

The Endodontics

Lecture

Isolation of the
operating field



Isolation of the operating field

Introduction

- Problems during restorative treatment.

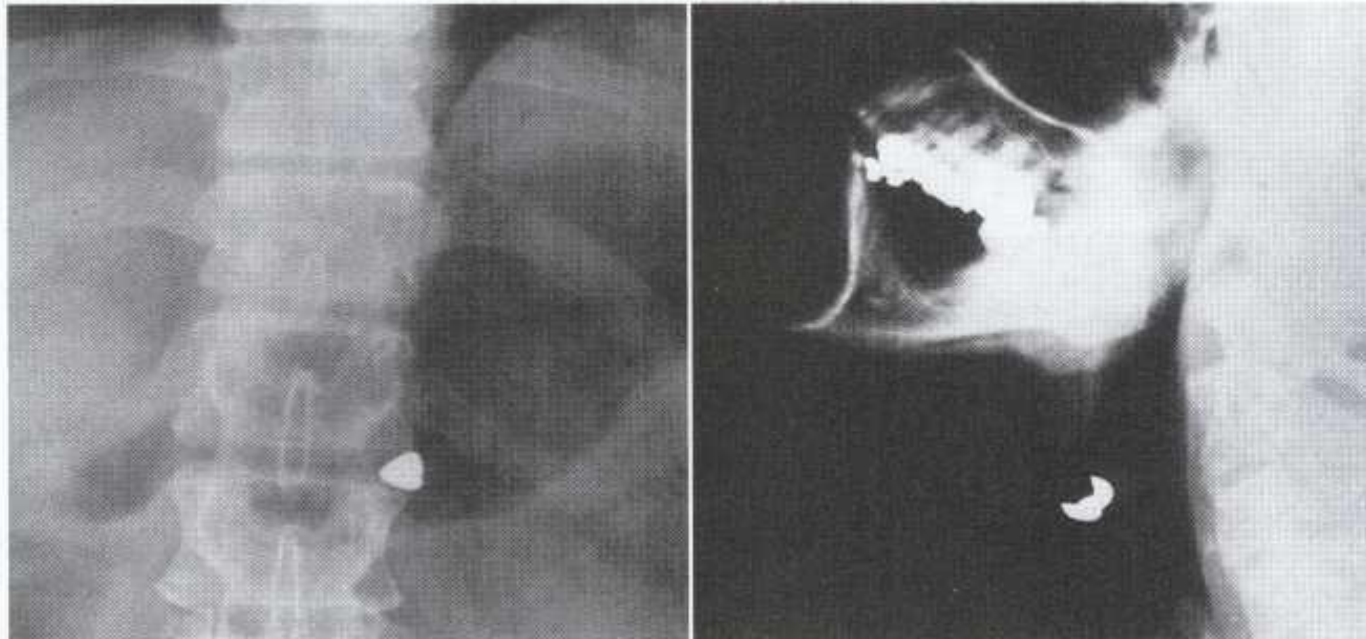


Figure 1. A, Radiograph of swallowed casting in patient's stomach. B, Radiograph of casting lodged in patient's throat.

Isolation of the operating field

- The goals of operating field isolation are:
 - **harm prevention** (Excessive saliva and handpiece spray can alarm the patient. Small instruments and restorative debris can be aspirated or swallowed. Soft tissue can be damaged accidentally).
 - **moisture control** (sulcular fluid, saliva, and gingival bleeding from the operating field).
 - **retraction** (maintaining an open mouth and depressing or retracting the gingival tissue, tongue, lips, and cheek).

Isolation of the operating field

Techniques of isolation of the operating field

I-Local anesthesia

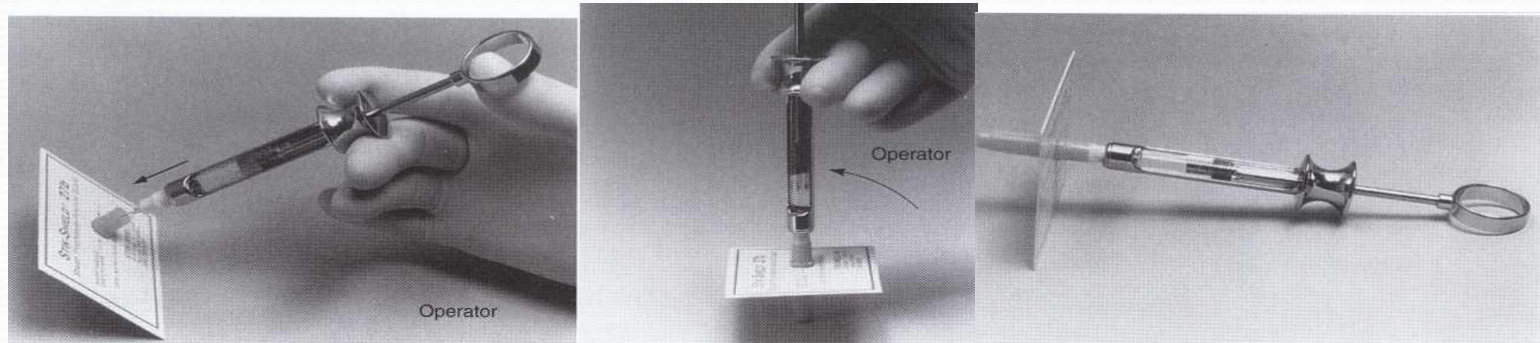


Figure 2. A, Behind the patient, the operator (or person who gave injection), using only the syringe-holding hand, inserts the needle partially into the sheath propped by prop/guard card, and then, B, uprights syringe and sheath upon the tray or countertop and presses the needle fully into sheath. C, Operator lays resheathed syringe propped by card on countertop.

