



*GOOD AFTERNOON*

# **INSTITUTE OF DENTAL SCIENCES**

**DEPARTMENT OF CONSERVATIVE DENTISTRY**

**SEMINAR ON**

## **ISOLATION OF OPERATING FIELD**



# TOPICS COVERED :-

- GOALS OF ISOLATION.
- METHODS OF ISOLATION.

# GOALS OF ISOLATION :-

- Aids in maintaining dry clean operating field by controlling the moisture.
- Improves access and visibility. Retraction and access provides maximal exposure of the operating site and usually involves maintaining an open mouth and depressing or retracting the gingival tissue, tongue, lips and cheek.
- Improves the properties of dental materials. Hence, improves the quality of the treatment performed.
- Helps in protecting the adjacent hard and soft tissues.
- Improves the operating efficiency.

# METHODS OF ISOLATION :-

## ***DIRECT METHODS-***


- RUBBER DAM.
- COTTON ROLLS AND CELLULOSE WAFERS.
- GAUZE PIECES/THROAT SHIELD.
- SUCTION DEVICES:
  - High volume evacuators.
  - Low volume evacuators: SALIVA EJECTORS.
- GINGIVAL RETRACTION CORDS.

## ***INDIRECT METHODS-***

- COMFORTABLE POSITION OF THE PATIENT AND RELAXED SURROUNDINGS.
- LOCAL ANAESTHESIA.
- DRUGS-
  - Anti- sialogogues
  - Anti-anxiety drugs

The background features a soft, multi-colored gradient of light blue, yellow, and purple. A prominent, wavy vertical line in a slightly darker shade of blue and yellow runs down the left side of the image, creating a sense of movement and depth.

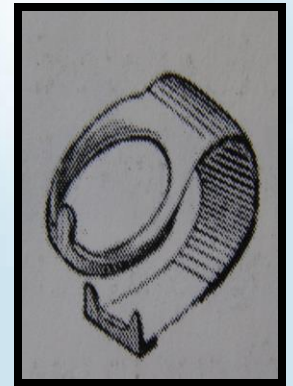
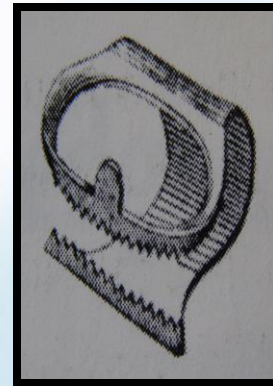
# **DIRECT METHODS OF ISOLATION**



RUBBER DAM

# HISTORY

- ❖ **1864 S C Barnum** first described rubber dam.
- ❖ **Hodson's** clamps were in use. He described methods without using forceps, these clamps were retentive exclusively with wedges and floss silk ligature.



# ADVANTAGES :-

1. Dry Clean Operating Field.
2. Access and Visibility.
3. Improves Properties of Dental Materials.
4. Protection of the Patient and Operator.
5. It prevents swallowing or aspiration of instruments, materials etc.
6. It discourages excessive patient conversation during the procedure. Thereby improves operating efficiency and productivity.
7. The rubber dam aids in providing moderate extent of mouth opening.





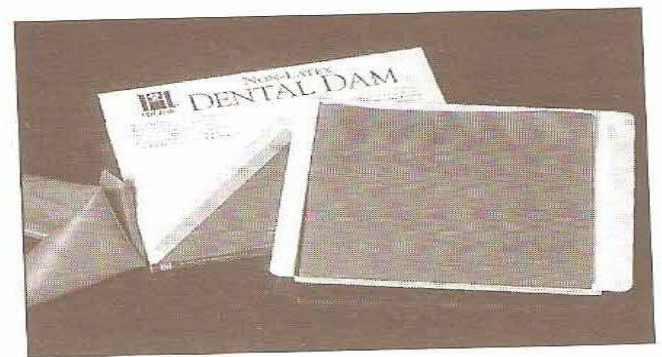
**FIGURE 10-43** **A**, Radiograph of swallowed casting in patient's stomach. **B**, Radiograph of casting lodged in patient's throat.

# DISADVANTAGES :-

***“THE MOST TIME- CONSUMING THING ABOUT THE RUBBER DAM IS THE TIME REQUIRED TO CONVINCE THE DENTIST TO USE IT”***

***Time consumption*** and ***patient objection*** are the most frequently quoted disadvantages of rubber dam.

- Rubber dam cannot be applied to the tooth that are not sufficiently erupted to receive retainers.
- Cannot be used in extremely malpositioned teeth
- Cannot be used in asthmatic patients who have difficulty in breathing through nose
- Cannot be used in patients who is allergic to latex
- Inappropriate retainers can impinge on the soft tissues and traumatise it
- Saliva can accumulate beneath the rubber dam when it is used for longer durations.



**Fig 7-50** Nonlatex dam material from Hygenic. Nonlatex dams should be used for patients with a latex allergy.





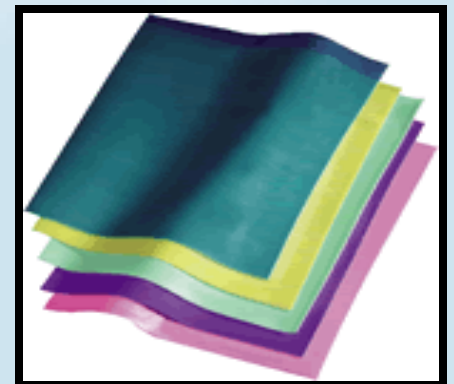
**ARMAMENTARIUM**

- RUBBER DAM SHEETS
- RUBBER DAM RETAINER
- RUBBER DAM HOLDER
- RUBBER DAM PUNCH
- RUBBER DAM CLAMP FORCEPS
- RUBBER DAM NAPKINS
- LUBRICANTS
- PLASTIC TEMPLATE OR RUBBER STAMP
- DENTAL FLOSS
- OCCASSIONALLY MODELING COMPOUND



# Rubber Dam Sheets

- Rubber dam is made from natural latex rubber . As the material deteriorates over time, reasonably new from date of manufacture should be used.
- Dam material is available as rolls 5 or 6 inches wide or as sheets in 5x5 inch (12.5 x 12.5cm) or 6x6 inch (15x15cm sheets).
- Sterile dam materials is also available, packaged as individual sheets.
- Latex free dams are also available.
- Rubber dam has a shiny and dull surface, the dull side is placed towards occlusal surface as it is less light reflector.
- The dam sheets come in both dark and light colors.



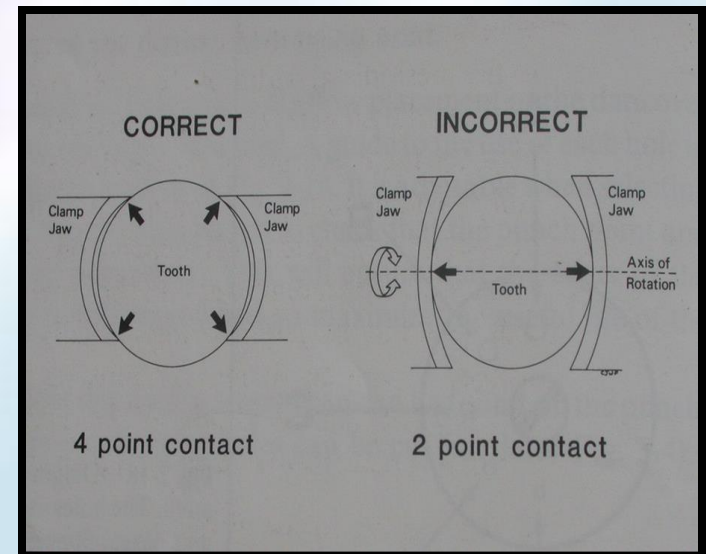
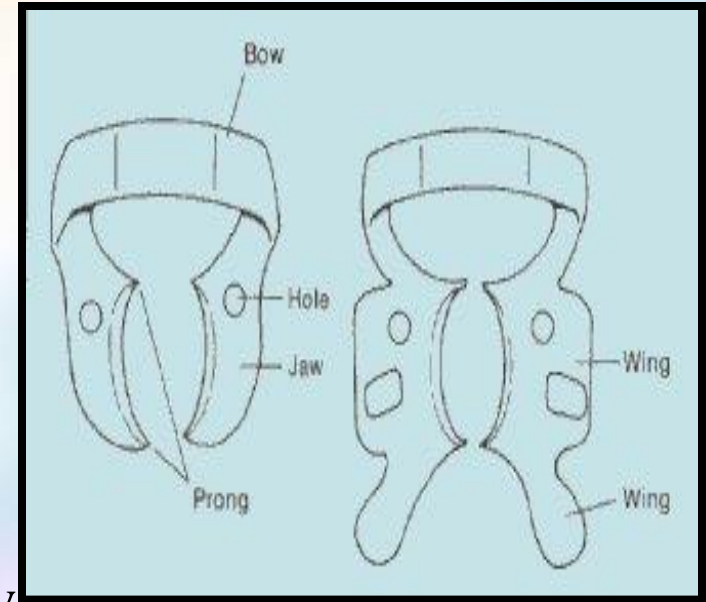
# THICKNESS

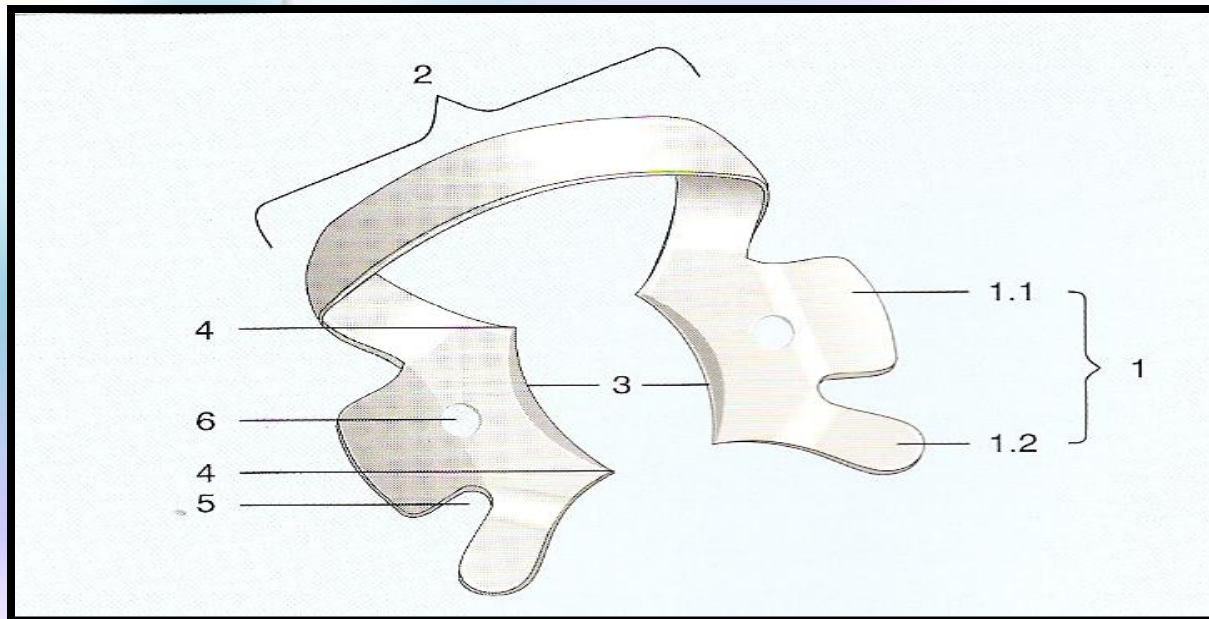
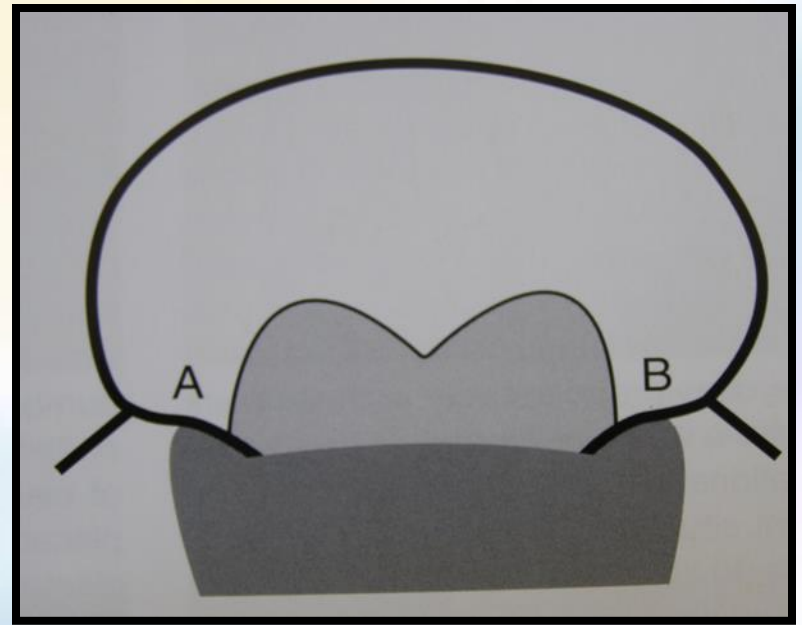
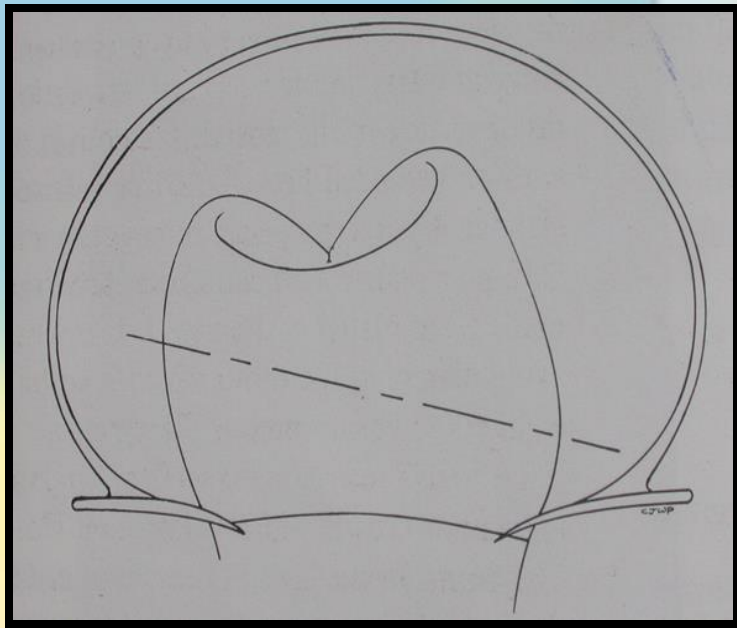
- ❖ The thickness or weights available are
  - Thin (0.006 inch or 0.15 mm)
  - Medium (0.008 inch or 0.2 mm)
  - Heavy (0.010 inch or 0.25 mm)
  - Extra heavy (0.012 inch or 0.30 mm)
  - Special heavy (0.014 inch or 0.35 mm)
  
