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METHODS OF ISOLATION

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Abstract

Background:

Dentist faces several difficulties while operating on the oral cavity, namely: salivary secretions, as well as microorganisms and lack of control of cheek and tongue. These difficulties reduce the quality of dental procedures. This lead to an ongoing search for means of controlling them, which would increase the chances of dental therapy success.

The aim of work: *In this study, we aim to understand the role of rubber dam and other isolation methods in clinical practices for better moisture control and visual access.*

Materials and methods: *This review is using the comprehensive search of J. American Dent Association, Saunders, PDR Network from 1992 to 2010. The search terms used were: Rubber dam , High-Volume Evacuators and Saliva Ejectors , retraction cords*

Conclusion: *For over one and a half century, it was known that rubber dam use diminishes microbial infection and the potential for patients swallowing or inhaling irritants, hand-files, infected tooth debris, etc. The Quality Assurance Guidelines of the American Associations of Endodontists says that "cleaning, shaping, disinfection and obturation of all canals are accomplished using an aseptic technique with dental dam isolation whenever possible."*

Keywords: *Rubber dam , High-Volume Evacuators and Saliva Ejectors*

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INTRODUCTION:

Several difficulties pose to dentists while operating on the oral cavity, namely: salivary secretions, as well as microorganisms and lack of control of cheek and tongue. These difficulties reduce the quality of dental procedures. This lead to an ongoing search for means of controlling them, which would increase the chances of dental therapy success [1].

'Endodontic procedures must never be performed without the rubber dam.' The title of a paper by Heling and Heling [2] that clearly emphasizes the essential role of the rubber dam (RD) for every endodontic procedure. For over one and a half century, it was known that RD use reduces microbial contamination and the potential for patients swallowing or inhaling irritants, hand-files, infected tooth debris, etc. Furthermore, every dental student is taught early in instruction that in clinical practice the rubber dam` enhances visibility, improves visual access to the canals optimizes moisture control and retraction of the soft tissue, thus enhancing the efficiency of every endodontic treatment procedure [3-6]·The Quality Assurance Guidelines of the American Associations of Endodontists says that "cleaning, shaping, disinfection and obturation of all canals are accomplished using an aseptic technique with dental dam isolation whenever possible."

METHODOLOGY:

- Data Sources and Search terms

We conducted this review using a comprehensive search of J. American Dent Association, Saunders, PDR Network from 1992 to 2010.The following search terms were used: Rubber dam**,** High-Volume Evacuators and Saliva Ejectors, retraction cords

- Data Extraction

Two reviewers have independently reviewed the studies, abstracted data and disagreements were resolved by consensus. Studies were evaluated for quality and a review protocol was followed throughout.

The study was approved by the ethical board of King Abdulaziz University Hospital

RUBBER DAM ISOLATION:

The rubber dam was first used by Dr. Sanford C. Barnum on 15 March 1864. Since then, some publications have appeared related to its practicality and methods of application. The use of the rubber dam during root canal treatment confers three main advantages: control of cross-infection, protection and improving treatment efficiency. Air turbine produces aerosols and droplets that may be contaminated with bacteria and blood. These aerosols and droplets characterize a source for transmission of infectious diseases such as measles, tuberculosis, SARS, hepatitis and AIDS. Rubber dam significantly reduces the microbial content of air turbine aerosols produced during operative procedures, thereby reducing the risk of cross-infection in the dental practice [7].

Rubber dam enhances treatment efficiency by [7-9]:

1. The patient is protected from the ingestion or, worse, the aspiration of small endodontic files, burs, tooth fragments, irrigating solutions, or irritant materials.

2. Provides a clean operative field.

3. Retraction and shielding of the soft tissues, which may be at the risk of iatrogenic injuries

4. Improved view of the operating area. The advertisement of a well-known manufacturer of utensils for rubber dam assembly rightly reads: "Do better what you see and see better what you do."

5. Minimizing interruptions: the patients cannot speak during the procedure; besides, they will not rinse their mouth during treatment.