Isolation of the operating field

II-Rubber dam

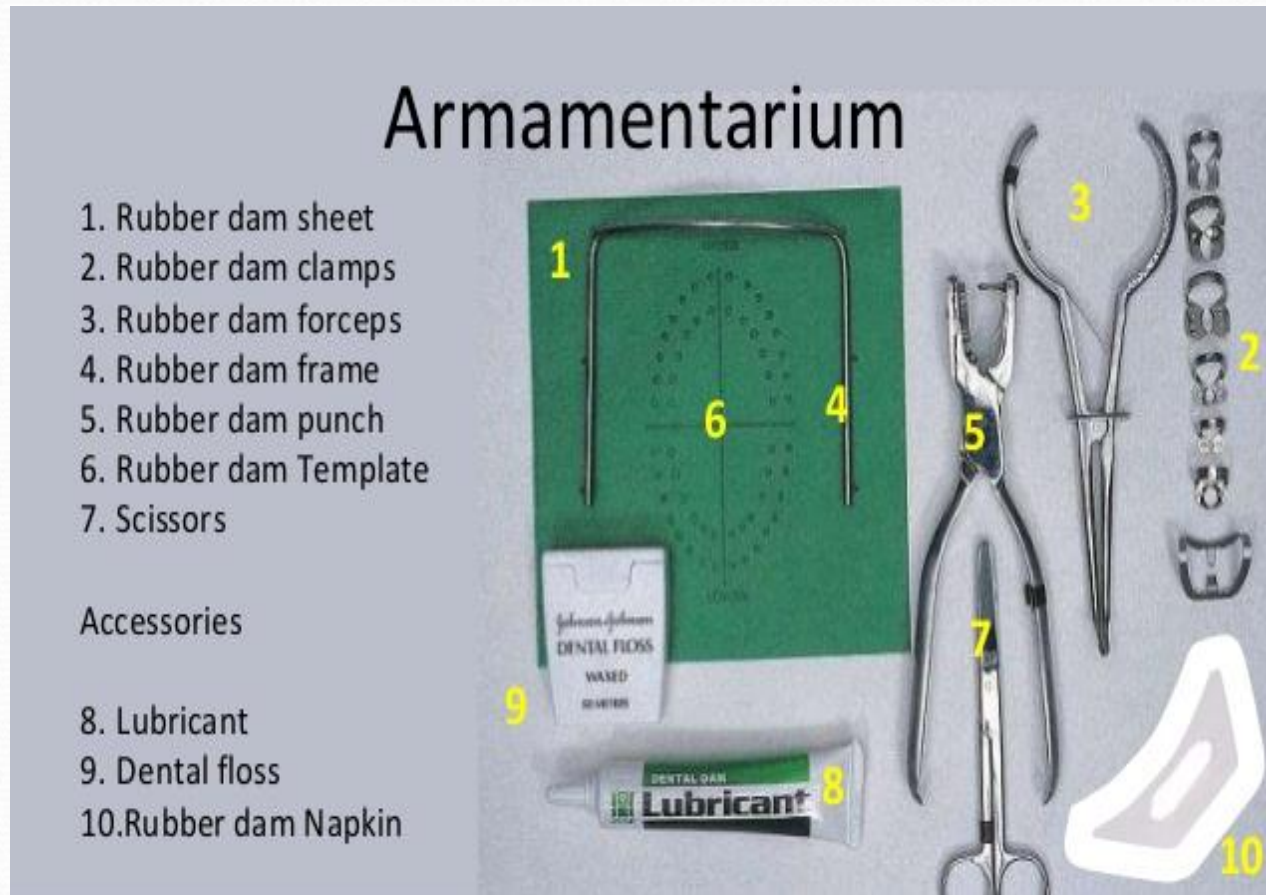


Figure 3. Rubber dam kit.

Isolation of the operating field

III-Absorbents (cotton roll isolation and cellulose wafers)

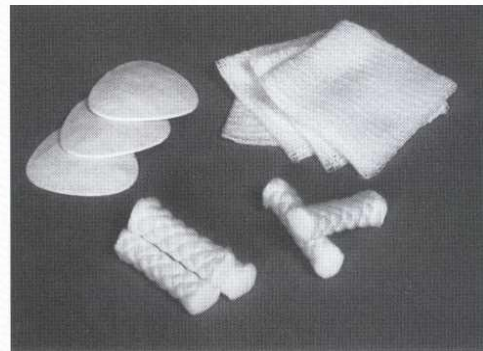


Figure 4. Absorbents such as cotton rolls, cellulose wafers, and gauze sponges provide satisfactory dryness for short periods of time.

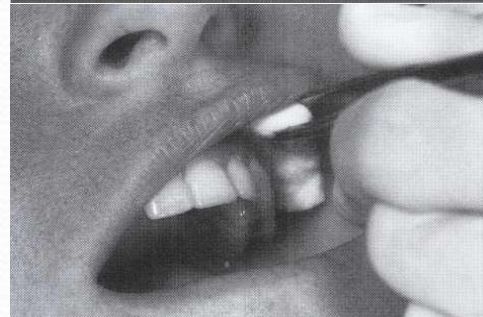


Figure 5. Isolate maxillary posterior teeth by placing cotton roll in vestibule adjacent to teeth.



Figure 6. A cotton roll holder in position.



Figure 7. Position large cotton roll between tongue and teeth by "rolling" it to place in direction of arrow. B, Properly positioned facial and lingual cotton rolls improve access and visibility.

Isolation of the operating field

IV-Throat shields or throat screens (gauze sponges)

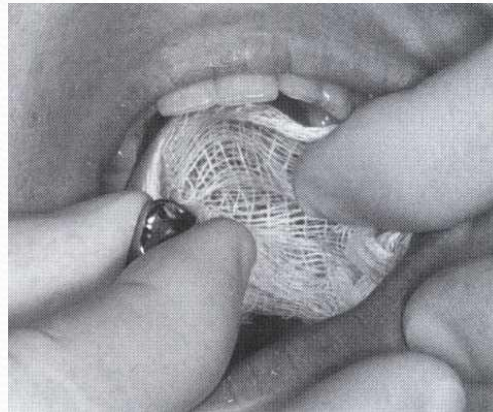


Figure 8. A throat screen is used during try-in and removal of indirect restorations.

Isolation of the operating field

V-High-volume evacuators and saliva ejector



Figure 9. Evacuator tip.

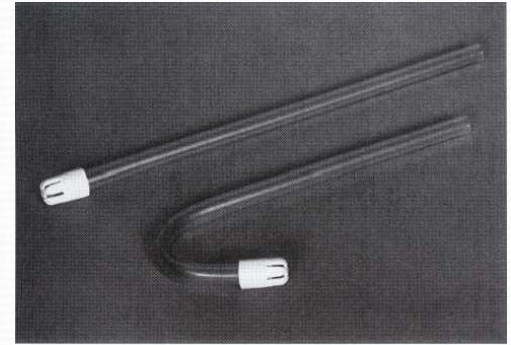


Figure 10. Saliva ejectors.

Isolation of the operating field

Other isolation techniques:

I-Retraction cord

II-Mirror and evacuator tip

III-Mouth prop

IV-Drugs

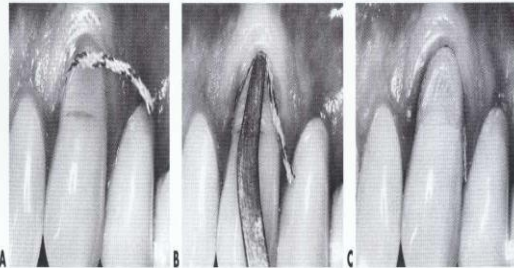


Figure 11. Retraction cord placed in gingival crevice. A, Cord placement initiated. B, A thin, flatbladed instrument is used for cord placement. C, Cord placed.



Figure 12. Position of evacuator tip for maximal removal of water and debris in operating area. A, With rubber dam applied. B, With cotton roll isolation.



Figure 13. Chairside assistant uses air syringe to dry teeth and to keep mirror free of debris.

Isolation of the operating field

Other isolation techniques:

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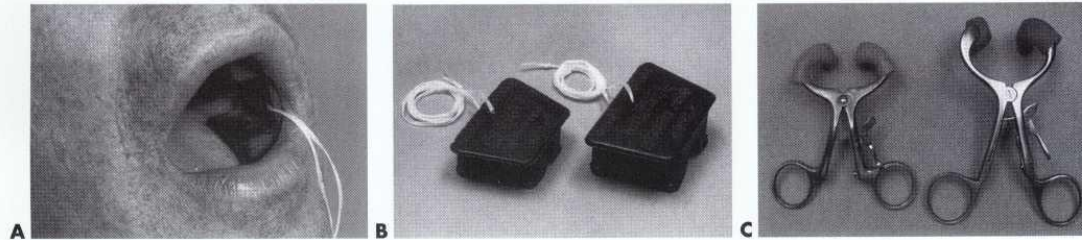


Figure 14. Mouth props. A, Block-type prop maintaining mouth opening. B, Block-type prop. C, Ratchet-type prop.

Isolation of the operating field

I-Local anesthesia

- Local anesthesia is important in moisture control.
 - It **reduces salivation**, apparently because the **patient** is more **comfortable**, less anxious, and less sensitive to oral stimuli, thus reducing salivary flow.
 - Local anesthetics incorporating a **vasoconstrictor** also reduce blood flow, thus helping to **control hemorrhage** at the operating site.

