

## Dental Assistant Registration Course Must Cover 3 Subjects

1. Jurisprudence
2. Infection Control
3. Radiology

Internet Course For Dental Assistant Registration Is Available At The Texas Academy Of General Dentistry's Website

[www.tagd.org](http://www.tagd.org)

## State Board's Objectives For Dental Assistant Registration Course

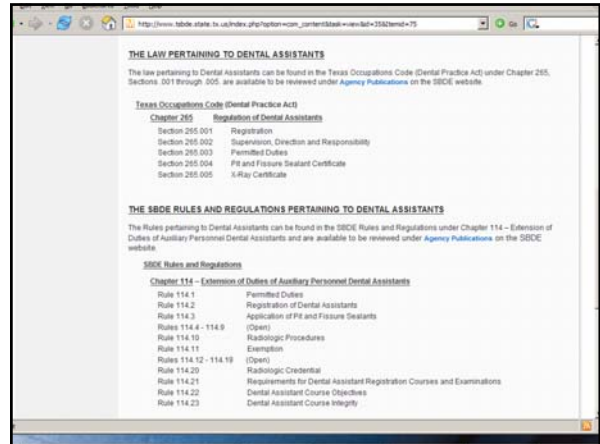
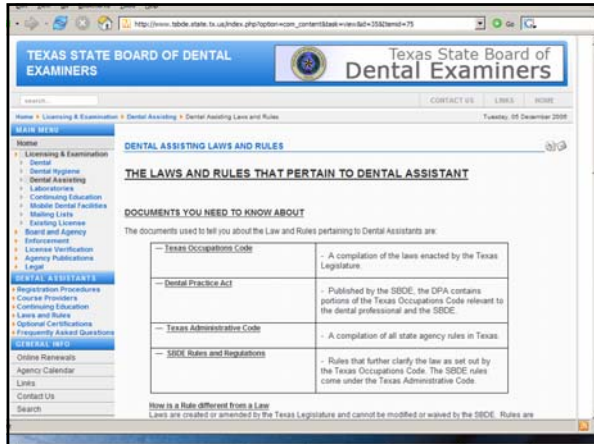
- Course must be 8 hours.
- 7 Hours of lecture
- 1 Hour for the test
- Long Day – Maintain your concentration of the course material.

## Jurisprudence for Dental Assistant Registration

Jurisprudence is the laws and interpretation of those laws that apply to and affect the dental profession.

## Disclaimer

- Do not take anything I say in this lecture as "Legal Advice".
- I am not an attorney.
- My interpretation of the Board Rules may not be the same as the those made by the State Board.



## State Board Names

All Of These Refer To The State Board

- TSBDE
- SBDE
- State Board
- The Board
- The State Board grants the dental assistant the certificate of registration.
- The State Board enforces the Dental Practice Act.

## TSBDE Mission

- Protect The Public
- To safeguard the dental health of Texans by developing and maintaining programs to:
  1. Ensure that only qualified persons are licensed to provide dental care; and
  2. Ensure that violators of laws and rules regulating dentistry are sanctioned as appropriate.

## TSBDE Members

Who's on the board ??

- 15 Members – Serve 6 Years
  - 8 Dentists
  - 2 Hygienists
  - 5 Members of Public
- Staff
  - Executive Director
  - Legal Advisors
  - Clerks and Committees
  - Investigators

Sec. 252.001

Sec.253.003

## Advisory Committees To State Board

- Dental Hygiene Advisory Committee
- Dental Laboratory Certification Council

## TSBDE Rules

Where do these come from ??

- Laws From Texas Legislature
- Dental laws are created by the same legislative process as any other law.
- Laws are published in the Occupation Codes.
- Laws are called the "Practice Acts".

## Texas Laws Become TSBDE Rules

- TSBDE has the authority to take the new law and write it into **Rules**.
- **Sec.** refers to sections of the Dental Practice Act while **Rules** refers to the State Board Rules.
- TSBDE Rules must be followed or the professional can be reprimanded, fined or lose their license or certification to practice.

## Occupation Codes vs State Board Rules

- Occupation Codes are the laws passed by the legislature.
- State Board Rules are written from the Occupation Codes.

## TSBDE Rulemaking Authority

1. The board may adopt and enforce rules necessary to:
  - \* Perform duties
  - \* Ensure compliance with rules to protect the public health & safety.
  - \* Examine applicants for licensure
  - \* Organize board meetings.

Sec. 254.001

## TSBDE Rulemaking Authority

2. May adopt rules to prohibit a dentist from entering a contract with person who is not a dentist that allows interference with dentist's **professional judgment**.  
Sec. 254.001
3. May adopt and enforce rules to protect the public health from the spread of **infection** in dentistry.  
Sec. 254.003

## Authority to Revoke, Suspend, or Deny License Sec. 53.021

1. The State Board may **Deny** the opportunity to take a licensing examination on the grounds that the person has been convicted of a **felony or misdemeanor** that directly relates to the duties of the licensed occupation.
2. The State Board will **Revoke** a license at:
  - Imprisonment of felony conviction
  - Revocation of felony community supervision
  - Revocation of parole
  - Revocation of mandatory supervision.

## Default On Student Loan

- Deny application for license or license renewal.
- Suspend the person's license.
- Take other disciplinary action.

Sec. 56.003

## X-Ray Registration

After September 1, 2004

- Dental Assistants who take x-rays must pass certification exams on Radiology, Jurisprudence and Infection Control.
- DAs who do NOT take x-rays do not have to do any of this.
- DAs who are CDAs thru the Dental Assisting National Boards only have to take the jurisprudence test.

Rule 114.2

## Dental Assistant Registration

- As of September, 2006 Assistants must take a course with an exit exam that has 50 questions that cover Radiology, Infection Control and Jurisprudence.
- September, 2007 is date all Assistants who take x-rays must be registered with State Board.

Rule 114.2

## New Legislation Affecting Dental Assistant Registration SB 610.

- Authorizes a course and exam to be offered through self-study, computer courses, Internet or lecture courses. **Courses and exams must be approved by the State Dental Board.**
- Retains the current requirement that radiology certificates be renewed annually as well as the current continuing education (CE) requirements.
- Authorizes newly-hired dental assistants to take x-rays for up to 12 months after the date hired, to study for and take the new 8 hour course and exam.

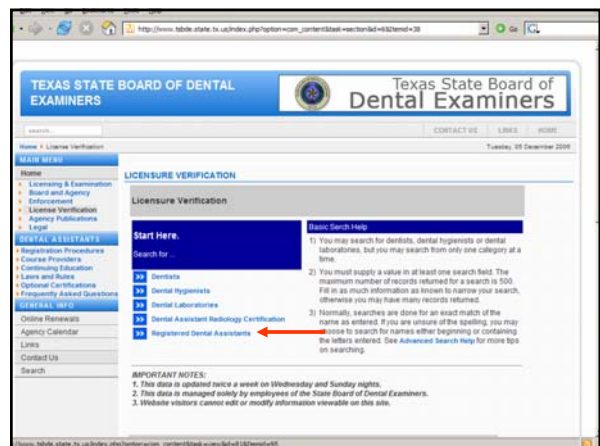
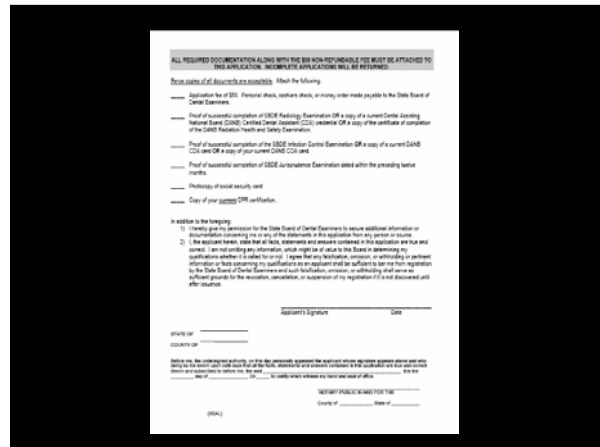
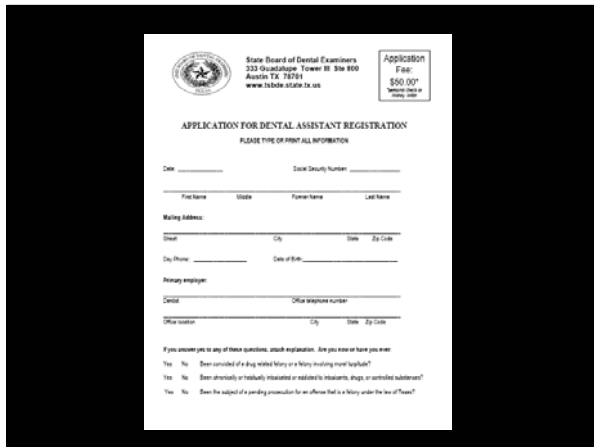
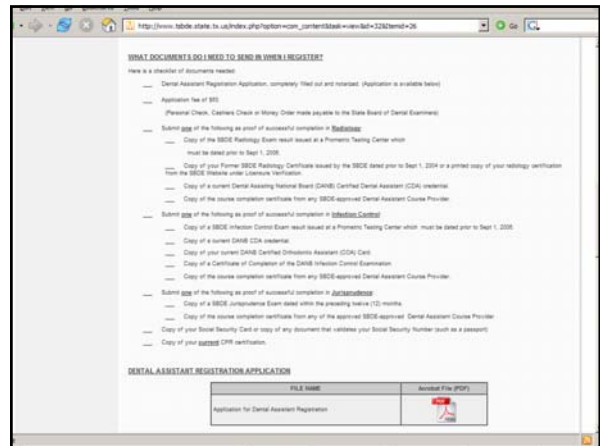
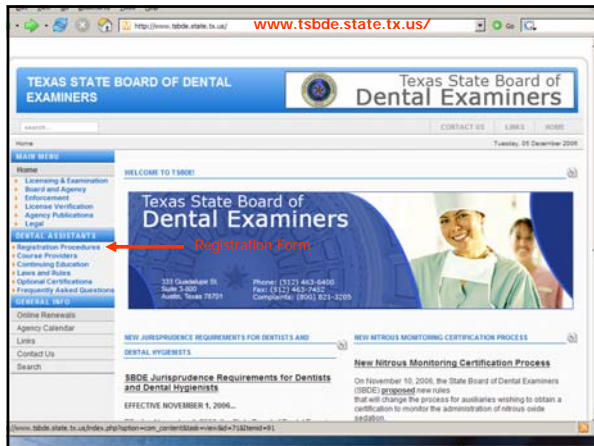
## New Legislation Affecting Dental Assistant Registration SB 610.

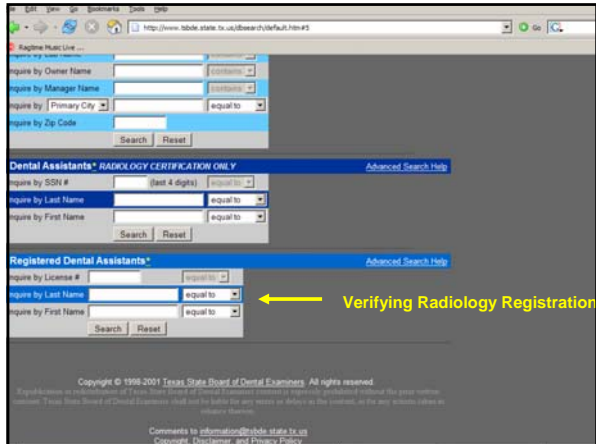
- Extends the compliance deadline for dental assistants who obtained certificates before September 1, 2004. The new deadline would be **September 1, 2007**. The affected assistants would be required to use the current three exam process until September 1, 2006 (or January 1, 2007 if the Dental Board determines that additional time is needed to implement the new process.) After that date, dental assistants would be able to use the new course and exam process authorized by SB 610.

## DA Registration Procedures

- Provide proof of passing an exam that covers:
  1. Radiation
  2. Jurisprudence
  3. Infection Control
- Provide proof of CPR
- Complete an application and send in fees.

Rule 114.2





## Registration Renewal

- Renewal of Certification will be staggered and will occur at 6 months to 17 months.
- Notification sent 60 days prior to expiration.

Rule 114.2

## Registration Renewal

- Send the renewal fee.
- Send proof of CPR training.
- Have proof of 6 hours of continuing education in the past 12 months.
  - CE must be related to the duties of the dental assistant
  - \* No more than 3 hours can be self study.

Rule 114.2

## Registration Renewal

- Renewal forms must be submitted to the TSBDE in Austin.
- Renewal forms will be reviewed within 3 working days.
- If forms are complete, renewal certificates will be mailed out to the DA.
- If not complete, will be returned with an explanation and request for additional documents.
- Certificates expired for 1 year will not be renewed.

Rule 114.2

## Display Of Registration Certificate

- Dental Assistant shall display the certificate of registration in the dental office where employed.
- Dental Assistant who works in more than one location will need to request additional copies from the TSBDE.
- Photocopy of registration is NOT permitted.

Rule 114.2

## Registration May Be Revoked For Violation Of:

- Rules of TSBDE
- Texas Dental Practice Act (Occupational Codes)
- Bureau of Radiation Control Rules.
- Any other rules affecting x-ray procedures in Texas.

Rule 114.10

## Who Is Practicing Dentistry ?

1. Use of term Dentist, Doctor, or DDS,
2. Diagnose or remove stains from teeth.
3. Provides surgical treatment for pain or injury.
4. Performs cleaning or stain removal from teeth
5. Making impressions of teeth or mouth.
6. Owns an office which employees another person to practice dentistry.

Sec. 251.003

## Who Is Practicing Dentistry ?

7. Fits or repairs a dental appliance.
8. Aids in fitting or repairing an appliance.
9. Making a full or partial denture without a prescription.
10. Giving anesthesia or an anesthetic drug.
11. Denturist

Sec. 251.003

## Who Is Not Practicing Dentistry

1. An employee of a licensed dentist who makes dental x rays in the dental office under the supervision of the dentist.
2. A dental assistant who performs duties within limits of the Dental Practice Act.

Sec. 251.004

## Visual Dental Inspections “Screenings”

- Inspection made by health care workers, other than dentists, dental hygienists, physicians and physician assistants.
- Can be performed by DA.
- Group activity taking place in a public setting. **No fee is charged.**
- **Can only use gloves, tongue depressors and light.**
- Purpose is to recognize potential problems and refer to a dentist.



Sec. 112.2

## Dental Visual Inspection “Screening”



## Criminal Penalty Practicing Without A Dental License

- Practicing without a license is a felony offense.
- Each day is a separate offense.

Sec. 264.151

## Practice Of Dental Hygiene

- Removes accumulated matter, tartar, deposits, accretions, and stains from natural or restored teeth.
- Smooths root surfaces.
- Polishes exposed tooth surfaces.
- Makes dental x-rays.
- Applies medications topically to teeth.

Sec. 262.002

## Dental Hygienist Cannot:

- Diagnose Dental Disease.
- Prescribe Treatment.
- Prescribe, Order, or Dispense Medications.
- Cannot use a laser for any purpose including whitening procedures.
- Perform any procedure that is irreversible or involves intentional cutting of hard or soft tissue.

Sec. 262.151

## A Licensed Dentist May Delegate To Hygienist:

1. Any task or procedure that hygienist is licensed to perform.
2. The supervising dentist examines the patient:
  - \* At the time the procedure is performed, **OR**
  - \* During the past 12 months.
3. The dentist is not required to be on the premises when the delegated act is performed.

Sec. 262.151

## Penalties For Violating The Dental Hygiene Regs

1. Fine of \$100 to \$1000
2. Jail for 1 month to one year.
3. Both fine and jail.
4. Each day is a separate offense.

Sec. 262.203

## Duties That Can Not Be Delegated

- Taking impressions for **final** restoration, appliance, or prosthesis. (Can take into consideration if it is Permanent)
- Making an intra oral occlusal adjustment.
- Direct pulp capping or any endo procedure.
- Final placement of an intra oral fixed or removable appliance.
- Placement of any restoration.
- Administer any form of anesthesia, inhalation sedative agent or general anesthetic.

Sec. 258.001

## Frequently Asked Questions

State Board Website

### #26. Who can legally adjust dental appliances?

Answer: Only a licensed dentist can make final adjustments to dental appliances. Adjustments that are not final can be delegated by the dentist to an assistant.



### Duties That Can Be Delegated To DA Under The Dentist's Direct Supervision

- Any dental act that a reasonable and prudent dentist would find is within the scope of sound judgment.
- Can be properly and safely performed by the Dental Assistant.
- Generally, any procedure that is reversible.  
Reversible means that it can be repaired or fixed.
- Performed in the customary manner and does not violate any section of the Dental Practice Act.

Sec. 258.002

### Duties That Can Not Be Delegated

- Removal of calculus, deposits or accretions from a natural tooth or restoration.
- Smoothing of teeth by polishing or root planning.
- Comprehensive examination.
- Cutting of hard or soft tissue.
- Prescribing a drug, medication or authorizing laboratory work.

Sec. 258.001

### If Duties Are Delegated To The Dental Assistant

- Dentist is responsible for duties performed.
- Dentist must be physically present in the office during the time duties are performed by Dental Assistant.
- Duty is performed in usual manner.

