

Case Series

Technique to stabilize a lingual retainer under rubber dam isolation: A case series and review

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Abstract

Retention represents a crucial stage in orthodontic therapy, aimed at maintaining treatment outcomes and minimizing relapse. Numerous direct and indirect approaches have been introduced over time for bonding lingual retainers. Achieving effective isolation during bonding is essential, and the use of a rubber dam has become increasingly important, as it significantly reduces aerosol dispersion within the clinical environment. This article presents three case reports demonstrating a straightforward technique in which rubber dam clamps are used to stabilize the lingual retainer wire during bonding. The described method is simple, dependable, time-efficient, and cost-effective, as it eliminates the need for specialized equipment or transfer trays.

Keywords: Lingual retainer, Orthodontic retention, Rubber dam isolation, Composite adhesive.

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1. Introduction

Retention is a critical phase of orthodontic treatment, as it helps preserve the achieved alignment and minimizes the chances of relapse. Over the years, numerous direct and indirect clinical methods have been employed for the placement of bonded lingual retainers.¹⁻³ The composite adhesive technique provides dependable positioning for directly bonded retainers and, with long-term use, does not appear to increase the risk of carious lesions or enamel demineralization on the bonded teeth.¹ Despite these advantages, all bonding procedures remain vulnerable to moisture contamination, which may compromise bond strength, result in bond failure, and ultimately contribute to relapse.^{2,3}

Proper moisture control is therefore essential during bonding procedures. Rubber dam isolation is considered a well-established and highly recommended method for dental procedures involving composite resins and adhesive systems.⁴ In addition, during the COVID-19 pandemic, the British Orthodontic Society issued guidelines addressing the risks associated with aerosol-generating procedures (AGPs) in orthodontic practice.

Consequently, the use of a rubber dam during fixed lingual retainer bonding has become increasingly

important, as it helps limit aerosol dispersion within the operatory.⁵ This article describes a simple technique that utilizes rubber dam clamps to aid in stabilizing the lingual retainer wire on the teeth. The method is particularly useful when placing a retainer after debonding of labial brackets, where the rubber dam sheet may otherwise tear in the presence of brackets. The technique is applicable to both flat retainer wires and flexible twisted wires. It is straightforward, reliable, and cost-effective; moreover, because it does not require specialized equipment or transfer trays, it significantly reduces both chairside and laboratory time.

2. Reasons for Debonding or Bond Failure of Fixed Retainers

Failures of fixed lingual retainers (**Figure 1**) may be categorized according to their extent, such as partial or complete debonding, or based on the nature of the failure. These include separation at the tooth–adhesive interface, failure at the adhesive–wire interface, or fracture within the retainer wire itself.⁴



Figure 1: Broken upper fixed retainer

Several factors affecting the clinical stability and longevity of fixed retainers have been investigated. These include the type of wire used,⁵⁻⁸ the polymerization method of the adhesive,⁹ the technique employed for retainer placement (direct versus indirect),¹⁰⁻¹² the isolation method or adhesive material selected,¹³ and the use of liquid resin during bonding.¹⁴ In contrast, patient-related variables such as age and gender, as well as the operator's level of clinical experience, have not been found to significantly influence retainer survival.¹¹

Clinical observations indicate that the first six months following placement of fixed lingual retainers represent the most critical period, during which the majority of bond failures tend to occur.¹² Additionally, in vitro investigations have evaluated other variables that may affect retainer longevity, including the type of light-

curing unit utilized,¹⁴ the surface area covered by the adhesive,¹⁵ and the use of self-adhering composites with or without prior acid etching.¹⁶ Recent studies, including comparative prospective randomized clinical trials, have also assessed in vivo failure rates of fixed mandibular and maxillary lingual retainers bonded using a light-cured nano-hybrid composite based on nano-optimized technology and a light-cured low-viscosity flowable composite over a six-month observation period.