- ❖ The thicker dam is generally preferred as it is more effective in retracting tissue, more resisting to tearing and especially recommended for isolating **Class V** cavities with a cervical retainer. The thinner material has the advantages of passing through the contacts easier which is particularly helpful when they are tight.



# Rubber dam retainer / clamp

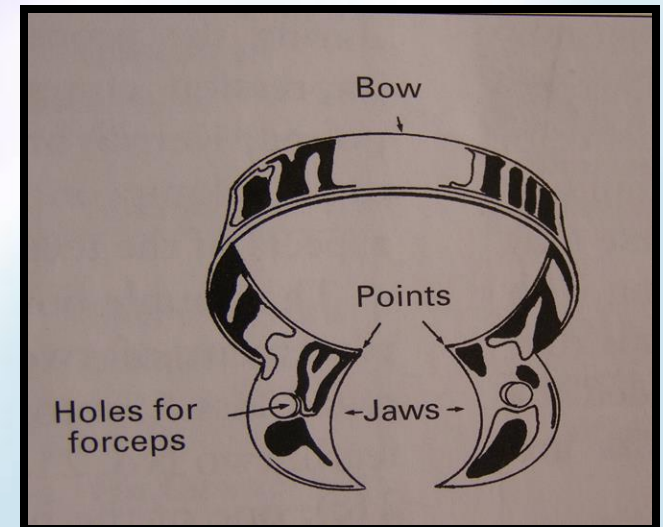
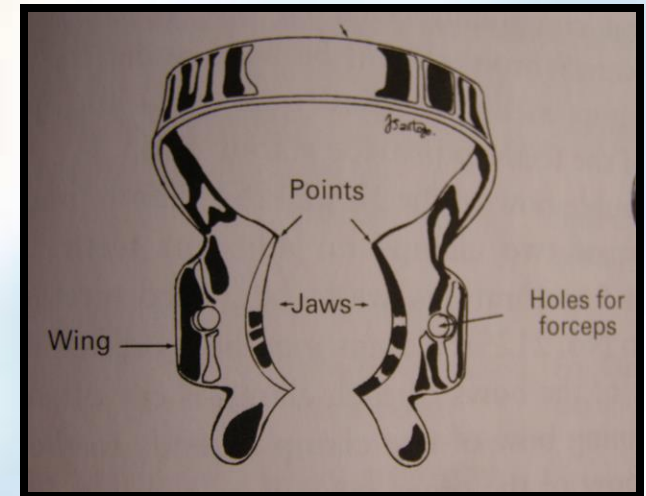
- Consists of four prongs and two jaws connected by a bow.
- It is used to anchor the dam to the most posterior tooth to be isolated.
- Retainers are also used to retract gingival tissue.
- When positioned on a tooth the properly selected retainer should contact the tooth in four areas, two on the facial surfaces and two on the lingual surface.
- Jaws of the retainer should not extend beyond the mesial and distal line angles of the tooth because, they may interfere with wedge placement.





# Wingless and Winged Clamp

- The winged retainer has anterior and lateral wings which provide extra retraction of the rubber dam from the operating field.
- The winged retainers however interfere with the placement of matrix bands, band retainers and wedges and thus wingless retainers are preferred.
- The advantage of winged clamp is that rubber dam and clamp can be placed in single assembly.





