

# IMPEDIMENTS TO THE USE OF GINGIVAL RETRACTION TECHNIQUES

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## ABSTRACT

*Gingival displacement is defined as “retraction of marginal gingiva away from the tooth”. It helps create space between the prepared tooth and the gingival tissues for bulk of impression material to record fine details. It also provides control of moisture necessary for moisture – sensitive restorative and impression materials. A number of gingival retraction techniques are available, broadly classified as surgical and non – surgical methods. Every practicing dentist needs to employ gingival retraction methods during routine dental procedures, especially when providing crowns with subgingival margins or when restoring cervical lesions on a tooth. This study aimed to assess the prevalence of use of gingival retraction methods by local dental practitioners and to highlight the impediments preventing the routine use of such techniques. A survey was carried out involving 216 dentists practicing in Rawalpindi/Islamabad. Data was analyzed using SPSS version 21 and descriptive statistics were calculated. About 74% of the dentists preferred retraction cords to achieve gingival retraction; however, majority (40%) of the dentists used them only “sometimes” while 31% used them “hardly ever”. Most (37.51%) of the dentists found the employment of retraction techniques a time-consuming procedure followed by 31% of the dentists who stated unavailability of suitable retraction materials at their practice as the major impediment. Results of this survey highlight the need to improve the practice of local dental practitioners regarding the employment of gingival retraction methods.*

**Key Words:** *Gingival retraction, gingival displacement, retraction cord, tissue retraction materials.*

## INTRODUCTION

Success of direct and indirect dental restorations demands exact replication of the natural tooth contours. This makes restoring teeth all the more technique sensitive. For longevity of direct restorations, proper material handling and isolation of the operative field both are mandatory.<sup>1</sup> Indirect restorations, on the other hand, rely on the accurate recording of an impression that will duplicate both the prepared and unprepared tooth surfaces, including the margins, as well as the surrounding soft tissues.<sup>2</sup>

Operative field isolation and exposure of the prepared tooth for an accurate impression can be achieved by displacing the gingival tissues.<sup>3</sup> Gingival displacement is defined as “retraction of marginal gingiva

away from the tooth”.<sup>4</sup> It helps create space between the prepared tooth and the gingival tissues for bulk of impression material to record fine details.<sup>5</sup> Control of moisture, either due to saliva or sulcular fluid is also necessary when moisture – sensitive restorative and impression materials are used. Restorative and impression materials themselves do not displace gingiva nor do they have a hemostatic or astringent effect.<sup>6</sup> Gingival displacement also prevents soft – tissue trauma when finish lines are placed subgingivally.<sup>7</sup>

A number of gingival retraction techniques are available. These are broadly classified as surgical and non – surgical methods. Non – surgical techniques include mechanical methods such as retraction cords, retraction strips and pastes without any hemostatic agent and chemo – mechanical methods such as cords impregnated with epinephrine or aluminium chloride and retraction pastes with hemostatic agents.<sup>8</sup> Surgical methods include use of rotary curettage, conventional surgery such as gingivoplasty, electro – surgery and use of lasers e.g. CO<sub>2</sub> and Nd:YAG.<sup>4</sup>

Every practicing dentist needs to employ gingival retraction methods during routine dental procedures, especially when providing crowns with subgingival margins or when restoring cervical lesions on a tooth. A survey carried out on Irish dentists reported approximately 95% of the dentists used retraction methods, of which about 60% used retraction cords.<sup>9</sup> A similar

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**Received for Publication:** August 20, 2016  
**Revision:** September 10, 2016  
**Approved:** September 17, 2016

study carried out on dentists in New Zealand reported that 85% of the respondents used gingival retraction methods, usually for recording impressions for fixed prosthodontic procedures, with 82% dentists preferring the use of surgical methods of retraction.<sup>10</sup>

Contrary to the above mentioned results, use of gingival retraction methods by Pakistani dentists appears to be rather low. No study has so far been carried out to evaluate the practice of local dentists regarding the use of retraction techniques. This study aims to assess the prevalence of use of gingival retraction methods by local dental practitioners and to highlight the impediments preventing the routine use of such techniques.