6. Several infections that are transmitted via saliva and other fluids can be prevented

7. The dental operator may work comfortably and can even answer a phone call if needed leaving his/her operating field unaffected.

8. Better access is achieved during cleaning and shaping procedures. The dentists can work from any angle without worrying about instruments causing injury or falling into the oral cavity. Rubber dam gives dentists much greater dexterity and confidence while working with patients.

9. The patients too feel more comfortable as there is more mutual trust between dentists and patients.

INSTRUMENTS:

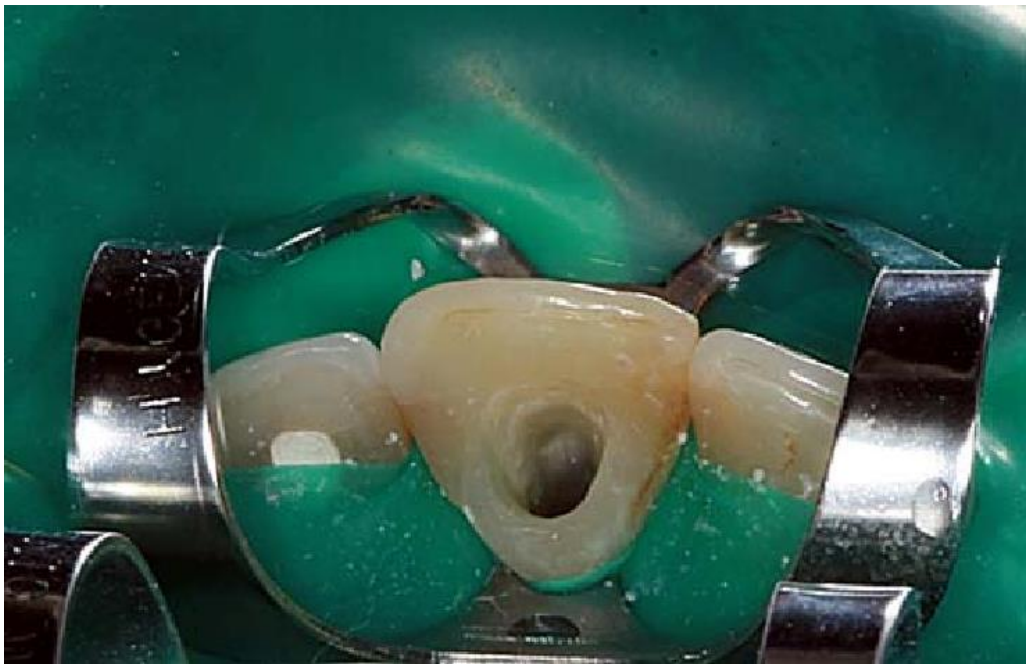

Figure 1: Rubber dam with clamp [16]

Rubber dam comes in various colors, sizes, and thickness. A 6”x6” is preferred when multiple teeth are being isolated. Whereas, a 5”x5” is preferred if a single tooth is being isolated even if it is a posterior one. Several dentists prefer darkly colored rubber dam as it contrasts with the lightly colored tooth. Others select lighter shades since they are more translucent to underlying structures as it helps in taking intra-oral radiographs. Over time, the rubber dam may lose its elasticity and may need replacement [10].

Dentist obtains one’s supplies from a distributor that sells them at high volume, to avoid buying supplies that have already been in the warehouse for a long period and have thus already expired. Rubber dam’s adequacy can be determined by punching it and stretching across all directions while checking for tears[10].

Rubber dam punches:

They punch a hole in the rubber dam of varying diameters depending on the size of the tooth. The hole punched should be round without any irregularities. Holes can be stretched in all direction equally, but they should not tear down [10].