Sec. 258.003

### Delegation Of Sealants

- DA may place sealants if:
  - (1) DA is certified to place sealants.
  - (2) Dentist is a Medicaid provider.

OR

Dentist practices in an area determined to be underserved by the Texas Department of Health.

Sec. 258.002

Sec. 265.003

### Sealant Certification TSBDE

- DA must have 2 years of experience.
- Attend a 16 hour certification course with specific instruction in:
  1. Infection Control
  2. CPR and medical emergencies
  3. Microbiology, chemistry & dental anatomy
  4. Ethics and jurisprudence related to sealant application
  5. Correct application of sealants

Sec. 265.004

### DA May Place Sealants Under The Following Conditions

1. DA is employed by and works under the direct supervision of the dentist.
2. Certified to place sealants.
3. Certification allows the DA to:
  - \* Polish occlusal surfaces in preparation for sealant placement.
  - \* Billing for prophylaxis **NOT** permitted for polishing.

Sec. 258.020

## Sealant Certification Process

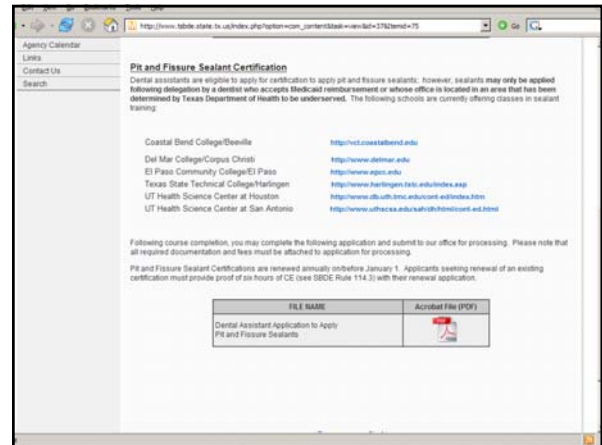
1. Complete an application and pay fee to TSBDE.
2. Provide proof of CPR training.
3. Provide proof of 16 hours of didactic and clinical education to place sealants at an accredited dental hygiene school approved by the TSBDE.

Sec. 265.004

## Sealant Certification Renewal

1. Pay the renewal fee to TSBDE.
2. Provide proof of CPR training.
3. Provide proof of 6 hours of CE in technical and scientific areas. No more than 3 hours can be in self-study.
4. **Before January 1<sup>st</sup> each year.**

Rule 114.3



## Dental Privilege

- Privilege is the confidentiality of information created by the dentist, the record and the patient.
- Patient is the holder of the Privilege.
- Privilege applies regardless of when the patient received the professional service from the dentist.

Sec. 258.102

## Information That Is Privileged

- ❖ Information between the dentist and patient as it relates to dental treatment.
- ❖ Any information in the dental record.
- ❖ Privileged information may **NOT** be disclosed unless patient consents in writing.

Exception: (1) Parent or legal guardian of patient  
 (2) Dentist acting on patient's behalf  
 (3) Attorney appointed by patient.  
 (4) Executor of deceased person's estate.

Sec. 258.104

### Dental Privilege Signed Consent Must Include

1. Specific information being released.
2. Person to whom the information is being released.
3. The purpose of the release of information.

Sec. 258.104

Authorization Under HIPAA must contain all the above plus:

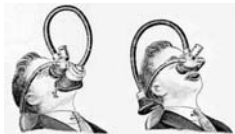
4. Expiration Date
5. Statement that the Authorization can be revoked at any time.

### Dental Assistant May Be Registered With The State Board In 3 Areas

1. Radiology
  2. Sealant Placement
  3. Nitrous Oxide Monitoring
- There is no “cross-over” registration. If you are registered in one area, you are not registered in the other areas.

### Nitrous Oxide Monitoring

- Dentist must have a permit and must induce and maintain the N<sub>2</sub>O.
- Dentist must maintain direct supervision over personnel who are monitoring the procedure.
- Assistant can **reduce the levels** of Nitrous Oxide or **turn it off**.



Rule 108.34

### Dental Assistant Requirements For Monitoring N<sub>2</sub>O

- Passed the N<sub>2</sub>O Test from the TSBDE.
- Maintain CPR certification.
- Under direct supervision of the dentist.
- Document the name of the assistant, concentration of N<sub>2</sub>O administered and time of administration.

Rule 108.34

**Downloadable File(s)**  
(The files below are the same files you would receive in paper form from the SBDE)

FILE NAME	Microsoft Word File	Adobe Acrobat File (PDF)
APPLICATION FOR NITROUS OXIDE MONITORING CERTIFICATE		

### Records Of The Dentist Dental record Includes The Following

- Radiographs
- Medical and dental history
- Periodontal charting
- Diagnoses made
- Treatment plans
- Informed consent statements
- Study models, casts, and impressions
- Billing and payment records
- Appointment records

Rule 108.8

### Dental Records

- Must be kept not less than 5 years.
- Are the sole property of the dentist.
- This ownership shall not prohibit the transfer of a copy of the records to the patient nor transfer of the original records to another Texas dentist who will provide treatment to the patient.

Rule 108.8

## Patient Request For Records

- Dental record must be provided to patient within 30 days.
- Can charge reasonable fee or copying:
  - \* \$25 for first 20 pages
  - \* \$0.15 for each additional page
  - \* \$15 for FMX, Pano, Ceph
  - \* \$5 for single film

Rule 108.8

## Consumer Information

Rule 108.3

- Patients shall be notified that complaints concerning dental treatment can be directed to State Board.
- Must provide the patient with the name, mailing address, and phone numbers of the State Board.

## Consumer Information

Rule 108.3

- Three ways to provide consumer info:
  1. Sign prominently displayed
  2. Info on each registration form, application, brochure or contract.
  3. On a bill of service.

## X-Ray Laboratories

- Must be located in the dental office of a Texas licensed dentist.
- Must have appropriate degree of supervision.
- Patients protected with **lead apron** and **thyroid collar**.
- X-ray equipment must be properly monitored by the authorized agency



Rule 113.2

## An Investigator From The State Board With Sanitation Complaint Must Be:

- Granted immediate access to the entire office.
- Failure to grant access may result in temporary license suspension.

Rule 108.22

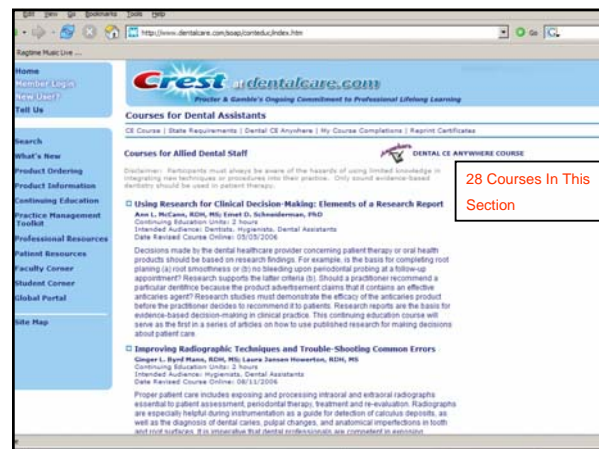
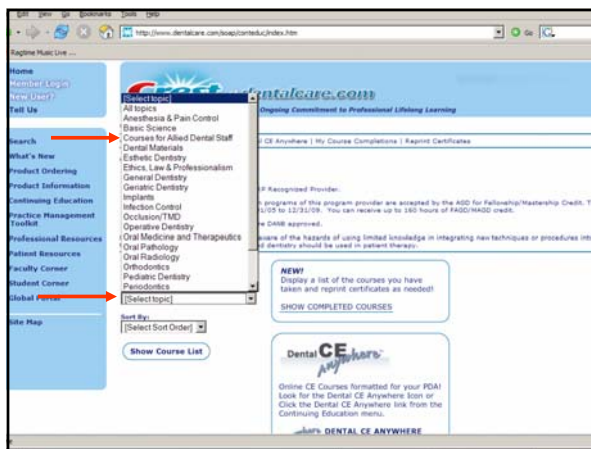
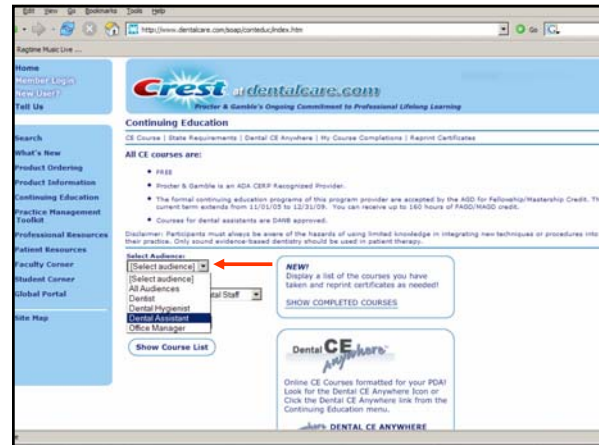
## Continuing Education Requirements

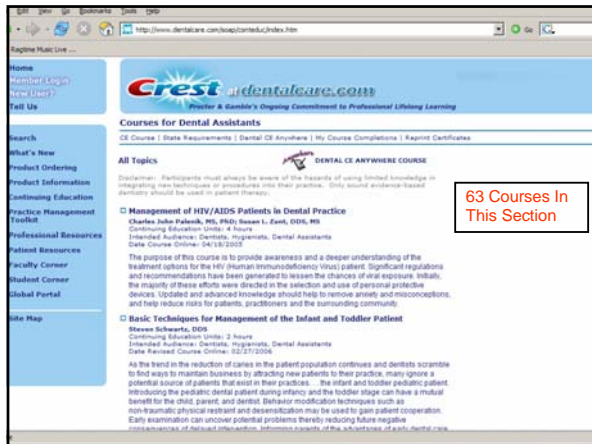
- RDA – 6 hours of CE each year.
  - 3 hours can be self study.
- Dentist, Hygienist, Certified Dental Tech
  - 12 hours each year.
- State Board will do random audits to ensure CE is being done.
- Keep registration certificate and completion codes.

Rule 104.1

# CE Accepted By State Board

- American Dental Association  
Local societies of the ADA
- Academy Of General Dentistry  
Local societies of the AGD





## Infection Control Course

### Infection Control Test Will Have Questions On

- ❖ Infection Control
- And
- ❖ OSHA Requirements

### How To Follow OSHA's Bloodborne Pathogens Standard

- Read the Bloodborne Pathogens Standard, identify the major elements and implement in your office.
- Main Thing – have a written plan in your office entitled “**The Exposure Control Plan**” that explains the major elements of the Standard and how you implement them in your office. Provide **yearly** training on Bloodborne Pathogens.

### Key Requirements Of Bloodborne Pathogens Standard

- Implementing Universal Precautions
- Use of Personal Protective Equipment (PPE)
- Sharps & Recapping Needles
- Hepatitis B Vaccine
- Engineering Controls
- Use of Safety Needles and Safety Scalpels
- Medical records on each exposed employee
- What to do after a needlestick. OSHA refers to this as the Post Exposure Evaluation

### Universal Precautions

- Universal Precautions means using the same infection control procedures for **ALL** patients for a given procedure.
- Standard Precautions is coming into use and it means taking precautions against all body fluids to include secretions and excretions.

## Personal Protective Equipment (PPE)

- Gloves should be worn any time the hands come into contact with blood, saliva or mucous membranes.
- Protective eyewear, face mask, and a protective gown should be worn when performing a procedure that generates splash or splatter. The protective gown must:
  - ✓ Protect street clothes & exposed skin (arms)
  - ✓ Have long sleeves
  - ✓ Disposable or reusable (cotton or cotton-polyester)
  - ✓ Be waist length or knee length
  - ✓ Does not have to fluid proof for dentistry

## Sharps And Recapping Needles

- Sharps must be immediately placed into a Sharps Container at end patient procedures.
- Sharps include needles, scalpels, suture needles and orthodontic wire.
- Needles can be recapped with:
  - ✓ One handed scoop technique
  - ✓ Mechanical recapping device

## Hepatitis B Vaccine

Offered To All Employees With Exposure To Blood

- Offered within 10 days of starting work
- Free of charge to employee
- 1 to 2 months after the HBV, the HB antibody test should be offered to the employee. If the employee has antibodies to Hepatitis B, this is indication of seroconversion and the employee is now immune to Hepatitis B.

## Engineering Controls

- OSHA mandates the use of Engineering Controls to prevent transmission of blood-borne diseases.
- Example is the sharps container or high volume evacuator.



## Use Of Safety Needles & Scalpels

- Bloodborne Pathogens Standard requires each dental office to consider the use of safety needles and devices once a year.
- The Standard does NOT require their use, but their use must be considered.
- The Standard also requires that the dental office gets the Employees Input into whether these devices are to be used.

## Examples Of Safety Needles



## Safety Scalpels



Sandel Safety Scalpel

Futura Safety Scalpel

## Medical Records

- Bloodborne Pathogens Standard requires a medical record on each employee exposed to blood and saliva.
- Initially, the medical record needs only 3 items of information:
  1. Employees Name
  2. Employees Social Security Number
  3. Dates of Hepatitis B Vaccine

## Needlestick or Spash Procedures

### Needlestick or Splash of Blood or Saliva

- Main Thing - Who Do You Report This To
- First Aid Procedures
- Employee Should Be Offered A Medical Evaluation (but are not required to go)
- Explain Accident To Patient and Get Their Permission To Go For Blood Testing

## First Aid Procedures After An Accident

- Needlestick or Puncture Wound  
Wash the wound & go for medical eval
- Splash (onto mucous membranes of eye, nose, mouth)  
Go to the eyewash station and flush the eyes for .....

## Blood Tests For Patient & Employee

- Bloodborne Pathogens Standard requires 3 blood test to be run on the employee and the patient (if patient willing to go).
  - HIV
  - Hepatitis B
  - Hepatitis C

## How To Follow OSHA's Hazard Communication Standard

- Read the Hazard Communication Standard, identify the major elements and implement in your office.
- Main Thing – have a written plan in your office entitled "The Hazard Communication Plan" that explains the major elements of the Standard and how you implement them in your office. Provide initial training on Hazard Communication.



## Hazard Communication Standard Requirements For Labels

- There are two types of labels under this Standard:
  - Primary Labels which are placed on a product by the manufacturer and must have 3 items of information: (1) Product Name (2) Manufacturer Name and Address (3) Hazardous Warning
  - Secondary Labels are required when a product is removed from its original container and placed into another container. The secondary label must have the (1) Product Name (2) Hazardous Warning.

## Material Safety Data Sheets (MSDS)

- Hazard Communication Standard requires a MSDS on each dental material and chemical (disinfectants & x-ray solutions) in the office.
- Collect these from the manufacturer and place them in a notebook or file.
- There is no standard format for MSDS so each one may be different.

## Material Safety Data Sheets

**BLOCK DRUG CORPORATION**  
387 Audubon Blvd., Jersey City, New Jersey 07310  
Telephone: 201-734-1800

**MATERIAL SAFETY DATA SHEET**

24 HOUR EMERGENCY CHEMTRAC TELEPHONE # (800) 424-3330

DATE PREPARED: March 24, 1997 EPA REG. NO.: 427812-0073

**I. GENERAL INFORMATION**

PRODUCT NAME: Vial Defense™-S Sterilizing and Disinfecting Solution (Activated Solution)  
PRODUCT CATEGORY: Sterilizing and Disinfecting Solution

HAZARDOUS INGREDIENTS		CSF #	TW	HAZARD DATA
Phosphoric acid (activator only)	65.8%	11-30-00	0.01 mg/ml	Severe Irritant
Sodium hydroxide	2.0%	7000-00-0	0.001 mg/ml	Corrosive/Irritant/Sensitizer
Sodium hypochlorite	0.05%	7681-00-0	0.0005 mg/ml	Toxic

**II. HEALTH HAZARD DATA**

**EFFECTS OF OVEREXPOSURE**

**SKIN:** Moderate irritation. Repeated contact may cause sensitization.

**EYE:** Causes eye damage.

**INHALATION:** Mild irritation.

**INGESTION:** Harmful if swallowed.

**FIRST AID PROCEDURE**

**SKIN:** Immediately flush thoroughly with water.

**EYES:** Immediately flush with water for 15 minutes. Get medical attention.

**INHALATION:** Remove to fresh air.

**INGESTION:** Drink milk, gelatin or large quantities of water. Avoid alcohol. Call a physician or Poison Control Center.

**NOTE TO PHYSICIAN:** Possible medical damage may necessitate the use of gastric lavage.

**III. SPECIAL PROTECTION INFORMATION**

**EYE PROTECTION:** Goggles or safety glasses.

**SKIN PROTECTION:** Rubber gloves.

**RESPIRATORY PROTECTION:** Use in a ventilated area.

## Material Safety Data Sheet

**VI. FIRE & EXPLOSION HAZARD DATA**

FLAMMABLE LIMITS: Non-flammable  
EXTINGUISHING MEDIA: Not Applicable  
SPECIAL FIRE FIGHTING PROCEDURES: None  
UNUSUAL FIRE & EXPLOSION HAZARDS: None

**VII. ENVIRONMENTAL PROTECTION PROCEDURES**

**SPILL RESPONSE:** Flush with large quantities of water.  
**WASTE DISPOSAL METHOD:** Dilute residual solution in drain. Flush thoroughly with water. Do not reuse empty container. Rinse and put in trash. Residual solutions that contain blood and other body fluids shall be autoclaved and disposed of according to local regulations.

