prepared tooth. Have the patient bite down or apply pressure to cap if patient lacks opposing dentition. Optionally, a single strand of retraction cord can be placed prior to dispensing Traxodent.

5) Allow Traxodent paste to remain in the sulcus for at least one to two minutes. Often, the marginal gingiva will grow pale when retraction is achieved.

6) After hemostasis has been achieved, the Traxodent should be removed by thoroughly rinsing using air-water syringe and saliva ejector or suction tip.

7) Examine treatment site to verify complete removal of the Traxodent prior to taking the impression.

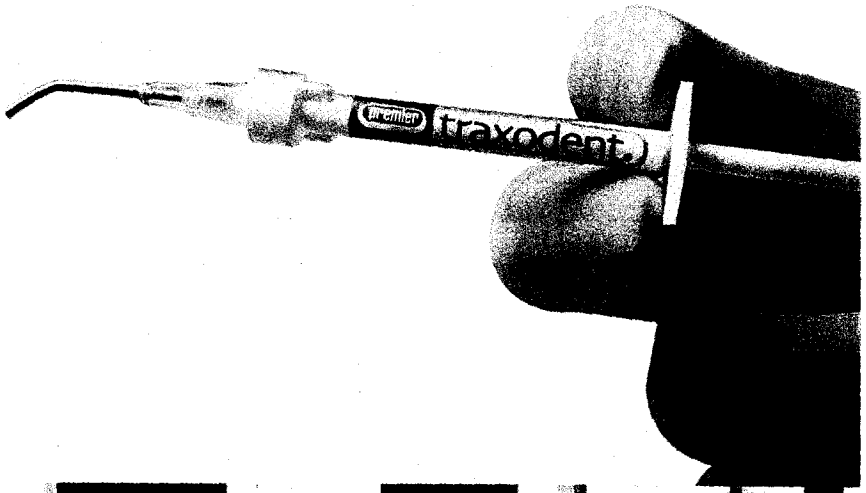
Remove canula dispensing tip and dispose of properly after use. Re-cap Traxodent syringe for storage in sealable foil bag.

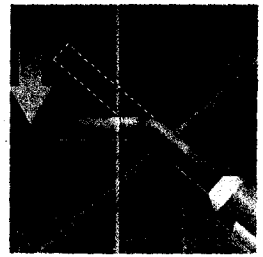
Contraindications:
- Do not use on persons with known allergy to aluminum chloride
- Do not use in patients with significant periodontal disease or furcation involvement.

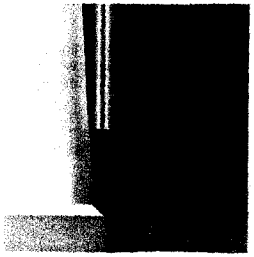
Precautions:
- Do not insert canula dispensing tip into the sulcus.
- Be sure all paste is removed before taking impression to avoid inhibition of polymerization of impression material.

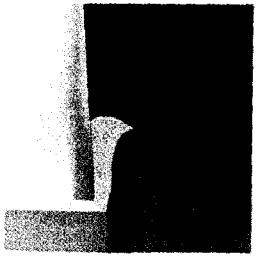
Caution-U.S. Law restricts this device to sale by or on order of a dental professional.

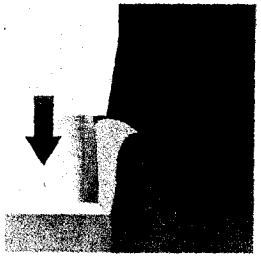
Storage:
Store at room temperature <28°C / 82°F.

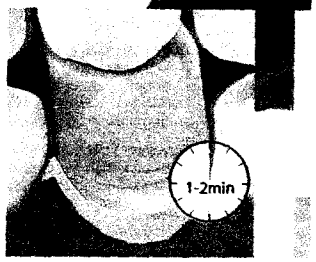












(888) 670-6100 - (...)

ıy 1710 Romano Drive, Plymouth Meeting, PA 19462 U.S.A.

ɔremusa.com

To obtain MSDS visit www.premusa.com or call Premier at 610-239-6053.

