

# **A Study To Evaluate Clinical Performance Of Two Commercially Available Cordless Dilatation Systems –An Ex-Vivo Study.**

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## **I. Introduction:**

Gingival displacement is an important procedure in fabricating indirect restorations. Gingival displacement is relatively simple and effective when dealing with healthy gingival tissues and when margins are properly placed<sup>1</sup>. The most common technique used for gingival displacement is use of gingival dilatation cord with a hemostatic medicament<sup>2</sup>. A cord of sufficient diameter (000/00) should be used to provide adequate lateral displacement to create a mean sulcular width of 0.2 mm. The optimum position of the margin is 0.5 mm from the healthy free gingival margin or 3.0 to 4.0 mm from the crest of the alveolar bone and must follow the natural scalloped form of the attachment and alveolar housing. The method of gingival displacement used by the majority of practitioners is a combination of mechanical-chemical displacement using gingival dilatation cords along with specific hemostatic medicament<sup>3,4</sup>. Though retraction cord achieves desired gingival dilation, it involves physical manipulation of tissues which leads to increased gingival hemorrhage Increased risk of epithelial attachment injury, added discomfort, time and at times use of local anesthetic agent. In contrast to cord retractions, cordless dilation paste has been found to be better from periodontal point of view when assessed histologically. The cordless paste systems appear to be promising with significant retraction, less time consuming, minimal hemorrhage and ease of application when compared to cord<sup>5</sup>.

Cordless retraction pastes act as atraumatic gingival retractile material that are in a compressed dehydrated state composed of polyvinyl acetate polymer. By absorbing the intra crevicular fluid in the sulcus, they expand and increase in size by absorbing the fluid thus allowing adequate quantity of impression material to flow in the sulcus to record precise details. Thus, pastes help to record the margin without triggering iatrogenic tissue injury<sup>6,7</sup>. Thus a study was undertaken to evaluate clinical performance of 2 commercially available systems for cordless dilatation.

## **II. Materials And Methodology:**

Two commercially available gingival dilation pastes i.e. Traxodent and 3M ESPE retraction astringent paste were evaluated in this study. A sample size of 42 in total with 21 subjects each were evaluated for each dilatation system (n=21). The subjects were adult patients male /female within age group of 20-40 with no previous medical history, no signs of periodontal inflammation, probing pocket depth <3mm and thick gingival biotype. A Polyvinylsiloxane impression (Silagaum, DMG) was made prior to dilatation using a double stage technique. Tooth preparation was done. Dilatation was performed for 21 samples with Traxodent paste (Premier products) and remaining 21 samples with 3M ESPE retraction astringent paste (3M ESPE). Retraction for 3M ESPE performed using dispensing gun for the paste system and kept within the sulcus for 2 minutes. After 2 minutes the paste will be washed off using air water jet. Traxodent paste was dispensed into the sulcus using syringe and compre cap was placed following injection of paste into the sulcus. A reimpression using double stage technique will be made using the same polyvinyl siloxane impression material.

Impressions were poured using type 4 die stone. Dies were obtained from the same and were evaluated under stereomicroscope with 20x magnification (Motic stereomicroscope 100x- Greenough 7.5X-50X zoom magnificationsystem new generation Lead-free optics ,6.7:1 zoom range with 110mm working distance, Parfocal throughout full range) on the buccal aspect of the die. The images obtained were analyzed using Motic image analyzing software. The results obtained were compared for two pastes and used to provide clinically relevant data.

## **III. Results:**

The mean values of horizontal gingival dilation were obtained for two retraction pastes namely Traxodent

and 3M ESPE using stereomicroscopy with (10X) magnification power.

- The mean dilation value for samples obtained using 3MESPE paste is 0.1525mm.
- The mean dilation value for samples obtained using Traxodent paste is 0.2958mm

#### **IV. Discussion:**

Horizontal or lateral displacement of the gingival sulcus is a generally recognized prerequisite for making accurate impression to achieve desirable emergence profile of fixed restoration particularly when the finish line is at, or just within, the gingival sulcus. Therefore, it is necessary to displace free gingival margin effectively. This technique also becomes important when the level of the crown margins is in or close to the crevice because of cervical lesion. The critical sulcular width has been reported to be approximately 0.15–0.2 mm at the level of the finish line which is important for good flow of impression material around the finish line. Impressions with less sulcular width have higher incidences of voids, tearing of impression materials, and reduction in marginal accuracy. The present study deals with comparison of effective gingival dilation achieved using 2 commercially available paste systems, i.e. Traxodent and 3M ESPE retraction astringent paste.

Beier et al found cordless displacement system was less effective in teeth with deep finish lines (>2mm)<sup>1</sup>. The findings of this study correlate with present study in terms of retraction values. Ramadan et al compared the histologic response of gingival tissues in dogs to cords impregnated with 5%, 10%, and 15% solution of aluminum chloride and concluded that the 10% and 15% solutions elicited a severe tissue response with lack of healing at 15 days whereas the 5% solution demonstrated adequate healing as long as it remained in the sulcus no longer than 3 minutes. The cordless dilation systems used in present study had acceptable concentration values of aluminum chloride. Acar et al found no difference in the amount of dilatation in between cords and paste system. This is in contrary to the findings in this present study.

Dilation was best observed in group consisting impregnated cords and paste system. Traxodent paste gives benefits of hemostasis, time saving and ease of application<sup>3</sup>. Yang et al showed groups of ultra Pak, expasyl showed a similar increase in the sulcus width of >.2 mm.<sup>4</sup>

Prasanna et al showed that paste systems showed an increase of .26mm in sulcular width whereas retraction cords showed only 0.21 mm increase in horizontal width. The findings correlate with the findings of present study. Gupta et al found Stay put and Magic Foam Cord gel were more efficient in vertical and horizontal gingival displacement compared to expasyl.<sup>7</sup> De Gennaro et al studied humans to compare the histologic response to plain cord and cords impregnated with potassium aluminum sulfate, 8% racemic epinephrine. No practical differences among the treated cords were observed<sup>8</sup>. Benson in 1986 described significance of lateral and vertical expansion.<sup>9</sup> Phatale *et al.* (2010) showed a higher percentage of intact junctional epithelium with Expasyl in comparison to the use of a dilatation cord.<sup>10</sup> Mokbel and Mohamed' found that 10% and 15% aluminum chloride resulted in severe destruction and that a 5% solution was quite satisfactory<sup>11</sup>

The study was performed with a specific inclusion criteria and thick gingival biotype patients determined using probe transparency method. The standardization of pastes in study was maintained by ensuring that both systems contained 15% aluminum chloride as astringent. The study performed was an ex-vivo study as part of the study up to dilation was performed in vivo

and rest part of the study was ex-vivo. The mean gingival dilation for Traxodent paste was 0.2958 mm which is more than the critical sulcular width whereas for that of 3M ESPE was 0.1525mm which is just at the lower limit value of the range of interval for critical sulcular width. Thus, the effective dilation achieved using 3M ESPE paste is less than that with Traxodent paste.

#### **V. Conclusion:**

- On basis of the results obtained, the mean dilation values for traxodent paste are more than the 3M ESPE retraction astringent paste.
- The values of dilation achieved using 3MESPE retraction astringent paste are less than critical sulcular width when compared with Traxodent.

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