## METHODOLOGY

A self-administered questionnaire (Table 1) was designed and pilot – tested for content validity, reliability, relevance and any ambiguity. The questions were closed – ended and aimed to assess the prevalence of use of gingival retraction techniques and the impediments that prevented its routine use by dentists. Sample size for the survey was calculated based on previous data<sup>10</sup> using OpenEpi calculator ([www.OpenEpi.com](http://www.OpenEpi.com)). The questionnaire was then distributed to 216 dentists serving in various dental institutes and private practices in Rawalpindi/Islamabad and involved in the provision of direct and indirect dental restorations. Collected data was analyzed using SPSS version 21. Frequency and percentages were calculated for categorical variables.

## RESULTS

Of the 216 distributed questionnaires, all were completed and returned with a response rate of 100%. Figure 1 highlights the designation of the study participants and their clinical experience. In response to questions about the use of gingival retraction methods, 51.4% dentists “agreed” that gingival retraction is necessary to provide optimal dental restorations esp. in the cervical 3rd of the tooth while 62% agreed that gingival retraction is necessary for recording optimal impressions for crown and bridge work. Table 2 depicts the gingival retraction methods according to their ease of use and preference by dentists. Fig 2 shows the results pertaining to the use of retraction methods, impediments to their use and the types of retraction cords commonly used.

## DISCUSSION

A search of the literature on PubMed and Google Scholar reveals that most of the articles published globally on gingival retraction techniques are *in vitro* studies or studies comparing the efficacy of various retraction techniques.<sup>2,5,7,11,12</sup> There is a lack of data reporting the practice of dentists regarding gingival retraction method. This is probably because gingival retraction is an obligation rather than an option. However, dental profession in developing countries is still evolving and would benefit from data reporting the presence of such practices or a lack thereof. This cross-sectional survey, hence, aimed to assess the practice of local dental practitioners regarding the use of gingival retraction

methods. To the best of the authors’ knowledge, very few studies<sup>9,10</sup> have been conducted in this regard so far.

Majority of the study participants considered retraction of gingival tissues necessary for the provision of direct and indirect dental restorations. About 74% of the dentists preferred retraction cords to achieve gingival retraction. This finding is endorsed by the results of Rath et al<sup>9</sup> who reported the use of retraction cords as the preferred retraction technique by majority (> 55%) of Irish dentists. The results are, however, in contrast to those reported by Al-Ani et al<sup>10</sup> who found that 82% of dentists in New Zealand used surgical methods to achieve gingival retraction around natural teeth while cords were used by 62% of the dentists. Surgical methods such as rotary curettage, electrosurgery and the use of lasers, though effective, result in trauma and damage to the tissues and are best avoided. In the present survey, the second preferred method for gingival retraction was the use of retraction pastes. These have been described in the literature as “cordless” retraction techniques.<sup>8</sup> The injectable retraction pastes tend to be atraumatic<sup>11,13</sup>, eliminating the potential for any soft-tissue laceration, bleeding and/or damage to the junctional epithelium.<sup>10</sup> Owing to these benefits, the use of retraction pastes is on the rise.

The frequency of use of retraction techniques for routine dental procedures was found to be rather low. With an over-all prevalence of 83%, only 4% of the participating dentists “always” employed retraction techniques, 8% employed them “quite often”, majority (40%) of the dentists used them “sometimes” while 31% used them “hardly ever”. These figures are low when compared to a 95% prevalence of use of retraction techniques by Irish general dentists.<sup>9</sup> However, the study on Irish dentists did not specify the frequency of use of retraction techniques.

Of those who reported using retraction cords, 59.7% preferred cords impregnated with aluminum chloride over those impregnated with epinephrine or the non-impregnated ones. Aluminum chloride has been established as the safest and most effective astringent, resulting in the least amount of irritation to the soft tissues.<sup>14</sup> The use of cords impregnated with epinephrine has decreased considerably over time because of its potential for causing cardiovascular problems.<sup>12</sup> Non-impregnated dry cords, on the other hand, tend to stick to the dry mucosa resulting in increased chances of bleeding upon removal. A lack of any hemostatic agent also fails to inhibit sulcular bleeding.<sup>10</sup>