# DIFFERENT TYPES OF CLAMPS

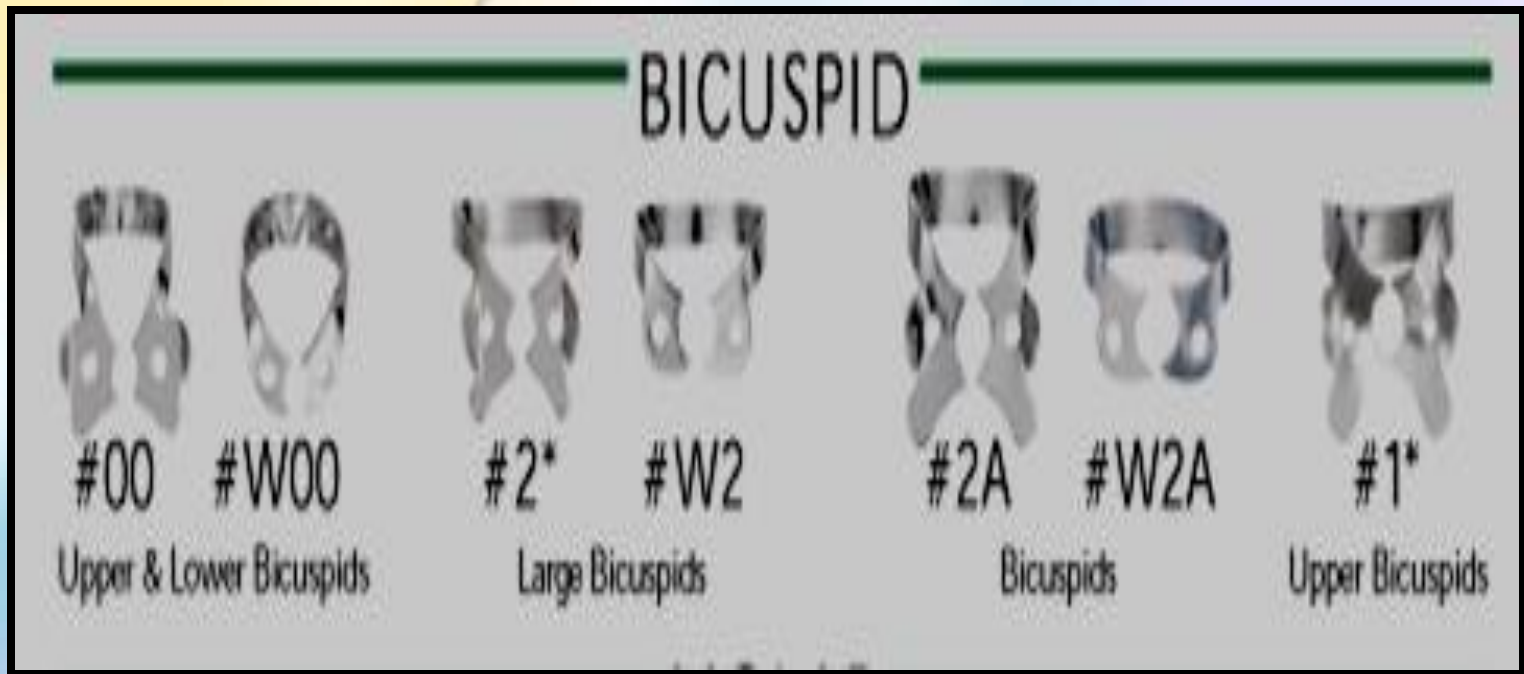


# ANTERIOR/BUTTERFLY CLAMPS

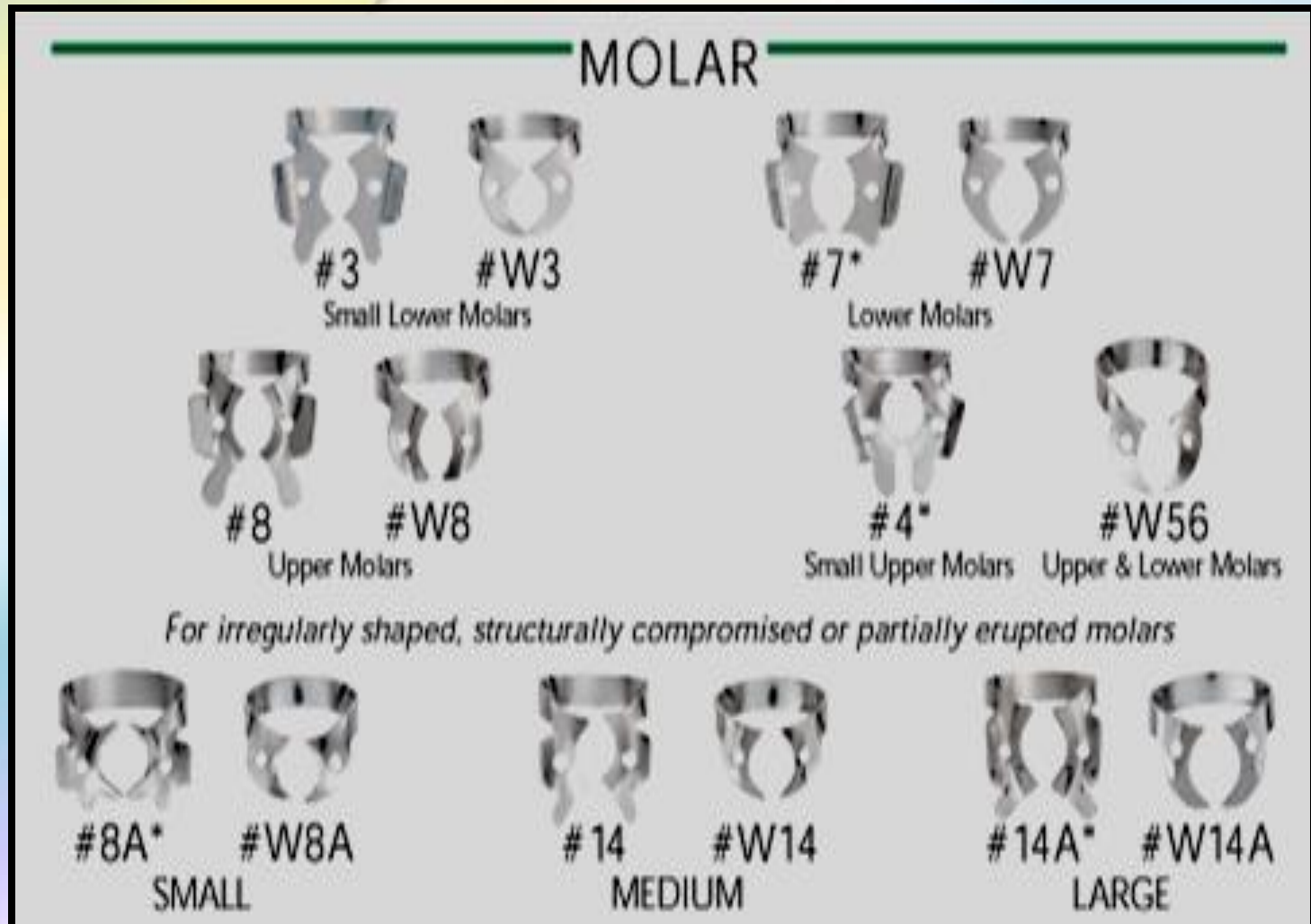




# Premolar clamps



# Molar Clamps



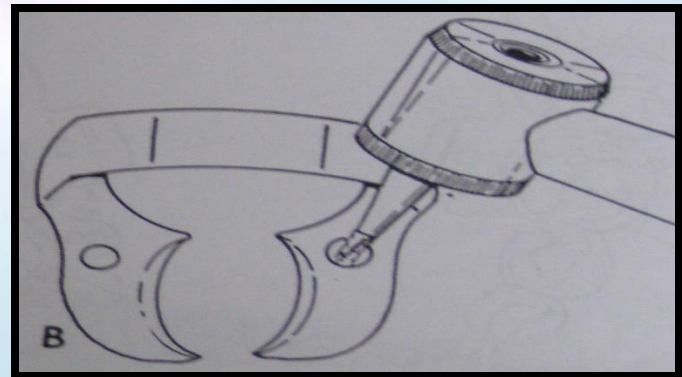
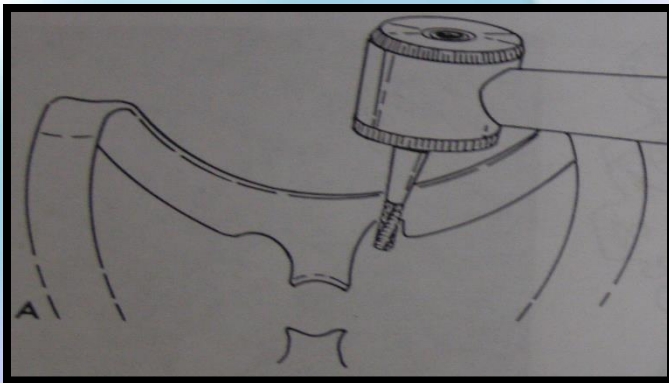
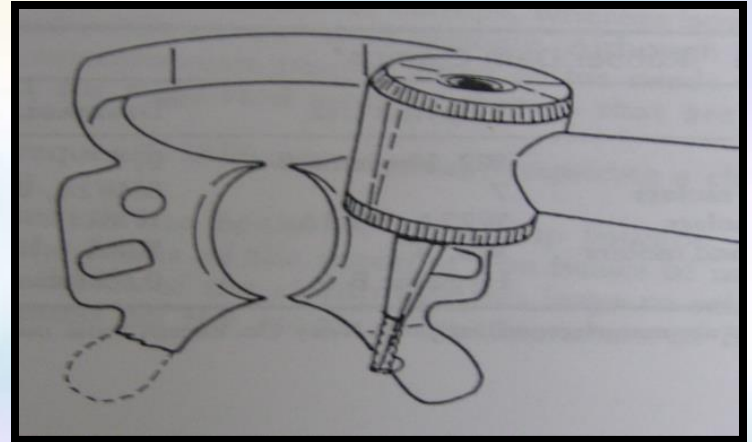


# Clamps with long guard extension



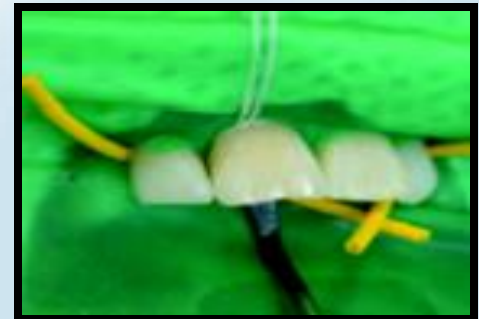
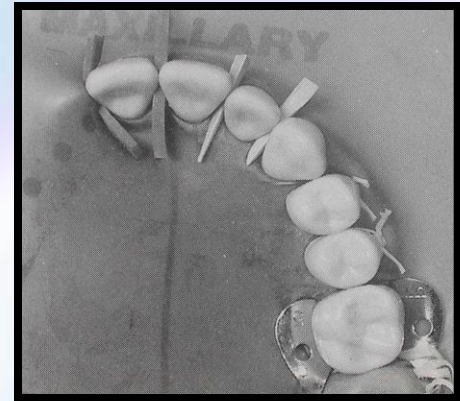
# CUSTOMIZING CLAMPS

- Alteration of jaws,wings,prongs using fissure bur
- No 212 clamp -Deepening the lingual notches

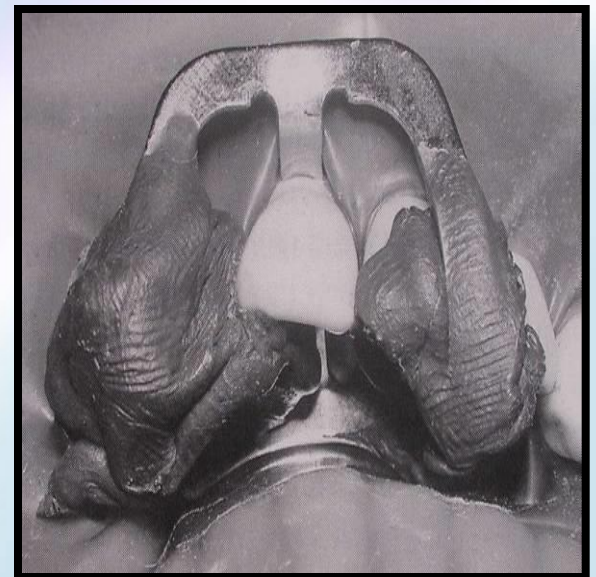
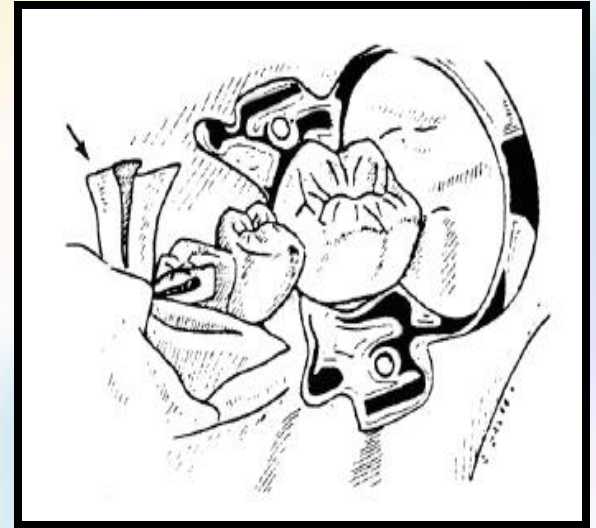


# Other retainers

- Elastic cord eg; **WEDGETS**  
(hygienic) is placed interproximally to retain the dam.
- Interdental wood sticks or **WEDGES**
- Dental floss/tape placed doubly through a contact and then cut to short length



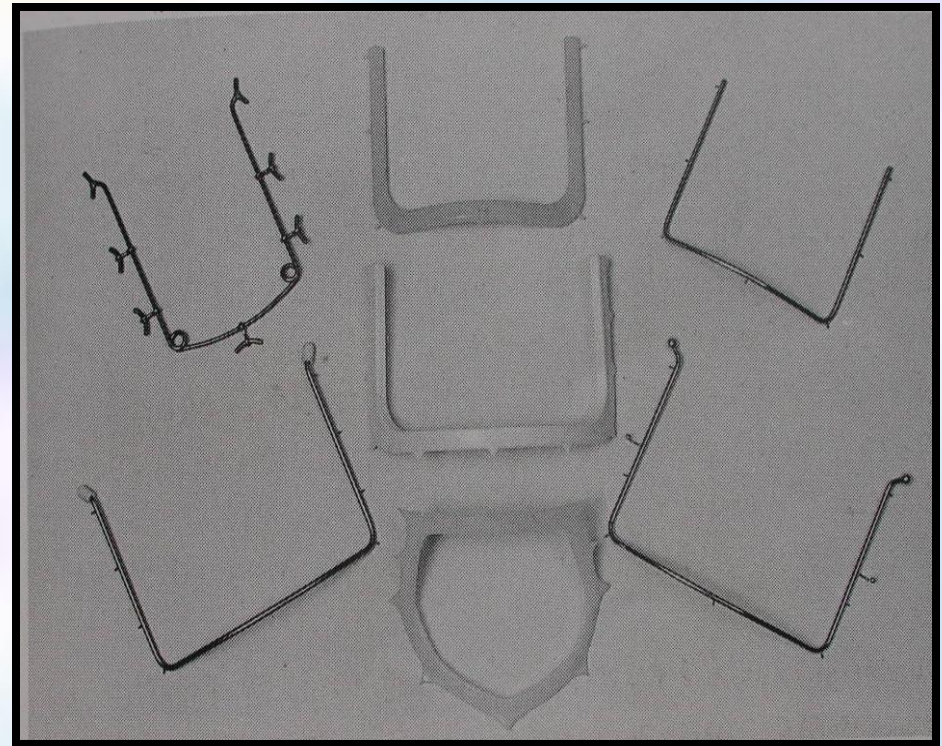
- Short strip of rubberdam
- Low fusing **modelling compound** is sometimes used to secure the retainer to the tooth to prevent retainer movement during operative procedure.



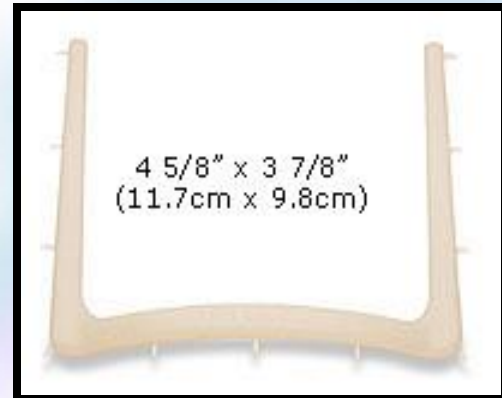


# Rubber Dam Holder

- It can be either frame or harness
- It supports the edges of the rubber dam and thus retract the soft tissues and improves access to the isolated teeth
- Frame can be made of metal or plastic
- The main objective of holder is to keep the periphery of dam out of the mouth and stretch the dam in all directions



# Young's frame



# Nygard- Ostby frame



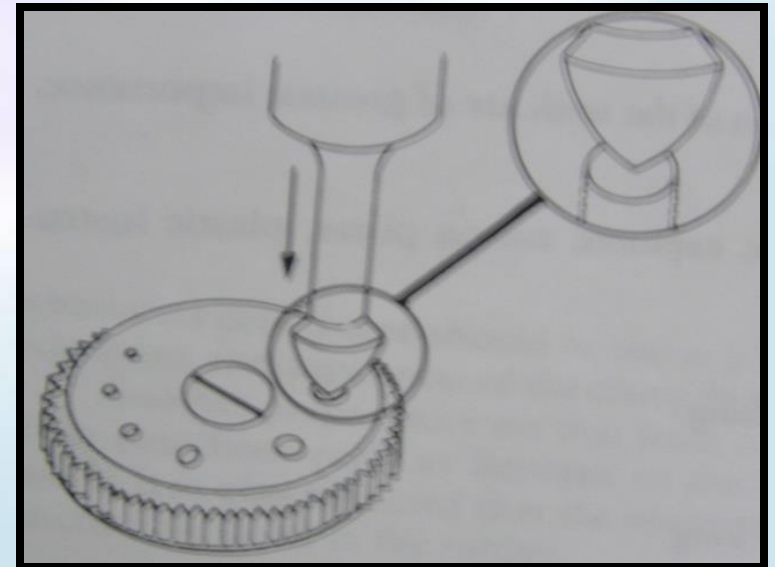
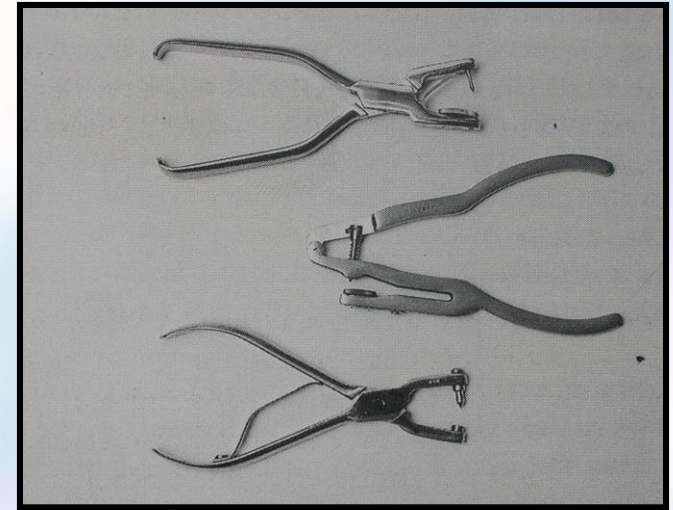
## Hygienic frame