EC REP MDSS Schiffgraben 41 30175 Hannover, Germany

English

TAKE 1® ADVANCED™
Vinylpolysiloxane Impression Material System
DIRECTIONS FOR USE

Take 1® Advanced™ Putty Regular Set
Type 0: Very High Consistency – Heavy Body
Take 1® Advanced™ Volume™ Putty Regular Set
Type 0: Very High Consistency – Heavy Body
Take 1® Advanced™ Cartridge Tray Regular Set
Type 1: High Consistency – Heavy Body
Take 1® Advanced™ Cartridge Tray Fast Set
Type 1: High Consistency – Heavy Body
Take 1® Advanced™ Cartridge Tray Super Fast Set
Type 1: High Consistency – Heavy Body
Take 1® Advanced™ Volume™ Tray Regular Set
Type 1: High Consistency – Heavy Body
Take 1® Advanced™ Volume™ Tray Fast Set
Type 1: High Consistency – Heavy Body
Take 1® Advanced™ Cartridge Medium Regular Set
Type 2: Medium Consistency – Medium Body
Take 1® Advanced™ Cartridge Medium Fast Set
Type 2: Medium Consistency – Medium Body
Take 1® Advanced™ Cartridge Medium Super Fast Set
Type 2: Medium Consistency – Medium Body
Take 1® Advanced™ Cartridge RB Wash Regular Set
Type 3: Low Consistency – Light Body
Take 1® Advanced™ Cartridge RB Wash Fast Set
Type 3: Low Consistency – Light Body
Take 1® Advanced™ Cartridge RB Wash Super Fast Set
Type 3: Low Consistency – Light Body
Take 1® Advanced™ Cartridge LB Wash Regular Set
Type 3: Low Consistency – Light Body
Take 1® Advanced™ Cartridge LB Wash Fast Set
Type 3: Low Consistency – Light Body
Take 1® Advanced™ Cartridge LB Wash Super Fast Set
Type 3: Low Consistency – Light Body
Take 1® Advanced™ Unidose™ RB Wash Regular Set
Type 3: Low Consistency – Light Body
Take 1® Advanced™ Unidose™ RB Wash Fast Set
Type 3: Low Consistency – Light Body
Take 1® Advanced™ Unidose™ RB Wash Super Fast Set
Type 3: Low Consistency – Light Body
Take 1® Advanced™ Unidose™ LB Wash Regular Set
Type 3: Low Consistency – Light Body
Take 1® Advanced™ Unidose™ LB Wash Fast Set
Type 3: Low Consistency – Light Body
Take 1® Advanced™ Unidose™ LB Wash Super Fast Set
Type 3: Low Consistency – Light Body

General Description

Take 1® Advanced™ is a complete system of vinylpolysiloxane impression materials suitable for all crown and bridge, edentulous and implant impressions. The Take 1® Advanced™ system of materials is available in five viscosities, four delivery options, and in a range of set times. Take 1® Advanced™ has high elongation for easy mouth removal while its excellent elastic recovery and tear strength provide accurate, detailed impressions time after time.

The Wash viscosities are available in both Cartridge and Unidose™ syringe, a single use delivery system. The Tray viscosity is available in both Cartridge and Volume™ 5:1 delivery, for use in automated dynamic mixing machines. Take 1® Advanced™ offers three setting speeds: Regular Set, Fast Set, and Super Fast Set. Take 1® Advanced™ Putty is also available for Putty/Wash technique.

TAKE 1® ADVANCED™ CARTRIDGE SYSTEM

Inserting Cartridge into Extruder Gun

1. Push metal lever at back of extruder up (toward plunger assembly) and pull back on plunger assembly until assembly is fully retracted.
2. Lift up on lock assembly on top of extruder exposing slot for insertion of cartridge.
3. Insert cartridge with notch in collar of cartridge down to match protrusion of extruder.
4. Snap lock assembly down locking cartridge into place.

