

## ORIGINAL RESEARCH

### Evaluation of the level of gingival displacement produced by aluminum chloride retraction cords, expasyl and tetrahydrozoline soaked retraction cord- A comparative study

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#### ABSTRACT:

**Background:** The chemico- mechanical method of using a retraction cord impregnated or soaked in various chemicals is the most frequently used method. The present study was conducted to evaluate the level of gingival displacement produced by three different gingival displacement systems such as aluminum chloride retraction cords, expasyl, and tetrahydrozoline soaked retraction cord. **Materials & Methods:** The present study was conducted on 60 patients of both genders. Baseline impressions were made in which no gingival displacement was done (control group). Patients were divided into 3 groups of 15 each. In group I patients, aluminum chloride retraction cord was used, in group II patients, tetrahydrozoline displacement system was used and in group III patients, expasyl displacement system was used. Impressions in all patients were made. Sample was studied under a microscope with X20 magnification. The values of gingival displacement for all the specimens were recorded in  $\mu\text{m}^2$ . **Results:** In control group, retraction achieved was  $25814 \mu\text{m}^2$ , in group II was  $143452 \mu\text{m}^2$ , and in group III was  $49625 \mu\text{m}^2$ . The difference was significant ( $P < 0.05$ ). **Conclusion:** Authors found that aluminum chloride displacement cord showed the maximum displacement. Expasyl showed the least amount of displacement.

**Key words:** Aluminum chloride, displacement cord, Expasyl

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#### INTRODUCTION

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.<sup>1</sup> Full coverage preparations often require subgingival margins because of caries, existing restorations, esthetic demands, or the need for additional retention. There is need of making impressions that accurately capture the prepared

cervical finish lines and permit the fabrication of accurate dies on which the restorations are fabricated. In spite of all efforts, sometimes the cervical finish lines captured are inadequate.<sup>2</sup> Gingival deflection techniques are commonly used for retraction. They are classified as mechanical, chemomechanical, electrosurgical and rotary curettage, or a combination of these techniques.<sup>3</sup> 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.<sup>4</sup> 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.<sup>5</sup> The present study assessed the gingival displacement produced by three different gingival displacement systems such as aluminum chloride retraction cords, expasyl, and tetrahydrozoline soaked retraction cord.

**MATERIALS & METHODS**

The present study was conducted in the Department of Prosthodontics, Maratha Mandal's N.G.H. Institute of Dental Sciences and Research Centre, Belgaum, Karnataka from February to May 2016. It comprised of

60 patients of both genders. Study protocol was approved from ethical clearance committee and all patients were informed regarding the study and written consent was obtained.

Data such as name, age, gender etc. was recorded. In all patients, maxillary Impressions were made with irreversible hydrocolloid impression material and custom trays were fabricated (2 mm short of sulcus). Impressions were made using a custom tray after 24 hours of fabrication.

Baseline impressions were made in which no gingival displacement was done (control group). Patients were divided into 3 groups of 15 each. In group I patients, aluminum chloride retraction cord was used, in group II patients, tetrahydrozoline displacement system was used and in group III patients, expasyl displacement system was used. Impressions in all patients were made. Sample was studied under a microscope with X20 magnification. The values of gingival displacement were recorded in  $\mu\text{m}^2$ . Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Distribution of patients**

Groups	Control	Group I	Group II	Group III
Retraction system	No	Aluminum chloride	Tetrahydrozoline	Expasyl
No	15	15	15	15