Isolation of the operating field

II-Rubber dam

- In 1864, S.C. Barnum, a New York City dentist, introduced the rubber dam into dentistry.
- The rubber dam is used to define the operating field by isolating one or more teeth from the oral environment.
- The dam **eliminates saliva** from the operating site and retracts the soft tissue.
- The dam ensures **appropriate dryness** of the teeth and improves the quality of clinical restorative dentistry.

Isolation of the operating field

Advantages of rubber dam

In general, the rubber dam is the most successful method of isolating the operating field.

- a **dry, clean** operating field.
- **improved access** and **visibility**.
- potentially **improved properties** of dental materials.
- **operating efficiency**.
- **protection of the patient and operator**. In addition, most of the patients are more relaxed, because water spray and debris from the procedure are isolated from them..

Isolation of the operating field

Disadvantages of rubber dam

- Most frequently, **time consumption** and patient objection. They are reduced with the use of a simplified technique for application and removal.
- Usually, the rubber dam can be placed in **3-5 minutes**, it is the approximate time necessary for onset of anesthesia.

Isolation of the operating field

Disadvantages of rubber dam

- Certain oral conditions may preclude the use of the rubber dam:
 - teeth that have **not erupted sufficiently** to support a retainer.
 - **some** third molars.
 - **extremely malpositioned** teeth.
- In addition, patients suffering from **asthma** may not tolerate the rubber dam if breathing through the nose is difficult.
- In rare instances when the **patient cannot tolerate** a rubber dam because of psychologic reasons or latex allergy.

Isolation of the operating field

Materials & instruments of the rubber dam

- Rubber dam material:
 - Size: 5 X 5 inch (12.5 X 12.5 cm) or 6 X 6 inch (15 X 15 cm) sheets.
 - The thicknesses or weights available are thin (0.006 inch [0.15 mm]), medium (0.008 inch [0.2 mm]), heavy (0.010 inch [0.25 mm]), extra heavy (0.012 inch [0.30 mm]), and special heavy (0.014 inch [0.35 mm]).
 - Both light and dark dam material are available, but the dark color is preferred for contrast.
 - It has a shiny and a dull side.
- Generally, **dark, heavy, 6 X 6 inch** sheets are recommended.

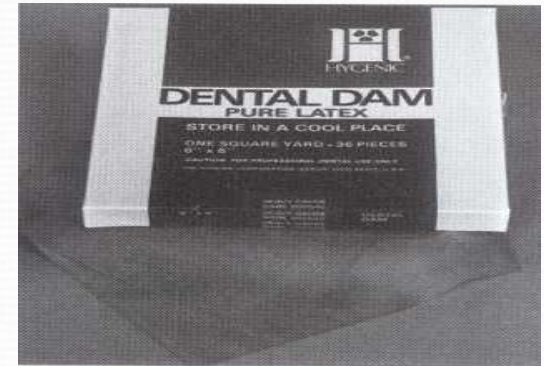


Figure 15. Rubber dam material as supplied in sheets.

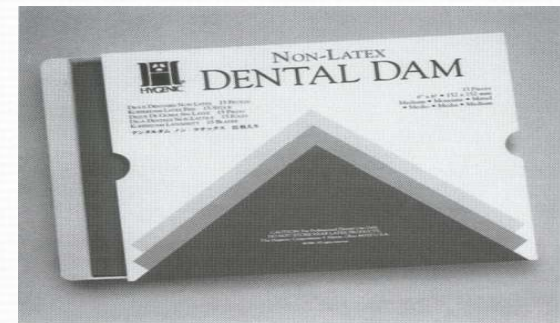


Figure 15. Nonlatex, rubber dam is ideal for patients with known latex allergies.

Isolation of the operating field

Materials & instruments of the rubber dam

- Holder (frame) maintains the borders of the rubber dam in position. The Young holder is a U-shaped metal frame with small metal projections for securing the borders of the rubber dam. It is easily applied and comfortable for the patient.

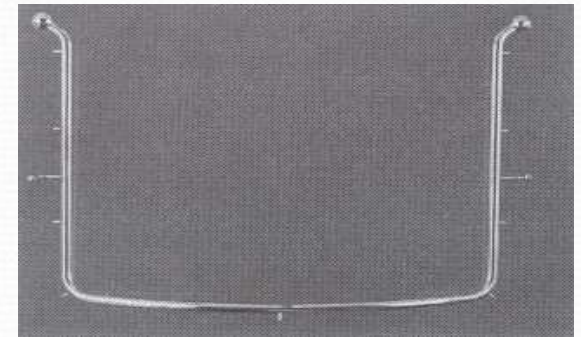


Figure 16. The Young rubber dam frame (holder).



Figure 16 A. Foldable plastic rubber dam frame (Plast-Frame) with hinge to allow for easy film-sensor placement.

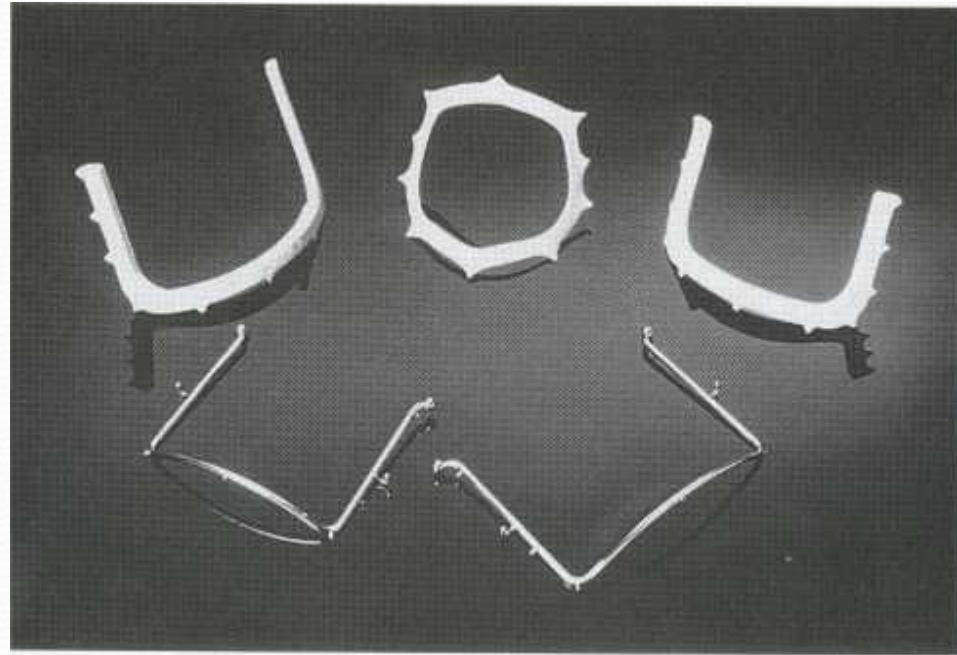


Figure 16 B. Plastic radiolucent and metal rubber dam frames. Top left Young's frame. Top center, Nygaard-Ostby (N-O) frame.

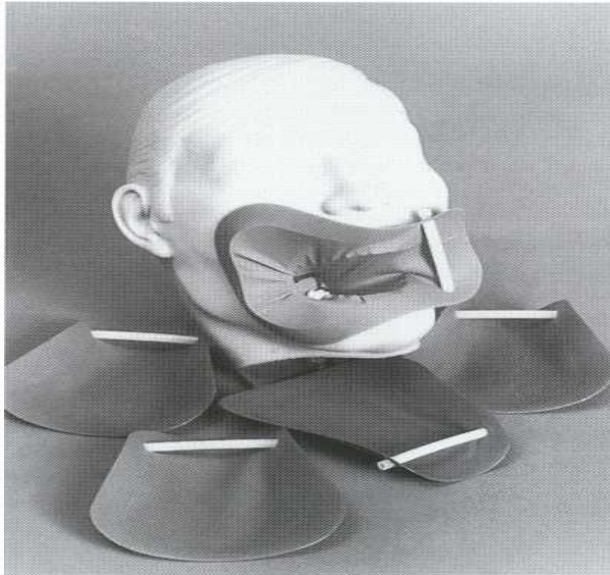


Figure 16 C. The Handidam is a rubber dam system with built-in plastic frame. The disposable frame bends easily for film placement.

