Rubber Dam (tooth isolation)

Rubber dam placement is a fundamental requirement for performing non-surgical endodontic procedures. For root canal therapy, efficient and straightforward techniques for rubber dam application have been established. Except in rare cases, the rubber dam can typically be positioned within one minute.

The rubber dam is used in endodontics because it ensures the following:-

1. Patient is protected from aspiration or from the swallowing of instruments, tooth debris, medicaments &irrigation solutions.
2. Clinician is protected from litigation because of patient aspiration or swallowing of an endodonting file.
3. A surgically dam operating field is isolated from saliva, hemorrhage, & other tissue fluids. The dam reduces the risk of cross-contamination of the root canal system, & it provides an excellent barrier to the potential spread of infectious agents.
4. Soft tissues are retracted & protected.
5. Visibility is improved. The rubber dam provides a dry field & reduces mirror fogging.
6. Efficiency is increased. The rubber dam minimizes patient conversation during treatment &the need for frequent rinsing. It also relaxes the patient &saves time.

Equipment:-

Dam material: - rubber dam is available in a variety of thickness, colors, sizes, & material. The medium-weight thickness is recommended for general all-around use. It has the advantage of cupping around the cervical of teeth, providing a fluid seal without the use of floss ligature ties around each tooth. Also, it does not tear, or rip easily & provides an unusual degree of protection from injury for the underlying soft tissues. It exerts a greater retracting force on the lips &cheeks then does the thinner material, thus affording greater access &improved vision.

The advantages of thin weight dam in:-

1. Mandibular anterior teeth.
2. Partially erupted posterior teeth.

The problem of retaining a clamp on these tapered teeth, with little or no cervical undercut, is solved by applying the thinner dam, which

exerts less dislodging force on the clamp. The disadvantage is that it is easily torn.

The size of dam materials may be purchased in 5-or 6- inch wide rolls, or precut sheets, either 5-inches×6-inches 5×6 inches, or 6×6 inches.

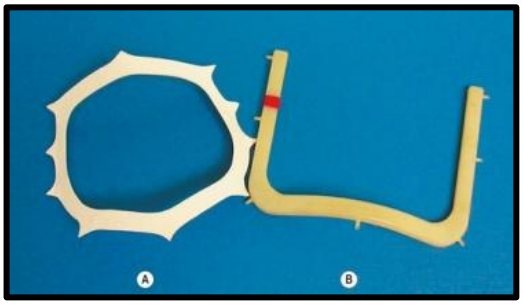
Rubber dam is available in latex & non latex material. If the patient may have an allergy to latex rubber dam, so:-

1. Either use silicone rubber dam.
2. Or, the digits can be cut from a vinyl glove, & the remainder can be adapted to act as a rubber dam in patients who exhibit hypersensitivity to latex.

Frames: - In addition to supporting the dam, frames should be radio lucent to prevent obliteration of an important area on the endodontic working radiograph.

1. Young's frame: it's U-shaped, made of either metal for use in restorative dentistry or of radio lucent plastic for endodontic applications. It's easily manipulated & is widely used. This frame holds the dam against the patient's face, & an absorbent napkin under the dam can be used for patient comfort.

2. Nygaard- Østby (N-Ø):- Is shield shaped, made of radiolucent nylon, &may be in place while a tooth is subjected to x-ray without interfering with the radiographic image. It tends to hold the dam a way from comfortable, & requires no absorbent napkin. Because of its shape, it also directs the breath from the nostrils away from the operative field, thus minimizing possible root canal contamination by nasal staphylococci.



3. Starlite visiframe: - It's U-shaped frame, made in radiolucent plastic. Because of its shape, it exerts less tension on the dam & is easier to use than the N-Ø frame, it requires no absorbent napkin, &stands a way from the face.

4. An innovative, articulated frame developed to facilitate endodontic radiography is Le Cadre Articule' (the articulated frame). Developed in France by Dr.G sauveur, it is curved to fit the face

& is hinged in the middle to fold back, allowing easier access for radiographic film placement.

5. Disposable Rubber dam: - The disposable Handi dam rubber dam system also provides a radiolucent plastic frame.

Another one is the Quick dam, is a single-isolation device with a flexible outer ring, eliminating the need for an additional frame.

Clamps: - Although a basic selection of five to seven clamps will permit most dentists to place a clamp & dam on a majority of teeth encountered, the more experienced operator builds up a larger collection over the years. Teeth that are rotated, partially erupted, malaligned, fractured, anomalous in crown form, or with severe carious involvement all present problems requiring special clamps or clamping techniques.

❋ **Plastic clamps:** are also available in two sizes, large &small, & are used in selected cases. When metal clamp obstruction is a problem in radiography, radiolucent plastic clamps allow for an unobstructed view of the tooth. Plastic clamps can also be used to isolate teeth during vital tooth bleaching, using a heat lamp to avoid excessive heat build up that occurs with conventional metal clamps.

Forceps: - The forceps holds & carries the clamp during placement & removal. Either the Ash or Ivory style clamp forceps is satisfactory.

Punch: - Any rubber dam punch that is convenient for the operator & creates a sharp clean hole in the dam material is satisfactory.