A number of factors appear to hinder the use of retraction techniques by local dentists. Most (37.51%) of the dentists found the employment of retraction techniques a time-consuming procedure followed by 31% of the dentists who stated unavailability of suitable retraction materials at their practice as the major impediment. Patient discomfort, material cost and lack of expertise did not appear to be a major concern. A time-tested established procedure, such as gingival retraction, that is being practiced worldwide

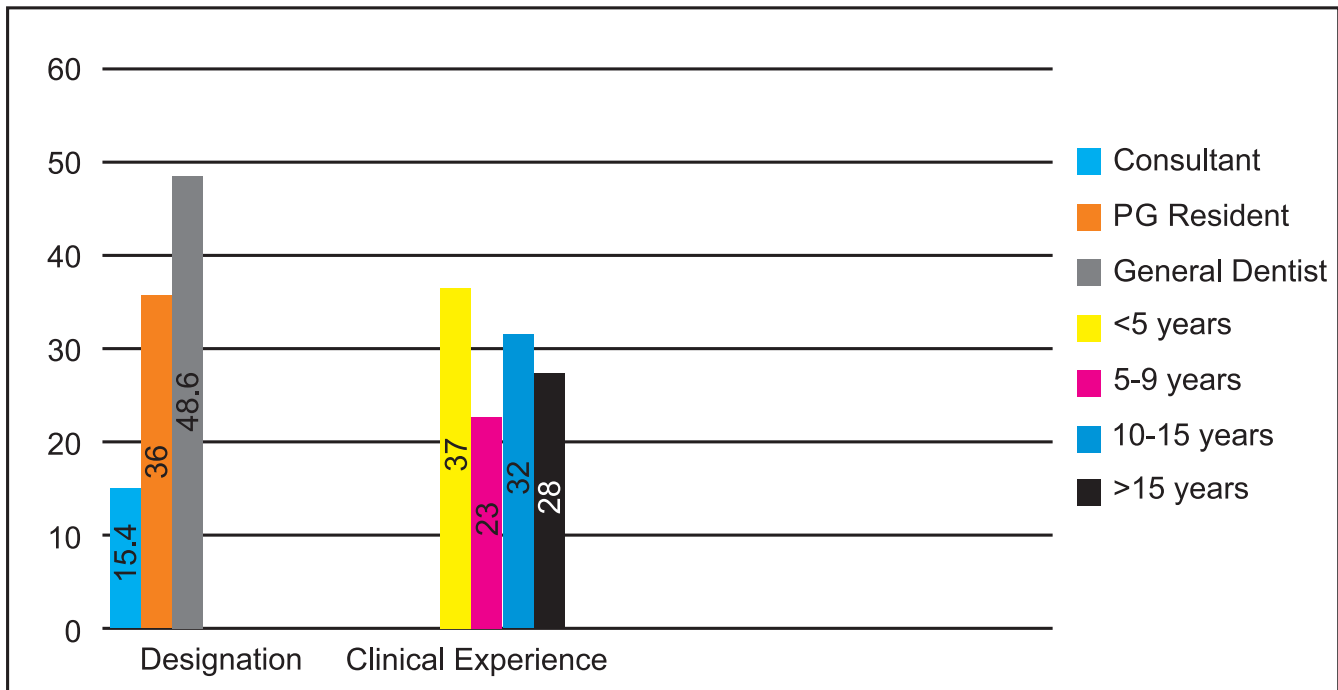


Fig 1: Designation and clinical experience of participating dentists

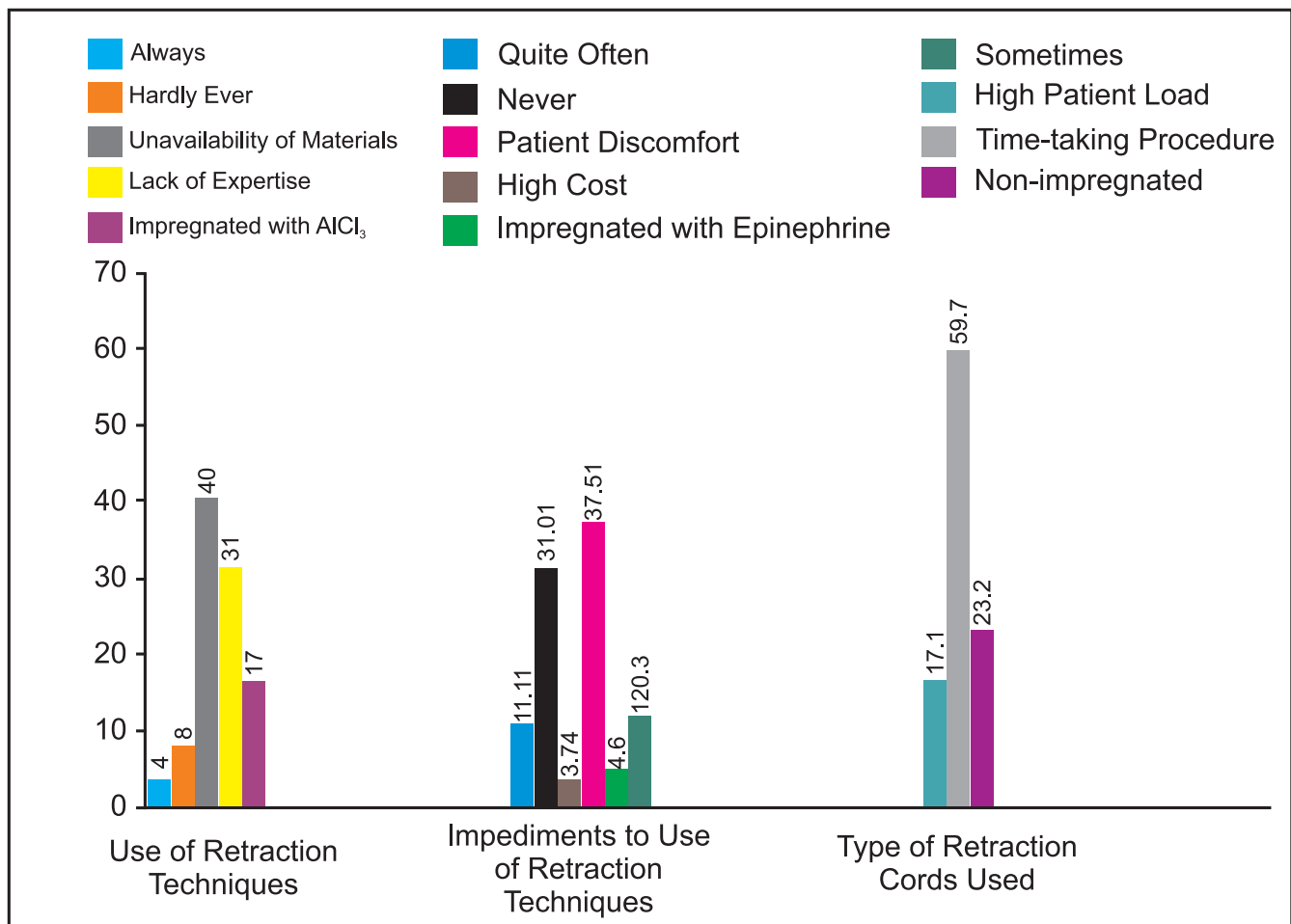


Fig 2: Frequency of use of gingival retraction methods, impediments to their use and types of retraction cords commonly used

TABLE 1: DATA COLLECTION TOOL (QUESTIONNAIRE)  
**IMPEDIMENTS TO THE USE OF GINGIVAL RETRACTION CORDS**

**Designation:** PG Resident ☐ Consultant ☐ General Dentist ☐  
**Years in practice:** < 5 years ☐ 5-9 years ☐ 10-15 years ☐ > 15 years ☐

*Kindly tick the most suitable option for each statement:*

1 Do you think gingival retraction is necessary to provide optimal dental restorations in the cervical/gingival third?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

2 In your opinion, which ONE of the following is the easiest method for gingival retraction?

- a. Retraction cords                      b. Retraction Pastes                      c. Polyvinylsiloxane  
 d. Lasers (Nd:YAG)                      e. Electro surgery                      f. Rotary Curettage