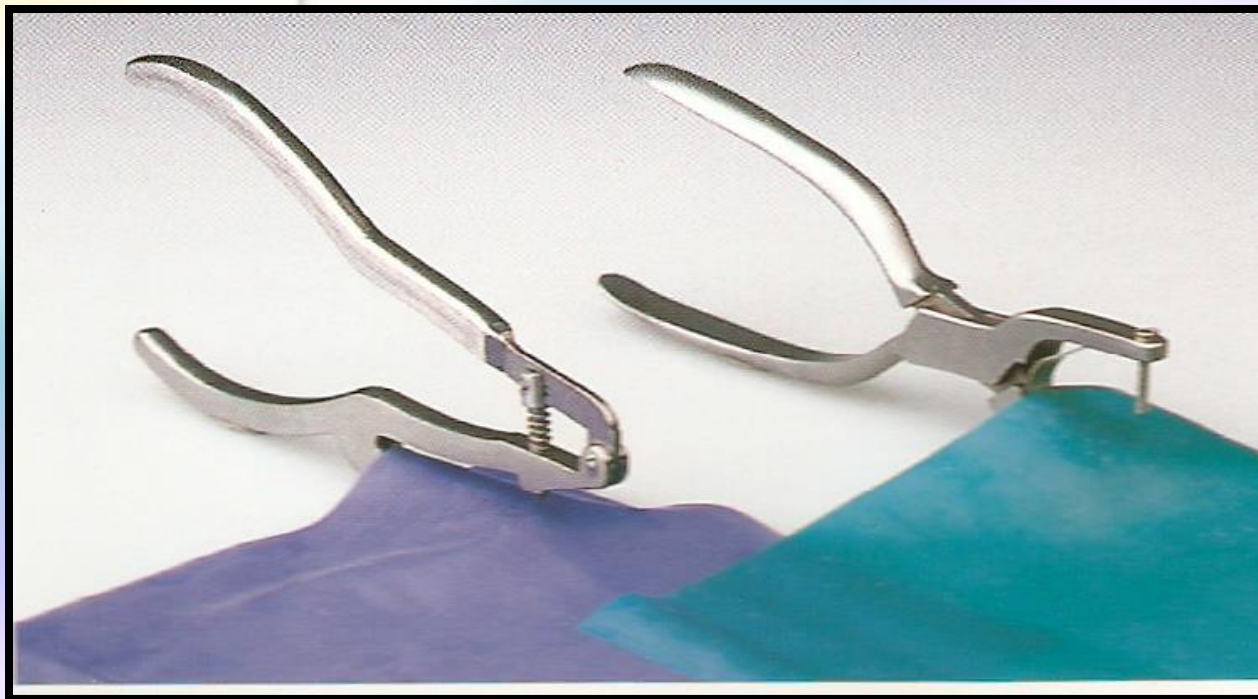
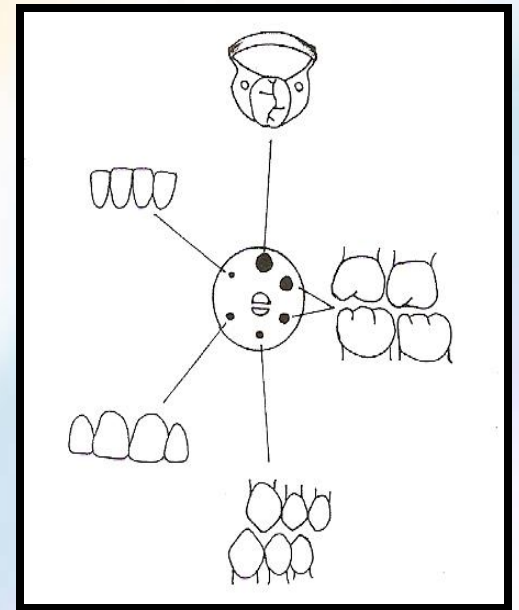
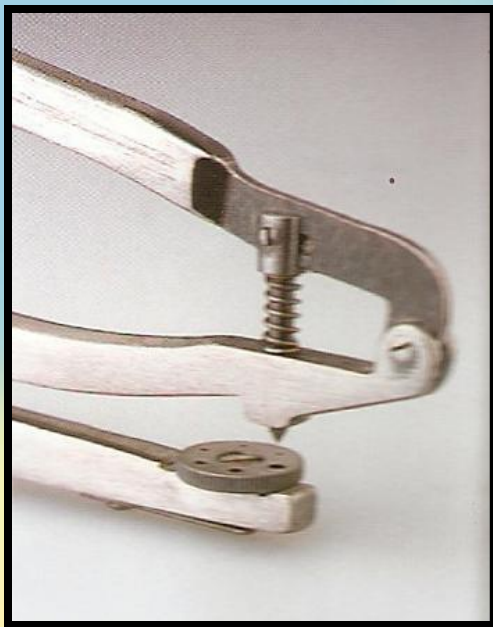




# Rubber Dam Punch

- It is precision instrument which has a rotating metal disk with six holes of varying sizes a tapered, sharp-pointed plunger
- Holes in a range of sizes from 0.5-2.5mm<sub>A</sub> in diameter
- Designs –
  - Ivory pattern
  - Ash or Ainsworth pattern







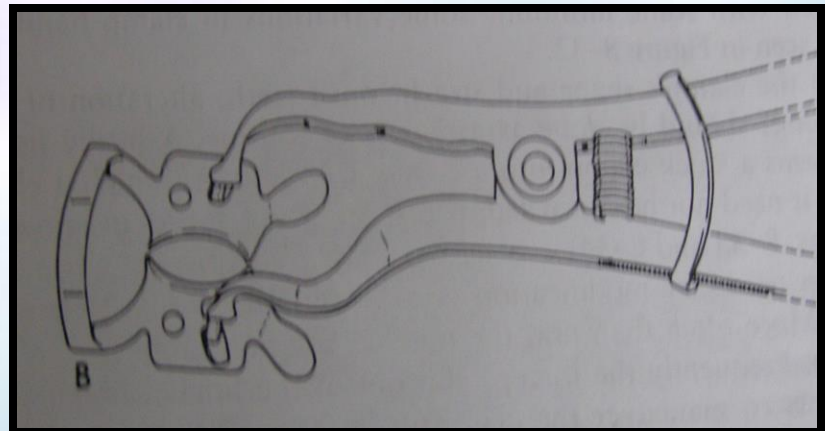
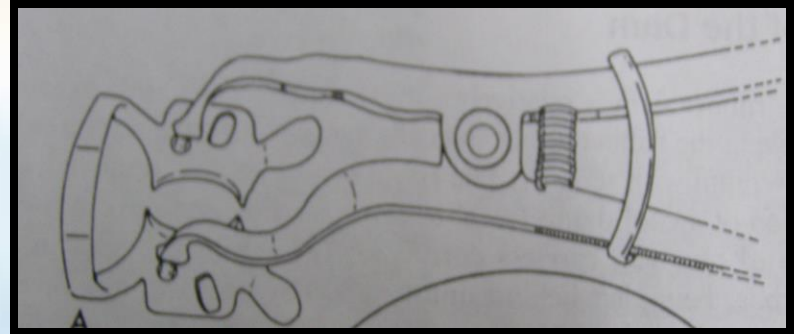
# Rubber dam retainer forceps

- It is used both for the placement of the retainer and its removal from the tooth.
- The forcep retracts the jaws of the clamp when activated by engaging the holes.



# Methods of grasping clamp with forceps

- Clamp forceps under ordinary conditions
- Engaging the elongated holes in the wings





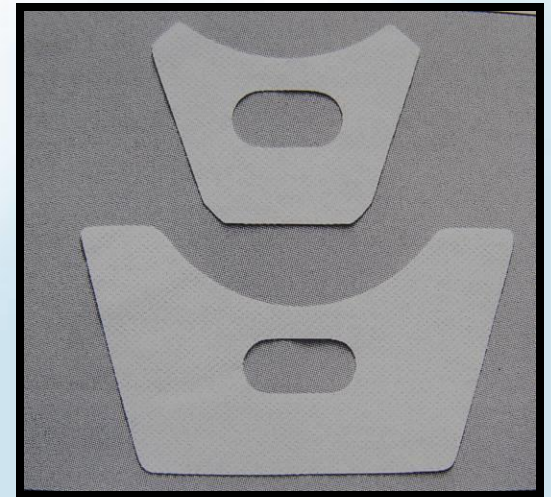
# Rubber Dam Napkin

Is placed between the rubber dam and patients skin.

## ADVANTAGES:

- It prevents skin contact with rubber to reduce the possibility of allergic reactions.
- Absorbs saliva at the corners of the mouth.
- It acts as a cushion aiding comfort to the patient particularly when the dam is used for longer time period.

*Most operators use commercially available napkins that are soft, absorbent and disposable.*



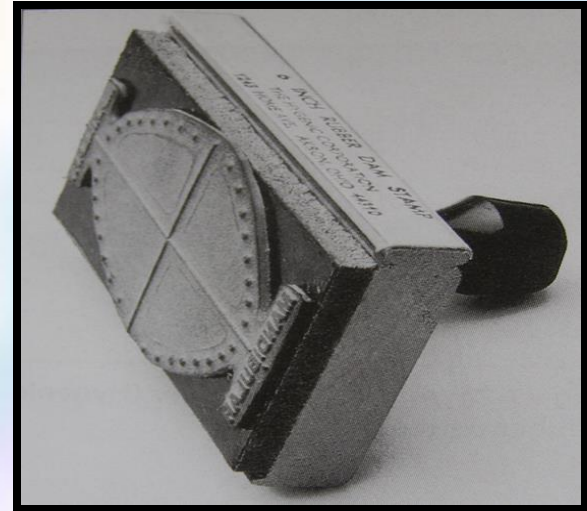
# Lubricant

- A water soluble lubricant applied in the area of the punched holes facilitates the passing of the dam through the proximal contacts.
- A water soluble lubricant is preferred. Dam lubricants are commercially available but other lubricants such as soap slurry are also satisfactory.
- It can also be used to prevent irritation at the corners of the mouth. eg> cocoa butter and petroleum jelly.

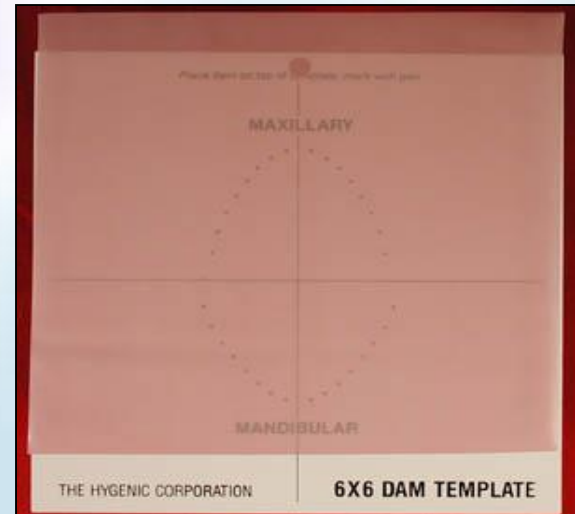


# Plastic template or Rubber stamp

- A **rubber stamp** is available that imprints both permanent and primary arch forms in the rubber dam.



- A **plastic template** can also be used to mark hole positions.



# Guidelines in placing a rubber dam

- Always isolate at least three teeth except when root canal therapy is indicated, then only the tooth to be treated is isolated.
- When operating on the incisors and mesial surfaces of canines, isolate from first premolar to first premolar. When operating on a canine isolate from first molar to the opposite lateral incisor.
- When operating on posterior teeth, it is beneficial to isolate anteriorly to include the lateral incisor on the opposite side of the arch from the operating site. Anterior teeth may be included to provide better access and visibility and also that fingers can rest on dry teeth.



- When a cervical retainer is to be applied to isolate a class V lesion, the heavier rubber dam is usually recommended for better tissue retraction. The hole for the tooth should be punched facially to the arch to compensate for the extension of the rubber.
- When the thinner rubber dam is used, smaller holes must be punched to achieve an adequate seal around the teeth because the thin dam has greater elasticity.
- Distance between holes should be equal to the distance of two teeth at their centre to avoid wrinkling between the teeth.
- Too little distance between holes causes the dam to stretch, resulting in space around the teeth and leakage.

# PREPARING THE MOUTH FOR RUBBER DAM APPLICATION

- Examine the patient's mouth to check for calculus deposits and sharp edges on restorations.
- If plaque and calculus are present first perform oral prophylaxis.
- Test contact areas of teeth in the area to be isolated with dental floss. The contact areas must allow easy passage of the rubber dam sheet.
- The gingival areas is anaesthetized so as to prevent pain during clamp placement.
- Finally, the operating field is rinsed and dried.

The background features a soft, abstract design. A wavy, vertical line in shades of blue, yellow, and purple separates the left side from the right. The right side is a light, hazy blue. The text is centered in a bold, purple, italicized font.