**VIII. SPECIAL PRECAUTIONS**

**HANDLING/STORAGE/TRANSPORTATION:** Do not get in eyes, on skin or on clothing. Store in a cool place.  
**REACTIVITY DATA**

**STABILITY:** Stable. Shelf temperature above 50°F.  
**INCOMPATIBILITY:** Acids and alkaline materials neutralize active ingredients.  
**HAZARDOUS DECOMPOSITION PRODUCTS:** None

**IX. PHYSICAL DATA**

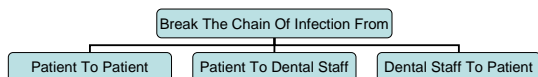
BOILING POINT (°F): 250 SPECIFIC GRAVITY (H<sub>2</sub>O=1): 1.008  
VAPOR PRESSURE (mm Hg): 0 % VOLATILE BY VOLUME: 0  
VAPOR DENSITY (AIR = 1): 0.63 SOLUBILITY IN WATER: 100%  
pH (unadjusted): 2.2-12 admission: 100-118 adjusted: 7.5-8.5

**APPEARANCE & ODOR:** Clear, colorless liquid with a mild odor. Blue-green when activated.

The information provided in this Material Safety Data Sheet has been compiled from our experience and data with similar commercially available materials and is believed to be accurate. We guarantee no liability in made it or the user's responsibility to determine the suitability of this information for the adoption of necessary safety precautions and disposal procedures.

MSDS-0000 1647629955

## Purpose Of Infection Control Program



## Infectious Diseases In The Dental Office

- Dental Assistant may come into contact with a number of infectious diseases in the dental office.
- These diseases fall into 4 categories depending on their mode of transmission.

## Modes Of Disease Transmission In Dental Offices

1. **Direct** contact with infectious lesion
2. **Indirect** transmission via contaminated object
3. **Bloodborne by splatter** of blood, saliva or nasal secretions onto broken skin or mucosa
4. **Airborne** by aerosolization of microbes

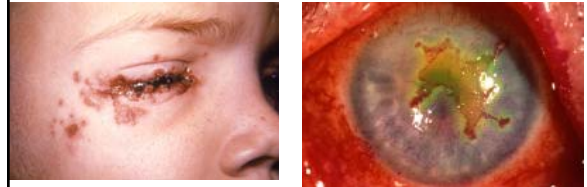
## Modes Of Disease Transmission Examples Of Each Mode

- **Airborne** - TB, Measles, Chickenpox  
Precautions: Do not treat until disease is resolved.
- **Bloodborne** - Hepatitis & HIV  
Precautions: (1) Standard Precautions (2) PPE (3) Work Practice Controls
- **Direct Contact** - Herpes  
Precautions: Do not treat until disease resolves.

## Herpes Of The Finger Herpetic Whitlow



## Herpes Of The Eye Ocular Herpes



## Hepatitis Viruses

### Spread By Fecal-Oral

Not Occupational Disease

- ❖ Hepatitis A
- ❖ Hepatitis E

### Spread By Blood

Occupational Disease

- ❖ Hepatitis B
- ❖ Hepatitis C
- ❖ Hepatitis D
- ❖ Hepatitis F
- ❖ Hepatitis G

## Vaccinations Recommended by CDC For Dental Staff

- Hepatitis B
- Flu
- Measles
- Mumps
- Rubella or German Measles
- Varicella-Zoster or Chickenpox

## No Vaccination For Following Diseases

- HIV or AIDS
- Hepatitis C
- TB or Tuberculosis

## Work Restrictions For Health Care Personnel Recommended By CDC

- Conjunctivitis
- Diarrhea
- Hepatitis A
- Herpes (on hands)
- Measles
- Mumps
- Pertussis
- Rubella
- Staphylococcus aureus
- TB

## Preventing Cross-Contamination & Disease Transmission In The Dental Office

- Perform Proper Hand Washing
- Use Disposable Items Wherever Possible
- Unit Dose Concept
- Utilize Barrier Techniques and PPE

## Proper Hand Washing CDC Recommendations

- Alcohol based hand rubs (hand sanitizers) if the hands are NOT visibly soiled.
- If the hands are visibly soiled, use regular soap OR antimicrobial soap and water.
- Recommended wash time is 15 seconds.
- Surgery Procedures – wash hands with antimicrobial soap and water for 2 to 6 min.

## Hand Sanitizers



## Hand Washing

Soap Containers: CDC Recommendations

- (1) Use disposable containers OR
- (2) Wash and dry containers before refilling.
- (3) Do not “top off” containers.



## Fingernails

Fingernails are the dirtiest parts of the hand

- Keep fingernails short with smooth edges for (1) thorough cleaning and (2) prevent glove tears.
- Use of artificial fingernails is usually not recommended
- Do not wear hand or nail jewelry **IF** it makes donning gloves difficult or compromises fit or integrity of glove.

## When To Wash Hands CDC Recommendations

1. When hands are visibly soiled with blood or infectious matter.
  2. After touching items contaminated by blood, saliva or respiratory secretions.
  3. Before and after treating patients.
  4. Before and after glove use.
- Hand washing is the **MOST** important step in preventing cross contamination.

## Use Of Disposable Items

- Use disposable items whenever possible to prevent cross-contamination.
- Disposable items include:
  - Saliva Ejector
  - High Volume Suction Tips
  - Prophy Angles & Prophy Cups
  - Air-Water Syringe Tips
  - Impression Trays

## Disposable Items Cannot be reliably cleaned

- State Board Rules state that disposable items shall not be used in the treatment of more than one patient.
- CDC recommends that disposable items not be used in the treatment of more than one patient.

## Unit Dose Concept

- Dispensing the amount of material needed for a given procedure.
- Done before the patient procedure.
- Excess is discarded.
- Examples: cotton balls, cotton rolls, 2x2s, waxes, compound, Vaseline, cements.
- Unit dosing prevents cross contamination of cabinets and drawers.
- To get supplies out of cabinet: (1) Remove gloves or (2) Use over-gloves over the latex gloves.

## Utilize Barrier Techniques and PPE To Prevent Cross-Contamination

- Barrier techniques include plastic wrap, impervious paper and aluminum foil.
- These can be placed over work surfaces and difficult to clean items such as electrical switches.
- Work surfaces that can be barrier wrapped include light switches, light handle, air water syringe, bracket table, x ray equipment and any surface that is touched or comes in contact with contaminated items.

### PPE Can Be Use To Prevent Cross-Contamination and Disease Transmission

- **Gloves** – Should Be Changed After Each Patient
- **Masks** – When To Change
  1. Between Patients
  2. When Wet
  3. Splashed With Blood
- **Eyewear** – Face Shield or Glasses
  1. Wash Between Patients
- **Protective Gowns**
  1. Change if splattered with blood.
  2. Long sleeves
  3. Disposable or reusable cotton or cotton polyester

### Surgical Masks

1. Change between patients.
2. Change when wet.
3. Change when contaminated with blood.



### SARS Or Flu Epidemic



### N-95 Masks

- N – means normal air with no oil in the air.
- 95 – means that it will filter 95% of the particles down to .3 microns.



### Protective Eyewear 4 Types

1. Safety Glasses
2. Goggles
3. Face Shields
4. Prescription glasses with side shields



### Utility Gloves Should Be Used In 3 Situations

CDC Recommendations

1. Decontaminating the operatory
2. Cleaning instruments
3. Handling chemicals such as disinfectants



## Performing Disinfection Procedures

1. Select appropriate PPE.
2. Select, prepare and use chemical agents following manufacturers instructions.
3. Prepare surfaces for disinfection.
4. After treating the patient, disinfect:

Treatment room  
Darkroom  
Instrument Processing Area  
All associated equipment

## Disinfection vs. Sterilization

Definitions From State Board Rules

- **Disinfection** - the partial elimination of active growth stage bacteria and the inactivation of some viruses. The potential for infections remains after disinfection, including infection with M. tuberculosis, hepatitis A virus (HAV) and hepatitis B virus (HBV). The human immunodeficiency virus (HIV) may also remain active following disinfection.
- **Sterilization** - a process by which all forms of life within a defined environment are completely destroyed.

## Selecting PPE For Disinfection Procedures CDC Recommendations

- Wear the complete ensemble to include gloves, mask, eyewear, and gown.
- Use puncture resistant utility gloves.  
CDC recommends utility gloves when:
  1. Cleaning instruments
  2. Cleaning and disinfecting surfaces
  3. When handling chemicals

## Select And Prepare Chemical Disinfectants

- Follow the manufacturer's instructions for correct use of disinfecting products.
- If using bleach, must be mixed daily.
- Do not use Chemical Sterilants (such as glutaraldehydes) on surfaces.

## Clinical Contact Surfaces

Light Switch, Light Handle, Bracket Table, Mobile Cabinet  
CDC Recommendations

- Use an EPA registered hospital disinfectant
  - \* Low level activity (HBV and HIV claims)
  - \* Intermediate level activity (TB claim)
- Use Intermediate Level disinfectant if visibly contaminated with blood.

## Chemicals That Can Be Used For Disinfectants For Surfaces

- Chlorine, phenols and iodophors
- Alcohol should not be used.
- Glutaraldehydes should not be use.
- EPA or Environmental Protection Agency is the agency that registers disinfectants in the USA. Your disinfectant should have an EPA Number on the label.

## Housekeeping Surfaces

Floors, Walls & Sinks  
CDC Recommendations

- Soap and Water  
OR
- EPA Registered Hospital Disinfectant
- Clean walls, blinds and window curtains in patient care areas when visibly dusty or soiled.

## Prepare Surfaces For Disinfection

- Surfaces must be clean before disinfecting. Any debris may protect microorganisms from the disinfectant.
- Surfaces may be cleaned and disinfected with a "Spray-Wipe- Spray" procedure. The disinfectant is sprayed on the surface and then wiped off as a cleaning procedure. Then the disinfectant is again sprayed and left for the contact time listed on the label.

## Performing Sterilization Procedures

1. Select appropriate PPE  
Wear the complete ensemble of PPE  
Wear utility gloves when cleaning instruments
2. Prepare dental instruments for sterilization
3. Apply appropriate method for sterilization of dental instruments and equipment.
4. Label and store all instruments properly
5. Monitor effectiveness of sterilization process

## Properly Prepare Instruments For Sterilization

- Clean all blood or debris from instruments  
State Board Rules require all visible debris removed before sterilizing
- Use Ultrasonic Cleaner OR Instrument Washer
- If hand scrubbing, use long handle brush
- Wear utility gloves – puncture resistance
- If hand scrubbing wear (1) Utility Gloves (2) Eyewear (3) Mask (4) Protective Gown

## Miele Instrument Washer



## Long Handle Scrub Brush

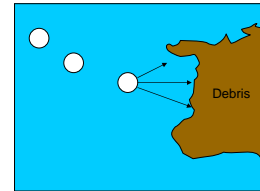


## Ultrasonic Cleaner



## Bubble Cleaning Action

Electricity is converted to bubbles in the solution. The bubbles "implode" which sends out shock waves that remove the debris.



## Apply Appropriate Sterilization Method CDC Recommendations

- Heat sterilize all **Critical** and **Semi-critical** instruments.
  - Autoclave
  - Chemiclave
  - Dry Heat Sterilizer
- Heat sensitive items (plastic instruments) can be processed with high level disinfectant or chemical sterilant.

## Label & Store Instruments Properly

- Wrap instruments or place in containers designed to maintain sterility (cassettes or trays)
- Place sterilization date on wraps or containers. In event of sterilizer failure, packs can be re-sterilized.
- Store in covered or closed cabinets
- Do not store under a sink

## Preparation & Packaging

- ✓ Use wrapping compatible with type of sterilization and has FDA Clearance.
- ✓ Before sterilization, inspect instruments for cleanliness and then wrap or place in containers designed to maintain sterility.



## Sterilization of Unwrapped Instruments

- **Semi-critical** instruments that will be used **immediately** can be sterilized unwrapped provided that they are handled aseptically.
- **Critical instruments** for **immediate** use can be sterilized unwrapped if maintained sterile (transported in a sterile covered container)



## Sterilization of Unwrapped Instruments

- ✓ Do not sterilize implants unwrapped.
- ✓ Do not store critical instruments unwrapped.



## Monitor Effectiveness of Sterilization Process

- Spore test the sterilizer once a week. Use a matching control. **Spore Test is the only way to determine if sterilization process is successful.**
- Place a chemical indicator (color change device) on the inside of each package.
- Monitor each load with mechanical indicators:
  - Timer**
  - Pressure Gauge**
  - Temperature Gauge**

## Preparation & Packaging

Use internal **chemical indicator** in each package. If cannot be seen from outside, use external indicator.



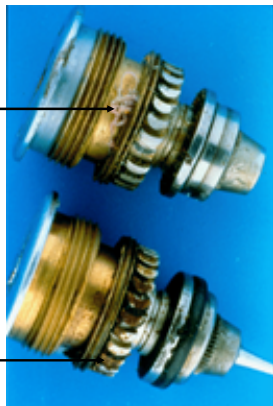
## Dental Handpieces & Other Devices Attached To Air & Waterlines

1. Clean & **heat sterilize handpieces** and other waterline instruments between patients.
2. Do **NOT** surface disinfect, use chemical sterilants or ethylene oxide on handpieces.
3. Any device attached to the waterlines should be flushed **20 to 30 seconds**.
4. Do NOT tell patients to close their lips tightly around the tip of the saliva ejector.

## Turbines Sent In For Repair

Cotton or Gauze

Blood



## Maintain Infection Control Of Dental Unit And Equipment

- Both CDC And OSHA permit a choice in maintaining dental unit disinfection:
  1. Use of plastic wrap, impervious paper or aluminum foil to prevent contamination.

**OR**

  2. Use of a disinfectant to decontaminate the dental unit.
  3. There is not a requirement to do both.

## Practice Safety Measures When Handling Hazardous Materials

### Toxic Materials In The Dental Office

- Mercury
- Nitrous Oxide
- Formaldehyde
- Glutaraldehyde
- Etching Acids

## Precautions For Mercury & Formaldehyde

- Mercury
  - Mercury is a poison – clean up any spilled
  - Use PreCap amalgam capsules to reduce spills
- Formaldehyde
  - Can cause cancer
  - Use in biopsy bottles
  - Keep cap on bottle when not using

## Mad Hatter Term Used In England Since 1836



## Precaution For Nitrous Oxide And Glutaraldehyde

- Nitrous Oxide – ways to reduce exposure
  - ✓ Use a scavenging mask
  - ✓ Check all fittings before turning on Nitrous
  - ✓ Have good ventilation in office
- Glutaraldehyde
  - ✓ Skin irritant, eye irritant, respiratory irritant
  - ✓ Keep containers with glutaraldehyde covered
  - ✓ Do not use as surface disinfectant

## Precautions For Acids

- Acids can cause skin and eye burns
- Use PPE when handling acids
- Have an eye wash station in the office

## Identify and Dispose Of Biohazardous Waste

- **Regulated Waste** is the term that OSHA has given to Biohazardous Waste or Medical waste.
- There are 3 categories of OSHA Regulated Waste Rules:
  1. Sharps
  2. Items saturated with blood & saliva
  3. Tissues – Hard or Soft removed from patient

## Disposal Of Biohazard Waste

OSHA Calls This Regulated Waste

### ➤ Items Saturated With Blood or Saliva

- ✓ Cotton rolls or 2x2 gauze
- ✓ If saturated place in the "Red Bag"
- ✓ Saturated means it will drip if picked up
- ✓ If not saturated, can place in regular trash

### ➤ Hard or Soft Tissues

- ✓ Teeth and gingival tissues place in "Red Bag"
- ✓ Teeth can be given to patient if "rendered non-biohazardous" (State Board Rule)

## Disposal Of Regulated Waste

- Commercial Regulated Waste Carrier can be contracted to pick up and remove the "Red Bags" from your office.
- Texas Commission On Environmental Quality regulates Medical Waste in Texas. Commission has rules and procedures that allow Medical Waste to be placed in regular trash if certain procedures are followed.

## Identify & Dispose Of Non-Regulated Waste

- Commonly called trash
- Non-regulated waste includes:
  - ✓ Patient Bib
  - ✓ Bracket Table Covers
  - ✓ Plastic or Paper Wrap
  - ✓ Gloves and Disposable Gowns
  - ✓ Paper Products
  - ✓ Disposable Items

## Identify And Manage Chemical Hazards In Accordance With MSDS

- Read each of the MSDS to determine if any hazards exist for employees.
- Check the section "Health Hazard Data" and "Fire & Explosion Data" to determine the hazards and precautions.
- The most common hazardous products have been discussed in a previous section and include:
  - ✓ Mercury
  - ✓ Nitrous Oxide
  - ✓ Formaldehyde
  - ✓ Glutaraldehyde
  - ✓ Etching Acids

## Practice Infection Control In Handling And Transporting Dental Items

1. Select appropriate PPE
2. Identify conditions for potential cross contamination.
3. Select and apply appropriate disinfectant.
4. Label biohazardous material.