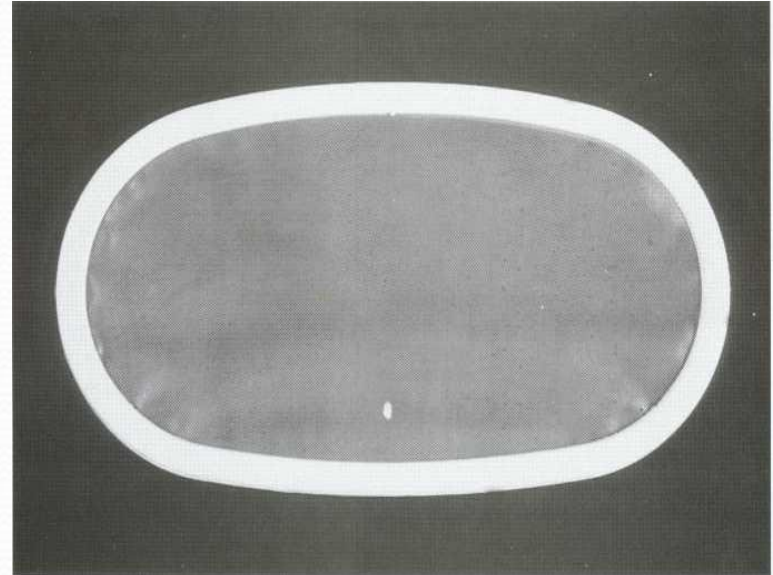


Figure 16 D. The Quickdam is a disposable isolation system with a pliable outer ring.

Isolation of the operating field

Materials & instruments of the rubber dam

- Retainer (clamp), to anchor the dam to the most posterior tooth to be isolated. It is also used to retract gingival tissue.

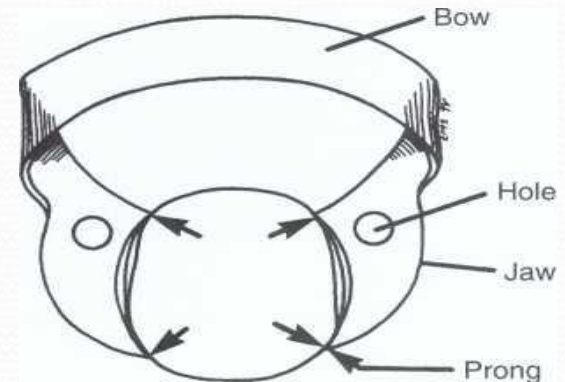


Figure 17. Rubber dam retainer. Note four-point prong contact (arrows) with tooth.

- Note: Experience will reduce the number of retainers necessary.

Isolation of the operating field

Materials & instruments of the rubber dam

- Retainer (clamp), Wingless and winged retainers are available. The **wings** are designed to provide **extra retraction** of the **rubber dam** from the operating field and to **allow attachment of the dam** to the retainer.

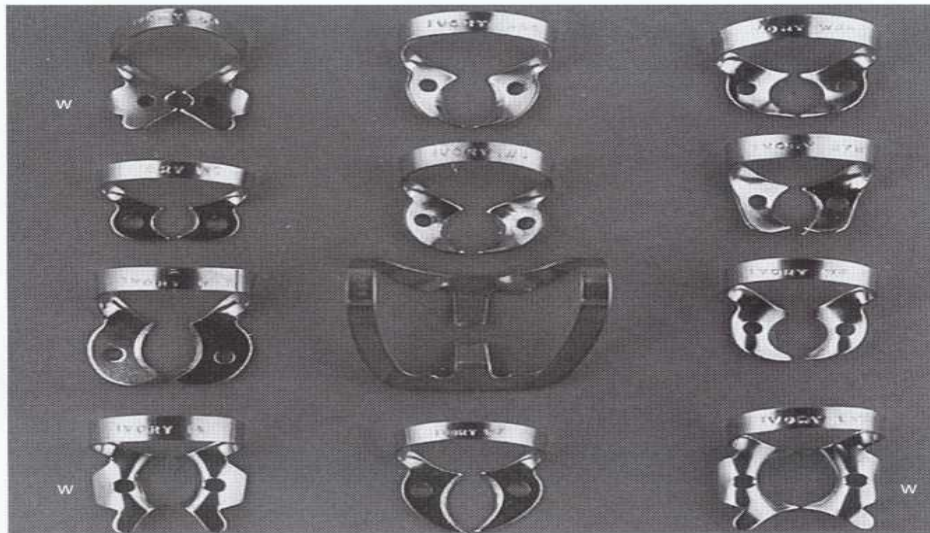
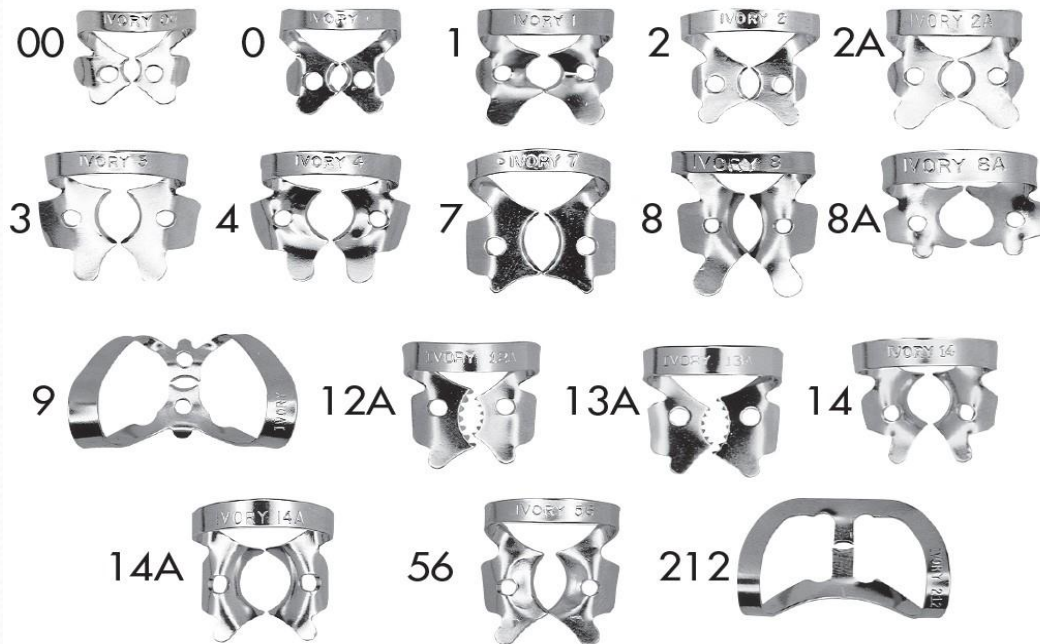


Figure 18. Typical selection of rubber dam retainers. Note retainers with wings (w).



Google image. Ivory no. 2 and 0 premolar clamps, no. 7, 8 and 56 mandibular molar clamps, no. 9 anterior teeth clamp, no. 14 maxillary molar clamp.