# *TECHNIQUES FOR RUBBER DAM PLACEMENT*

# **TECHNIQUE- 1**

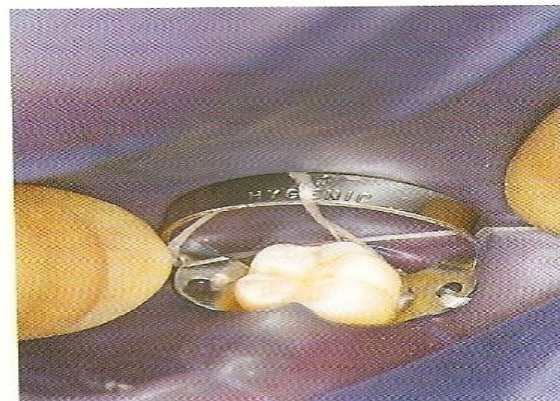
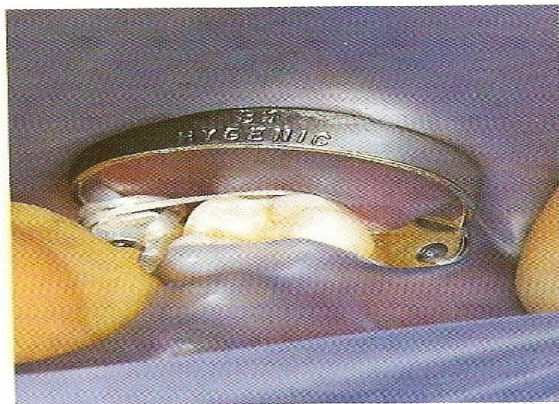
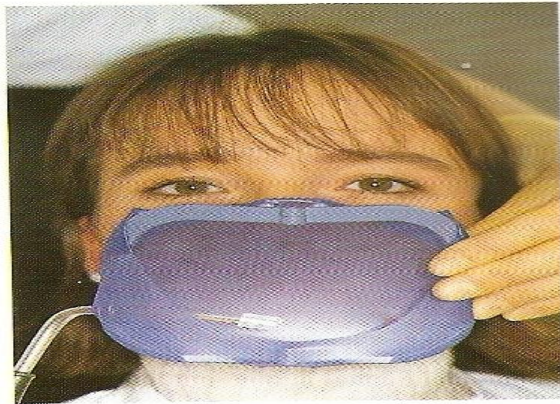
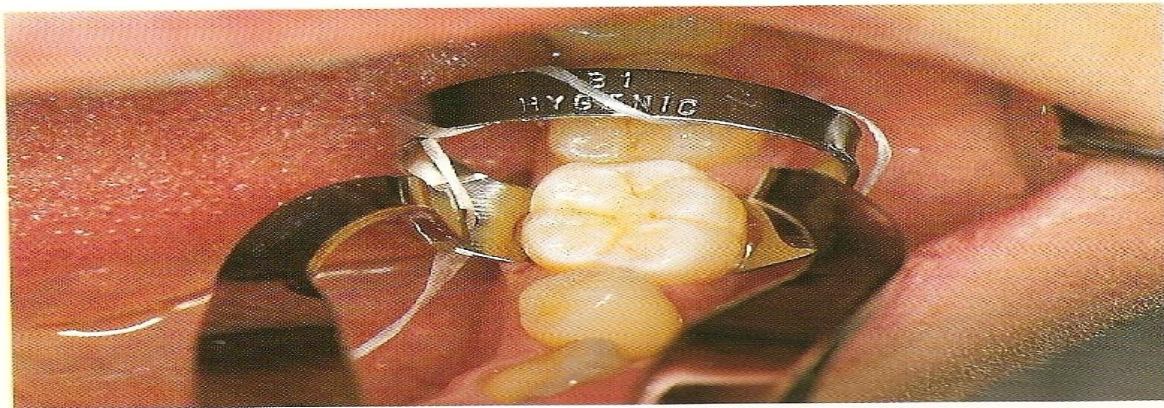
**CLAMP PLACEMENT  
PRIOR TO  
RUBBER DAM**



- As the clamp is placed first in this technique the tooth and gingival margin are clearly visible during placement and thus there is minimal risk of gingival trauma.







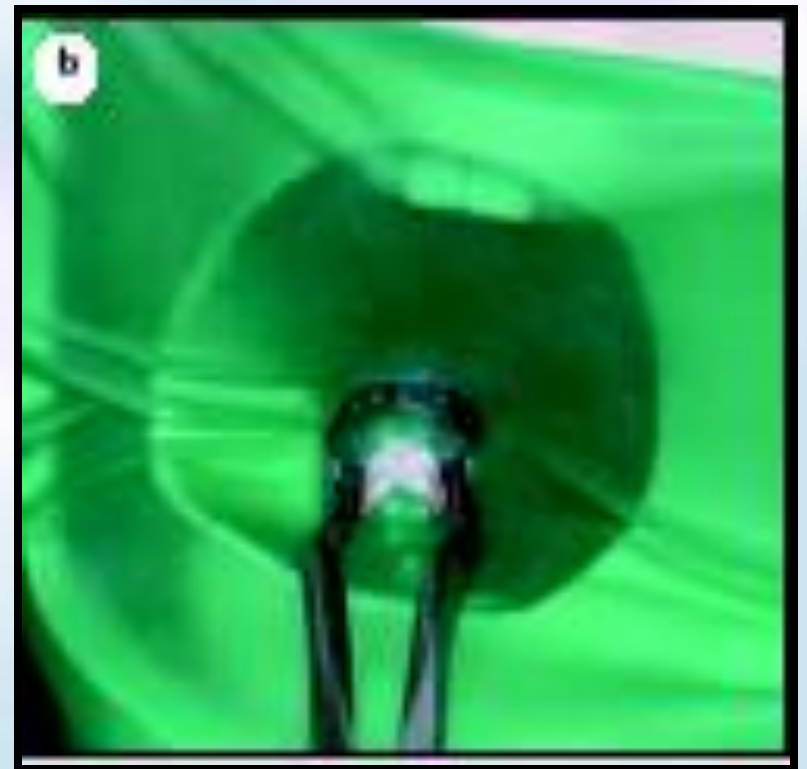
## **TECHNIQUE- 2**

**CLAMP AND  
RUBBER DAM  
PLACED  
TOGETHER**

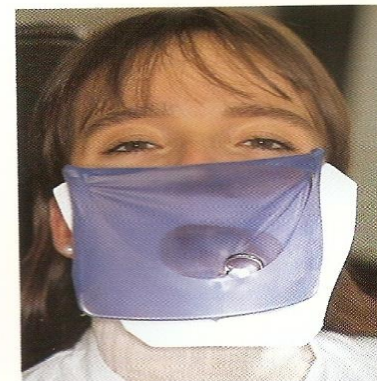
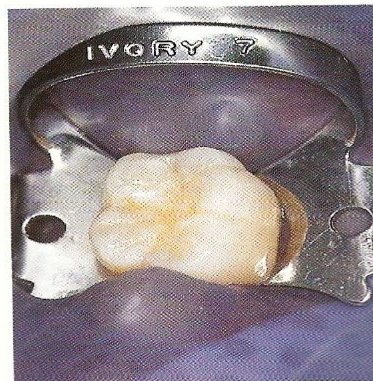
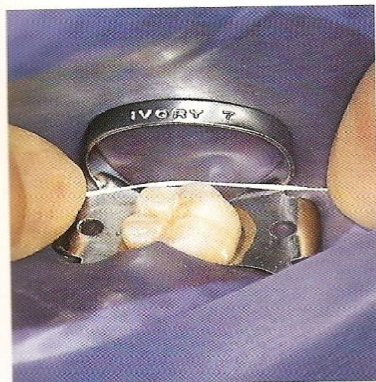
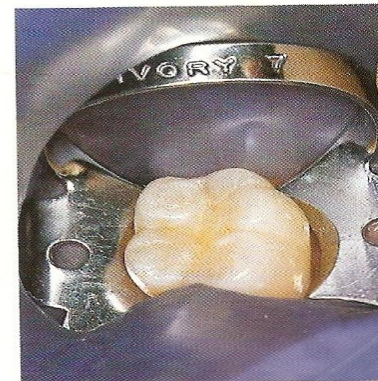
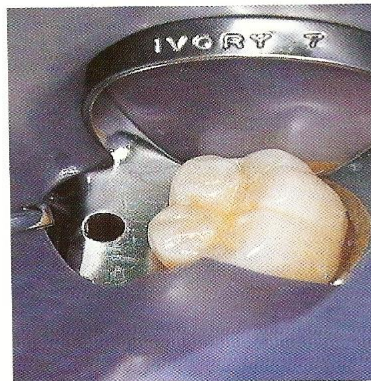
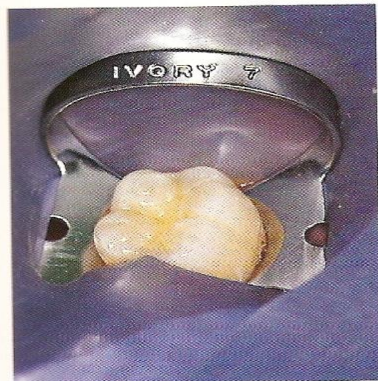
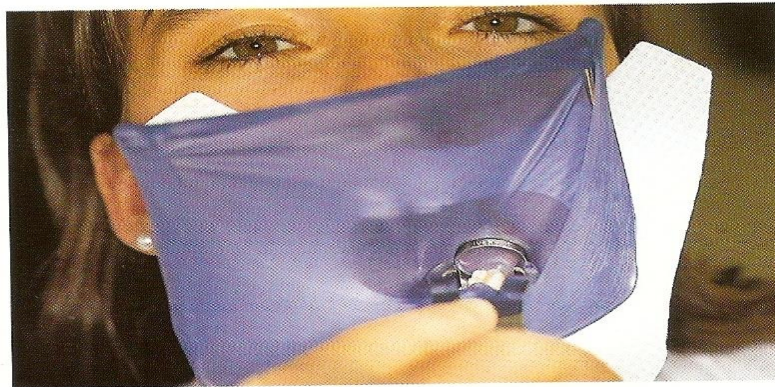


Winged clamp are usually used in this technique.

- The wings retain the clamp in the hole punched in the Rubber dam while both are carried to the mouth.
- Trial of the clamp is important because the operator has limited vision of anchor tooth while the clamp + rubber dam combination is finally seated.







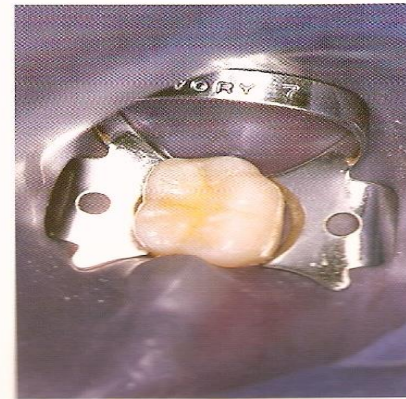
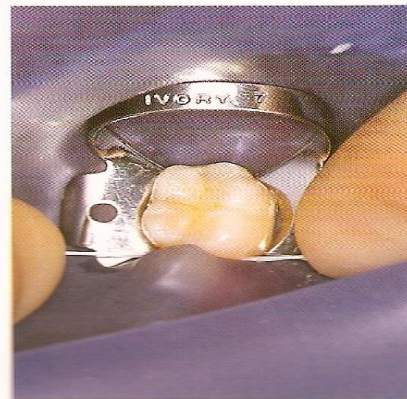
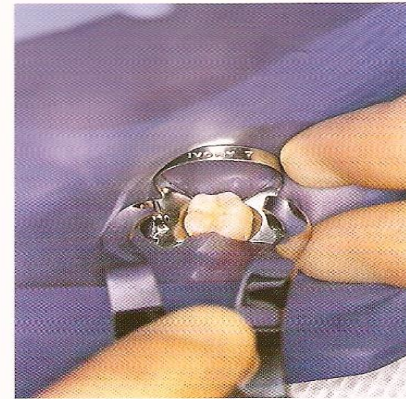
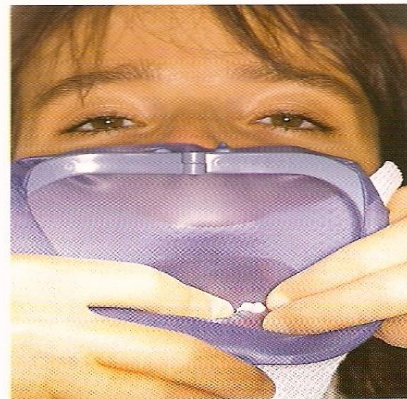
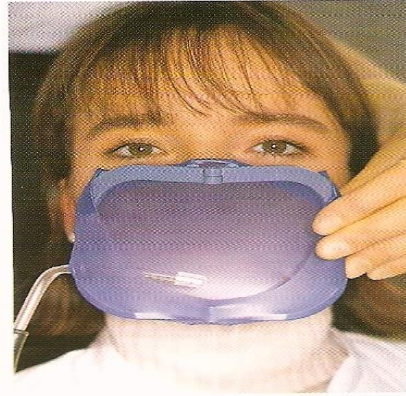
## **TECHNIQUE- 3**

**CLAMP PLACED  
AFTER THE DAM**



- This technique can prove difficult for an operator working alone and assistance will simplify the whole process.