## Select Appropriate PPE

- When transporting contaminated dental items, wear the complete ensemble (gloves, mask, gown, protective eyewear).
- When treating patients with a procedure that generates **NO** splash or spatter, only gloves are required.
- If performing a procedure that generates splash or spatter, wear the complete ensemble of PPE.

## Identify Conditions For Potential Cross-Contamination

- Bare hands touching contaminated instruments or equipment.
- Removing bulk items (cotton rolls) with contaminated gloves.
- Taking contaminated oral prosthesis into the dental lab without disinfection.
- While working in the instrument processing area, going from the dirty side to the clean side with contaminated PPE.
- Touching paper records with contaminated gloves.

## Select And Apply Appropriate Disinfectant

### CDC Recommends For Clinical Surfaces:

- Use an EPA registered hospital disinfectant
  - \* Low level activity (HBV and HIV claims)
  - \* Intermediate level activity (TB claim)
- Use Intermediate Level disinfectant if visibly contaminated with blood.

## Disinfecting Items Going To Lab

### Short Contact Time Disinfectants



1 Minute Contact Time



Minute Contact Time

## Label Biohazardous Material

Used on sharp containers, regulated waste, contaminated laundry or where there is blood or body fluids.



## Utilize And Maintain A Quality Assurance Program For Infection Control

- Develop a written Infection Control Manual.
- As part of this manual, develop a checklist of the Infection Control Procedures discussed in this lecture.
- At least once a year, review the checklist to ensure these procedures are being done correctly in your office.

## Quality Assurance Checklist

### Some Items To Include

- Immunizations For Staff
- Proper Use Of PPE
- Proper Hand Washing
- Use of Barrier Techniques
- Use of Disinfectants
- Use of Disposable Items
- Cleaning Instruments
- Packaging Instruments
- Storage of Instruments
- Spore Testing of Sterilizer
- Use of Chemical Indicators
- Disposal Biohazardous Waste
- Flushing Waterlines
- Heat Sterilize Handpieces
- Exposure Control Checklist
- Hazard Communication Checklist
- Can Be Obtained From OSHA

## Radiology For Dental Assistants

## Terminology Used In Dental Radiography

### Dental Radiology vs. Dental Radiography

- Radiology is the use of radiant energy (x-rays) in the diagnosis and treatment of disease. Only dentist can practice radiology as it involves diagnosis and treatment.
- Radiography is the photographically recording of images of the teeth and surrounding structures with use of x-rays. Can be done by hygienists and assistants

### Periapical Radiograph vs. Bitewing Radiograph

- Periapical should record the entire tooth including 4 mm of bone surrounding the apical areas.
- Bitewing should equally record the crowns of the maxillary and mandibular teeth AND the crestal 1/3<sup>rd</sup> of the alveolar process.

### Periapical vs. Bitewing What is the primary purpose of each film?



### Occlusal Radiograph

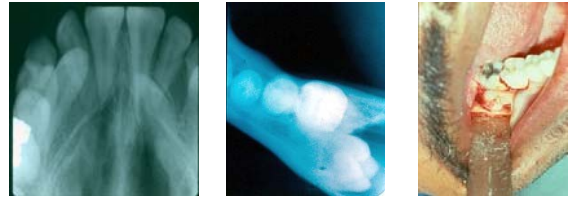
- The purpose of this film is to record a major portion of the maxilla OR mandible on one film.



## Occlusal Radiographs Salivary Stones or Sialoliths



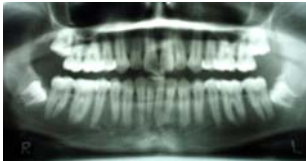
## Occlusal Radiographs Impacted Teeth



## Extraoral Radiographs

- These are radiographs in which the film or sensor is placed **outside** the oral cavity.

- \* PA Skull
- \* Water's View
- \* Submental vertex
- \* TMJ Radiographs

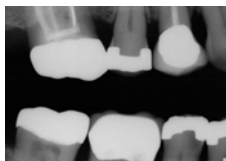


## Purpose Of Radiographs

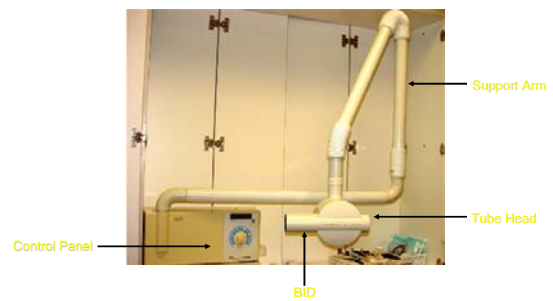
- Periapical is used to diagnose abnormalities involving the root apices and bone.
- Biteewing is used to diagnose caries and early stage periodontal disease.
- Occlusal is for evaluation of larger areas of the maxilla OR mandible that may not appear on the periapical.
- Panoramic has the same purpose as the Occlusal film.

## Radiopaque vs. Radiolucent

- Radiopaque is the term applied to white or light gray areas on the x ray film.
- Radiolucent is the term applied to medium gray or black areas on the x ray film.



## Heliodent X-Ray Unit Components Of The X-Ray Unit



## Central Ray

- CR is an imaginary beam of x rays going directly through the center of the BID or Beam Indicating Device. It is used as a reference point for orienting the x ray beam to the film in both Vertical and Horizontal directions.



## Vertical Angulation Horizontal Angulation

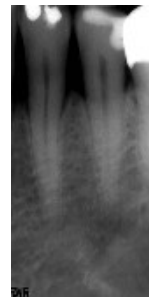


Positive Vertical Angulation  
Negative Vertical Angulation

## Foreshortening & Elongation With Vertical Angulation

- Foreshortening is caused by excessive vertical angulation that is either positive or negative.
- Elongation is caused by insufficient vertical angulation that is either positive or negative.

## Elongation



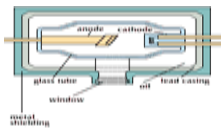
## Overlapped Contacts With Incorrect Horizontal Angulation



## Factors Affecting X-Ray Production

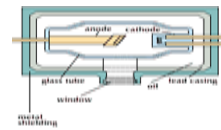
## X-Ray Tube

1. Anode has the Target
2. Cathode has the Filament
3. Electrical Power to the x ray tube



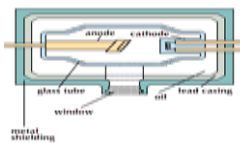
## Three Factors Influence X-Ray Production

1. **Milliamps** or mA
2. **Kilovolts** or kVp
3. **Timer** or time kVp is applied to the tube



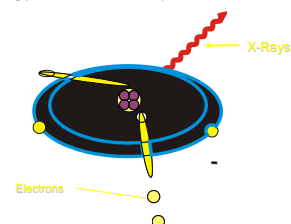
## How X-Rays Are Produced

1. Filament produces an Electron Cloud
2. When Exposure Button is pressed, electrons move rapidly toward the Target
3. **The sudden stop of the electrons when hitting the Target, produces the x rays.**



## Creation Of X-Rays

- The sudden stopping of high speed electrons produces X-rays as they collide with the nucleus of the target atom.
- **1% energy** becomes x-rays – 99% is heat



## Photons

- Photons are **packets or parcels** of x rays.
- Both x rays and visible light are produced in these packets or parcels. And travel in these groups.

## Three Factors Influence X-Ray Production

1. Milliamps (mA) determine the amount of x-rays coming out of the machine.
2. Kilovolts (kVp) determine the:
  - ✓ Quality or penetrating power of the x rays
  - ✓ Amount of x rays emitted
3. Timer determines the amount of x-rays coming out of the machine.



## Exposure Button Activation

### Fail Safe System

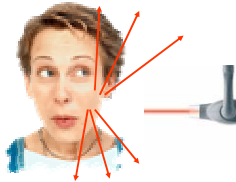
- If you remove your finger from the Exposure Button before the set time is completed, x-ray production will stop.
- If you keep your finger on the Exposure Button beyond the set time, x-ray production will not continue.

## X-Ray Machine Factors That Influence Radiation Safety

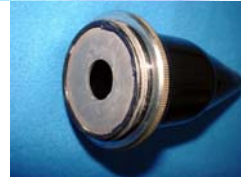
- Radiation exposure is directly linked to:
  - ✓ Milliamps or mA
  - ✓ Kilovoltage or kVP
  - ✓ Time of exposure
- Radiation exposure can effect the:
  - ✓ Operator
  - ✓ Patient

## Scattered Radiation or Secondary Radiation

- Primary radiation will travel in a straight line until it hits an object.
- Then it will travel in a second direction and is then called Secondary Radiation or Scattered Radiation.



## Pointed Cone Produces Twice As Much Scatter Radiation



Radiation Symbol

## X-Ray Machine Malfunctions

- Turn it off, then turn it back on.
- If this does not correct the problem, next step is:
- Turn it off and unplug the machine.
- Do not use it.
- Place a sign "Do Not Use".
- Call the repair technician.

## Safety Measures For Patient Protection

- Use a Lead Apron with a Thyroid Collar.
- Do not "Sight" develop film.
- Use a "fast" speed film such as F speed instead of D speed film. 50% Less Radiation
- Collimation and Filtration of x-ray beam.
- Use a long BID or Beam Indicating Device
- Use film holding devices



## Thyroid Collar

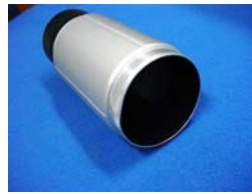
Thyroid Collars Reduce Thyroid Exposure By 50%  
Lead Aprons Reduce Genetic Exposure By 98%



## Storage Of Lead Apron



## Filtration And Collimation Of X-Ray Beam

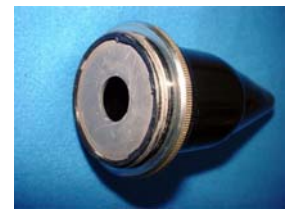


Collimator 2.75 inch or 7 cm. at skin.

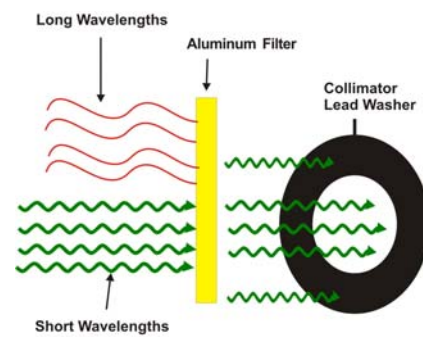
What is the purpose of Collimation & Filtration?

## Collimator

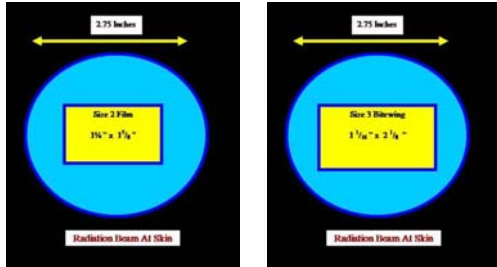
➤ Spot size of 2.75 inches or 7 cm. At Patient's Skin



## Types Of Cones Or BIDs



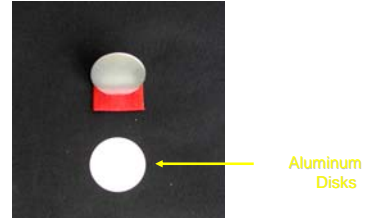
## Collimation Reduces Exposure To The Patient



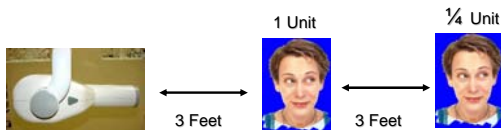
## Aluminum Filters

To remove the long wavelength x-rays which are not useful in producing a dental radiograph.

- 50  $\emptyset$  kVp 1.5mm of aluminum
- 70 100 kVp 2.5 mm of aluminum



## Inverse Square Law



A person standing twice as far from the x-ray machine will receive one fourth the radiation.

## Major Causes Of Unnecessary Radiation Exposure

1. Not using a Lead Apron with a Thyroid Collar.
2. Using the "Sight" develop film instead of time temperature processing.
3. Not using a "fast" speed film such as F speed instead of D speed film. 50% Less Radiation.
4. Collimation and Filtration not correct.
5. Not using a long BID or Beam Indicating Device.
6. Not using film holding devices.

## Short Term Effects Of Radiation On Cells and Tissues (Low Levels)

- Will not produce any visible effects.
- May damage chemicals and DNA in the cell.
- If damage is severe enough, damage occurs to cells, tissues and organs.
- Cells and DNA can repair radiation damage.
- Damage to DNA is called a **Mutation** and can be passed on to kids and grandkids.
- Radiation exposure is **cumulative**.

## DNA Structure



## Long Term Effects Of Radiation On Cells And Tissues

- If the doses of radiation exceeds the cells and DNA's ability to repair, damage occurs.
- Some tissues are more sensitive to radiation.
- This could lead to cancer, birth defects and cataracts.

## Radiosensitive Organs

- Reproductive Organs
- Thyroid gland
- Fetus
- Breast in females
- Skin
- Lens of eye
- Blood forming organs
- Inherited mutations
- Cancer
- Birth defects
- Cancer
- Cancer
- Cataract
- Leukemia

## Ways To Reduce Radiation Exposure To Patients

- **ALARA Concept**
  - ✓ As Low As Reasonably Achievable
  - ✓ Means every reasonable measure will be taken to reduce radiation exposure.
  - ✓ Is considered the most relevant concept for reducing radiation exposure.
- Digital X-Rays
  - ✓ Consider the use of digital radiography.
  - ✓ Can reduce x ray exposure by 80%.

## Guidelines For Prescribing Dental Radiographs American Dental Association Food And Drug Administration

- Guidelines were established to reduce radiation exposure and be a guide to the dentist when to take radiographs on each type of patient.
- Rather than have each patient receive the same radiographs, this will individualize the exam to the type of patient and age of patient.
- Clinical exam must be performed first to determine what radiographs are needed.

From: American Dental Association, U.S. Food & Drug Administration: The Selection of Patients For Dental Radiograph Examinations. Available on www.ada.org

### GUIDELINES FOR PRESCRIBING DENTAL RADIOGRAPHS

The recommendations in this chart are subject to clinical judgment and may not apply to every patient. They are to be used by dentists only after reviewing the patient's health history and completing a clinical examination. Because every precaution should be taken to minimize radiation exposure, protective thyroid collars and aprons should be used whenever possible. This practice is strongly recommended for children, women of childbearing age and pregnant women.

