Gingival Retraction Methods: A Descriptive Survey among Dentists in Nepal

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ABSTRACT

Introduction: Marginal integrity of fixed prosthesis can be achieved only if the margins of the restoration are closely adapted to the finish line of the preparation. The purpose of this descriptive cross-sectional study was to learn about different gingival displacement techniques that are currently used by dentists in Nepal.

Material and methods: Questionnaires pertaining to gingival displacement methods were distributed among 297 dentists in Nepal. Standard self-explanatory questionnaires with 12 closed ended multiple choice questions were distributed to the dentists practicing in various parts of Nepal.

Results: Out of the 297 total participants, 180 (60.6%) dentists reported use of gingival retraction cords, 5.1% used cordless technique and 18.9% used surgical technique as an aid for gingival displacement. Preimpregnated cords were used by a total of 47 dentists of which, 49% used aluminum chloride preimpregnated cords, 29.8% used cords impregnated with aluminum potassium sulfate and 27.6% used cords impregnated with epinephrine.

Conclusion: The study showed that preimpregnated cord was used by 47 dentists of which, 49% used aluminum chloride preimpregnated cords, 29.8% used cords impregnated with aluminum potassium sulfate and 27.6% used cords impregnated with epinephrine. This could be due to the increased level of awareness among practicing dentists regarding the adverse effects of epinephrine impregnated cords.

Keywords: Gingival Displacement, Marginal Integrity, Preimpregnated Cord

INTRODUCTION

Relationship between fixed prosthesis and the surrounding hard and soft tissues should be considered crucial for its long-term success.[1] Procedures for fixed prosthodontics on natural teeth and implants require adequate and accurate duplication of the prepared teeth and the corresponding finish lines[2] and a portion of apical uncut tooth structure[3,4] so that the restoration has suitable emergence profile with well-adapted and smooth gingival margins[1] that minimizes cement dissolution and preserve the periodontium.[5] This can be achieved only when preparation details are captured adequately in the impression and transferred to cast. For these reasons, gingival displacement without irreversible damage to the gingival tissues is necessary to capture sub-gingival preparation details.[2,6] This procedure permits adequate lateral displacement of gingiva for adequate flow of low viscosity impression material into sulcus and for accurate capturing of prepared finish line and a portion of apical uncut tooth structure.[7,8] Several techniques of gingival displacement have been proposed: mechanical, mechano-chemical (chemicals embedded in cords or in injectable matrix form), and surgical (electro surgery, lasers, rotary curettage), although surgical techniques are associated with greater amount of gingival insult.[9] On the other hand, mechano-chemical techniques of gingival retraction have gained wider acceptance among practitioners.[10] Two such examples are retraction cords and retraction paste system.[11]

To authors' knowledge there is no existing literature regarding gingival retraction methods used by dentists in Nepal. Considering this, the study was conducted to determine approaches of gingival retraction used by dentists in Nepal.

MATERIAL AND METHODS

Ethical approval for the study was obtained from Institutional Review Comittee of Kathmandu Medical College. Descriptive cross-sectional study was undertaken that included 297 dental practitioners, both general dentists and specialist dentists of Nepal. Based on relevance to the study population in present study, we adapted the previously used questionnaires to our study setting.[12,13] Standard self-explanatory questionnaires with 12 closed ended multiple choice questions were distributed to the dentists practicing in various parts of Nepal. The aim of this study was to determine different approaches of gingival retraction used by dentists in Nepal.

STATISTICAL ANALYSIS

Descriptive statistical analysis was used to assess the percentage of respondents in each category using Statistical Package for the Social Sciences version 20.

RESULTS

Out of 297 total participating dentists, 160 (54.9%) were specialist dentists with experience of 6.30±4.29 years. Retraction cords for gingival displacement were used by 180 (60.6%) participating dentist of which 70.6% were knitted,

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9.4% were braided, 4.4% were twisted and 8.3% were unknown. Most commonly used retraction cords and their frequency of use among the participating dentists are listed in Table 1. The value totals more than 100% for the tabulated products because many dentists reported that they used more than one product.