Attaching Mixing Tip to Cartridge

1. While holding cartridge with cap toward you, rotate cap 90° counter-clockwise. Move alignment tab on cap to align with notch on cartridge.
2. Seperate cap from cartridge by pulling cap off.
3. For first use bleed cartridge by dispensing a small amount of material to ensure even extrusion from each side of the cartridge. Wipe excess material from cartridge.
4. Take the mixing tip and align alignment tab with notch on cartridge. Push mixing tip down onto cartridge. Rotate 90° clockwise to lock mixing tip onto cartridge.

Attaching Intra-oral Tip to Mixing Tip

1. Insert the round end of the intra-oral tip into mixing tip.
2. Press intra-oral tip into mixing tip. A click should be heard when the intra-oral tip locks into place.

ACTIVATING TAKE 1® ADVANCED™ VOLUME™ SYSTEM

1. Press the release lever to withdraw the retaining arm of the Volume™ reusable cartridge.
2. Insert the Take 1® Advanced™ Volume™ foils into the reusable cartridge. Aligning notch on the cap with the notch on the cartridge, press the material firmly into cartridge to lock in place and ensure activation.
3. Insert assembled Take 1® Advanced™ Volume™ system into mixing machine.
4. Before first use dispense a small amount of material to ensure even extrusion from each side of the cartridge. Wipe excess material from cartridge before installing a mixing tip.
5. Brush a thin coat of Kerr VPS tray adhesive on the selected tray. Allow a minimum of 10 minutes to air dry for maximum adhesion.
6. Attach mixing tip, close retaining arm and dispense desired amount.
7. Remove and discard the empty foils and caps from the reusable cartridge.

ACTIVATING TAKE 1® ADVANCED™ UNIDOSE™ SYRINGE

1. Remove the Take 1® Advanced™ Unidose™ syringe from the blister pack.
2. Twist the white dispensing tip 90 degrees to align tabs with notches in the syringe.
3. Press dispensing tip down firmly. A click is heard when the syringe is properly activated.
4. The impression material is now ready to be dispensed.

MIXING TAKE 1® ADVANCED™ PUTTY

1. Brush a thin coat of Kerr VPS tray adhesive on the selected tray. Allow a minimum of 10 minutes to air dry for maximum adhesion.
2. Measure equal amounts of Take 1® Advanced™ Putty base and catalyst.
3. Mix base and catalyst with fingertips until a homogenous color is achieved (approx. 30 seconds).
4. Place the mixed putty into the adhesive coated tray.
5. Your technique will determine the need for a putty spacer prior to insertion of the putty filled tray into the mouth. Once inserted into the mouth, immobilize the tray without applying excessive pressure until the materials are completely set.
6. Remove the tray from the mouth by applying downward pressure along the edge of the tray.

GENERAL IMPRESSION TAKING GUIDELINES

1. Select the appropriate impression tray for the procedure. Ensure proper fit to patient and adequate room for impression material to surround prepared teeth.
2. Always use Kerr VPS Adhesive with impression trays. Allow a minimum of 10 minutes to air dry for maximum adhesion. Kerr VPS Adhesive contains solvent. Use in a well-ventilated area and avoid contact with skin or eyes, wear protective gloves and eye protection when using adhesive.

Kerr

TAKE 1® ADVANCED™

Kerr Corporation
28200 Wick Road
Romulus, MI 48174
(800) KERR-123
KerrDental.com

33977B
10/08

[redacted]

-acute, -chronic and onged toxicity	Prolonged and/or frequent skin contact may cause allergic skin reactions in susceptible individuals. Prolonged exposure to large amounts (more than in this product) of this material may cause eye and respiratory irritation.
cinogenicity,	None known.

PULPDENT®

Lime-Lite™ Light Cure Cavity Liner

CE 0459

• Fluoride Releasing • Radiopaque • Universal Shade • Contains Hydroxyapatite

Lime-Lite™ is a light cure, fluoride releasing, radiopaque cavity liner and base material specially formulated for use with adhesives, composites and conventional restorative materials. Lime-Lite™ contains hydroxyapatite in a urethane dimethacrylate resin. It chemically bonds to adhesive primers, composites and other resin based materials, and it micromechanically bonds to dentin.