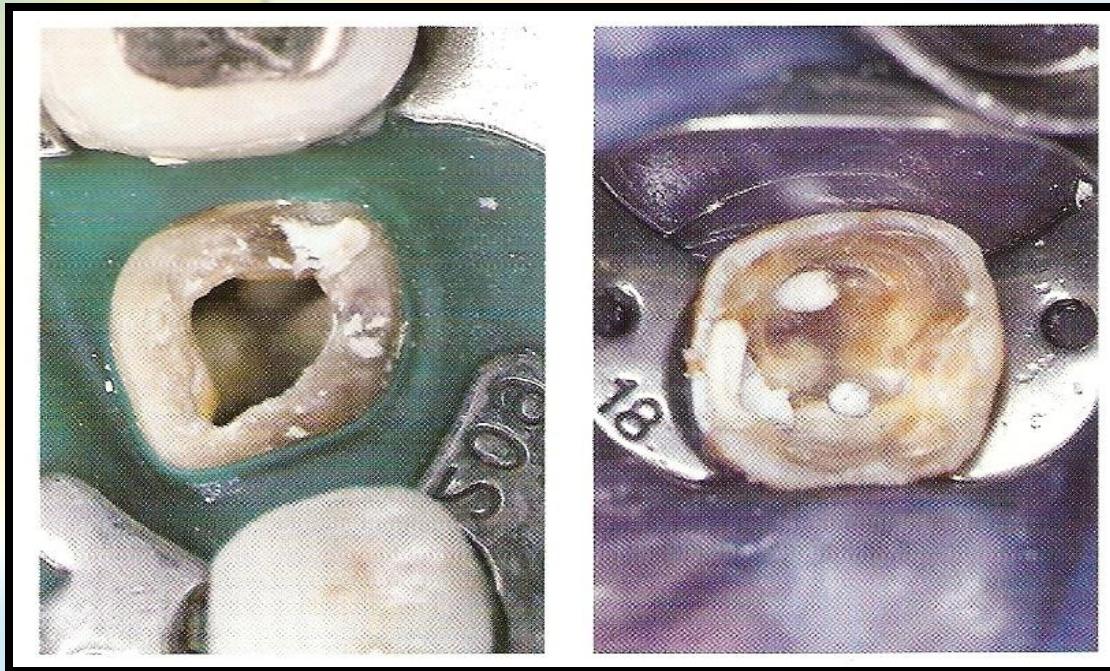




# SPECIAL CASES :-

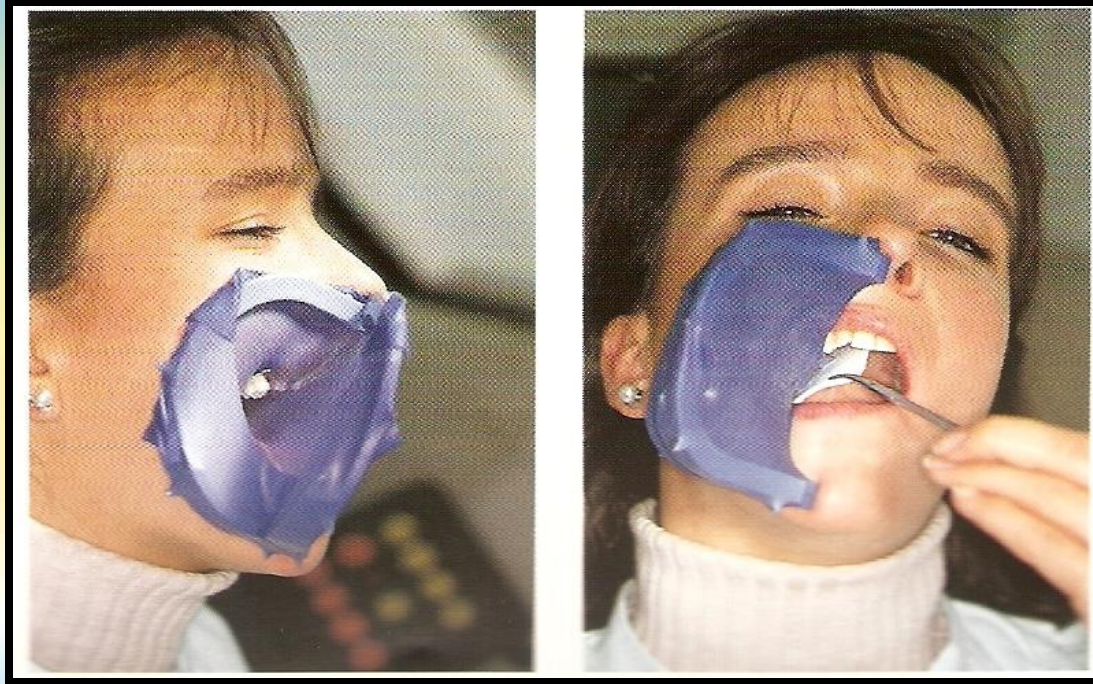


Application of rubber dam  
over a fixed orthodontic  
appliance



Deep coronal destruction





Radiograph with rubber dam in place

# Removal of Rubber dam

- Before removal of the rubber dam rinse and suction away any debris that may have collected to prevent its falling into the floor of the mouth during the removal procedure.
- First is to remove any wedges, rubber strips or floss ligature.
- The second stage is to cut the interdental rubber dam. A pair of round ended scissors should be used, while the rubber sheet is stretched buccally with the other hand.
- The clamp or other auxillary retention aids are finally removed.
- Immediately followed removal, the rubber dam should be carefully checked for missing piece.



# Errors in application and removal of rubber dam



### Errors in rubber dam placement and means to correct the same

Sl. No.	Error	Cause	Problem	Correction
1.	Off-center arch form	<ul style="list-style-type: none"> <li>Improper hole placement.</li> </ul>	<ul style="list-style-type: none"> <li>Occlusion of the patient's nasal airway</li> </ul>	<ul style="list-style-type: none"> <li>Excess dam folded under the nose or cut from around patient's nose.</li> <li>Proper punching of the holes in the dam using rubber dam template or stamp.</li> </ul>
2.	Improper distance between holes	<ul style="list-style-type: none"> <li>Incorrect punching of holes.</li> </ul>	<ul style="list-style-type: none"> <li>Too less distance between holes causes stretching of rubber dam and poor fit around the teeth.</li> <li>Excess distance between holes causes wrinkles in the dam between the teeth interfering with proximal access.</li> </ul>	<ul style="list-style-type: none"> <li>Proper use of rubber dam punch and template.</li> <li>Providing adjustments for malposed teeth.</li> </ul>
3.	Incorrect choice of retainer.	<ul style="list-style-type: none"> <li>Selecting the retainer without verifying its fit.</li> </ul>	<ul style="list-style-type: none"> <li>A retainer that is too small may spring back after placement.</li> <li>A large retainer is unstable and can impinge on the soft tissues.</li> </ul>	<ul style="list-style-type: none"> <li>Verify the fit of the retainer prior to final placement. It should provide a stable four-point contact with the anchor tooth.</li> </ul>
4.	Torn dam	<ul style="list-style-type: none"> <li>Incorrect selection of dam material.</li> </ul>	<ul style="list-style-type: none"> <li>Leakage and poor moisture control.</li> </ul>	<ul style="list-style-type: none"> <li>Proper selection of appropriate dam material.</li> <li>Thin dam should be used in case of tight contacts.</li> </ul>



**5. Retainer- pinched tissue:-** The jaws and prongs of retainer usually slightly depress the tissue, but they should not pinch or impinge on it.

**6. Incorrect location of hole for class V lesion:-** If there is incorrect location of the hole for a class-v lesion and the hole is not punched facial to arch form, circulation in the inter-proximal tissue will be diminished.

**7. Sharp tips on No. 212 retainer:-** sufficiently dulled to prevent damaging of cementum.

**8. Incorrect technique for cutting septa:-** during removal of rubber dam, an incorrect technique for cutting the septa may result in cut tissue or a torn septa.

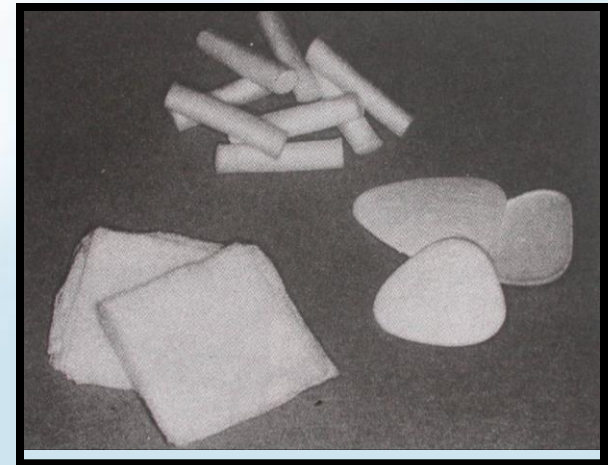
COTTON  
ROLL

AND

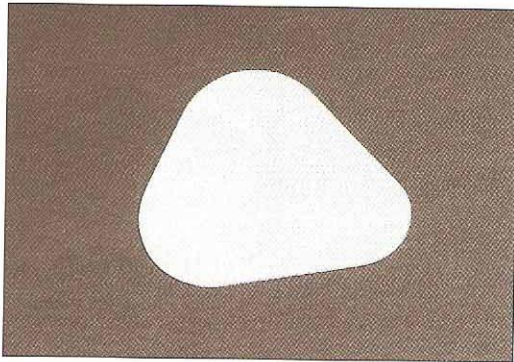
CELLULOSE  
WAFERS



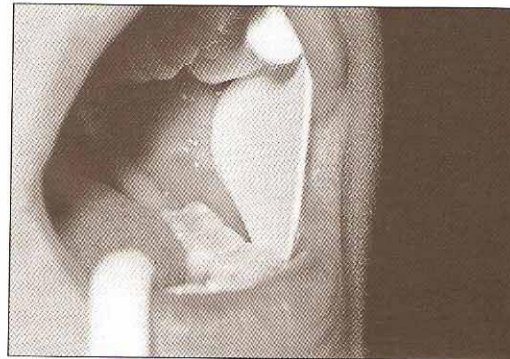
- **Cotton rolls** can be manually rolled or prefabricated. Prefabricated are more compact.
- They provide satisfactory dryness.
- They are not used while cavity preparation is being done using the airtor hand piece but only when the restoration is being placed.
- Advantage of cotton roll holders is that they may slightly retract the cheek and tongue from the teeth, which enhances access and visibility.



- For maxillary teeth, a cotton roll is placed in the facial vestibule adjacent to the involved teeth
- For mandibular teeth, cotton rolls are placed in the lingual and facial vestibule
- **Cellulose wafers/ Parotid shield** are used in conjunction with cotton rolls, especially in the facial aspect of posterior teeth to absorb the saliva secreted by the parotid gland.

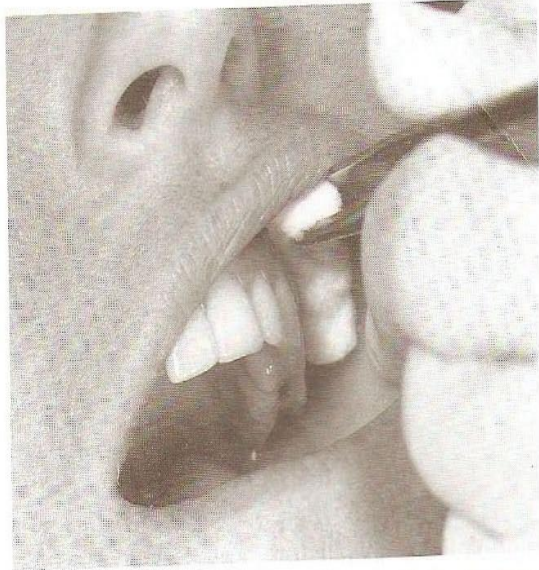


**Fig 7-54a** A parotid shield is triangular and made of absorbent paper.

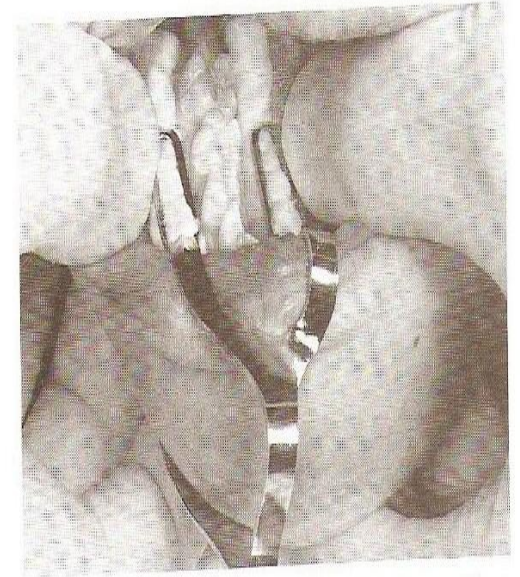


**Fig 7-54b** A parotid shield may supplement a cotton roll in the buccal vestibule or may be used alone.

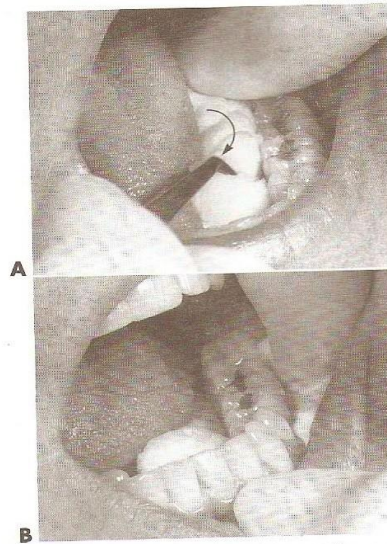




**FIGURE 10-40** Isolate maxillary posterior teeth by placing cotton roll in vestibule adjacent to teeth.



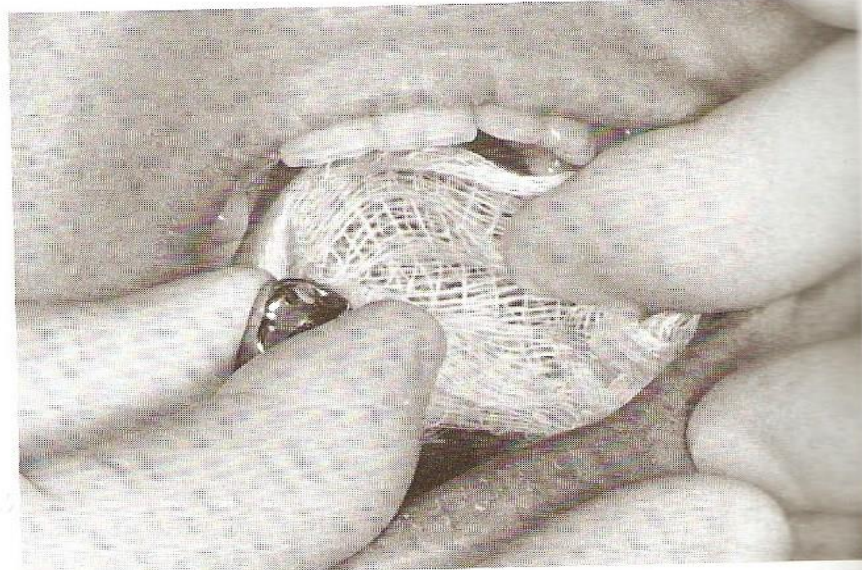
**FIGURE 10-39** A cotton roll holder in position.