Of the participating dentist using retraction cord, 142 (68.4%) used retraction cord for crown and bridge impression, and only 10 (5.7%) used it for crown cementation. Of those dentists who used retraction cord, 80 (44.4%) soaked plain or impregnated cord in additional medicament before packing. The medicaments used to soak the cords and there percentage is listed in Table 2. The value again totals more than 100% because some dentists used more than one medicament.

Name of product	Manufacturer	Total n (%)
Ultrapak	Ultradent Products	87 (48.1)
Medipak	Medicept dental	28 (15.6)
Sure-cord	Suredent	23 (12.9)
Gingipak	Gingipak	14 (8.5)
Knittrax	Pascal international	11 (6.3)
Gingibraid	DUX dental	8 (5.7)
Ultrapak E	Ultradent products	7 (4.0)
Siltrax AS	Pascal international	7 (3.9)
Other (Roeko stayput)	Coltene/ Whaledent	5 (2.9)
Retrax	Pascal international	4 (2.2)
Hemodent retraction cord	Premier dental products	3 (1.8)
Knit-pak	Premier dental products company	2 (1.2)
Gingipak z twist	Gingipak	2 (1.2)
Pascord	Pascal international	2 (1.2)
Crownpak	Gingipak	1 (0.6)
Sil-Trax Plain	Pascal international	1 (0.6)
Unibraid	DUX dental	1 (0.6)

Table-1: Retraction cords and their frequency of use among the participating dentists (n=180)

Forty seven (26.1%) dentists reported using preimpregnated cords of which, 49% used retraction cords impregnated with aluminum chloride, 29.8% used cords impregnated with aluminum potassium sulfate (alum) and 27.6% used cords impregnated with epinephrine. Out of 180 dentists using retraction cords, 87 dentists use double cord technique, and out of 87 only 74 occasionally use double cord technique.

Eighty three (46.1%) dentists routinely wet retraction cord before removal. Cordless technique for gingival displacement was used by 15 (5.1%) participating dentist, and the percentage of products reportedly used in the cordless technique is listed in Table 3. The values total more than 100% because some dentist used more than one type of cordless technique.

Surgical techniques were used by 34 (18.9%) participating dentists, as an aid for gingival retraction, of which 18 (52.9%) used rotary curettage, 13 (38.2%) used electrosurgery and 6 (17.6%) used Soft tissue laser.

Addition silicone was used for making impression for fixed prosthesis by 226 (76.1%) participating dentists.

DISCUSSION

Gingival retraction has wide applications in clinical dentistry: in fixed prosthodontics to expose the sub-gingival finish line for crown margins, in restorative dentistry for the management of cervical abrasion, root caries, and root sensitivity, and more recently, in implant dentistry to capture an accurate impression to enhance the marginal fit of the implant prosthesis. There are variety of techniques and materials available for gingival displacement and finish line exposure. The selection of any one of the various methods depends on the clinical situation and the preference of the operator. In the present survey, 180 (60.6%) of the practicing dentist used gingival retraction cord for gingival displacement. This could be due to ease of availability

Name of medicament	Active component	Total users n (%)
Hemodent	Buffered Aluminum Chloride	21 (26.4)
Stypin	Aluminum Chloride	18 (22.6)
FS hemostatic epinephrine free liquid	Ferric Sulfate	15 (18.8)
Others (lignocaine with epinephrine)	2% epinephrine	14 (17.5)
Others (zingisol,)	Zinc sulphate	7 (8.8)
Gingaid solution	Aluminum chloride	3 (3.8)
Orostat	DL Epinephrine HCL	2 (2.5)
Stasis	Basic Ferric sulphate	1 (1.3)

Table-2: Types of medicaments used for soaking cord among dentists using retraction cord (n=80)