Isolation of the operating field

Materials & instruments of the rubber dam

- Retainer (clamp). The jaws of the retainer should not extend beyond the mesial and distal line angles of the tooth, because:
 - they may interfere with matrix and wedge placement.
 - gingival trauma is more likely to occur.
 - a complete seal around the anchor tooth is more difficult to achieve.

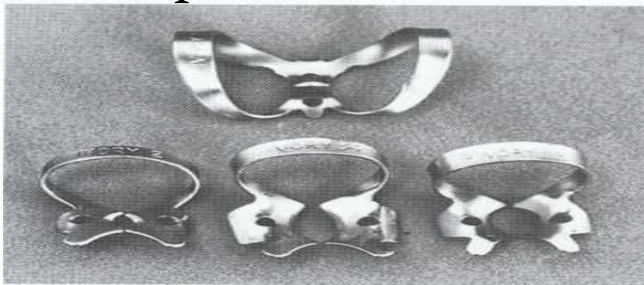


Figure 19. Basic set of ivory-winged rubber dam clamps: top, no. 9 butterfly clamp for anterior teeth; bottom (from left), no. 2 premolar clamp, no. 56 mandibular molar clamp, and no. 14 maxillary molar clamp.

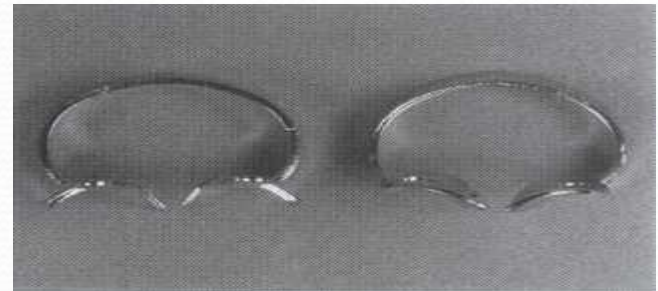


Figure 20. Retainers with prongs directed gingivally are helpful when the anchor tooth is only partially erupted.

Isolation of the operating field

Materials & instruments of the rubber dam

- Retainer (clamp), It is **sometimes necessary to recontour the jaws of the retainer to the shape of the tooth** by grinding with **mounted stone**. A retainer usually is not required when the dam is applied for treatment of the anterior teeth, except for the cervical retainer for Class V restorations.

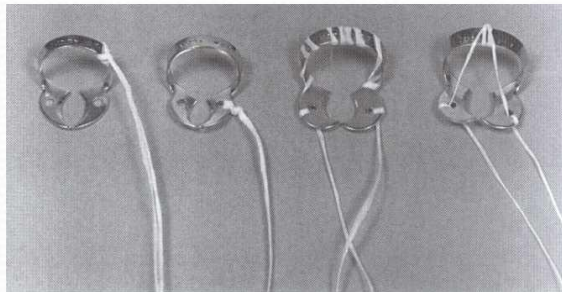


Figure 20. Methods of tying retainers with dental floss, except butterfly no. 212 retainer.



Figure 21. Removing anterior wings (a) on molar retainer. Lateral wings (b) are for holding lip of stretched rubber dam hole.



Figure 22. Recontouring jaws of retainer with mounted stone.

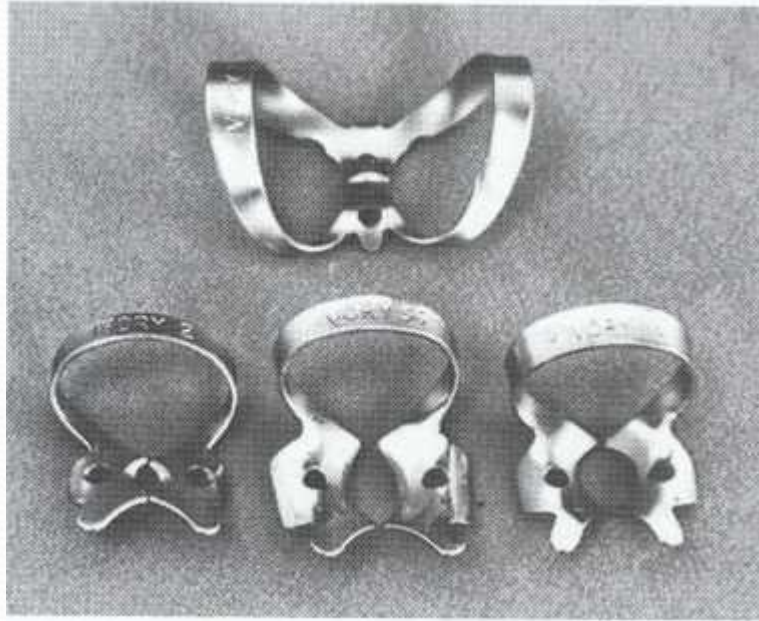


Fig. 5-32 Basic set of ivory-winged rubber dam clamps: top, no. 9 butterfly clamp for anterior teeth; bottom (from left), no. 2 premolar clamp, no. 56 mandibular molar clamp, and no. 14 maxillary molar clamp.

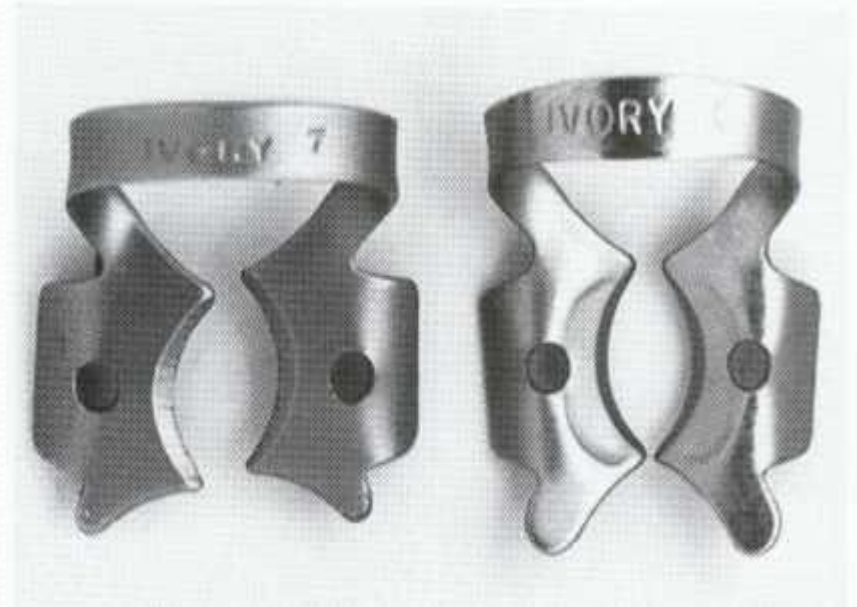


Fig. 5-33 Mandibular molar clamps. Clamp on right has jaws inclined apically to engage tooth with minimal tooth structure remaining.



Fig. 5-34 The S-G clamp for isolation of severely broken-down teeth.
(Courtesy The Smile Center, Deerwood, MN.)



Fig. 5-35 The S-G clamp is placed on the maxillary second molar to isolate severely broken-down maxillary first molar.