TYPE OF ENCOUNTER	PATIENT AGE AND DENTAL DEVELOPMENTAL STAGE				
	Child with Primary Dentition (prior to eruption of first permanent teeth)	Child with Transitional Dentition (after eruption of first permanent teeth)	Adolescent with Permanent Dentition (after eruption of third molars)	Adult, Dentate or Partially Edentulous	Adult, Edentulous
<b>New patient*</b> being evaluated for dental diagnosis and dental development	Individualized radiographic exams consisting of selected periapical/occlusal views and/or posterior bitewing or panoramic radiographs. Patient without evidence of disease and with open permanent contacts may not require a radiographic exam at this time.	Individualized radiographic exams consisting of posterior bitewing and/or panoramic radiographs and selected periapical images.	Individualized radiographic exams consisting of posterior bitewing and/or panoramic radiographs and selected periapical images. A full mouth panoramic radiographic exam is preferred when the patient has clinical evidence of generalized dental disease or a history of extensive dental treatment.	Individualized radiographic exams, based on clinical signs and symptoms.	Individualized radiographic exams, based on clinical signs and symptoms.
<b>Recall patient**</b> with clinical exams or at increased risk for cases**	Posterior bitewing exams at 6-12 month intervals if proximal surfaces cannot be examined visually or with a probe	Posterior bitewing exams at 12-24 month intervals if proximal surfaces cannot be examined visually or with a probe	Posterior bitewing exams at 6-18 month intervals	Posterior bitewing exams at 24-36 month intervals	Not applicable
<b>Recall patient**</b> with no clinical exams and not at increased risk for cases**	Posterior bitewing exams at 12-24 month intervals if proximal surfaces cannot be examined visually or with a probe	Posterior bitewing exams at 18-36 month intervals	Posterior bitewing exams at 24-36 month intervals	Posterior bitewing exams at 24-36 month intervals	Not applicable

Document created: November 2004

From: American Dental Association, U.S. Food & Drug Administration: The Selection of Patients For Dental Radiograph Examinations. Available on www.ada.org

### GUIDELINES FOR PRESCRIBING DENTAL RADIOGRAPHS, cont'd

TYPE OF ENCOUNTER	PATIENT AGE AND DENTAL DEVELOPMENTAL STAGE				
	Child with Primary Dentition (prior to eruption of first permanent teeth)	Child with Transitional Dentition (after eruption of first permanent teeth)	Adolescent with Permanent Dentition (after eruption of third molars)	Adult Dentate and Partially Edentulous	Adult Edentulous
<b>Recall patient**</b> with periodontal disease	Clinical judgment as to the need for and type of radiographic images for the evaluation of periodontal disease. Imaging may consist of, but is not limited to, selected bitewing and/or periapical images of areas where periodontal disease (other than gingivitis) can be identified clinically.	Clinical judgment as to the need for and type of radiographic images for the evaluation of periodontal disease. Imaging may consist of, but is not limited to, selected bitewing and/or periapical images of areas where periodontal disease (other than gingivitis) can be identified clinically.	Clinical judgment as to the need for and type of radiographic images for the evaluation of periodontal disease. Imaging may consist of, but is not limited to, selected bitewing and/or periapical images of areas where periodontal disease (other than gingivitis) can be identified clinically.	Clinical judgment as to the need for and type of radiographic images for the evaluation of periodontal disease. Imaging may consist of, but is not limited to, selected bitewing and/or periapical images of areas where periodontal disease (other than gingivitis) can be identified clinically.	Not applicable
<b>Patient for assessment of growth and development</b>	Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring of dental growth and development.	Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring of dental growth and development.	Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring of dental growth and development.	Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring of dental growth and development.	Usually not indicated
<b>Patient with other circumstances including, but not limited to, proposed or existing implants, pathology, restorative modifications, teeth, treated periodontal disease and other upper/lower.</b>	Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring in these circumstances.	Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring in these circumstances.	Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring in these circumstances.	Clinical judgment as to need for and type of radiographic images for evaluation and/or monitoring in these circumstances.	Usually not indicated

\*Clinical situations for which radiographs may be indicated include but are not limited to:

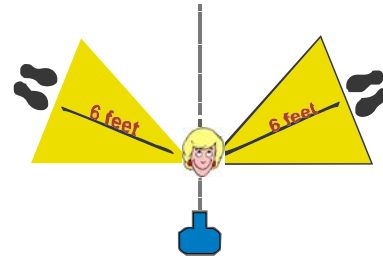
1. Positive Historical Findings
2. History of pain or trauma
3. Family history of dental anomalies
4. Preoperative evaluation of healing

Document created: November 2004

## Safety Measures For Operator Protection

1. Only the Operator and Patient are permitted in the X-Ray Room during exposures.
2. The Operator will stand in a safe place:
  - ✓ 6 Feet away Not in direct beam.
  - ✓ Behind an **appropriate barrier**.
  - ✓ Outside the room if you cannot get 6 feet away
  - ✓ Never stand in direct line with the beam of radiation
  - ✓ **Never hold films in patient's mouth**
  - ✓ Never hold or stabilize the tube head during exposure.

## Position and Distance Rule



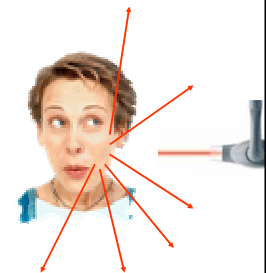
If no barriers are available, you should stand at least six feet away from the patient at an angle of 90-135 degrees to the direction of the x-ray beam.

## Radiation Biology For Operator

- X-Ray exposure is **cumulative**.
- DNA and cells can repair damage.
- If radiation exposure exceeds the ability of DNA to repair itself, mutations may occur.
- Effect of Mutations has been discussed.
- Practice ALARA and all safety procedures.

## Sources Of Radiation Exposure For Operators

- Direct from the x ray beam.
- Indirect from scattered radiation.



Scattered Radiation

## Infection Control For Dental Radiology

## What PPE Should You Wear When Exposing Radiographs

- Gloves - Only PPE that **MUST** Be Used.
- Patient's With Respiratory Infection or a severe Gagger:
  - \* Gloves
  - \* Surgical Masks
  - \* Eye Protection
  - \* Protective Gown

## Describe Infection Control Techniques & Barriers

1. Before bringing the patient into x ray room:
2. Clean & disinfect all surfaces you will touch including chair and counter.
3. Cover the control panel, exposure switch, counter, yoke and tube head, and BID with plastic wrap.
4. Operators must wash hands before donning gloves.
5. Gloves shall be worn at all times.

## Barriers On X-Ray Machine

Plastic Wrap



Plastic Bags



## Barriers On Control Panel



## Supplies and Film

1. Supplies and Film should be kept on a **covered** work surface.
2. Cotton Rolls should be out and available.
3. Paper Cups – After the film has been exposed, dry with paper towels and place in a paper cup.



## Operatory Breakdown After Taking X-Rays

1. Leave the operatory clean and neat.
2. Remove and dispose of plastic wrap.
3. Dispose of other supplies in trash.
4. Remove gloves and wash hands.
5. Clean and spray disinfectant on all contaminated surfaces **NOT** covered.
6. Turn off x ray unit and put tube head against the wall.
7. Lead apron is cleaned and hung up.
8. Remove gloves before leaving the operatory.

## Darkroom Infection Control Guidelines

1. Don new gloves on entering darkroom or using the daylight loader.
2. Strip films from packets using gloves.
3. Open film packet over clean cup and allow film to fall into cup without touching your gloves or film packet.
4. Lay the opened film packets on a paper towel **or** in a separate paper cup.
5. Once all films are out of packets, remove gloves and insert film in processor with bare hands.

## Daylight Loader



Cuffs Or Sleeves Can Become Contaminated

## Darkroom Infection Control Guidelines

6. Films should be handled as little as possible, preferably by the edges.
7. After all films are in the processor, wash and dry your hands.
8. Handle processed film with clean hands only, no gloves.

## Panoramic Infection Control Guidelines

1. Use bite block baggie. Patient can remove the baggie when x-ray is completed.
2. No need to wrap anything.
3. Before and After the exposure:
  - Wipe down the patient positioning area and handles of the panoramic unit.



## Patient Management Techniques Before Exposures

- Obtain informed consent.
- Explain procedures to the patient.
- Be confident.
- Be compassionate as patients may have had a bad experience before.

## Patient Management Techniques Before Exposures – Some “DOs”

- Make settings on machine before placing film in patient’s mouth.
- Ask patient to remove all intraoral objects and eyeglasses.
- Follow a definite order or sequence in placing and exposing films.
- Align the BID or cone flush with the aiming ring of the film holder.
- Ask the patient not to move.

## Patient Management Techniques Before Exposures – Some “Do Nots”

- Don’t use the word “Hurt”.
- Don’t say “Ooops” if you make a mistake.
- Don’t pickup anything you drop on floor.
- Don’t start the exposures in the molar area.
- Don’t position the film on a torus or tori. Place the film between the torus and the tongue.

## Patient Management Techniques During Exposures

- Explain what is going to happen  
For instance, you may say that this next x-ray is going to be pressing on the floor of the mouth and may be uncomfortable.
- Types of problems you may encounter
  - ✓ Gagging
  - ✓Tori
  - ✓Tongue Tied
  - ✓Fear of radiation- does not want x rays.

## What Can You Do To Reduce Gagging?

- Start with films in the anterior region.
- Tell the patient that gagging may occur and that everything will be OK.
- Hygienists remedy for gagging:
  - Topical on tongue or palate
  - Tell patient to “Lift one leg and hold it up”.
  - Tell patient to “Take a deep breath & hold”.
  - Put some salt on tongue.

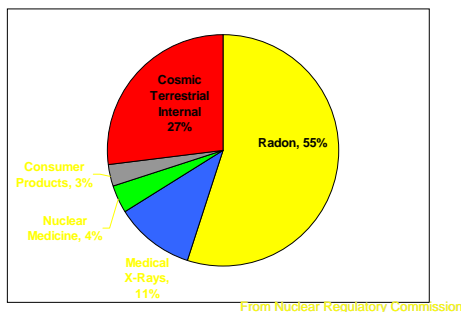
## Patient Refuses X-Rays Due To Fear Of Radiation

- Explain to patient that the doses of radiation are small compared to the BENEFIT of diagnosing problems.
- Explain that the Doctor cannot give a full exam without the x-rays.
- If all else fails, have the Dentist talk with the patient.
- Postpone x-rays during pregnancy.

## Dental Radiographs Have a High- perceived Risk But Low-Actual Risk

- Personal risk from dental radiographs is less than driving to appointment.
- FMX with E+ film equivalent to 3 days of background radiation exposure.

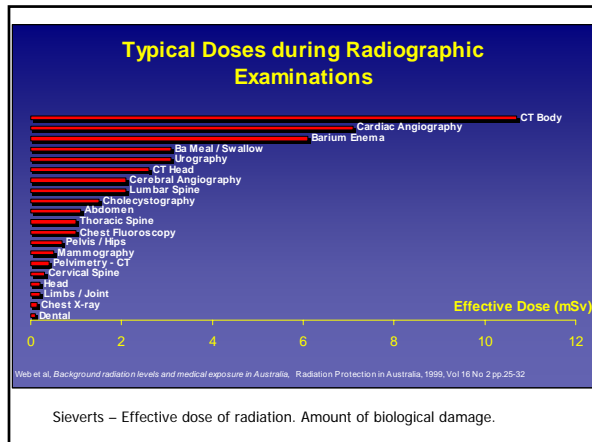
## Background Radiation Exposure



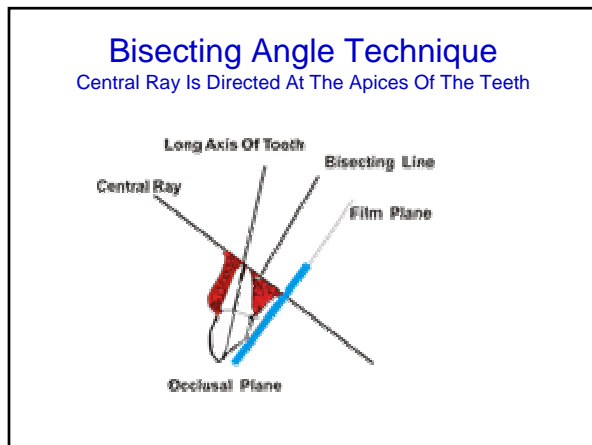
## Comparison Of Background Radiation To Dental X-rays

- REM is first and oldest measure of radiation.
- mREM is 1000<sup>th</sup> of a REM
- Background exposure 360 mREM  
for the average person per year
- Ave. Dental X-ray delivers 2 mREM
- FMX delivers 36 mREM
- Panoramic delivers 4 mREM
- Flying cross country 5 mREM additional
- Brick building delivers 10 mREM additional/yr
- Cooking with natural gas 10 mREM additional/yr
- Sleep with another person 10 mREM additional/yr



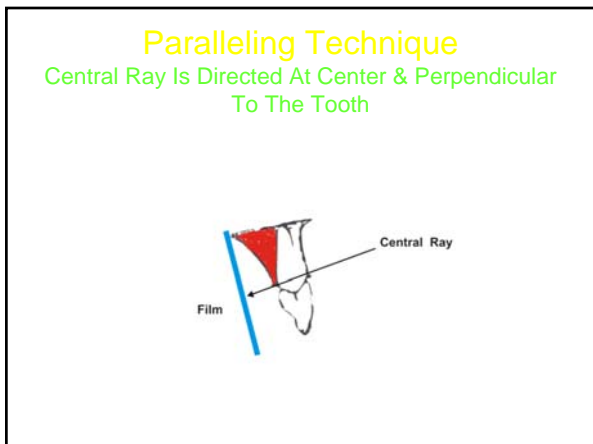


- ### Intraoral Radiographic Technique
- There are two intraoral radiographic techniques:
    1. Bisecting the Angle Technique (Short Cone)
    2. Paralleling Technique (Long Cone)
  - Technique Of Choice
    - ✓ Paralleling Technique with film holders.
    - ✓ It has the diagnostic advantage of accurate and reproducible images.



- ### Advantages of Bisecting Angle
- Positioning of film is simple and quick.
  - Positioning of film packet is relatively comfortable for patient in all areas of mouth.
  - Image of the tooth will be the same length as the tooth itself and should be adequate, **but not ideal**, for most diagnostic purposes.

- ### Disadvantages of Bisecting Angle
- Image distortion.
  - Molars are distorted because of more than one root.
  - Incorrect vertical angulation will result in foreshortening or elongation.
  - Bone levels are poorly shown.
  - Crowns of teeth are often distorted making caries detection difficult.
  - Not possible to obtain reproducible views.



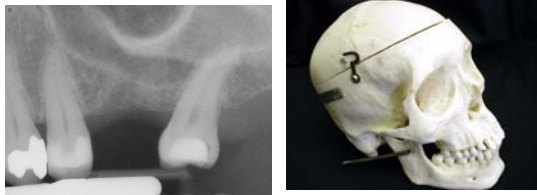
## Advantages of Paralleling Technique

- Malar process or Zygomatic arch is projected away from the apices of molars.
- Improved accuracy of the root apices, cervical line and the relationship of alveolar crest to CEJ.
- Periapical tissues are shown with little foreshortening or elongation.
- Caries detection is easier because crowns of teeth are accurately shown.
- Horizontal and vertical positions are determined by the positioning devices.
- Less likely to cone cut due to positioning device.

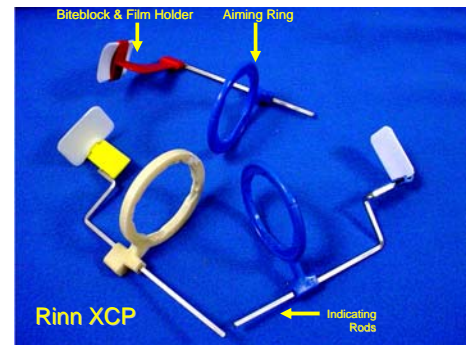
## Disadvantages of Paralleling Technique

- Positioning of film packet can be very uncomfortable for the patient.
- Film is placed farther away from the tooth.
- Not possible to place the film parallel to the tooth in every patient due to anatomical limitations.
- Positioning the film holders can be difficult for inexperienced operators.
- Apices of teeth may appear very near edge of film in some cases.

## Zygomatic Arch



## Film Holders For Paralleling Technique

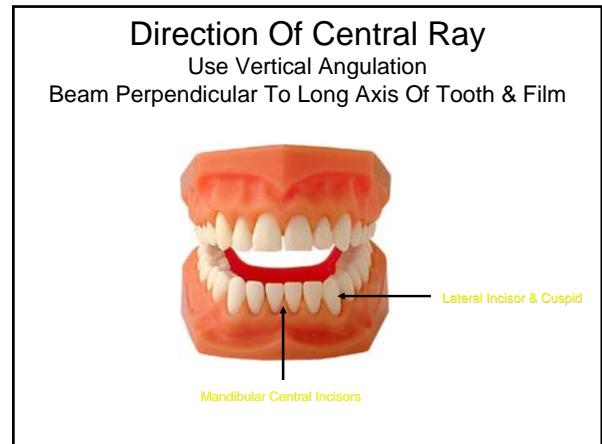
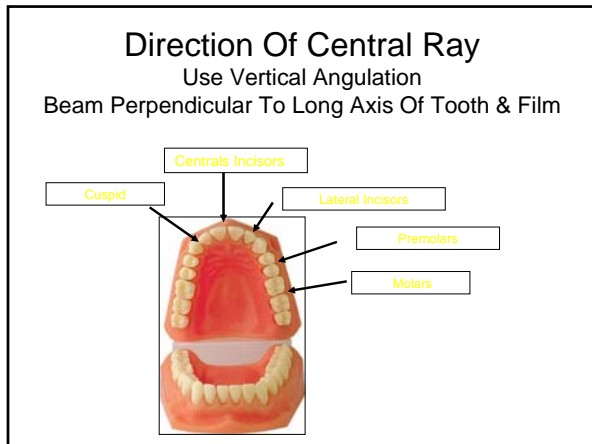


## Periapical Technique

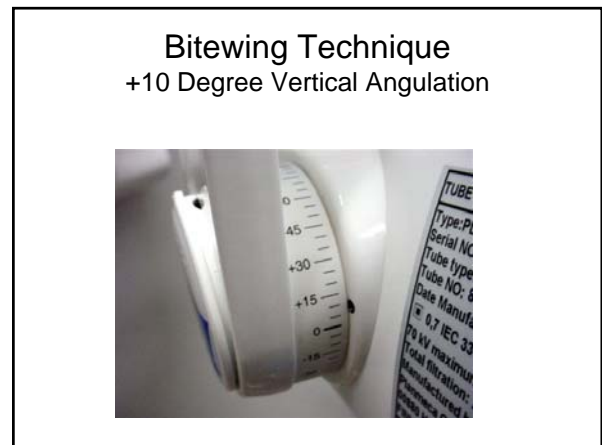
1. Use film holder to position the film parallel to the teeth.
2. Central ray directed perpendicular to the film and long axis of tooth.
3. Place film away from tooth and toward the middle of the oral cavity.
4. Select film based on anterior or posterior area.
5. Direct Central Ray through the contact areas to avoid overlapped contacts.

## Periapical Technique

6. Center the x-ray beam over the film to prevent "Cone Cuts".
7. Develop sequence for exposing film so no areas are skipped or overlooked.
8. Start in the anterior since this area is easier for patient to tolerate and less likely to cause gagging.



