

Gingival displacement produced by different retraction system- A comparative study

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ABSTRACT:

Background: Marginal adaptation plays an important role in the long-term success of the restoration, and failure to achieve the same can result in ill-fitting crowns. The present study determined the gingival displacement resulted from different gingival displacement systems.

Materials & Methods: 40 patients were divided into 4 groups of 10 each. In group I patients, aluminum chloride retraction cord was used, in group II patients, tetrahydrozoline displacement system and in group III patients, expasyl displacement system and in group IV no displacement system was used (control). Impressions in all patients were made. Sample was studied under a microscope with X20. **Results:** In group I retraction achieved was $142125 \mu\text{m}^2$, in group II was $142104 \mu\text{m}^2$, in group III was 49321 and in group IV was $25432 \mu\text{m}^2$. The difference was significant ($P < 0.05$).

Conclusion: Aluminum chloride displacement cord showed the maximum displacement as compared to other retraction system.

Key words: Aluminum chloride, Displacement cord, Gingival displacement system

INTRODUCTION

Marginal adaptation plays an important role in the long-term success of the restoration, and failure to achieve the same can result in ill-fitting crowns, hypersensitivity, marginal leakage, periodontal tissue inflammation, and increased risk of recurrent caries. The process of gingival

displacement allows the exposure of the gingival or subgingival finish line along with the adjacent unprepared part of the tooth. At present, in the market, there are various methods of the gingival tissue management such as mechanical method (retraction cords), chemo-mechanical method (chemicals embedded in cords), and surgical method (lasers, electrosurgery, and rotary curettage), of which gingival retraction cords are most commonly used

Gingival deflection techniques are commonly used for retraction. They are classified as mechanical, chemicomechanical, electrosurgical and rotary curettage, or a combination of these techniques.³ The variety of clinical situations has led to combine different techniques and development of different products, and a variety of contemporary materials are available these days. Chemicomechanical method using the cord with a hemostatic agent is a commonly used technique to provide space between the gingiva and the prepared tooth. The cordless technique includes expasyl, magic foam cord, gingitrac, race gel, traxodent, and merocel strips.⁴

The chemico- mechanical method of using a retraction cord impregnated or soaked in various chemicals is the most frequently used method. The retraction cord mechanically displaces the gingival tissue and absorbs moisture contamination in the gingival sulcus, while the chemical agents control hemorrhage and shrink the gingival tissues. Nasal decongestants like tetrahydrozoline and oxymetazoline have been introduced as gingival displacement solutions.⁵The present study determined the gingival displacement resulted from different gingival displacement systems.

MATERIALS &METHODS

The present study was conducted among 40patients of both genders. All patients were informed regarding the study and written consent was obtained. Study was approved from ethical clearance committee.

Data such as name, age, gender etc. was recorded. In all patients, maxillary impressions were obtained with irreversible hydrocolloid impression material and custom trays were prepared. Impressions were made using a custom tray after 24 hours of fabrication. Patients were divided into 4 groups of 10 each. In group I patients, aluminum chloride retraction cord was used, in group II patients, tetrahydrozoline displacement system and in group III patients, expasyl displacement system was used and in group II no displacement system was used (control). Impressions in all patients were made. Sample was studied under a microscope with X20 magnification. Gingival displacement value were recorded in μm .²Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II	Group III	Group IV
Retraction system	Aluminum chloride	Tetrahydrozoline	Expasyl	Control
Number	10	10	10	10

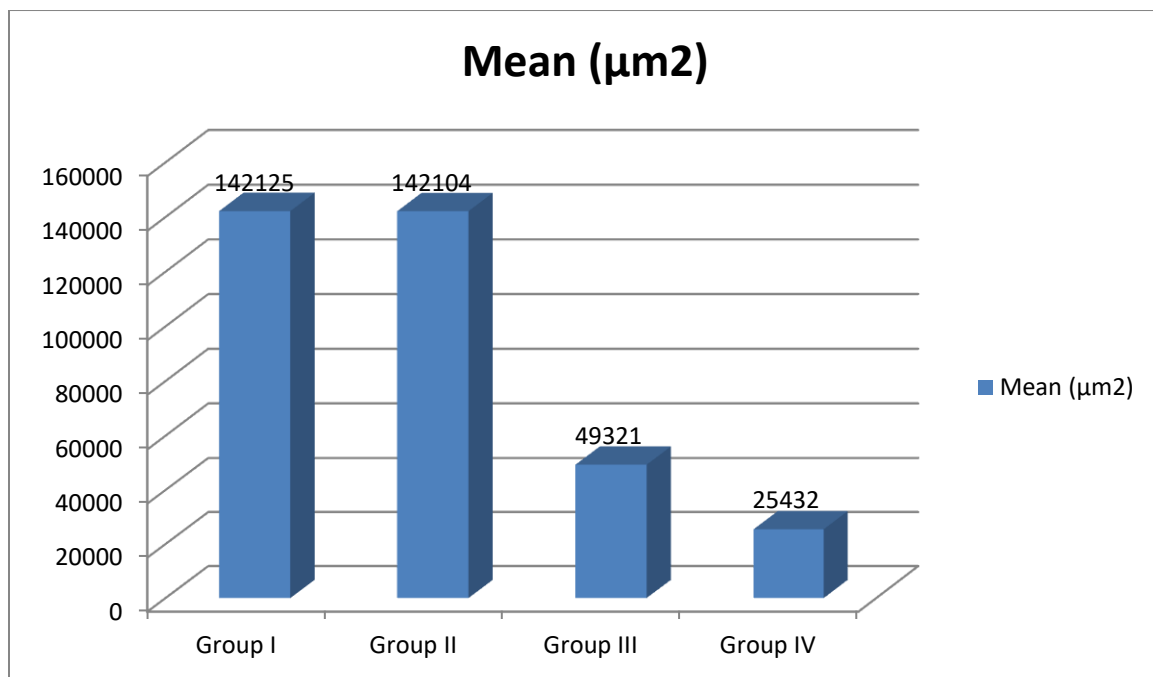
Table I shows that in group I, aluminum chloride retraction cord, in group II, tetrahydrozoline, in group III, expasyl displacement system and in group IV no displacement system (control) was used.