2.1. How to improve fixed retainer breakage or failure

1. Finish the case with proper overjet and overbite.
2. Selection of proper retainer wire
3. Selection of proper adhesive
4. Proper preparation of adhesive tooth surface
5. Proper isolation method
6. Proper light curing instruments

2.2. Materials

1. Flowable composite
2. Bonding agent
3. Rubber dam kit
4. Dental floss
5. Curing light
6. Retainer wire

2.3. Technique or steps

1. Debonding the case after achieving the orthodontic goal (with proper overbite and overjet).
2. Scaling and removal of adhesive from labial surface and in lingual surface if previously bonded retainer failed or broken.
3. Place the rubber dam on the maxillary or mandibular arch, ensuring exposure from the left second premolar to the right second premolar, or alternatively from molar to molar. Stabilization is achieved by securing rubber dam clamps on the right and left first premolars (**Figure 2**).
4. Then prepared surface acid etched with 37% phosphoric acid (**Figure 3**). Frosted appearance shows well etched enamel in (**Figure 4**).
5. On a study model, contour a 0.0175" stainless steel flexible twisted wire to conform closely to the lingual surfaces extending from canine to canine.
6. Bonding agent applied and cured on the prepared lingual surfaces of the anterior teeth for bonding as usual (**Figure 5**).
7. Secure the retainer using a light-activated adhesive. Carefully eliminate any excess composite from the tooth surfaces, then remove the rubber

dam by cutting it away. Carry out finishing and polishing as required (**Figure 6**).

8. After removing the rubber dam, assess the patient's tongue movements to check for any discomfort or sharp areas related to the retainer or the bonding material (**Figure 7**).

3. Case Report 1

Patient came to the Department of Orthodontics with the chief complaint of broken retainer for the past 2-3 times. Patient history revealed that she discontinued the treatment due to some personal matters and she did not wish to complete the treatment. Orthodontic treatment was conducted in the department for the past one year. Retainer was bonded under rubber dam (above mentioned all steps were followed) and follow up was done at 3, 6 months by tele-communication. Retainer was found to be stable after following the procedural steps and the patient was satisfied.



Figure 2: Broken upper fixed retainer in #22 and #23



Figure 3: Upper: Rubber dam isolation and acid etching after removing the old retainer and composite (Case 1)



Figure 4: Frosted appearance after acid etching



Figure 5: Bonding agent applied and cured

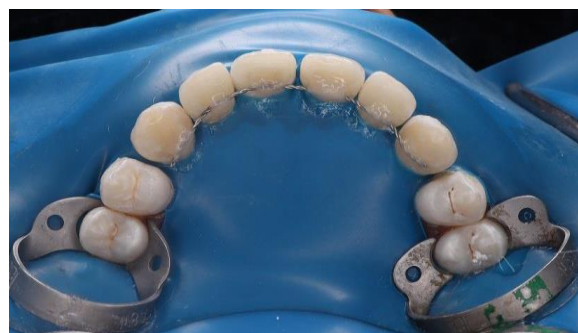


Figure 6: Bonded upper palatal fixed retainer with rubber dam

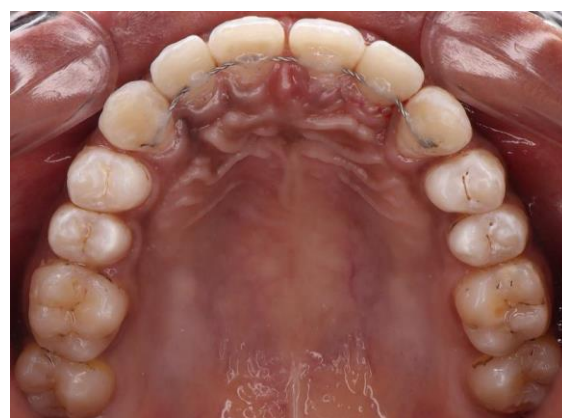


Figure 7: Bonded upper lingual fixed retainer without rubber dam

4. Case Report 2 and 3

Case 2 and 3 came to the Department of Orthodontics with the chief complaint of frequent breakage of lower lingual retainer for 3-5 times and got it repaired from private clinic. Later on, the patient visited K.D. Dental College and Hospital, Mathura, we informed about re-treatment but due to time and cost factor patients are not willing to do it and then later on provided fixed retainers that were bonded under rubber dam isolation following the same procedure as described earlier. Follow up was done through tele-communication at 3 and 6 months that showed no breakage.