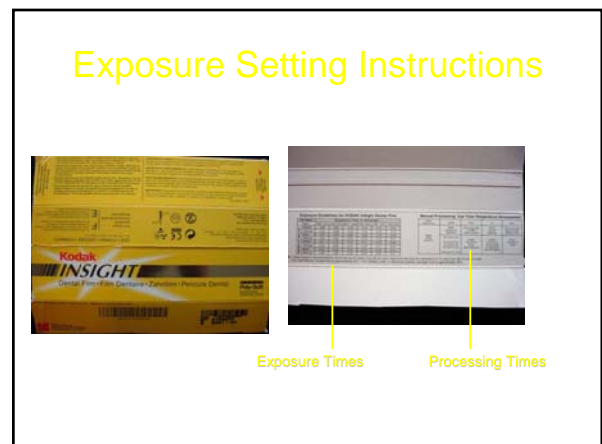
- ### Bitewing Technique
- Place film parallel to crowns of teeth
  - Film is stabilized when patient bites on bitewing tab or film holder.
  - Use +10 Degree Vertical Angulation
  - Direct the Central Ray through the contacts of the teeth to “open” the contacts.
  - Check the x-ray beam to see that it covers all film to prevent “cone cutting”.



### Kodak Film Sizes

<http://www.kodakdental.com/en/film/intraoralFilm/productLiterature/intraoralFilm/Sizes.html?plD=2382>

Periapical			Occlusal
Size 2 1 1/4 x 1 5/8	Size 1 15/16 x 1 9/16	Size 0 7/8 x 1 3/8	Size 4 2 1/4 x 3
Bitewing			
Size 3 1 1/16 x 2 1/8	Size 2 1 1/4 x 1 5/8	Size 1 15/16 x 1 9/16	Size 0 7/8 x 1 3/8



## X-Ray Exposure Settings

- Manufacturer instructions in the film package will give the Exposure Setting for that Speed of film.
- Exposure Settings should be **posted** near the Control Panel of the X Ray Machine.
- Check to see if Exposure Settings are for the type of film you are now using.



## Gendex Control Panel



Milliamp Setting

Exposure Timer

kVp Setting



## Control Panel - Planmecca

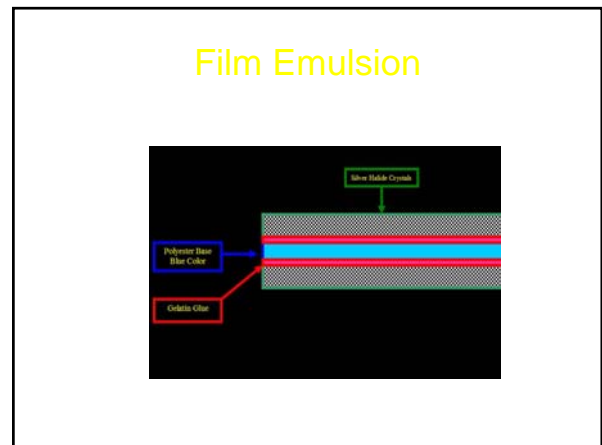
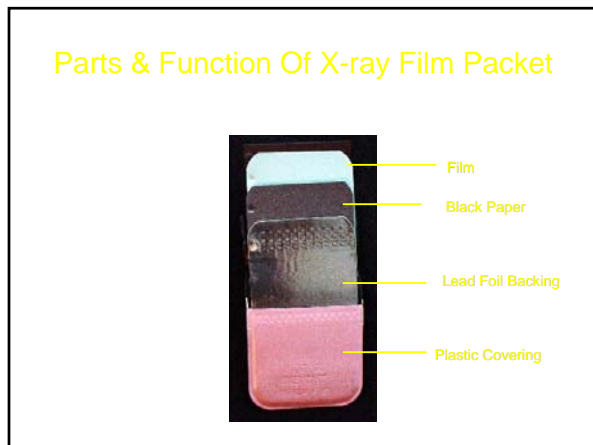


## If All Settings Stay The Same, What Happens When

- Kilovoltage (kVp) is increased?
- Milliamps (mA) is increased?
- Exposure time is increased?
- **All these setting affect the quality of the radiograph.**

## Film Speed

- Refers to the sensitivity of film to x-rays.
- Designated by "letter codes"- A to F
- "A Speed" film is least sensitive – Slow Film
- "F Speed" film is most sensitive – Fast Film
- "F Speed" film requires **HALF** the radiation to produce a x-ray compared the "D" film.



### Exposing The Radiographs

- Place lead apron and thyroid collar on patient.
- Have the patient remove any oral prosthesis ,eyeglasses or piercings.

### Exposing The Radiographs

- Turn on x ray machine and adjust exposure settings.
- Exposure settings for x ray machine should be posted near the control panel.
- Get everything set up before placing film in patients mouth. Place film in mouth for as short time as possible.
- Insure proper film placement.
- Align BID with Ring on film holder
- Move 6 feet away – Activate Exposure Switch

## Developing Solution

- Developer “develops” only x-ray exposed silver halide crystals that contain the latent image.
- The Developing Solution causes the entire crystal to turn into a block of metallic silver.
- The Developing Solution causes the emulsion to swell and soften permitting the solution to circulate around the crystals.

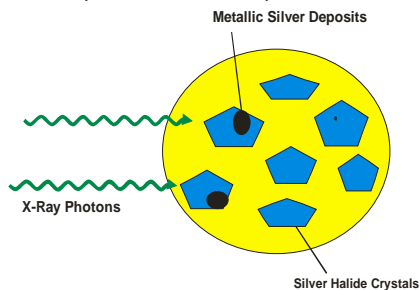
## Fixing Solutions

Has 2 Main Purposes

1. Remove all the undeveloped silver halide crystals.
2. Shrink and re-harden the emulsion to prevent scratching.

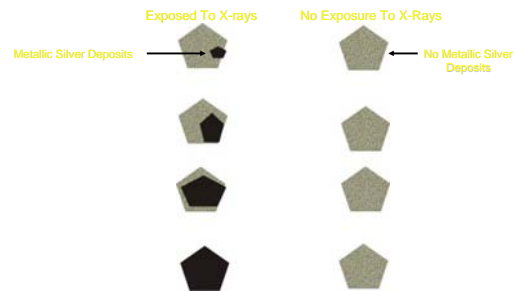
## IntraOral Direct Exposure

- × Rays hitting silver halide crystals that cause the deposit of invisible speck of metallic silver.



## Developing The X-ray Film

Effects Of Developing Solution On Silver Halide Crystals



## Preparing X-Ray Solutions For Processing

- Prepare solutions by using the manufacture's instructions. Some chemicals are NOT diluted others have to be diluted.
- Kodak Realdymatic and Ready Pro are used full strength and are made for an automatic processor.
- When mixing or placing in the processor, do not contaminate the solutions by splashing.



Kodak ReadyMatic



Kodak Ready Pro  
Automatic Processors

## Maintaining X-Ray Solutions For Processing

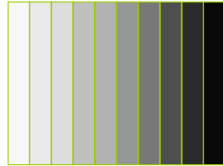
- As films are processed, the solutions are “used up” or depleted.
- The films will start to get lighter.
- Do NOT increase exposure times (radiation) to compensate for this.
- One method to evaluate the “state” of the solutions is to make an “X-Ray Checker Film”.

### X-Ray Checker Film For Checking Quality & Density Of X-Rays

- Automatic Processors – Daily
- Manual Processor - Weekly



Step Wedge



Step Wedge Pattern

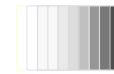
### X-ray Checker Film With Step Wedge



Day 1



Day 2



Day 4

### Replenishing X-Ray Solutions For Processing

- As the processed films or Checker Film become lighter, the solution will need to be **Replenished** by adding more solution.
- Automatic processors have small tanks and will need replenishing more often.
- Some automatic processors have automatic replenishing systems that add developer and fixer automatically.
- Replenishing can be done manually.

### Manual Replenishing X-Ray Solutions

- **Always follow the manufacturers instructions.**
- **Manual:** Each day remove 8 ounces of developer and 8 ounces of fixer. Then add 8 ounces of developer and 8 ounces of fixer.
- **Automatic:** Some replenish automatically. Check the fluid levels each day.
- Mix the solutions thoroughly.
- Do not contaminate one solution with other by mixing device or splashing.
- Change the solutions when recommended by the manufacturer.

### Automatic Replenishes



### Optimum Conditions For Processing Automatic Processors

- Solutions are automatically kept at 85 F to 105 F.
- Replenish chemicals at beginning each day.
- Wash rollers once a week with warm water and then soak for 10 to 15 minutes.
- Follow the manufacture's instructions on maintenance.

## Automatic Processor

### Rollers Move The Film Through The Following Stages:

- Developer
- Squeegee
- Fixing
- Squeegee
- Wash
- Dry

## Automatic Processor



Air Techniques



Peri-Pro

## Identify Errors In Film Processing

### Premature Opening Of Film Packet

- Cause: Opening film packet in "white light". Area exposed will be "black".
- Correction: Make sure "white lights" are turned off before opening the film packet.



White Light Exposure

## Under Developing

Produces A "Whiter" Than Normal Film

- Cause:
  1. Worn out developing solution.
  2. Processing shorter time than required.
  3. Developing solution too cold.
- Correction:
  1. Use fresh developing solution.
  2. Process films for proper time.
  3. Process films at proper temperature.

## Over Developing

Produces A Darker Than Normal Film

- Cause:
  1. Leaving films in developing solution too long.
  2. Processing films at too high temperature.
  3. Not diluting developing solution properly.
- Correction
  1. Process films for proper time.
  2. Process films at proper temperature.
  3. Mix developing solution to manufacturer's instructions.

## Under Fixing

Produces A "Milky" Film & Not Transparent

- Cause  
Too short a time in the fixer.
- Correction  
Keep film in fixer for twice the developing time or 10 minutes.



### Over Fixing

Produces film "Lighter" Than Normal and Appears Washed Out

- Cause

Film in fixer too long – several hours.

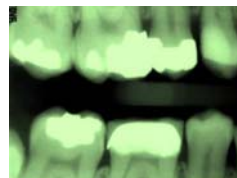
Film appears to be washed out.



- Correction

Place film in fixer for proper time.

### Failure To Wash After Fixing Film Turns Greenish Color



### Wet Readings

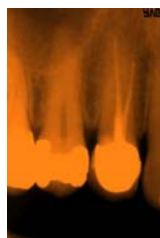
Developed For Proper Time But Fixed For Only Few Minutes.

- Cause

1. Brown stain will occur if not returned to fixing solution.
2. Brown stain is temporary if film is returned to fixing solution.
3. Brown stain becomes permanent after several hours.

- Correction

Return films to fixer promptly. Then wash and dry.



### Films Stuck Together During Developing Produces "Lighter" Area On Film Where Touching

- Cause

Developing solution cannot develop the parts of film that are touching. Silver halide crystals do not "develop" and are washed out by fixer.

- Correction

Make sure films are not in contact during developing.

### Films Stuck Together During Developing and Fixing

- Cause

1. Films too close together.
2. Wash water does not remove undeveloped and unfixed area of the emulsion.
3. Results in a "yellow green" area on film.

- Correction

Be sure films are separated from each other.

### Films Stuck Together During Drying

- Cause

1. Film too close together.
2. The two emulsions fuse together.
3. Pulling apart tears the emulsion resulting in a torn and fragmented surface.

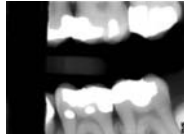
- Correction

Make sure films do not touch during drying.

### Automatic Processing Errors White Light Leaks

- Cause
  1. Turning on light before last film has entered processor completely.
  2. Removing hands from "cuff" too soon after last film has been inserted in processor.
- Correction

Be sure last film has entered the processor before turning on light or removing hands from "cuff".



White Light Exposure

### Automatic Processing Errors Films Sticking Together

- Cause
  1. Feeding films into processor too quickly.
  2. Creates a "yellow green" color in emulsion.
- Correction
  1. Be patient and allow film to enter processor before starting the next film.
  2. Put "yellow green" film in fixer for 10 minutes to try to salvage the film.

### Automatic Processing Errors Black Paper On Film

- Cause
  1. Inserting film with black paper still attached into the processor.
  2. After black paper is removed, film will appear mottled.
- Correction

Be sure black paper is removed from film before inserting into the processor.

### Automatic Processing Errors Chemical Stains or Debris on Film

- Cause
  1. Improper maintenance (Cleaning).
  2. Deposition of chemical debris on rollers.
- Correction

Follow manufacturer's instructions on maintenance and cleaning.

### Routine Exam 45 Year Old Female Patient What Is This Object?



### Storage Of X-Ray Film

- Film should be stored in a cool, dry place. Dampness and high temperatures have a damaging effect on film. Store at 50F to 70F.
- Film should NOT be stored in an area where x-rays are exposed as this could damage or "fog" the film.
- Film should not be stored under heavy objects or stacked too high as pressure can damage film

### Disposal Of Silver In Fixer And Lead Foil

- Two items that must be recycled:
  - > **Lead Foil** from the film pack
  - > **Silver** in the fixer
- Lead and Silver are heavy metals and are toxic.
- Kodak offers lead recycling.

[http://www.kodak.com/eknec/PageQuerier.jhtml?pq-locale=en\\_US&pq-path=4243](http://www.kodak.com/eknec/PageQuerier.jhtml?pq-locale=en_US&pq-path=4243)



### Recycling Silver In The Fixer

- Use an in-office silver recovery unit. An example is Kodak Chemical Recovery Cartridge.
- Contact the manufacturer for “Take Back” policy.
- Send used fixer to silver recovery facility.
- Drop off used fixer at designated silver drop off location.
- Check the Yellow Pages under Recyclers

### Kodak Silver Recovery Cartridge



### Digital X-Ray Users

- Do not have to do any of these things.
- There are no film packs, so no lead foil.
- No chemicals are needed to process the film.

### Mounting Radiographs With Facial View

- When radiographs are dry, take to View Box.
- Place films on View Box with **DOT** facing up.
- Group all maxillary films together with incisal edges and occlusal surfaces facing down.
- Group all the mandibular films together with incisal edges and occlusal surfaces facing up.
- Mount the anteriors first, then premolars, then molars, then bitewings.

### Mounting Radiographs With Facial View

- Mount the films as if you were in front of patient.
- The films representing the left side of that patient are on your right side.



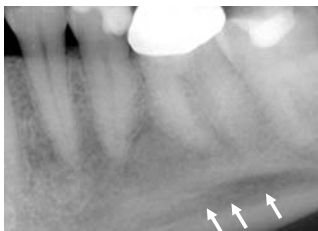
### Anatomical Landmarks That Aid In Mounting

- Maxillary Sinus
- Mandibular Canal
- Maxillary Tuberosity
- Ramus Of Mandible

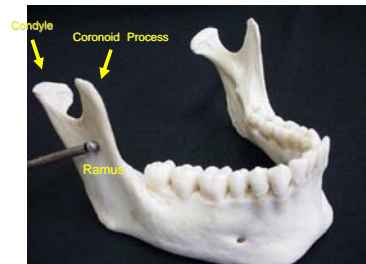
### Maxillary Sinus



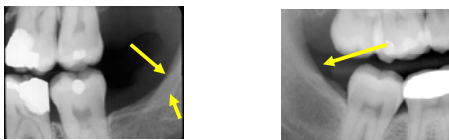
### Mandibular Canal



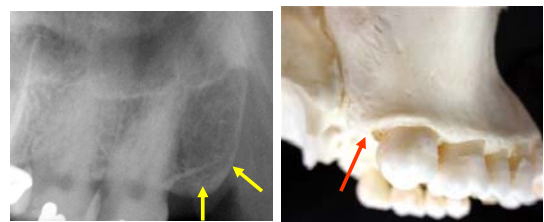
### Ramus Of Mandible



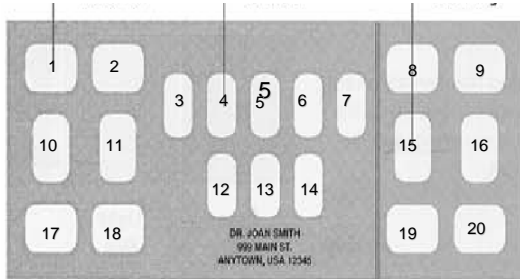
### Ramus Of Mandible



### Maxillary Tuberosity



## What Film Would Show Maxillary Sinus, Mandibular Canal, Maxillary Tuberosity, and Ramus



## Optimal Viewing Techniques

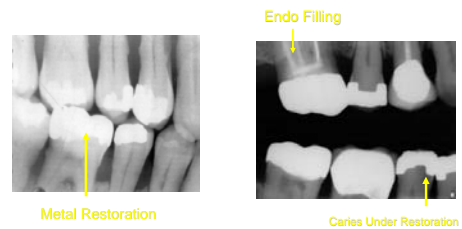
- Use a Viewbox that provides uniform illumination. There should be no dark or bright areas.
- Any areas of the Viewbox that are not covered by the film mount should be blocked out or "masked" to prevent glare to the viewer.
- Use a film mount that has a black, non-reflective surface. Avoid clear or frosted mounts because they produce glare.