**FIGURE 10-41** **A**, 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.

# THROAT SHIELDS

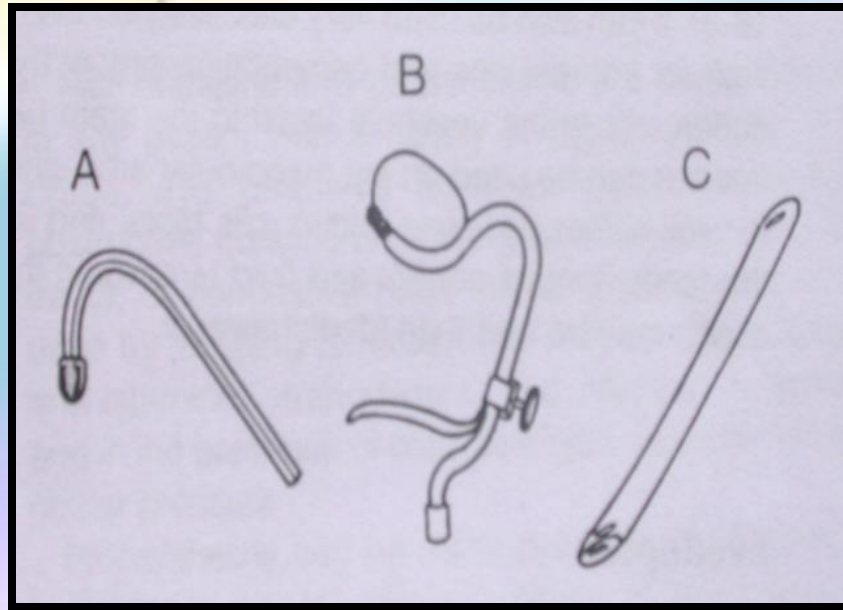
- When rubber dam is not being used, throat shield is indicated when there is danger of aspirating or swallowing small objects.
- This is particularly important when treating teeth in the maxillary arch.
- A gauze sponge [2 x 2" ( 5x 5 cm) ], unfolded and spread over the tongue and the posterior part of the mouth, is helpful in recovering small objects.



**FIGURE 10-42** A throat screen is used during try-in and removal of indirect restorations.



# Suction devices



# HIGH-VOLUME EVACUATORS:-

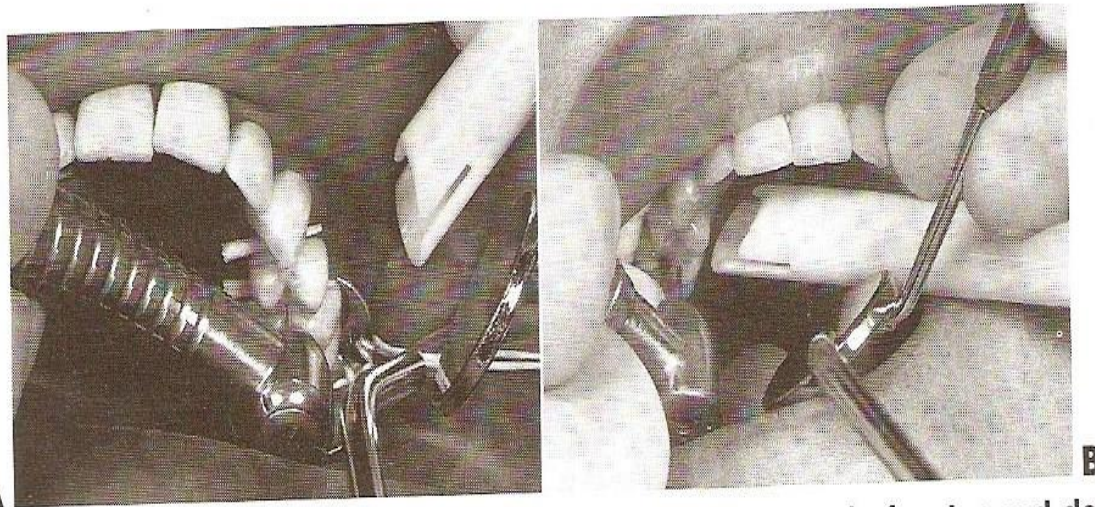
❖ High-volume evacuators are preferred for suctioning water and debris from the mouth.

*The combined uses of water spray or air water spray and a high volume evacuator during cutting procedure has the following advantages-*

- Cutting both of tooth and restorative material as well as other debris are removed from the operating site.
- A washed operating field improves access and visibility.
- There is no dehydration of the oral tissue.
- Quadrant dentistry facilitated.



- ❖ The assistant should place the evacuator tip in the mouth before the operator positions the handpiece and mirror.
- ❖ The tip of evacuator should be placed just distal to the tooth to be prepared. So that it should not obstruct the operators access or vision.



**FIGURE 10-44** Position of evacuator tip for maximal removal of water and debris in operating area. **A**, With rubber dam applied. **B**, With cotton roll isolation.



## **SALIVA EJECTORS/LOW-VOLUME EVACUATORS:-**

- Saliva ejectors remove water slowly and have little capacity for picking up solids.
- The saliva ejector removes saliva that collects on the floor of the mouth.
- It may be used in conjunction with sponges, cotton rolls, and the rubber dam.
- It should be placed in areas best likely to interfere with the operators movements and its tip should be smooth and made of a non-irritating material.
- Disposable, inexpensive plastic ejectors that may be shaped by bending with the fingers are preferable because of improved infection control.

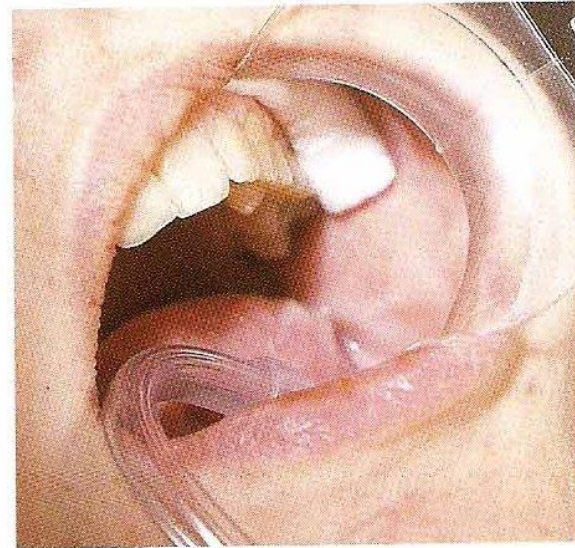


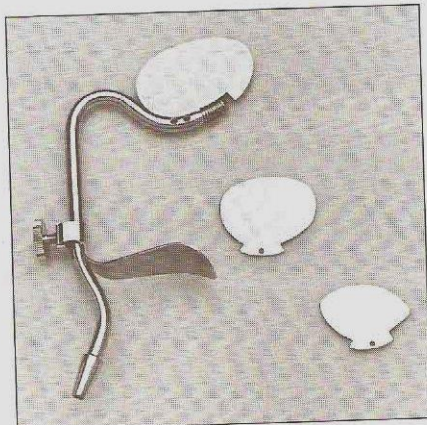
Fig. 4.9 A cotton-wool roll and saliva ejector in place so that the dentist can keep the upper left quadrant dry. The retractor is being used to hold back the lip so that the cotton-wool roll shows in this photograph.

## SVEDOPTER :-

- It is a saliva ejector which not only removes saliva but also retracts and protects the tongue and floor of the mouth.
- A mirror like vertical blade is attached to the evacuator tube so that it holds the tongue away from the field of operation.
- Several sizes of vertical blades are supplied by the manufacturer.



Fig. 4.8 Two endpieces for a saliva ejector. The design on the right is made of disposable plastic. The metal saliva ejector on the left has a flange to retract and protect the tongue and the floor of the mouth.



**Fig 7-51a** The Svedopter tongue-retracting evacuation device is supplied with three sizes of vertical blades.



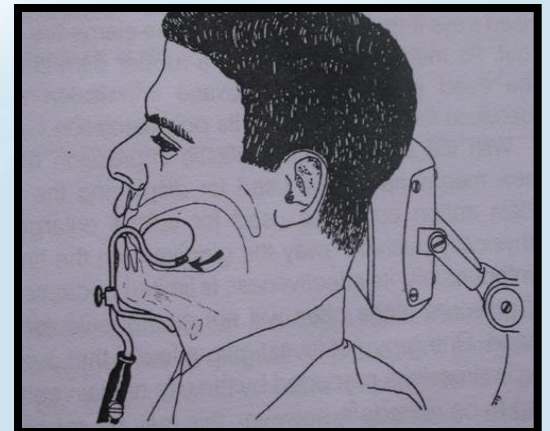
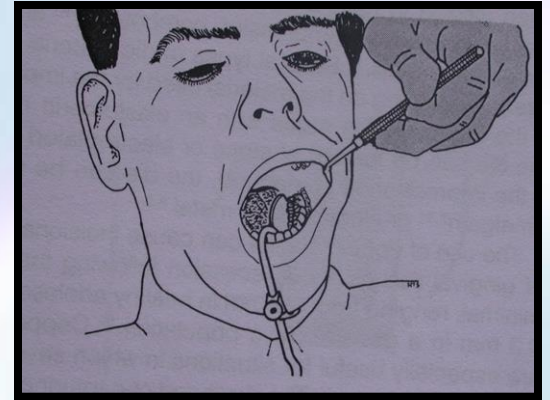
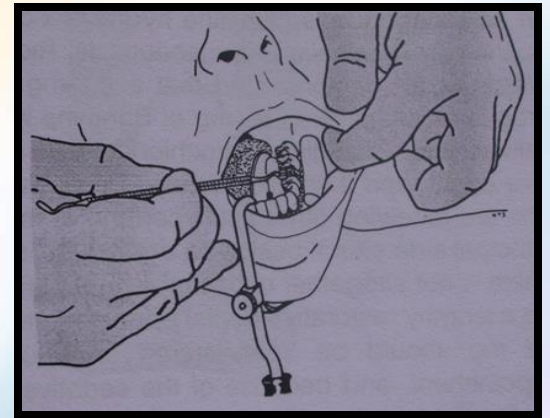
**Fig 7-51b** The Svedopter is used to hold the tongue away from the operating field.





- It is designed so that the vacuum evacuator tube passes anterior to the chin and mandibular anterior teeth, over the incisal edges of mandibular anterior teeth and down to the floor of the mouth.

- An adjustable horizontal chin blade is attached to the evacuation tube so that it will clamp under the chin to hold the apparatus in place.



## HYGOFORMIC SALIVA EJECTOR:-

- This coiled saliva ejector is used in the same way as the svedoptoer, but it does not have a reflective blade.
- It is more comfortable and less traumatic to lingual tissues than the svedopter.
- It must be reformed before use.
- The tongue retracting coil should be loosened or partially uncoiled so that it extends posteriorly enough to hold the tongue away from the operating field.
- It is also used in conjunction with absorbent cotton for maximum effectiveness.