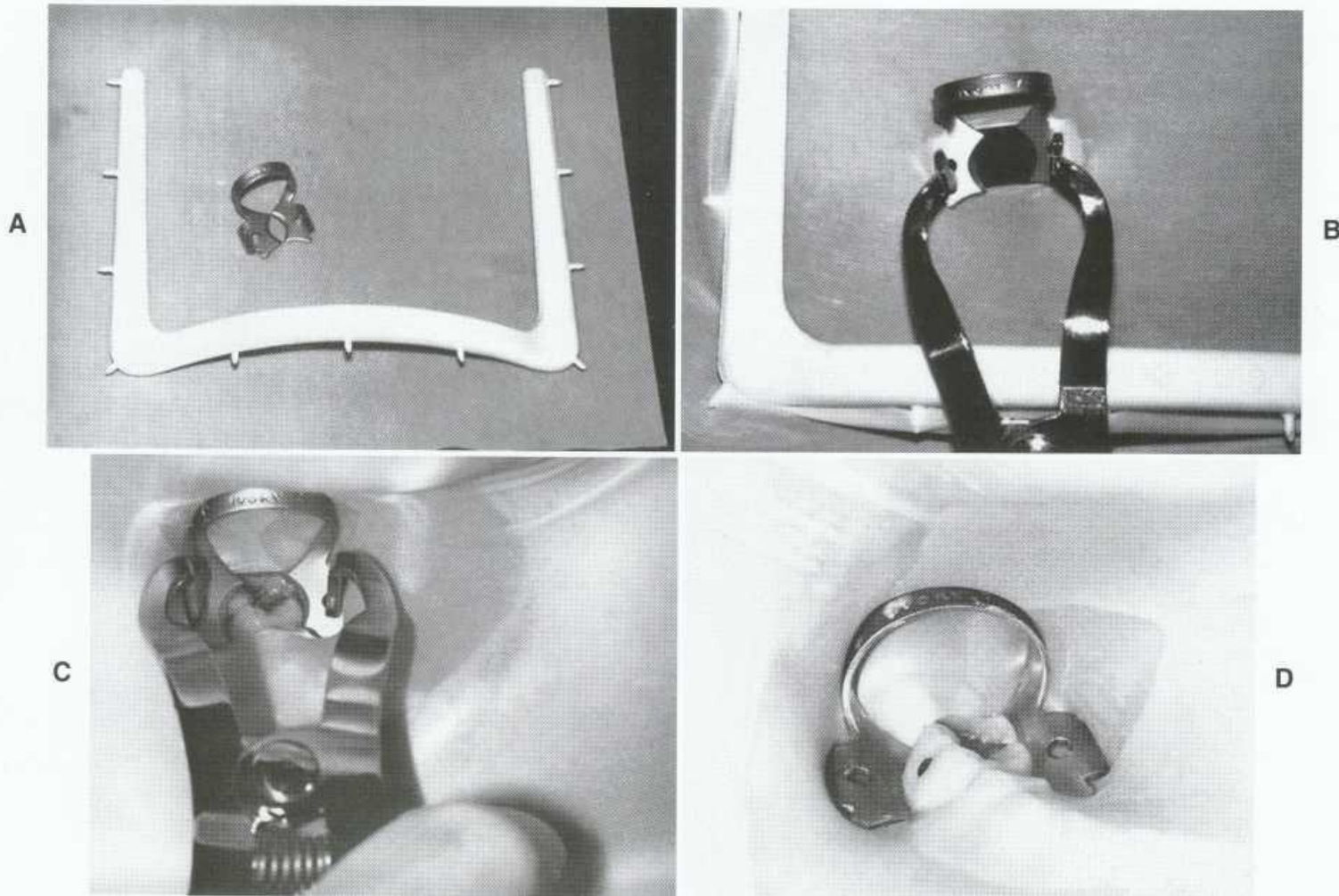


Fig. 5-36 A, Rubber dam, clamp, and frame. B, Clamp positioned in the dam with frame attached and held in position with rubber dam forceps. C, Dam, clamp, and frame carried to mouth as one unit and placed over the tooth. D, Clamp in place with four-point contact and rubber tucked under the wings.

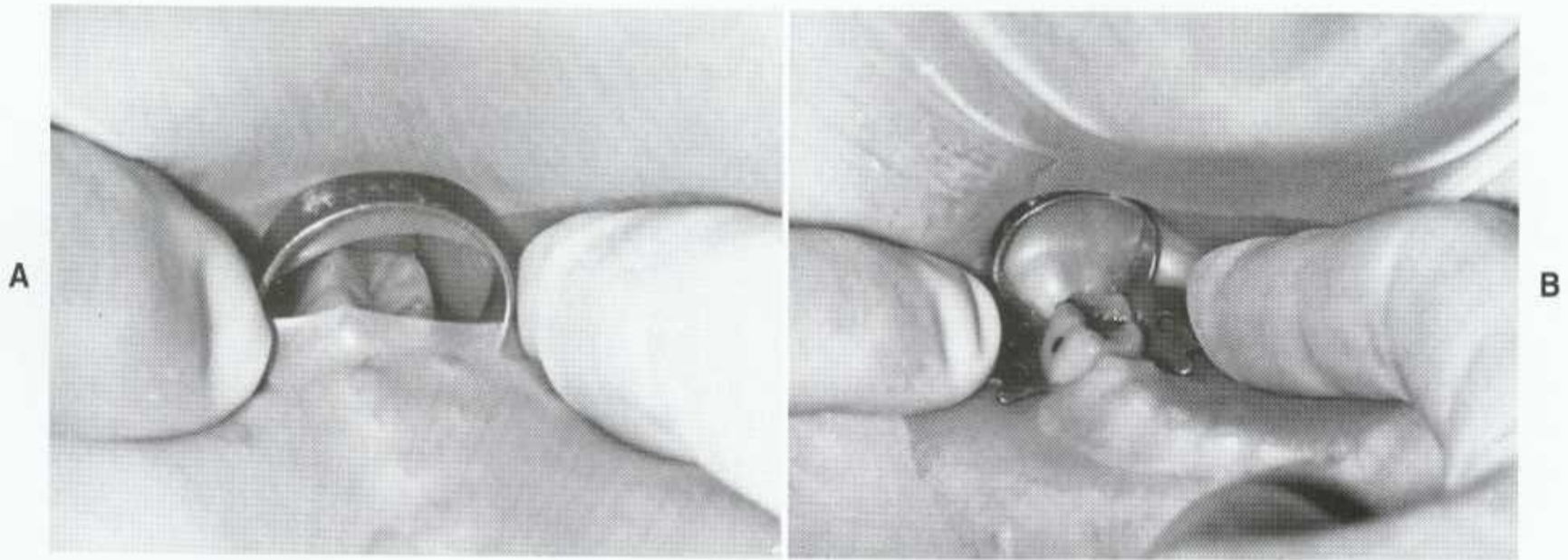


Fig. 5-37 A, After the clamp is placed, the dam is attached to the frame and gently stretched over the clamped tooth with the index finger of each hand. B, Clamp is tested for a secure fit with gentle finger pressure (alternately) on the buccal and lingual aspects of the clamp apron.

Isolation of the operating field

Materials & instruments of the rubber dam

- Punch. The rubber dam punch is a precision instrument having a rotating metal table (disk) with six holes of varying sizes and a **tapered sharp-pointed plunger**.

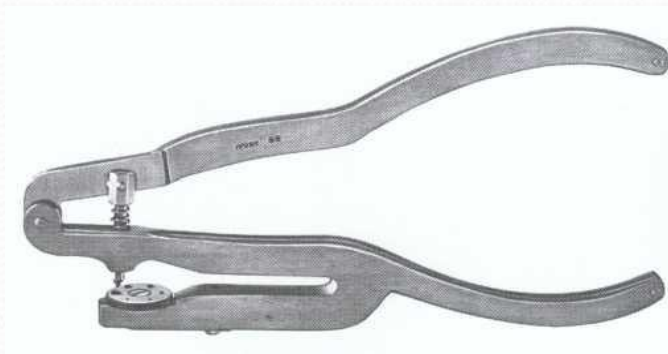


Figure 23. Rubber dam punch.