3 Which ONE of the following is your preferred method for gingival retraction?

- a. Retraction cords                      b. Retraction Pastes                      c. Polyvinylsiloxane  
 d. Lasers (Nd:YAG)                      e. Electro surgery                      f. Rotary Curettage

4 How often do you employ gingival retraction methods in your practice?

- a. Always                      b. Quite Often                      c. Sometimes                      d. Hardly ever                      e. Never

*(If your answer is "never", kindly skip the next question.)*

5 Which type of retraction cord do you prefer to use?

- a. Non – impregnated cords                      b. Cords impregnated with AlCl<sub>3</sub>                      c. Cords with epinephrine

6 For retraction cords, which technique do you prefer?

- a. Single cord technique                      b. Double cord technique

7 Are you aware of any contraindications to the use of impregnated cords?

- a. Yes                      b. No

*If yes, which in your opinion is the most important contra-indication? \_\_\_\_\_*

8 Do you feel any impediment to the routine use of gingival retraction cords in your daily practice?

Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree ☐

9 In your opinion, which of the following is the biggest impediment to the use of gingival retraction cords?

- a. High Cost                      b. Lack of expertise                      c. Time taking procedure  
 d. Patient Discomfort                      e. Unavailability of retraction cords                      f. High patient load

TABLE 2: DENTISTS' PREFERENCE FOR GINGIVAL RETRACTION TECHNIQUES

|   |                                              | Retrac-<br>tion Cords | Retrac-<br>tion Paste | PVS Putty<br>Impression<br>Material | Lasers | Electro-<br>surgery | Rotary<br>Curettage |
|---|----------------------------------------------|-----------------------|-----------------------|-------------------------------------|--------|---------------------|---------------------|
| 1 | Easiest method for<br>gingival retraction?   | 65%                   | 15%                   | 7%                                  | 2%     | 9%                  | 2%                  |
| 2 | Preferred method for<br>gingival retraction? | 74%                   | 12%                   | 3%                                  | 3%     | 8%                  | —                   |



cannot simply be cast aside if a few clinicians find it time-consuming, and such practices are strongly condemned. The importance of gingival displacement and tissue management for the long term periodontal health maintenance cannot be overemphasized.<sup>1,14</sup> Practice of the local dentists in this regard needs to be improved and a positive attitude to embrace the established practices as well as the advancements in dentistry needs to be inculcated. Unfortunately, studies published on gingival retraction techniques have never targeted nor reported any obstacles faced by clinicians during their use and hence, the findings of this survey regarding the impediments to the use of gingival retraction techniques cannot be compared. However, this makes the present survey first of its kind, building up on the data concerning the dental practices of local dental practitioners.

## CONCLUSION

On the basis of this cross-sectional survey, following inferences are formulated:

- i Prevalence of use of gingival retraction techniques for routine dental procedures among the local dental surgeons was quite low.
- ii Majority (37.51%) dentists stated “time-consuming procedure” as the biggest impediment to the use of gingival retraction techniques.
- iii Practice of the local dentist with respect to the employment of gingival retraction methods needs to be improved.

## RECOMMENDATIONS

Based on the findings of this study, following recommendations are made:

- i The use of gingival retraction methods should be emphasized at both the undergraduate and the postgraduate level of dental education.
- ii Gingival retraction techniques such as placement of retraction cords should be a mandatory part of professional examination at undergraduate level.
- iii Continuing dental education programs such as seminars, symposia and hands – on workshops must be conducted to familiarize the dental fraternity with advancements in the field of tissue management and isolation as well as to refresh existing knowledge.

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## CONTRIBUTIONS BY AUTHORS

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|---------------------------------------------------------------|-------------------------------------------------|
| <b>1 Syed Hammad Hassan:</b>                                  | Study conception and design                     |
| <b>2 Syed Hammad Hassan, Ayesha Aslam:</b>                    | Collection, analysis and interpretation of data |
| <b>3 Syed Hammad Hassan, Ayesha Aslam, Danish Azeem Khan:</b> | Drafting of manuscript                          |
| <b>4 Danish Azeem Khan, Syed Hammad Hassan:</b>               | Critical revision                               |