Short Communication

Influence of Different Retraction Techniques on Crevicular Fluid Flow

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This study aimed to analyze the influence of different retraction techniques (pure cotton cord, cord impregnated with epinephrine, and chemical retraction [Expa-syl]) on the crevicular fluid flow in vivo. A total of 340 prepared teeth were randomly assigned to one of the retraction procedures. Crevicular fluid flow was measured prior to and immediately after the removal of the respective retraction material. Pure cotton cords led to a significant increase in crevicular fluid flow, whereas impregnated cords and Expa-syl significantly reduced crevicular fluid flow ($P < .01$). The retraction technique has a high impact on the reduction of crevicular fluid flow in patients. Pure cotton retraction cords should be avoided. *Int J Prosthodont 2008;21:215–216.*

Gingival retraction is crucial when making impressions of infragingival finishing lines, because a moisture-free sulcus area is a prerequisite for a successful impression. In daily practice, a variety of gingival retraction techniques are used; however, their efficacy remains undocumented.[1] The techniques available include pure mechanical retraction (cords); chemomechanical techniques (cords soaked with astringents or vasoconstrictors), which are the most popular[1,2]; and chemical retraction procedures.

This study aimed to analyze the efficacy of a typical representative of each of these different retraction techniques in vivo. The crevicular fluid flow (CFF) was selected as the target variable. The following null hypothesis was tested: The retraction technique does not influence the CFF.

Materials and Methods

The study was carried out in a dental practice. The retraction techniques used are shown in Table 1. A total of 340 prepared teeth were assigned at random to one of the 3 test groups (Table 1). Randomization was carried out on a patient-related basis. Only teeth with a maximum probing depth of less than 4 mm, an interproximal Plaque Index less than 30% (Silness/Loe), and a papilla Bleeding Index of less than 2 were selected for the study. Patients signed an informed consent document.

Cotton caps (Comprecap, Roeko) were used for determination of the CFF. The investigator was calibrated to apply the cap with a force of approximately 6 N onto the prepared tooth. Prior to use, all caps were weighed with a high precision scale (accuracy: 0.1 mg; Kern & Sohn). After thoroughly drying the sulcus, the clinician applied a cotton cap for exactly 2 seconds onto the tooth to soak up the fluid. Next, the cap was weighed again, and the difference between the 2 weights calculated to determine the amount of absorbed fluid.

The amount of CFF was determined after preparation of the teeth immediately before the retraction procedure (baseline) and after the removal of the retraction material.

The retraction cords were packed dry into the gingival crevice with a cord-plugger (GCP11371, Hu-Friedy) and the Expa-syl with its application device. The cords were not immersed in any other solution. All retraction materials were allowed to interact for 15 minutes prior to their removal (Expa-syl was removed by air/water spray).

Because the data were not normally distributed, statistical analysis was performed using nonparametric statistics (H and *U* tests for paired sample groups; $P = .05$).

Results

The baseline CFF values are shown in Fig 1. There was no significant difference between the 3 groups ($P > .05$; H test). Thus, it can be concluded that the preconditions for all 3 retraction procedures were comparable. Figure 2 shows the CFF results after removal of the retraction

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Table 1 Retraction Techniques Used in the Study

Retraction system	Manufacturer	Type	Method	No. of teeth
Ultrapack (size 1–3)	Ultradent	Cord	Mechanical	120
Surgident* (size 1–3)	Sigma Dental Systems	Epinephrine-impregnated cord	Chemomechanical	95†
Expa-syl**	Kerr Dental/Saltec-Pierre Roland	Retraction paste	Chemical	120

*Active substance: 0.1 mg/cm (size 1) 0.2 mg/cm (sizes 2 and 3) racepinephrine hydrochloride.
**Material is based on aluminium chloride (15%) and kaolin.
†Teeth remaining after exclusion of cases with indisputable weighing errors.

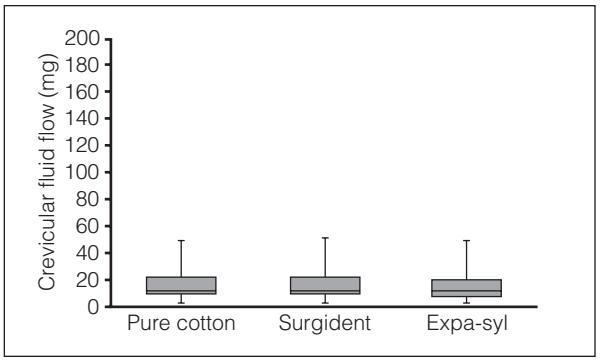

Fig 1 Crevicular fluid flow after preparation of the tooth and immediately prior to the retraction procedure (baseline) ($P > .05$, H test).

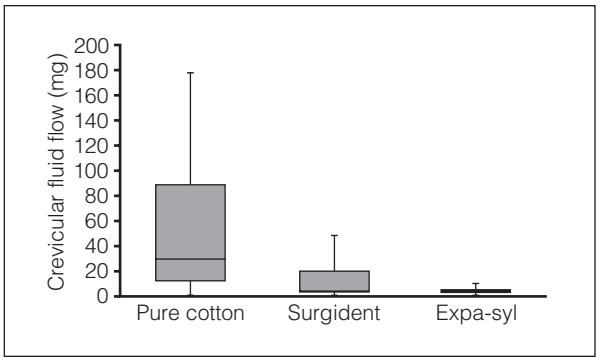

Fig 2 Crevicular fluid flow after the retraction procedure and prior to impression making ($P < .01$, H test).

materials. The differences between the 3 groups were highly significant ($P < .01$, H test). The pairwise comparison (*U* test) revealed a significant increase in CFF using pure cotton cords ($P < .01$) and a significant decrease using epinephrine cords ($P < .05$) and Expa-syl ($P < .01$) compared to the baseline values.

Discussion

This study aimed to investigate the influence of the retraction technique on the CFF, since a dry sulcus is a key parameter for successful impressions. For the chemomechanical retraction method, epinephrine-impregnated cords were selected because they are widely used.[2] Expa-syl was used because it is recommended by many practitioners[3] but lacks scientific data (only 6 articles were found in a Medline search conducted in July 2007).

Successful drying of the sulcus is only viable with chemical approaches; in fact, pure mechanical techniques (cotton cords) actually increased the CFF. Similar results were reported by some studies[2,4] and partially by others.[5] Expa-syl showed even better results in terms of reliable drying of the sulcus than the epinephrine-impregnated cords. However, the authors felt that in many cases the sulcus was not opened up as wide as with the retraction cords. Since this study did not aim to assess this aspect of gingival retraction, further research should be directed to this topic.

Conclusion

Within the limitations of this study, it can be concluded that the retraction technique has a decisive impact on the crevicular fluid flow during impression making. Consequently, the null hypothesis was rejected. The data suggest that pure cotton cords without a hemostatic or vasoconstricting agent are ineffective in reducing crevicular fluid flow.

Acknowledgment

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