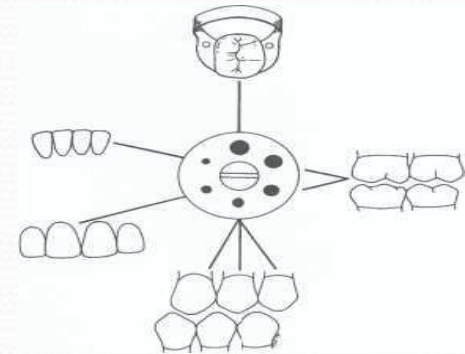


Figure 24. Cutting table on rubber dam punch, illustrating use of hole size

Isolation of the operating field

Materials & instruments of the rubber dam

- Stamp or template can aid in locating hole position.

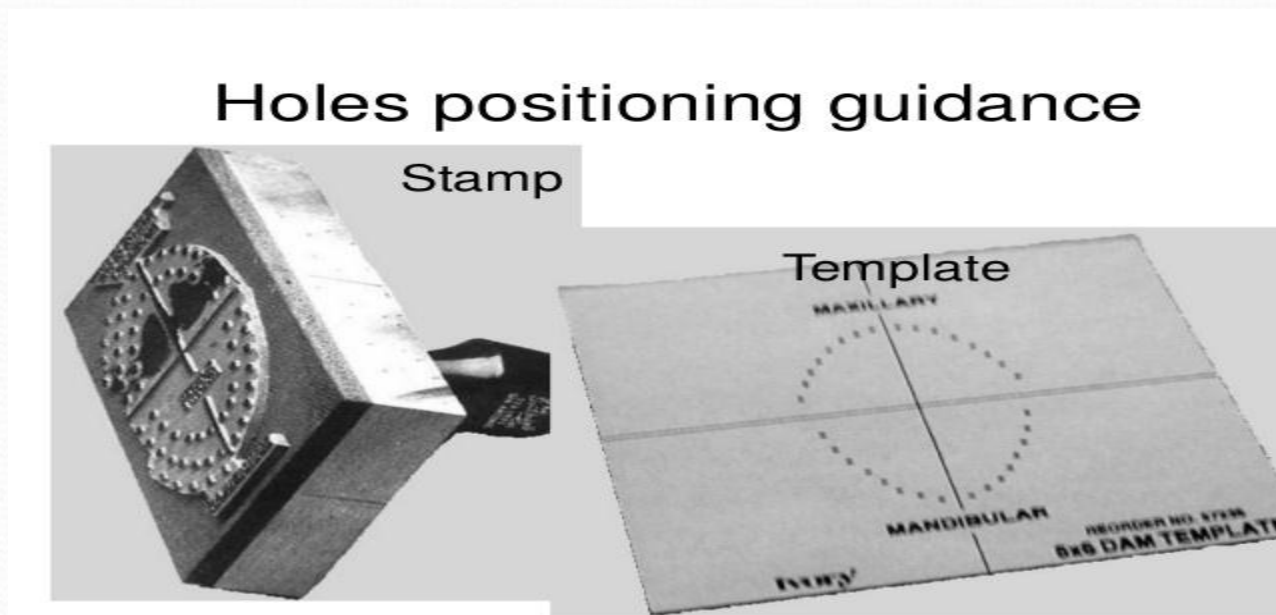


Figure 25. Commercial products to aid in locating hole position.

Isolation of the operating field

Materials & instruments of the rubber dam

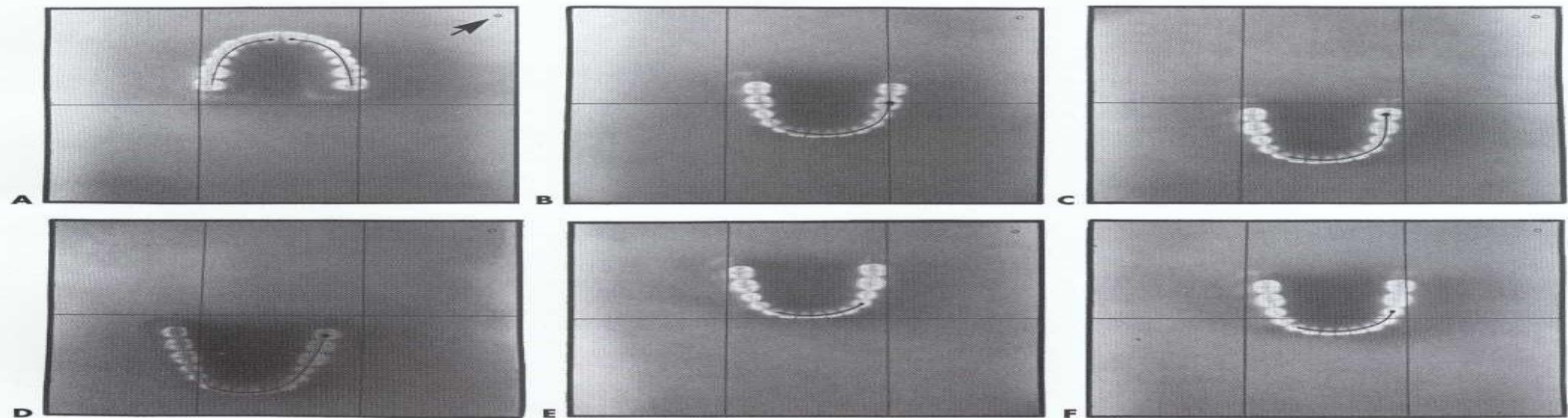


Figure 32. Hole position.

- A, When maxillary teeth are to be isolated, the first holes punched are for central incisors, approximately 1 inch (2.5 cm) from superior border.**
- B, Hole position when anchor tooth is mandibular first molar.**
- C, Hole position when anchor tooth is mandibular second molar.**
- D, Hole position when anchor tooth is mandibular third molar.**
- E, Hole position when anchor tooth is mandibular first premolar.**
- F, Hole position when anchor tooth is mandibular second premolar. Note the hole punched in each of these six representative rubber dam sheets is for identification of the upper left corner (arrow in A).**

Isolation of the operating field

Materials & instruments of the rubber dam

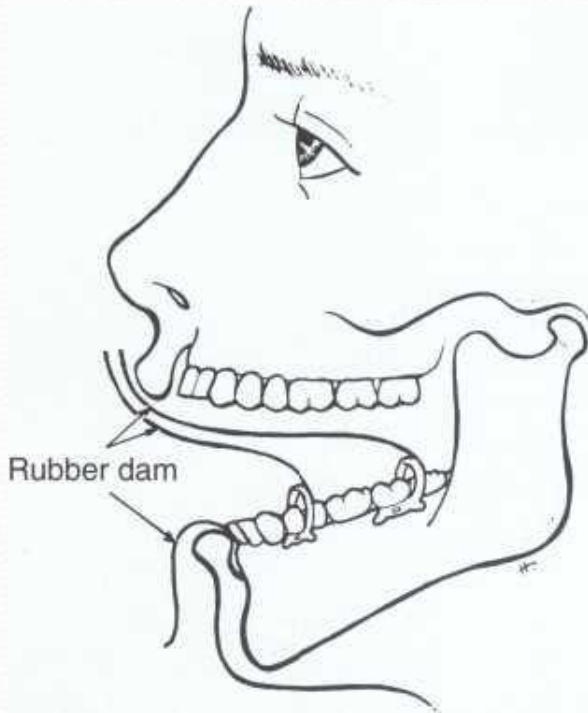


Figure 33. The farther posteriorly the mandibular anchor tooth, the more dam material is required to come from behind retainer over upper lip.