Table II Amount of retraction in all groups

Groups	Mean (μm^2)	P value
Group I	142125	0.02
Group II	142104	
Group III	49321	
Group IV	25432	

Table II, graph I shows that in group I retraction achieved was $142125\mu\text{m}^2$, in group II was $142104\mu\text{m}^2$, in group III was 49321 and in group IV was $25432\mu\text{m}^2$. The difference was significant ($P < 0.05$).

Graph I Amount of retraction in all groups



DISCUSSION

Fixed prosthodontic procedure requiring tooth preparation below the free gingival margin must be accomplished by gingival displacement to accurately record the prepared tooth margin during impression making.⁶ An accurate finish line allows impression to exactly records the aspects of

the prepared tooth and sufficient unprepared tooth structure immediately adjacent to the margins, is essential for the marginal adaptation. Success of fixed prosthodontics restorations depends on stability of the surrounding periodontal structures and on long-term health of subjects. Full coverage restoration requires good health of periodontal structures as compared to other crown for ensuring success rate.¹ Full coverage preparations often require subgingival margins because of caries, existing restorations, esthetic demands, or the need for additional retention.

The use of retraction cords can generate decent retraction, but clinicians usually report with the problem of gingival trauma and the time taken in the placement of the cord. Furthermore, there have been various investigations into the tendency of displacement cords to encourage bleeding and cause acute injury, which usually takes more than 1 week to heal. Gingival manipulation may result in significant bleeding in those patients taking antiplatelet medications and those with preexisting periodontal diseases. Hence, the retraction material should not only displace the gingival tissue laterally and vertically but also control the bleeding.⁸ The present study determined the gingival displacement resulted from different gingival displacement systems.

In this study, in group I, aluminum chloride retraction cord, in group II, tetrahydrozoline, in group III, expasyl displacement system and in group IV no displacement system (control) was used. Kohli et al⁹ in their study a total of 60 subjects were selected requiring fixed prosthesis. The two gingival retraction systems were used on the prepared abutments randomly. The vertical gingival retraction was measured before and after retraction using flexible measuring strip with 0.5 mm grading. The horizontal retraction was measured on the casts poured in polysilicone impressions made before the retraction and after retraction. Statistically significant difference was obtained.

We found that in group I retraction achieved was $142125 \mu\text{m}^2$, in group II was $142104 \mu\text{m}^2$, in group III was 49321 and in group IV was $25432 \mu\text{m}^2$. Chaudhri et al¹⁰ evaluated efficacy of newer retraction agent tetrahydrozoline with two widely used retraction systems i.e., Expasyl retraction system and medicated retraction cords on basis of amount of gingival retraction. 30 subjects were selected according to inclusion and exclusion criteria. Maxillary Impressions were made with irreversible hydrocolloid for all subjects. Tray material was used for making the special tray. Retraction was done with aluminium chloride; Tetrahydrozoline and Expasyl according to Latin block design. The amount of gingival retraction obtained by using aluminium chloride as gingival retraction agent was $148238.33 \mu\text{m}^2$, with tetrahydrozoline was $140737.87 \mu\text{m}^2$ and with expasyl was $67784.90 \mu\text{m}^2$.

Acar et al¹¹ evaluated the clinical performance and the impression quality between the cordless, and conventional retraction system showed that the displacement paste and cap showed better results in terms of ease of application, time spent and bleeding. Furthermore, the pressure generated by the cordless system was studied by Bennaniet al¹² in the year 2014 confirmed atraumatic pressure, with lower levels of post-treatment inflammatory cytokines as compared to the cord system.

CONCLUSION

Authors found that aluminum chloride displacement cord showed the maximum displacement as compared to other retraction system.

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