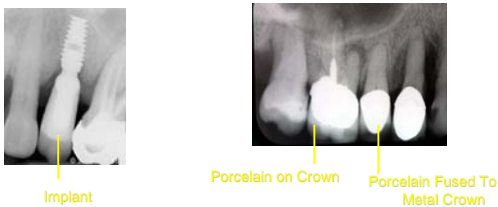
## Label The Film Mount

- Required Information
  - ✓ Patient's Name
  - ✓ Date of the radiographs
- Optional Information
  - ✓ Dentist's name and address
  - ✓ Operator's name

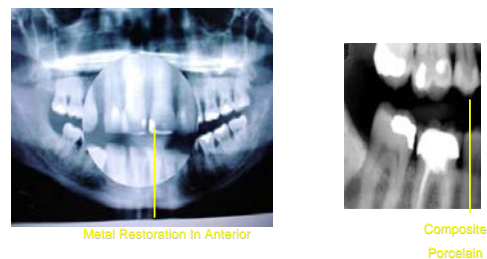
## Dental Materials On Radiographs



## Dental Materials On Radiographs



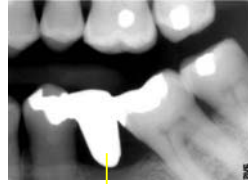
## Dental Materials On Radiographs



### Dental Materials On Radiographs

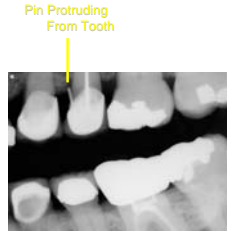


Composite  
Glass Ionomer  
Porcelain

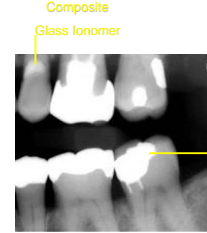


Metal Bridge

### Dental Materials On Radiographs



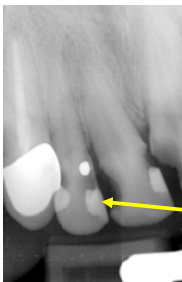
Pin Protruding From Tooth



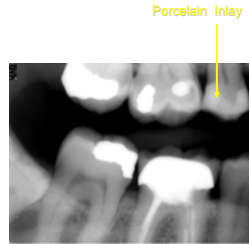
Composite  
Glass Ionomer

Pin  
Amalgam

### Dental Materials On Radiographs

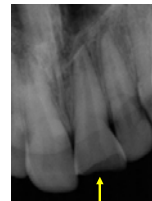


Composite

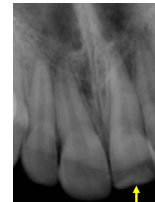


Porcelain Inlay

### Dental Materials On Radiographs



Fractured Central

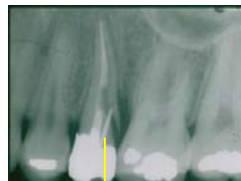


Composite

### Dental Materials On Radiographs

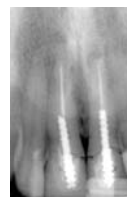


Stainless Steel Crown



Endo Post

### Dental Materials On Radiographs

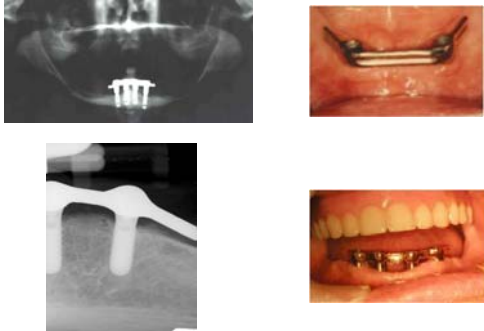


Endo Posts



All Porcelain Crowns

## Implant For Denture & Hader Bar



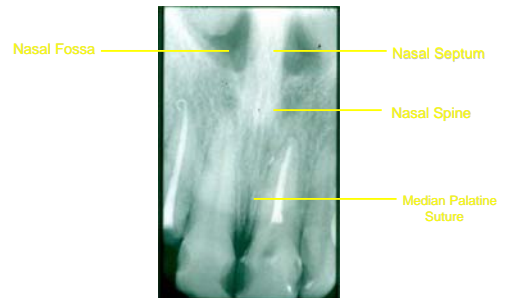
## Surgical Stabilization Plate



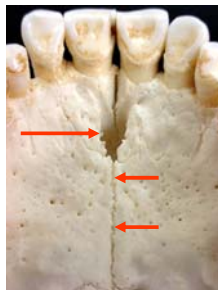
## Dental Radiographic Anatomy

- Incisive Foramen
- Nasal Septum
- Nasal Fossa
- Maxillary Sinus
- Zygomatic Arch
- Maxillary Tuberosity
- Genial Tubercles
- Lingual Foramen
- Mental Foramen
- Mandibular Canal

## Nasal Area – Anterior Radiograph

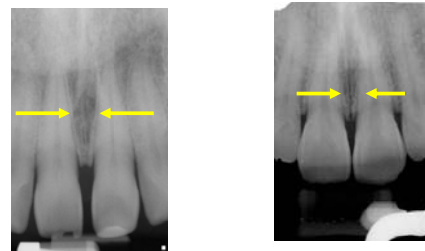


Nasal Septum  
Nasal Fossa  
Nasal Spine



Incisive Foramen  
Median Palatal Suture

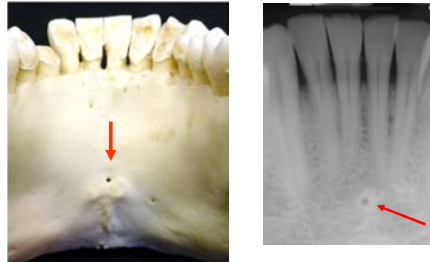
## Incisive Foramen



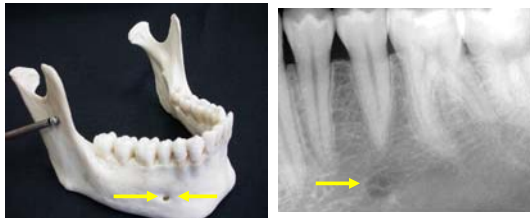
### Nose – Soft Tissue Projected On Film



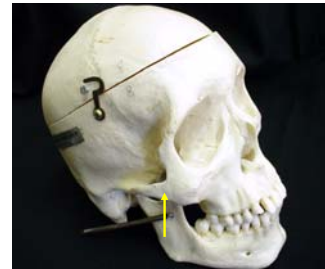
### Lingual Foramen



### Mental Foramen



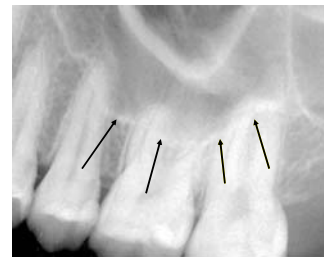
### Zygomatic Arch



### Zygomatic Arch

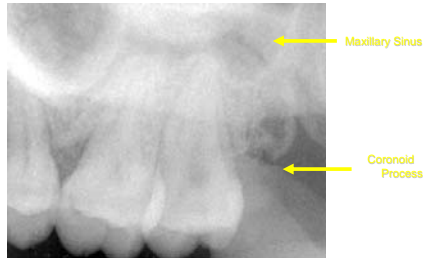


### Maxillary Sinus

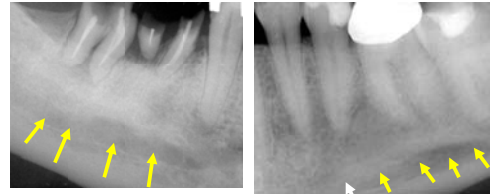




## Maxillary Sinus

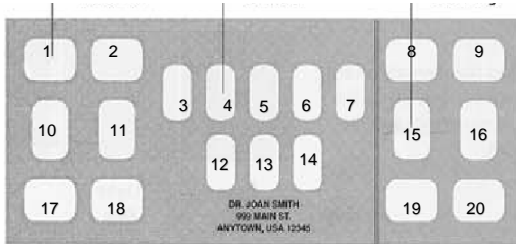


## Mandibular Canal



## What Film Would Show

Maxillary Sinus – Incisive Foramen – Mental Foramen  
Lingual Foramen – Nasal Septum – Median Palatine Suture



## Diagnostically Acceptable Radiographs

- Radiographs that the dentist is willing to accept for interpretation.
- The radiograph must demonstrate anatomic accuracy as well as proper
  - \* Detail
  - \* Density
  - \* Contrast

## Detail, Density, & Contrast

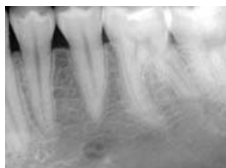
- **Detail** is the overall sharpness of the x-ray image. Is it “in focus and sharp” or “out of focus and blurry”.
- **Density** is the overall darkness of the image. Is it “too dark” or “too light”.
- **Contrast** is the shades of gray on the film.
- High Contrast is mainly black & white.
- Low Contrast has many shades of gray and no strong areas of black & white.

## Criteria For Evaluating Periapical Radiographs

1. Clinically acceptable representation of the area.
2. Teeth should not be foreshortened or elongated.
3. Interproximal spaces should not be overlapped.
4. 4 mm of bone around apex of tooth.
5. 2-4mm margin between crowns and edge of film.
6. Density should be acceptable.
7. No cone cuts – No distortions due film bending.

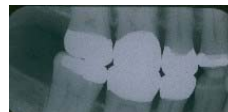
### Criteria For Evaluating Periapical Radiographs

8. Embossed dot should be at incisal or occlusal surface of periapical film.
9. Each root apex should be visible at least once, preferably twice.
10. Films should not have any scratches, fingerprints, chemical stains, or other imperfections.



### Criteria For Evaluating Bitewing X-Rays

1. Interproximal spaces should not be overlapped from distal of cuspid to distal of last tooth in arch.
2. Maxillary and Mandibular arches should be shown equally.
3. Alveolar bone should be shown interproximally without overlap of crowns.



### Minimum Diagnostic Acceptability of FMX (Full Mouth X Ray)

- Each interproximal space should be visible at least once in the FMX.
- Each root apex should be visible at least once in the FMX.

### Recognizing Technique Errors Two Types Of Radiographic Errors

- Radiographic Technique
- Radiographic Processing
- To identify these errors you must know what an "ideal" radiograph looks like.
- Then you compare your radiograph to the "ideal" one.

### Placement Of Anterior Films #1 Size Film

- Maxillary Central Incisor Region  
Film Centered behind 2 central incisors.
- Maxillary Lateral Incisor Region  
Film centered behind lateral incisor.
- Maxillary Cuspid Incisor Region  
Film centered behind the cuspid.
- When using #2 film, lateral incisor film is omitted.

### Placement of Bitewing Radiographs

- Should show equal amounts of maxillary and mandibular teeth.
- Premolar region should show distal 1/2 of mandibular cuspid.
- Molar regions should show the last erupted tooth in the arch.

## Standards Of Image Quality

- Image should not be distorted.
- Image should not be excessively magnified.
- Cusp tips should be superimposed on each other.
- Roots should not be elongated or foreshortened.
- Alveolar crest below the CEJ in adults.

## Standards For Horizontal Alignment Of The Central Ray

- Align central ray so that there are no overlapped teeth.
- Open contact areas.
- Not possible in every patient due to improper alignment of the teeth.

## Information To Be Recorded In Patient's Chart

- Doctor's authorization.
- Number and type of radiographs.
- Speed of film used.
- kVp and exposure time.
- Purpose:  
To document the dose to the patient when and if that becomes necessary.

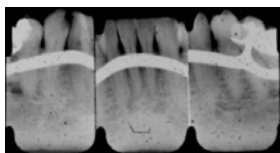
## Identifying Technique Errors Errors In Patient Preparation

- Error  
Radiopaque artifacts on periapicals
- Correction  
Remove metal appliances such eye glasses or partial dentures.

## Radiopaque Objects On Film



Eyeglasses



Partial Denture

## Errors In Exposure Radiographs "Lighter" Than Normal

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• Causes</li></ul> <ol style="list-style-type: none"><li>1. Take finger off timer switch too soon.</li><li>2. Exposure time set too short.</li><li>3. BID too far from patient's cheek.</li><li>4. kVp set too low</li><li>5. Using F speed film time for a D film.</li></ol> | <ul style="list-style-type: none"><li>• Correction</li></ul> <ol style="list-style-type: none"><li>1. Keep finger on switch until timer stops.</li><li>2. Set proper exposure time.</li><li>3. Place BID "fingers width" from cheek.</li><li>4. Use proper kVp.</li><li>5. Know speed of film you are using.</li></ol> |
|---|--|

### Errors In Exposure Radiographs “Darker” Than Normal

- Causes
  1. Exposure too long.
  2. kVp set too high.
  3. mA set too high.
  4. Using D speed film exposure time for an F speed film.
- Correction
  1. Use proper exposure.
  2. Use proper kVp.
  3. Use proper mA.
  4. Know speed of film you are using and use proper exposure time.

### Errors In Handling Film After Exposure Salivary Contamination

- Cause: Leaving saliva on film packs.
  - \* Saliva causes black paper to stick to film.
  - \* Film will not develop properly.
- Correction

Wipe saliva from film packet immediately after removing from patient's mouth.

### Errors In Film Packet Placement

- Cause: Failure to proper position film.
  - >Failure to include distal ½ of canine
  - >Failure to include all of 3<sup>rd</sup> molars.
- Correction

Place the film to include the area of interest.

### Film Packet Positioned Too Far Forward Or To Far Back In The Mouth

- Too Far Forward
  - \* Cuts off apices of premolar teeth.
  - \* Includes more than distal ½ of canine.
- Too Far Back
  - \* Fails to include the distal of canine.
  - \* Fails to include the mesial of premolar.

### Failure To Include Root Apices

- Bisecting Angle Technique

Film is placed to far above or below the incisal edges.
- Paralleling Angle Technique
  - \* Film placed too close to the teeth.
  - \* Biteblock not seated against the occlusal surfaces of the teeth.
  - \* Correction: Place film at midline of palate and parallel to lingual surfaces of teeth.

### Double Exposure

- Image Appearance
  - > Film depicts two images.
  - > Film appears twice darker as normal.
- Correction

Keep exposed and un-exposed film separate from each other.

## Backward Film

- Cause
  - \*Placing film with lead foil facing BID
  - \*Results in film lighter than normal
  - \*Results in “herringbone” or “tire track” pattern on film.
- Correction

Place film with the white or plain surface facing the BID.

## Double Exposure



## Backward Film



How Can These Be Prevented

## Errors In Vertical Angulation Paralleling Technique

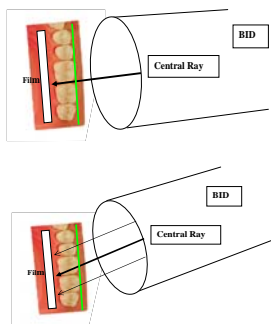
- Causes
  1. Excessive Vertical Angulation causes cusp tips to be off the film.
  2. Insufficient Vertical Angulation causes apices of teeth to be cut off.
- Correction

Make sure the film is parallel to long axis of tooth and central ray is directed perpendicular to the film.

## Errors In Horizontal Angulation

- Cause: Improper alignment of the central ray to the interproximal spaces.
- Correction: Make sure the central ray is parallel to the “key” interproximal spaces.

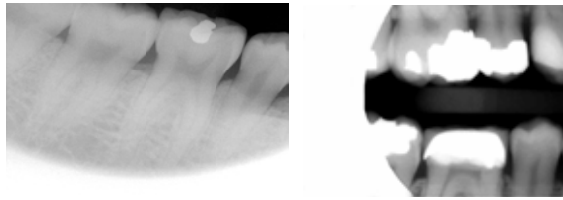
## Correct & Incorrect Horizontal Angulation



## Errors In Tubehead Alignment Cone Cutting

- Cause: Failure to center the BID or cone over the film.
- Make sure the BID or cone is centered over the film and within the rectangular marks on the Rinn holder.

### Cone Cutting



### Bent Films

- Cause: Excessive pressure on one area of the film.
  - \* Causes distortion of bone pattern.
  - \* Causes blurring of apical 1/3 of roots.
- Correction
  - \* Do not excessive bend film.
  - \* Tell patient to gently close on film.

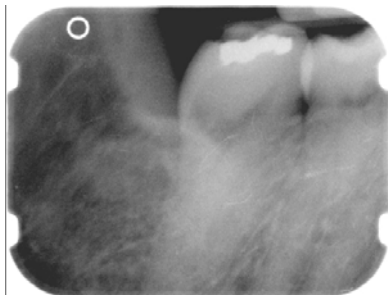
### Bent Films



### Patient or Tube Head Movement

- Cause
  - Patient or tube head moves during exposure.
- Correction
  - \* Tell patient not to move.
  - \* Make sure tube head is stable.

### Patient Movement



### Principles Of Panoramic Radiography



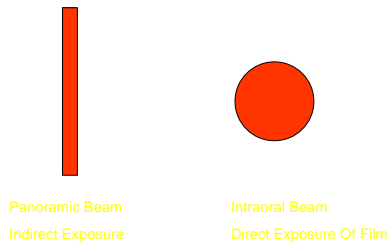
### Principles Of Panoramic Radiography

- Panoramic radiography differs greatly from intraoral radiography.
- Maxilla and mandible are captured on one film.
- Tube head and film move around the patient's head in a coordinated motion.