Lime-Lite™ releases favorable Calcium ions, Hydroxyl ions, Fluoride ions and Phosphate ions. These are known to be beneficial to tooth structure, to stimulate secondary dentin formation and to have cariostatic properties. Lime-Lite™ sets very hard upon light curing, and it is virtually insoluble in water and oral fluids.

Lime-Lite™ can be applied directly from the syringe through pre-bent dispenser tips for precise placement or can be dispensed on a pad or mixing well and placed on the tooth with a suitable instrument.

TECHNICAL DATA

Active ingredients: calcium hydroxy phosphate (hydroxy-apatite), urethane dimethacrylate resin,barium sulfate, fluoride salt, photo initiator.

- Visible Light Cure
- Universal Shade
- Store at room temperature
- Do not freeze
- Shelf Life: 2 years

WARNING: Wash uncured Lime-Lite™ from skin and soft tissue. If Lime-Lite™ contacts eyes, wash with copious amounts of water. Seek medical attention, if necessary.

INSTRUCTIONS FOR USE

1. Prepare cavity, rinse and dry.
2. Place a pink 20-gauge dispenser tip securely onto Lime-Lite™ syringe.
3. Apply Lime-Lite™ to the dentin in increments. Pull back on syringe plunger to stop flow of material. The first layer should be not more than 1/2 mm thick. Remove Lime-Lite™ from enamel margins and light cure for 20-30 seconds, depending on the light you are using.
4. Apply additional layers, if indicated, in increments of 1 1/2 mm – 2 mm. Remove Lime-Lite™ from enamel margins and light cure each layer for 30 seconds. Cap syringe immediately after use.
5. Proceed with restoration. Lime-Lite™ is compatible with all dental restorative materials. **NOTE:** Lime-Lite™ has a urethane dimethacrylate base and is similar in chemistry to dental composites. It chemically bonds to composites and adhesive primers.

When increased bond strength to dentin is desirable, apply DenTASTIC or your preferred dental adhesive to the dentin in accordance with the instructions for use for the adhesive primer. Then apply Lime-Lite™ over the adhesive primer following instructions # 2-5 above.

For direct pulp capping, we recommend placing Pulpdent Paste or Multi-Cal on the exposed pulp. Lime-Lite™ can be applied over the pulpal dressing and light cured.

If using Lime-Lite™ under water based cements, such as zinc phosphate, polyacrylic or glass ionomer cement, remove any uncured resin from the Lime-Lite™ surface (oxygen inhibited layer) by wiping it with a pledget of cotton moistened with alcohol.

Note: Multi-dose syringes should either be encased in a fresh protective barrier for each patient or cleaned and disinfected between patients, as appropriate.

RECEIVED
MAR 17 2014
IOWA DENTAL BOARD

Iowa Dental Board

Documentation of Training for Delegable Procedures to Expanded Function Dental Assistants

Name: Catherine A Johnson Work Address: 5270 elmore Ave Suite 4 Dav IA 52807

Certified with the Dental Assisting National Board: Yes ☒ No ☐ If yes, date: July 28 2012

Have a minimum of two years experience in clinical dental assisting: Yes ☒ No ☐ From: 1995 to 2012

Delegable Procedure	Review of Educational Material	Training Observation	Supervised Application M= model P= patient	Date Training Completed	Postcourse Assessment Pass/Fail	Signature of Trainee	Signature of Dentist
Taking Occlusal Registrations	✓	✓	P X5	11/12/12	Pass		[illegible]
Placement & Removal of Gingival Retraction	✓	✓	P X3	10/31/12	Pass		[illegible]
Taking Final Impressions	✓	✓	P X5	11/12/12	pass		[illegible]
Fabrication and Removal of Provisional Restorations	✓	✓	P X5	10/31/12	pass		[illegible]
Applying Cavity Liners and Bases, Desensitizing Agents and Bonding Systems	✓	✓	P X3	10/31/12	pass		[illegible]
Placement & Removal of Dry Socket Medication							
Placement of Periodontal Dressings							
Testing Pulp Vitality							
Monitoring of Nitrous Oxide Inhalation Analgesia							