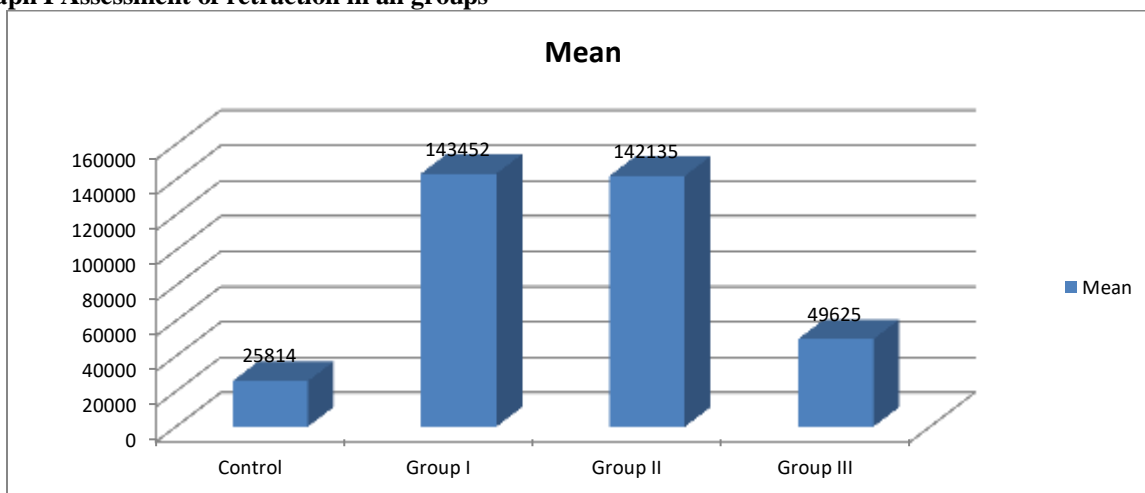
Table I shows that there was control group. In group I, aluminum chloride retraction cord was used, in group II, tetrahydrozoline and in group III, expasyl displacement system was used.

**Table II Assessment of retraction in all groups**

Groups	Control	Group I	Group II	Group III	P value
Value ( $\mu\text{m}^2$ )	25814	143452	142135	49625	0.001

Table II, graph I shows that in control group, retraction achieved was  $25814 \mu\text{m}^2$ , in group II was  $143452 \mu\text{m}^2$ , and in group III was  $49625 \mu\text{m}^2$ . The difference was significant ( $P < 0.05$ ).

**Graph I Assessment 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.<sup>6</sup> 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. The elastomeric impression materials are popular due to their high degree of accuracy in registering details. However, most of them have an inherent short of wettability that may avert adequate registration of soft and hard tissue details.<sup>7</sup>The control of the fluids in the gingival sulcus is obligatory, particularly when hydrophobic impression materials are used, as the sulcular fluid which can cause an incomplete impression of the critical finish line.<sup>8</sup> The present study was conducted to evaluate the level of gingival displacement produced by three different gingival displacement systems.

In this study, there was control group. In group I, aluminum chloride retraction cord was used, in group II, tetrahydrozoline and in group III, expasyl displacement system was used. Prasanna et al<sup>9</sup> included 16 subjects in the study. Gingival displacement was done with gingival retraction cord and gingival displacement paste on Premolars. Impression of the gingival sulcus was made. Sulcus width after displacement was measured under magnification. The mean displacement value of sulcus width was  $0.21 \pm 0.01$  mm for the gingival retraction cord and  $0.26 \pm 0.02$  mm for the gingival displacement paste. Gingival displacement paste showed better response in achieving horizontal displacement of the gingival sulcus than gingival retraction cord.

We found that in control group, retraction achieved was  $25814 \mu\text{m}^2$ , in group II was  $143452 \mu\text{m}^2$ , and in group III was  $49625 \mu\text{m}^2$ . Thimappa et al<sup>10</sup> compared the gingival retraction efficacy of retraction strip along with conventional retraction cord and paste system on 30 patients. Gingival displacement was done with ultrapak cord, merocel strip, and magic foam cord immediately, 7 and 14 days after the tooth preparation, respectively. The amount of gingival displacement in vertical and lateral directions was measured at mesiobuccal, midbuccal, and distobuccal regions of the prepared tooth. ANOVA test showed the significant difference between the materials tested with respect to the mean vertical and lateral gingival retraction. Multiple comparisons by Bonferroni test revealed a significant difference in vertical and lateral displacement among the materials tested.

Chaudahri et al<sup>11</sup> 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  $67784.90 \mu\text{m}^2$ . The marginal integrity of the restoration depends on its close adaptation to the finish line of the preparation. The gingival tissues should be displaced to accurately record the prepared finish line during impression making. Medicament used for displacement should be effective, must results in lateral displacement of the gingival tissue contaminated with tissue shrinkage and control of hemorrhage and fluid seepage to permit the dentist to make an adequate impression of gingival finish line of the prepared tooth. It should not lead to significant irreversible tissue damage. There should not be harmful systemic effect.<sup>12</sup> The shortcoming of the study is small sample size. Moreover there are different retraction systems are available which can result better results. In present study only 3 retraction systems were compared. Inclusion of different retraction systems would have been provided better results.

## CONCLUSION

Authors found that aluminum chloride displacement cord showed the maximum displacement. Expasyl showed the least amount of displacement.

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