Product name	Manufacturer	Total users n (%)
Expasyl	Kerr Corp	6 (40)
Magic foam cord	Coltene/ Whaledent	3 (20)
3M ESPE astringent retraction paste	3M ESPE	3 (20)
3M ESPE retraction capsule	3M ESPE	3 (20)
Traxaodent	Premier Dental Products Company	1 (6.7)

Table-3: Cordless technique products used for gingival displacement (n=15)

and having adequate knowledge about use of retraction cord. Ahmed et al. reported 92% of dentists used gingival displacement cords.[14] Retraction cords were used by 68.4% for crown and bridge impression and least was used for veneer bonding and cervical restorations. The findings are similar to the study conducted by Azza et al. in which 82% of the participated dentist used gingival retraction for crown and bridge impression around natural teeth, and least for veneer bonding.[12]

Of those who used retraction cord, 80 (44.4%) soaked plain or impregnated cord in additional medicament before packing. Medicament containing aluminum chloride was used by 54.8% and medicament containing epinephrine by 25.3%. The finding is contradictory to the result found by Ahmed et al, in which only 1.3% of dentist reported using epinephrine as an active component.[14] Donovan et al. found that medicament containing Aluminum chloride was used by 89.55% of dentists. [15] Hansen et al. found that 54% of prosthodontists preferred buffered Aluminum chloride to soak the cords.[10]

In the present study 26.1% of the participating dentists used preimpregnated cords, of which 49% were impregnated with aluminum chloride, 27.6% with epinephrine and 29.8% aluminum potassium sulfate. In the study by Reddy et al., 24% of respondents preferred to use epinephrine impregnated cord.[16] On the other hand, Donovan et al. found that 79.39% used epinephrine-impregnated cords, 19.39% used cords with alum, aluminum sulfate, or aluminum chloride, and 16.97% used plain cord.[15] Shaw and Krejci reported that epinephrine impregnated cord was used by 55% of the dentists.[17] In the present study, majority of the respondents preferred to use aluminum chloride impregnated retraction cord. This could be due to increased level of awareness among practicing dentist regarding adverse effects of epinephrine impregnated cords.

Removal of dry retraction cord from the gingival sulcus can cause injury to the delicate sulcus epithelial lining.[18] In the present study, 46.1% of respondents wet the retraction cord before removal from the gingival sulcus. In the study by Reddy et al. 69.2% of respondents wet the retraction cord before removal from the gingival sulcus.[16] Donovan et al. reported that only 33.94% of respondents wetting the cords before removal from the sulcus.[15]

Cordless technique claims of being more effective in displacing tissues, and less injurious to gingival health.[19] Of the total participating dentist, only 5.1% used cordless technique for gingival displacement. The survey did not determine whether this technique was used occasionally or routinely. Cordless technique for gingival displacement has been recently introduced in Nepal. The percentage of users is lesser compared to study by Ahmed et al[14], in which 28% of the participants used cordless technique. This may be because of lack of awareness of these newer techniques amongst dentist, poor marketing of these materials, difficulty in availability and cost factor associated with these materials compared to retraction cord.

While the present study focuses on use of different gingival retraction methods around natural dentition, similar studies can be performed on dental implants that are currently on the rise in Nepal.

CONCLUSION

Within the limitations of the study, 60.6% of participants used gingival retraction cords for gingival displacement, 5.1% dentists used cordless technique and 18.9% used surgical technique as an aid for gingival displacement. Preimpregnated cords were used by a total of 47 (26.1%) dentists of which, 49% used aluminum chloride preimpregnated cords, 29.8% used cords impregnated with aluminum potassium sulfate and 27.6% used epinephrine impregnated retraction cord. This could be due to the increased level of awareness among practicing dentists regarding the adverse effects of epinephrine impregnated cords. Forty seven dentists, who used retraction cord, wet the retraction cord before removal from gingival sulcus.

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