Figure 8: A, B): Bonded lower lingual retainer with rubber dam (Case 2 and 3)

5. Discussion

Long-term stability following orthodontic treatment often depends on bonded lingual retainers, particularly in the mandibular anterior segment where relapse tendency is high. Previous longitudinal studies have reported varying survival rates and bond failure incidences of mandibular canine-to-canine retainers, highlighting that clinical success is influenced by bonding protocol, wire adaptation, and environmental contamination during placement.^{1,6,10,11} Although bonded retainers may remain functional for extended periods, failures-especially at individual bonding sites-continue to represent a common clinical challenge.^{1,7,8}

Moisture control is one of the most critical determinants of adhesive bond strength. Rubber dam isolation has been

recommended to improve bonding reliability by providing a clean and dry operating field and reducing salivary contamination.^{3,4} Earlier descriptions of retainer bonding under rubber dam have outlined structured step-by-step approaches; however, maintaining passive adaptation of flexible wires during isolation can be technically demanding.³ The technique proposed in the present study aims to overcome these difficulties by stabilizing the retainer wire during bonding while preserving optimal isolation conditions.

Accurate passive adaptation of the retainer is essential for long-term clinical success. Even slight displacement during bonding may introduce unwanted forces, increasing the risk of debonding or unintended tooth movement.^{12,13} Transfer techniques using acrylic or resin jigs have been proposed to improve accuracy and reduce chairside time.^{2,12} While these methods enhance positioning, they may require additional laboratory procedures or increase technique complexity. The stabilization technique described in this paper simplifies the procedure by allowing direct bonding under rubber dam without additional fabrication steps, thereby maintaining passive adaptation throughout the bonding process.

Previous studies have also emphasized that retainer material, adhesive surface area, and curing protocols influence bond survival.^{7,8,14-16} Multistranded stainless steel wires have demonstrated favourable clinical longevity compared with Fiber-reinforced composites in several clinical trials.^{7,8} Additionally, increasing resin coverage and optimizing curing conditions have been shown to improve bond strength and reduce detachment rates.^{14,16} The stabilization technique may contribute to improved outcomes by ensuring uniform adhesive placement and controlled polymerization due to enhanced wire stability.

Comparisons between indirect and direct bonding techniques indicate that indirect methods reduce placement time but may not consistently improve survival rates.¹²

Direct bonding, particularly under rubber dam isolation, provides superior moisture control but can be challenging when handling flexible wires.³ The present stabilization approach combines the advantages of direct bonding with improved wire control, thereby reducing technique sensitivity and facilitating precise retainer placement.

Furthermore, the use of rubber dam isolation has gained additional importance in contemporary orthodontic practice due to infection control

considerations and improved clinical efficiency.⁵ By simplifying retainer placement under rubber dam isolation, the proposed technique offers both procedural safety and improved bonding conditions. This may ultimately contribute to reduced bond failure rates and enhanced long-term retention.

Although the technique demonstrates clinical feasibility, long-term prospective studies are necessary to evaluate its influence on survival rates compared with conventional bonding approaches.

6. Conclusion

The described technique for stabilizing a lingual retainer under rubber dam isolation provides a simple and effective method for maintaining passive wire positioning during bonding. Improved moisture control and minimized wire displacement may enhance bonding reliability and reduce the likelihood of early debonding. The technique also simplifies chairside handling without requiring laboratory steps, making it suitable for routine clinical use.

Further controlled clinical studies with larger sample sizes and long-term follow-up are recommended to confirm the effectiveness of this stabilization method and to compare its performance with conventional bonding techniques.

Abbreviations

AGP: Aerosol-Generating Procedure
 COVID-19: Coronavirus Disease 2019
 RD: Rubber Dam
 LR: Lingual Retainer

Author Contributions

K. Loganathan: Conceptualization, methodology, supervision, and manuscript review.

Atul Kumar Singh: Case management, data collection, and manuscript drafting.

Omkar Singh Yadav: Clinical procedures, literature review, and data interpretation.

Anushree Rathi: Data collection, follow-up, and manuscript editing.

Manami Das: Literature review, manuscript preparation, and final proofreading.

All authors read and approved the final manuscript.

Ethical Approval

Ethical approval was not required for this case series.

Declaration of Patient Consent

Written informed consent was obtained from all patients, and patient confidentiality was maintained throughout the study.

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Conflict of Interest

The authors declare no conflict of interest

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