Rubber dam clamps:

The choice and correct positioning of clamp also determine the fit of the rubber dam itself. The clamps come as winged or wingless. It is a personal choice of the dentist to choose either one. The positioning techniques differ slightly, but the final results do not change. Wingless clamps are sometimes easier to work with especially in the posterior regions with thick cheek. The most commonly used are (table 1) [11]:

FRONT TEETH:	IVORY ..... # 6 IVORY ..... # 9 IVORY ..... # 90N IVORY ..... # 212S IVORY ..... # 15

PREMOLARS:	IVORY ..... # 1 IVORY ..... # 2 IVORY ..... # 2A
MOLARS THAT ARE COMPLETELY ERUPTED, WHOLE, OR COVERED BY FULL CROWNS:	IVORY ..... # 7
MOLARS THAT ARE INCOMPLETELY ERUPTED OR ALREADY PREPARED FOR A FULL CROWN	IVORY ..... # 14 IVORY ..... # 14A IVORY ..... # 7A
ASYMMETRICAL MOLARS, IN PARTICULAR, THE SECOND AND THIRD:	IVORY ..... # 10 IVORY ..... # 11 IVORY ..... # 12A IVORY ..... # 13A
WINGLESS, TO BE USED WHEN THE WINGS OBSTRUCT THE WORKING FIELD	IVORY ..... # W8A IVORY ..... # 26N

The clamps can interchange positions, premolar clamps can be used in small molar or larger anterior. Similarly, a # 9 clamp can be placed on a hemisected root of a lower molar; any such adaptation is permitted, as long as the final result – correct placement of the rubber dam – is achieved. Rubber dam clamp may fracture in such a maneuver. If this happens, the elastic nature of rubber dam will throw all dental fragments out of the mouth. It is therefore advisable to secure rubber dam with floss or uses rubber dam frame [10,11].

Rubber dam clamp forceps

This instrument opens the clamp to carefully positions it around the teeth. The Ivory forceps are instruments of choice because then dentists can apply direct pressure to the gingiva which is necessary to place clamp below the bulge of the tooth crown [10,12].

OTHER METHOD OF ISOLATION:

Cotton Roll Isolation and Cellulose Wafers

Cotton roll absorbents are isolation alteration when the rubber dam application is impractical or impossible. In a few situations, cotton roll isolation can be as effective as rubber dam isolation. Cotton rolls are normally used in conjunction with saliva ejector and profound anesthesia. Similarly cellulose wafers may be used to retract the cheek and provide additional absorbency [13].

Throat Shields:

When the rubber dam is not being used, throat shields are indicated when the risk of aspirating or swallowing small objects is present. It is particularly important when treating teeth in the maxillary arch. A gauze sponge (2" x 2"), unfolded and spread over the tongue and posterior part of the mouth [14].

Figure 2: Isolite comfortably retracts the patient's tongue and cheek, protects the airway, and keeps the mouth gently propped open — all while providing intra-oral illumination and continuous suctioning [17].

High-Volume Evacuators and Saliva Ejectors:

They are preferred for suctioning water and debris from the mouth because saliva ejectors remove water slowly and have a capacity for picking up solids [10].

Figure 3: High-volume evacuator (HVE) tips [18]

Retraction Cord:

Retraction cord can be used for isolation and retraction in direct procedures involving accessible subgingival area and indirect procedures involving gingival margins. the cord is usually moistened with a non -caustic hemostatic agent, may be placed in gingival sulcus to control gingival seepage and haemorrhage [13].

Figure 4: Retraction cords in upper anterior [19]

Drugs:

The use of drugs to control saliva is rarely indicated in restorative dentistry and generally limited to atropine [15].

CONCLUSION:

Maintaining optimal moisture control is a necessary component in the delivery of high-quality operative dentistry and endodontics. In general, dental practice, the current use of rubber dam during root canal treatment is low. Many reasons, particularly patient acceptance, time of rubber dam application and cost, are often advanced by dentists as disincentives to rubber dam use. The omission of rubber dam use influences other aspects of endodontic treatment, such as irrigant choice and treatment outcome, and subjects the dentist to litigation if the patient swallows or aspirates endodontic instruments and materials. Besides effective training, routine rubber dam use must be encouraged by convincing the dentist of its value and merits.

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