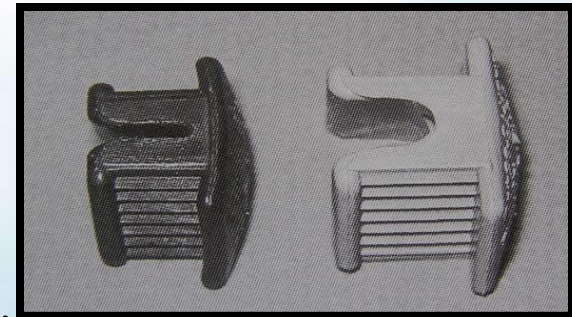


# MOUTH PROP

A potential aid for cavity preparation on posterior teeth is a mouth prop.

*The ideal characteristics of a mouth prop are-*

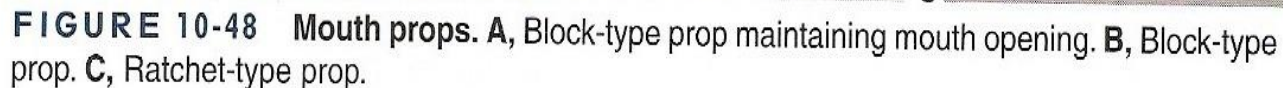
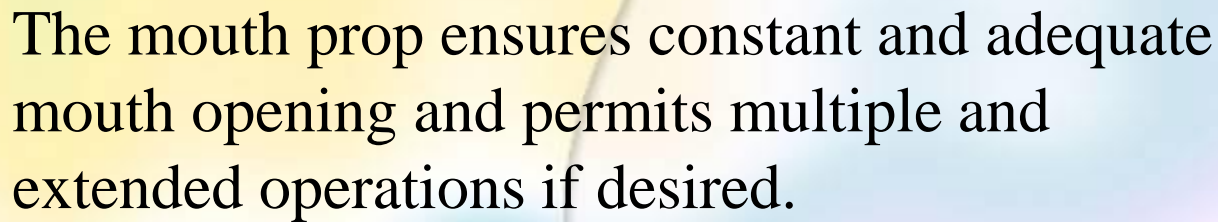
- It should be adaptable to all mouth and easily adjustable when required to provide proper mouth opening.
- It should be capable of being easily positioned with no patient discomfort.
- It should be stable once it is applied.
- It should be easily and readily removable.
- It should be either sterilizable or disposable.



It is placed on the side opposite to the treatment site and positioned posteriorly between the maxillary and mandibular teeth.



- The block type (commonly used).
- The ratchet type.



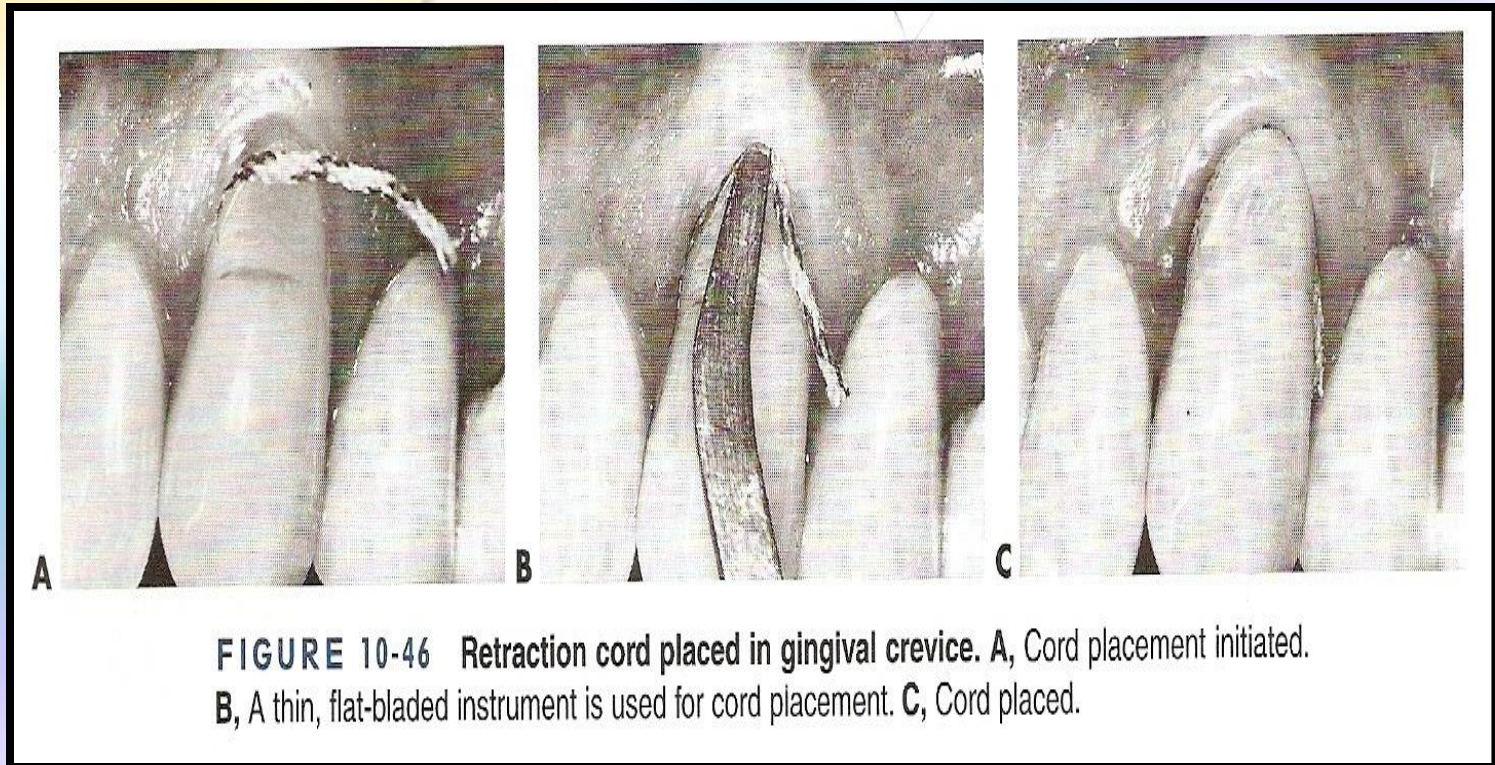
# GINGIVAL RETRACTION CORD



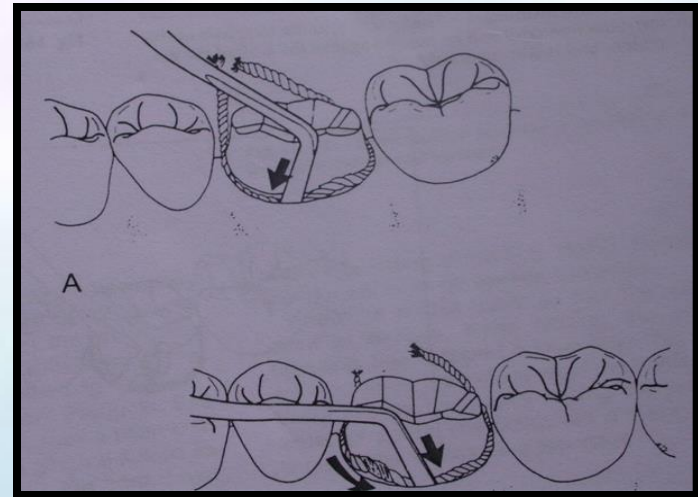
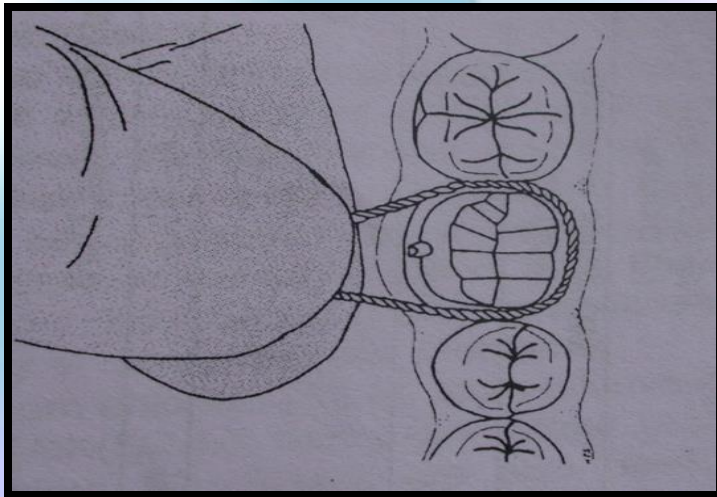
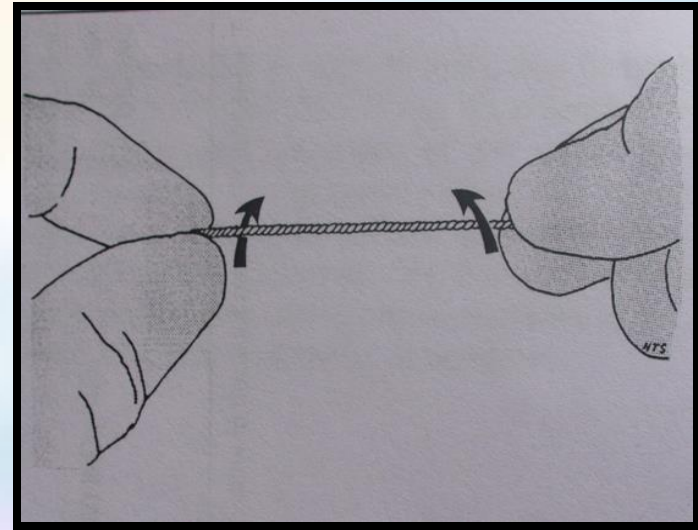
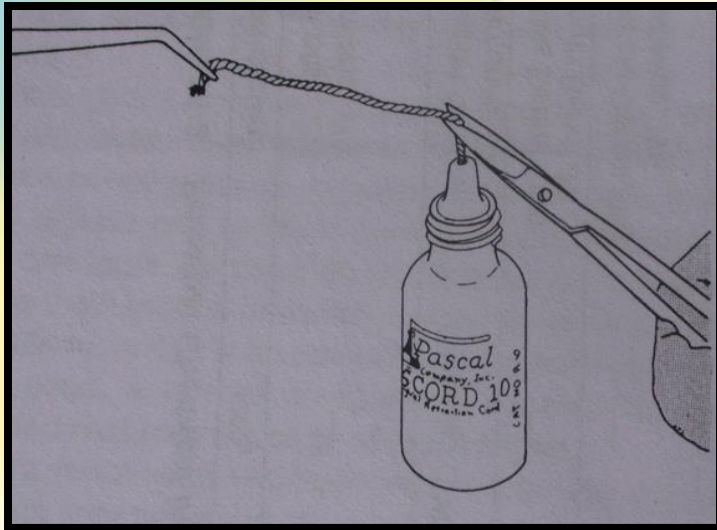
- Retraction cord can be used for isolation and retraction in the direct procedures of treatment of accessible sub-gingival areas and in indirect procedures involving gingival margins.
- Retraction cord is moistened with a non-caustic haemostatic agent and is placed in the gingival sulcus to control sulcular seepage or hemorrhage or both.
- A properly applied retraction cord improves access and visibility and helps prevent abrasion of gingival tissue during tooth preparation.
- It may help restrict excess restorative material from entering the gingival sulcus and provide better access for contouring and finishing the restorative material.
- The diameter of cord should be such that it can be inserted gently into the gingival sulcus and produces lateral displacement of free gingiva without blanching it.



- The length of cord should be sufficient to extend approximately 1mm beyond the gingival width of tooth preparation.
- A thin, blunt-edged instrument blade or the side of an explorer is used to insert the cord progressively.
- Cord placement should not abuse the gingival tissue or damage the epithelial attachment.



# Technique of placement











# INDIRECT METHODS OF ISOLATION

# Comfortable and relaxed position of the patient

- The patient should be comfortably seated in the dental chair.
- The surroundings should be pleasing and relaxing.
- All these factors as well as the comforting attitude of the dental staff reduce the anxiety levels of the patient and aid in reducing salivation.

# LOCAL ANESTHESIA

- It helps in reducing the discomfort associated with the treatment in addition to controlling moisture by decreasing salivation.
- Making the patient comfortable, less anxious and less sensitive to stimuli helps in producing lower salivary flow thus helping in moisture control.
- Another advantage is the vasoconstriction caused by Local anesthesia- which helps in reducing hemorrhage at the operating site.



# Drugs

- **Antisialagogues** : Premedication may be indicated using an anticholinergic agent to depress salivation in patients for whom no mechanical device is effective producing a dry field.

*ATROPINE SULPHATE* (0.3-1 mg, 1-2 hrs.) before procedure.

*PROPANTHELINE BROMIDE* (15 mg, 1hr.) before procedure.

*METHANTHILINE BROMIDE* (50 mg, 1hr.) before procedure.

Atropine should be avoided in patients with ocular (glaucoma) pressure, asthma, with cardio-vascular problems, nursing mother or patients with obstructive conditions of the gastro intestinal or urinary tracts.

- **Anti anxiety agent** (Anxiolytic agents) and **Sedatives** :  
Premedication with these drugs is quite helpful in apprehensive patients. Example : Diazepam 5-10 mg 24 hrs. before the appointment.



THANKYOU