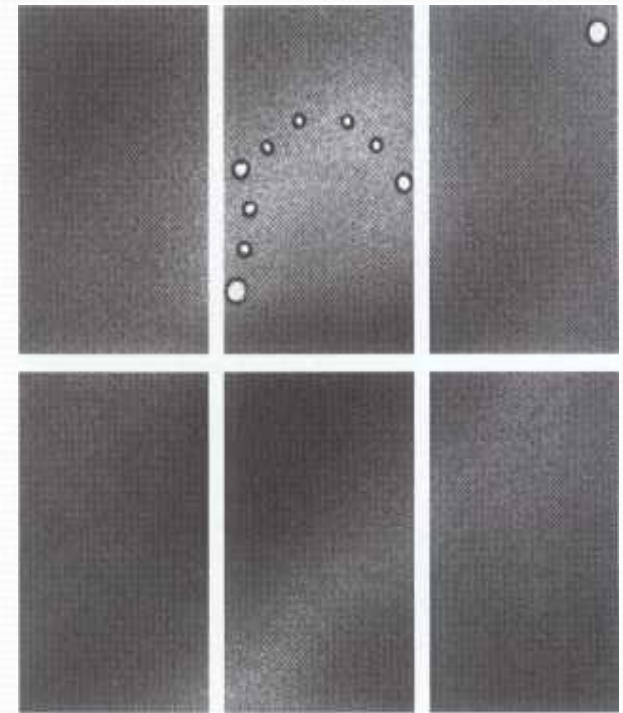


Figure 34. Hole position for tooth (maxillary right canine) to receive cervical retainer is positioned facially to arch form.

Isolation of the operating field

Materials & instruments of the rubber dam

- Retainer Forceps, both for placement and removal of the retainer from the tooth.

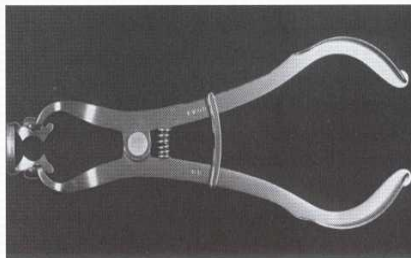


Figure 26. Rubber dam retainer forceps engaging retainer.

Isolation of the operating field

Materials & instruments of the rubber dam

- Napkin, is placed between the rubber dam and the patient's skin.
 - It **prevents skin contact** with rubber to reduce the possibility of allergic reactions in sensitive patients.
 - It **absorbs any saliva** seeping at the corners of the mouth.
 - It acts as **a cushion**.
 - It provides a **convenient** method of wiping the patient's lips on removal of the dam.

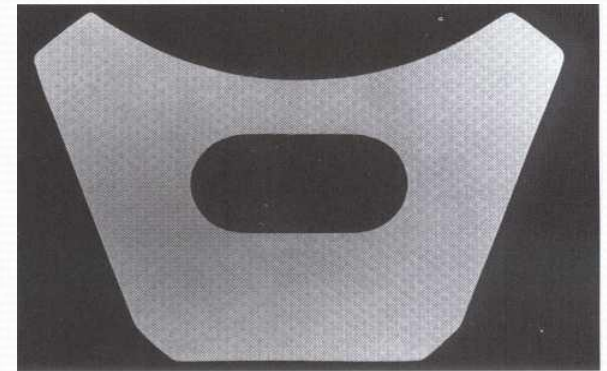


Figure 27. Disposable rubber dam napkin

Isolation of the operating field

Materials & instruments of the rubber dam

- Adjustable neck strap (optional) may be placed behind the patient's neck. It is lightly tightened to **snug the dam and frame** to the face **to maximize retraction** and provide access to the operating site. It is attached to two hooks, one in the middle of each side of the frame.

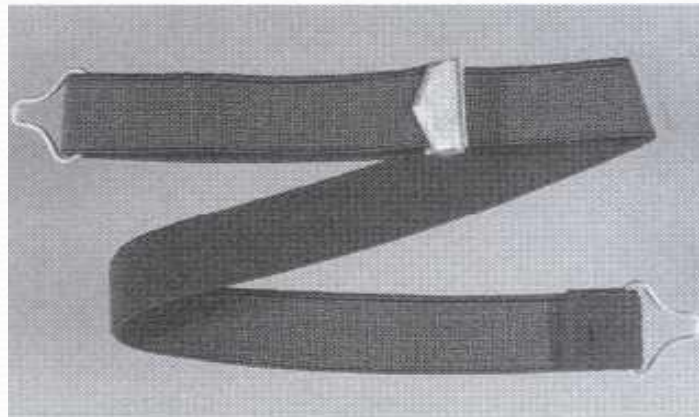


Figure 28. Adjustable neck strap for use with the Young rubber dam frame

Isolation of the operating field

Materials & instruments of the rubber dam

- Lubricant, water-soluble lubricant applied in the area of the punched holes **to facilitate the passing of the dam septa through the proximal contacts**. A rubber dam lubricant is commercially available, but other lubricants, such as shaving cream or soap slurry, are also satisfactory. Cocoa butter or petroleum jelly can be used at the corners of the patient's mouth to prevent irritation, but they are not satisfactory rubber dam lubricants.



Figure 29. Rubber dam lubricant.

Isolation of the operating field

Materials & instruments of the rubber dam

- Modeling Compound, Low-fusing modeling compound is **sometimes** used **to secure the retainer** to the tooth to prevent retainer movement during the operative procedure.



Figure 30. modeling compound.

Isolation of the operating field

Materials & instruments of the rubber dam

- Anchors (**Other Than Retainers**), The proximal contact may be sufficient to anchor the dam on the tooth farthest from the posterior retainer (in the isolated field), thereby **eliminating the need for a second retainer**. To further secure the rubber dam on the tooth farthest from the posterior retainer or to anchor it on any tooth where retainer is not indicated, **waxed dental tape (or floss)** or a **small piece of rubber dam** material (cut from a sheet of dam) may be passed through the proximal contact.

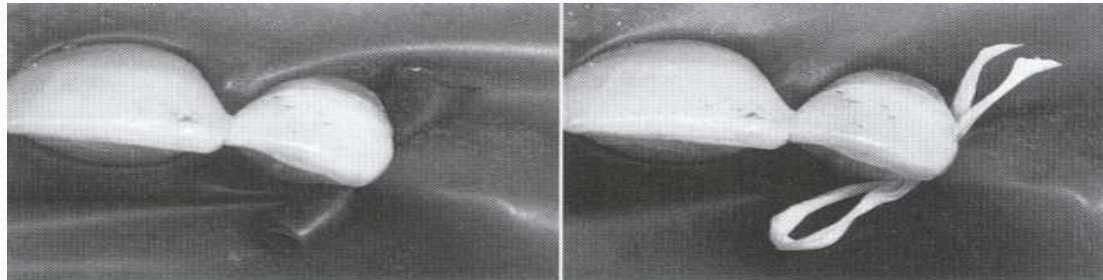


Figure 31. A, Anchor formed from dental tape. B, Anchor formed from rubber dam material.

Isolation of the operating field

Placement of the rubber dam

- Method 1: sequential method
 - **maximal visibility** when placing the retainer, **which reduces** the risk of **impinging gingival tissue**.
 - according to most operators, it is **more simple** procedure than other methods.
- Method 2: simultaneous method
 - it **reduces the risk** of the **retainer** being **swallowed or aspirated**.
 - it **solves the occasional difficulty** of trying to pass the dam over a previously placed retainer.
- Method 3: sequential method
 - **does not have to manipulate** the dam over the retainer.



Great Thanks