Frequently, the punch is not accurately aligned with the hole, resulting in a nick on the cutting edge and producing an incomplete, irregular cut in the dam material.

Table 1: Rubber dam clamp selection

Maxillary teeth

Central incisor	Ivory 00 or 2, 212 or 9A Hu-Friedy 27, Ash A
Lateral incisor	Ivory 00, 212 or 9A, Ash C
Canine	Ivory 2 or 2A, 212 or 9A
Premolars	Ivory 2 or 2A, Hu-friedy 27
Molars	Ivory 3 or 4, Ivory 8A, 12A or 13A, 14 or 14A, Ash A

Mandibular teeth

Incisors	Ivory 0 or 00, 212 or 9A, Ash C
Canine	Ivory 2 or 2A, 212 or 9A
Premolars	Ivory 2 or 2A, Hu-friedy 27
Molars	Hu-friedy 18, Ivory 8A, 12A or 13A, 14 or 14A, 26, Ash A, Fatigued Ivory 2A

Tucking instrument: - A plastic or cement instrument is used to shed the rubber dam off the wings of. The clamp once the clamp has been positioned. It's also used, along with a stream of air, to invert or tuck the edges of the dam into the gingival sulci, thus ensuring a moisture-proof seal. This is particularly necessary in multiple-tooth applications.

Dental floss: - Dental floss is used to test contacts before dam application and to guide the dam material through the contact points. The operator should release their lingual hold on the floss and pull it buccally, instead of reversing it back through the contact point.

Technique of Application:-

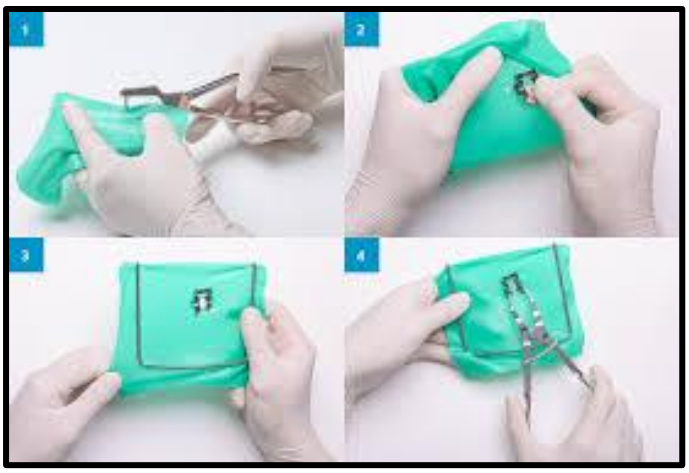
❋ **Preparation of rubber dam application using a single-bowed clamp:-**

Dentist:-

1- Remove supra- & subgingival calculus & dental plaque. Mark the tooth to be treated with a marker pen.
2- Select the clamp to be used.
3- Test contacts with floss to ensure possibility & to test for sharp edges that might tear the dam.

Assistant:-

1- Punch one appropriate-sized hole just off center of a 6×6 inch piece of dam material. Rotate the dam to match the tooth to be treated; upper or lower, right or left.



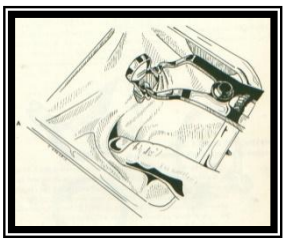
2- ***A:*** stretch the dam over the frame and place the wings of the selected clamp in the punched hole with the bow of the clamp to the distal, or

B: place only the bow of the clamp through the punched hole of the rubber dam.

3-Place the forceps in the clamp holes with tension & hold in readiness for the dentist.

Application by the Team Dentist:-

4- Place an index finger in the vestibule to retract the lip & cheek. The patient is instructed to place the tongue on the opposite side.

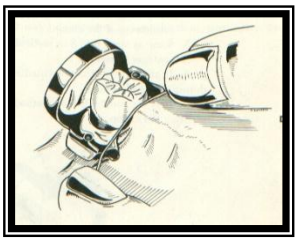


5- Sight the tooth to be clamped between the Jaws of the clamp, direct vision is essential.

6- Place the clamp into the cervical proximal undercuts on the tooth as the index finger is removed from the vestibule. Finger pressure is sometimes used to ensure seating of the clamp.

7- ***A-*** For 2a above shed the dam off the clamp wings with the tucking instrument. Care is taken not to rip the dam, or

B- For 2b above, loosely apply the rubber dam frame to the corners of the rubber dam with the aid of the assistant. Then stretch the dam under the wings of the clamp with the tucking instrument & tighten the rubber dam over the entire frame.



8- Use floss to aid in passing the dam through contacts. Pull the floss through the labial or buccal rather than pulling back through the contacts.

9- In multiple- tooth applications. tuck the dam into the gingival sulci of the unclamped teeth, using the tucking instrument,

10-Use compressed air to dry the teeth, this aids in tucking.