### Differences In Panoramic and Intraoral Radiography

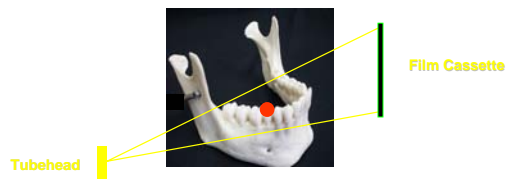
- Beam Of Radiation – Narrow Slit
- Film requires Intensifying Screens
- Film placement is extra oral
- Object to film distance varies
- Exposure time varies from 8 to 22 seconds depending on the manufacturer.
- Image Quality is fair to moderate but significantly less detail than a periapical.

### Beam Of Radiation For Intraoral And Panoramic Radiographs



### How The Pano Works

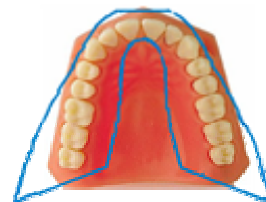
Everything around the Center of Rotation will be in focus



### Focal Trough Finely Depicted Plane

- The Focal Trough is an area in the Pano unit that causes the teeth and jaws to be projected on the film sharply and distinctly.
- The Focal Trough is that area of the dental anatomy that is reproduced distinctly on the radiograph.
- The teeth must be within the Focal Trough or will not be in focus on the radiograph.
- The most important factor that can be controlled by the Operator is the correct positioning of the patient's head.

### Focal Trough Finely Depicted Plane



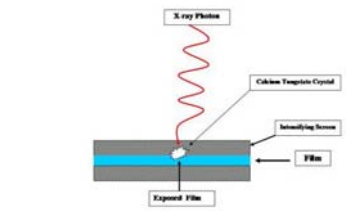
## Selecting The Film And Intensifying Screens

- Digital Panos do not use film, no selection.
- There are two types of film and intensifying screens: Rare Earth & Calcium Tungstate.
- The film and screen must be matched.

## Intensifying Screens

- Screens have fluorescent crystals that “glow” or produce visible light when hit by an x-ray.
- Convert x-ray energy into visible light and expose the film.
- Reduce the patient x-ray dose significantly.
- Film has less detail and higher contrast than direct exposure film with no intensifying screen.

## Intensifying Screen Two Types of Crystals Calcium Tungstate & Rare Earth



## Cassette Indirect Exposure



## Intensifying Screens Have To Be Matched To The Type Of Film That Responds To Blue or Green Light

Calcium Tungstate	Rare Earth
CIA blue emitting screens	CIA green emitting screens
Screen type and Speed class	Screen type and Speed class
CIA B 100	CIA G 100
CIA B 200	CIA G 200
CIA B 400	CIA G 400

Calcium Tungstate

Rare Earth

## Prepare The Patient For Exposure

- Have the patient removed any metal objects from neck to head.
- Oral prosthesis, eyeglasses, jewelry, piercings, bobby-pins.
- Drape lead apron on patient – no thyroid collar.
- Position patient in the machine & bite into notch.
- Move the head positioner into place, if not done automatically.
- Mid sagittal Plane should be perpendicular to the floor.
- Tell patient to put tongue in roof of mouth.



## Panoramic Patient Positioning



## Control Panel Setting Using A Touch Screen



## Bitewings With Planmeca Pano

- Planmeca has setting that will make bitewing x-rays.
- The machine will make a 2<sup>nd</sup> pass around the patient's head to make the bitewings.

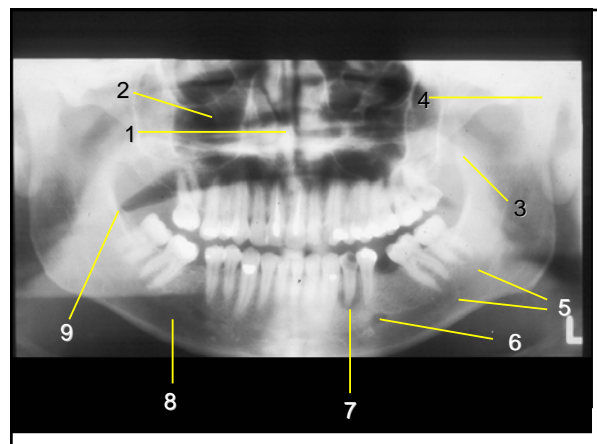


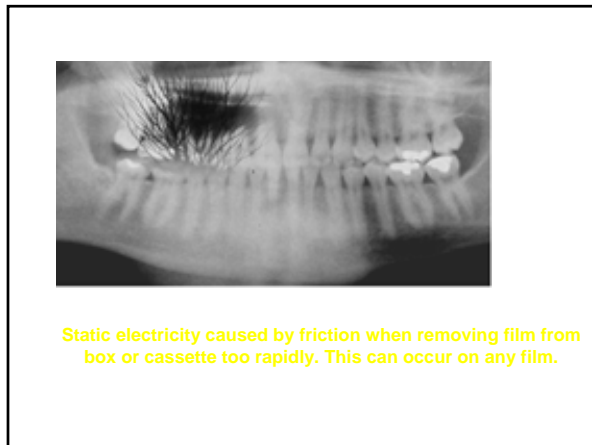
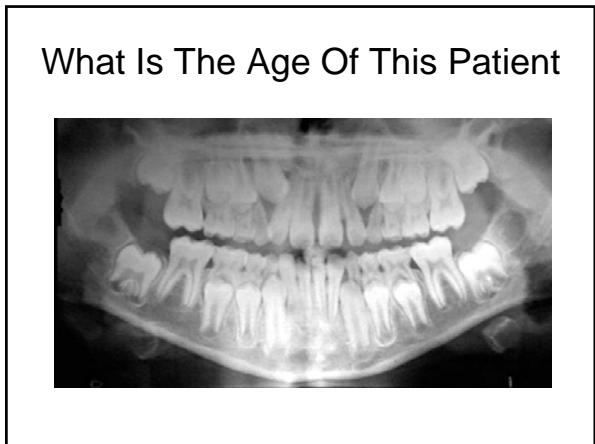
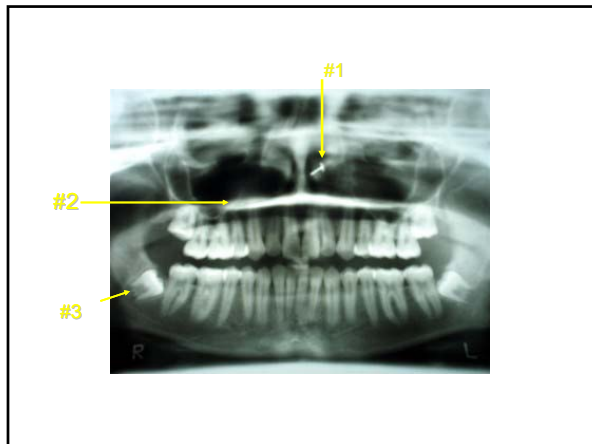
## Exposing The Pano Radiograph

- Confirm the Exposure Settings.
- Tell patient that machine will move around the head.
- Stress the importance of remaining still.
- Check to see that teeth are in notch of bite block and are edge-to-edge relationship.
- Move behind barrier or 6 feet from machine.
- Watch patient during entire exposure to ensure no movement.

## Panographic Errors

- Patient Too Far Forward
- Patient Too Far Back
- Patient's Head Rotated
- Chin Tipped Too Low
- Chin Raised Too High
- Anterior teeth blurred and diminished in width.
- Anterior teeth blurred and magnified.
- Teeth on side close to film diminished while teeth on opposite side magnified.
- Max & Mand teeth outside focal trough and are blurred.
- Palatal plate forms line over apices of maxillary teeth. Teeth blurred.





### Digital Radiography Concepts

- Digital Radiography is a filmless system.
- There are no processing solutions.
- The radiographic image exists only in the memory or hard drive of the computer.
- This system uses radiation from a tube head.
- The image is captured on a Sensor.
- The image is transmitted from the Sensor to the computer monitor where it can be viewed.

### Digital Radiography

- The term "Image" is used to describe the picture produced, not radiograph.
- Many existing x-ray machines can be used for Digital Radiography.
- Requires an electronic timer capable of very short of very short exposures.
- Sensors are thicker than film, in most popular systems, and have a wire attached.

### Advantages To Digital Radiography

- Instant viewing of the picture or Image.
- Elimination of film processing & darkroom.
- Less radiation exposure to the patient.
- Images can be sent by email.
- Remote consultation
- Can be used for patient education.

## Two Types Of Digital Systems

- Wired (CCD)
  - ✓ Wire is attached to the sensor.
  - ✓ Sensor is thicker than film.
  - ✓ May be more difficult to position in mouth.
- Wireless (PSP)
  - ✓ No wires attached to the sensor.
  - ✓ Sensors are thinner than film.
  - ✓ Sensors must be processed in a Scanner.
  - ✓ Requires longer time than the wireless system.

## Wired Digital System



Pixels or

Picture Elements



## Darker Than Normal Film



Darker Than Normal

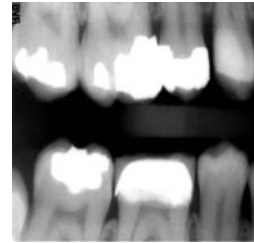


Lighter



Lighter

## Digital Bitewings



## Wireless Digital System



## Expose Digital Radiographs

- Place lead apron & thyroid collar.
- Open patient's file ( Dentrax , Eagle Soft, etc)
- Make exposure settings on control panel.
- Adjust patient's head so occlusal plane is parallel to floor. Sagittal plane perpendicular to floor.
- Remove eyeglasses, oral appliances, jewelry, piercings.
- Place the sensor in mouth using film holders.
- Move behind barriers or 6 feet away.
- Activate exposure switch. Watch Patient.

## Digital Radiograph Errors

- Same errors that occur with films.
- Patient preparation – oral appliances, etc.
- Errors in exposure – exposure time too short.
- Errors in Sensor placement.
- Errors in tube head alignment (BID)
  - Errors in vertical or horizontal alignment
  - Cone cutting
- ❑ Software Errors
  - Not having the software program activated.
  - Not establishing or activating the patient file.

## Quality Assurance Procedures

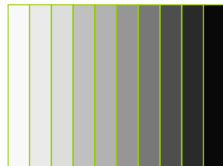
- Darkroom Quality Assurance
  - ✓ **Check for light leaks**  
Go into darkroom and let eyes adjust for 10-15 minutes. Then look for light leaks. Seal up leaks.
  - ✓ **Check processing solutions**  
Perform X-Ray Checker Test with Step Wedge.
  - ✓ **Check safe light**  
Perform Coin Test. In darkroom with lights off and safelight on, unwrap film and place on work counter. Place a coin on film and wait 5 minutes. Process film. If you can see outline of coin, film has been fogged. Safe light should be 15 watts and 4 feet above films.

## X-Ray Checker Film For Checking Quality & Density Of X-Rays

- Automatic Processors – Daily
- Manual Processor - Weekly



Step Wedge



Step Wedge Pattern

## X-ray Checker Film With Step Wedge



Day 1

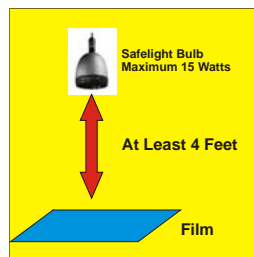


Day 2



Day 4

## Coin Test For Safelights



## Quality Assurance Films or Images

- Critique film or images for errors.
- Make a list of common errors.
  - Exposure
  - Film Placement
  - Tube head alignment
  - Processing
- Correct errors as soon as possible.

## Film Duplicators



Rinn Universal



Hewlett Packard  
Scanner

## Duplicating Procedures

- Duplicating requires a special film.  
KODAK X MAT 2 Dental Duplicating Film
- Under the safelight, place the duplicating film on the original film with the emulsion side in contact with original. Emulsion side has dull surface (other side is shiny).
- Close cover to keep 2 films in tight contact. If not tight, image will be fuzzy.
- Set exposure time (manufacturer's instructions).
- Activate the "Duplicate" switch.
- Process by manual or automatic processor.
- Label the duplicate with name and date.

## Reason For Retaining Radiographs

- Radiographs are part of the dental record.
- Therefore, are legal documents.
- Records must be kept of all aspects of dental care for every patient.
- Texas State Board of Dentistry requires dental records to be maintained for 5 years.

## Documentation In Patient's Record

- Patient's informed consent
- Number and type of radiographs, including retakes.
- Operator's name and date.
- Reason for taking the radiographs
- Results of interpretation of radiographs

## HIPAA

Health Insurance Portability And Accountability Act

- Privacy Rules

Compliance Date April 14, 2003

Enforcing Agency Office Of Civil Rights

- Security Rules

Compliance Date April 21, 2005

Enforcing Agency Centers For Medicare & Medicaid Services (CMS)

## Who Must Comply With HIPAA

- Most dentists are considered a Covered Entity.
- Healthcare providers who transmits health information, such as claims, in electronic form, directly or indirectly, through a vendor or billing service.
- Paper based offices who submit claims on paper and do not check eligibility and benefits electronically, do **NOT** have to comply with HIPAA.

### You Must Comply With HIPAA If You Transmit PHI By The Following

- Claims
- Claim Attachments
- Claim Status Inquiry
- Payment Advice or Remittance Advice
- Coordination of Benefits
- Explanation of Benefits
- 1<sup>st</sup> Report of Injury For Workers Comp
- Enrollment In A Health Plan
- Notice Of Premium Payment

### Privacy Rules

- The primary purpose for the Privacy Rule is to restrict the disclosure of a individual's protected health information or PHI.
- **PHI is any individually identifiable health information. Meaning health information that can be related back to a particular individual or patient.**
- PHI includes:
  - ✓ Health care provided to the patient
  - ✓ Demographic data (name, address, phone numbers)
  - ✓ And data that could be used to identify the individual

### Protected Health Information (PHI)

- Health information is any care provided to a patient or any payment for that care.
- PHI is any individually identifiable health information that is transmitted electronically or by other media.
- PHI includes oral communications.

### Identifiers Of Health Information

- Name
- Birth Dates
- Telephone Numbers
- Fax Numbers
- Email Address
- Social Security Number
- Dental Record Numbers

### Patient's Rights Under HIPAA

1. Right to access and copy their PHI
2. Right to amend or correct their PHI
3. Right to an accounting of disclosures
4. Right to confidential communication
5. Right to complain about your privacy practices
6. Right to request additional restrictions on PHI

### Primary Requirement For Dental Offices

- **Notice Of Privacy Practices**  
This will describe how PHI will be used and disclosed and the patients rights.
- **Acknowledgment Of Receipt**  
Get the patient to sign the Acknowledgment that he/she has received the Notice of Privacy Practices.
  - Keep the Acknowledgement for 6 years.

### Notice Of Privacy Practices

- Describes how PHI about the patient may be used and disclosed and how the patient may get access to this information.
- Must give one to each patient.
- Must be posted in a prominent location in the office.

### Acknowledgment Of Receipt Of Notice Of Privacy Practices

- Must make a good faith effort to get the patient to sign the Acknowledgment
- Once the Acknowledgement is signed, the can use the patient's PHI for TPO.
- TPO means treatment, payment or health care operations.

### Administrative Procedures

- Designate a Privacy Officer & Contact Person
- Provide training to employees
- Provide Notice Of Privacy Practices
- Establish complaint system
- Establish and use a Business Associate Contract

### Authorization

- Authorization is a special document that gives permission to use PHI for specific purposes other than TPO.
- An example would be to send the patient's name to a company marketing a new dental product.

### Authorization Not Necessary

- For reasons of public health surveillance.
- Suspected child abuse or neglect.
- Domestic violence.
- Law enforcement with valid warrant or court order.
- Healthcare fraud investigation
- Investigation by Health & Human Services

### Minimum Necessary Disclosure

- Must make reasonable efforts to limit the PHI to that necessary to accomplish the intended purpose.
- Minimum necessary also means taking reasonable safeguards to protect PHI against incidental disclosure.

## Rumors About HIPAA

- Soundproofing of dental offices not required
- Reminder postcards can be mailed
- Can call patient's name in waiting room
- Can have a sign in sheet
- Can use X-ray viewboxes.
- When you use "Reasonable Safeguards"

## Privacy "Do Nots"

- ✓ Leave charts or PHI where can be taken or seen by unauthorized persons.
- ✓ Discuss the patient's clinical information with anyone not involved in the patient's treatment.
- ✓ Discuss patient information in a public area.
- ✓ Leave computer unattended in an accessible area with PHI on the monitor.
- ✓ Allow the computer monitor to face public areas.

## HIPAA Help

- ADA toll-free number, 1-800-621-8099, Ext. 2750
- ADA by Email: [HIPAA@ADA.ORG](mailto:HIPAA@ADA.ORG)
- **Texas Dental Association**  
Diane Rhodes 1-800-832-1145
- Centers For Medicare & Medicaid Services  
Phone: 1-866-282-0659  
Email: [askhipaa@cms.hhs.gov](mailto:askhipaa@cms.hhs.gov).