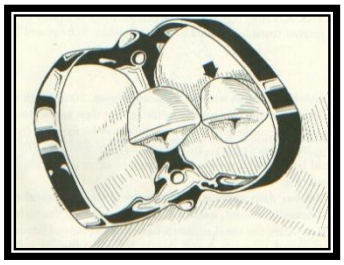
11-Aid in tightening the rubber dam over the frame once the clamp is on the tooth & after the rubber dam is stretched under the wings of the clamp.

12-Place the saliva ejector under the dam. On a maxillary dam application, many patients do not need the saliva ejector.

❋ **Preparation of Rubber Dam Application Using a Double-bowed Clamp:-**

Dentist:-

Same as for a single- bowed clamp.



Assistant:-

1- Punch one large hole just off center of a 6×6 inch piece of dam material.
2- Stretch the dam over the frame.

Application by the Team Dentist:-

1- After the assistant has positioned the dam over the involved & marked tooth, place the clamp into the cervical proximal undercuts on the tooth.
2- Use floss to aid in passing the dam through the contacts.

Assistant:-

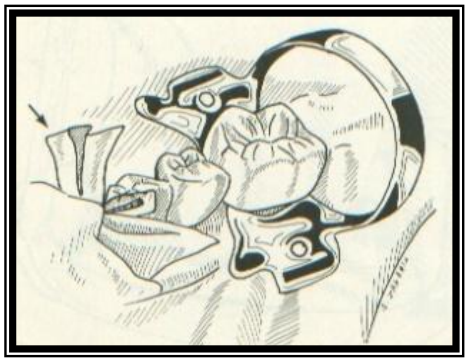
1- Stretch the rubber dam over the marked tooth to be isolated.
2- Ensure that the rubber dam is not blocking the patient's nose.
3- Place the saliva ejector under the dam.

Completed dam application should take less than 30 Sec, of the dentist's time in all but the unusual cases. In applying the dam to a single tooth, however, the dentist must take great care that the correct tooth is clamped. After placement, the record is checked & the teeth are counted under the dam, first by the dentist & then independently by the assistant.

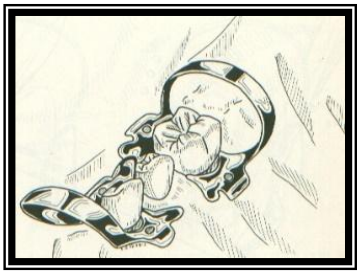
Circumstances requiring Variations from the Usual Application:-

1- A well-done gingival gold filling or PFM veneer crown on the involved tooth that could be damaged by clamps.

Variation: - clamp one tooth posterior to, & extend the rubber dam one tooth anterior to, the involved tooth.

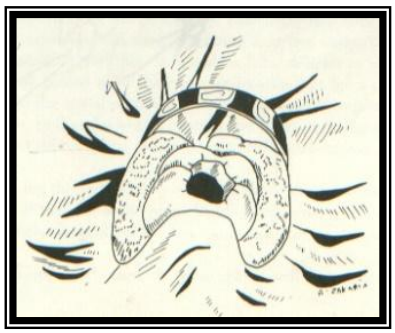


2- Multiple adjacent teeth requiring treatment.



Variation: - the posterior tooth is clamped normally while the clamp is reversed (with the bow pointing mesially) on the more anterior tooth.

3- Bridge abutments, splints & orthodontic bands with wires.



Variation: - Punch a larger than usual hole in the dam. Smear oraseal around the hole on the underside of the dam. This mucilaginous material prevents leakage. Clamp the tooth in the normal manner. In addition, place around tooth pick through the gingival embrasure next to the pontic. If leakage is still a problem, add more oraseal around the abutment at the site of the leakage.

4- Partially erupted tooth.

Variation: - An Ivory #14A or ash #A clamp forced subgingivally into the cervical undercut will often hold.

5- Caries, resulting in a subgingival restorative margin of the involved tooth.

Variation: - Clamp one tooth posterior to, & extend rubber dam one or two teeth anterior to, the involved tooth.

6- Hemisected mandibular or maxillary molars.

Variation: - Hemisected mandibular molars are treated as premolar those that are wide buccolingually are best clamped with a fatigued Hu-Friedy or Ivory #2 or #2A.

7- Full-crown preparation without a cervical undercut to retain the clamp.

Variation: - a proper full-crown preparation will shed toward the occlusal, & the clamp may not provide adequate resistance to the tension of the rubber dam. It may be necessary to place parallel horizontal grooves on the buccal & lingual axial walls of the preparation near the gingival margin to permit the clamp to grasp

on to the preparation. The Ivory #2 or #2A clamp will fit into these grooves for retention.

8- Posterior teeth with minimal tooth structure for clamp retention.

Variation: - The tension of the rubber dam as its stretched out over the frame exerts pressure, or a force of displacement, on the bow of the clamp. The clamp may be reversed on the working tooth; a second clamp is placed over the rubber dam on the next tooth posterior to absorb the pressure of the rubber dam.

9- Fractured cusp with subgingival margin on buccal or lingual surface.

Variation: - Use three-tooth rubber dam isolation as in second circumstance.

10- Tooth with calcified pulp chamber & canals.

Variation: - Use three-tooth rubber dam isolation as in second circumstance.