



Modern Materials and Methods for Retraction of Marginal Periodontium

Aliyeva N. M ¹, Khojayeva I. E. ², Saidmamudova M. A. ³

^{1, 2, 3} Tashkent State Dental Institute

Abstract: Modern dental restorations not only make it possible to recreate defects of the teeth and dental rows as a whole, but also to create a harmonious combination with the surrounding soft tissues, which is only possible with careful planning and gentle work on the surrounding tooth structures.

Keywords: marginal periodontium, restoration, , retraction, gingiva.

Introduction. Gingival retraction (lat. retractio - reduction, contraction, attrition) is a temporary displacement of soft gingival tissue with the opening of the periodontal sulcus and exposure of the sub-gingival part of the crown and root of the tooth.[1]

In indirect restorations where the basal line is below the gingival level, or at the level of the gingiva, gingival retraction is necessary in order to make and obtain an accurate impression. Retractions are also necessary for stopping cavities of classes II and V of Black. There is a wide range of preparations on the market today. Scientists have developed many techniques for gum retraction[3,5,7].

In order to perform their task, orthodontists need to use gingival level retraction techniques, not only to protect the surrounding soft tissue but also to maximize the aesthetic result of future restorations. [6, 8]

Various methods of gingival retraction are currently used. They are divided into groups:

- mechanical;
- chemical;

Chemo-mechanical (combined). The mechanical techniques are characterised by the great variety of materials used for their execution (silk or cotton threads, silicone masses and copper rings). However, this method is traumatic, which means a temporary disturbance of the microcirculation of the marginal gingiva, the recovery time of which can vary from 30 minutes to two weeks. Moreover, the use of some methods of mechanical retraction is known to cause damage to the soft tissue structures at the time of the technique [6, 8, and 10].

Chemical retraction involves the use of solutions and pastes that allow adequate retraction of the gingival tissue and ensure adequate hemostasis [4].

Combined chemo-mechanical gingival retraction is performed using impregnated retraction sutures and retraction pastes. [6]

The aim of our review was to examine the current materials for marginal periodontal retraction and to compare retraction techniques.

Literature review on the selected topic:

At the beginning of the topic review, we need to understand the concept of gingival retraction

Mechanical gingival retraction with unimpregnated Ultrapak (Ultradent) sutures is nowadays widely used, as the sutures also adsorb gingival fluid. Sutures can be impregnated with medication such as adrenaline (epinephrine). Sutures without impregnation in healthy periodontium, in restorations, in patients with cardiovascular diseases. [2, 3]

Chemical retraction

The chemical method of retraction involves the use of solutions and pastes containing adrenaline (epinephrine) as well as various astringents that have a hemostatic effect [2, 6].

Thus, adrenaline (epinephrine) has a pronounced vasoconstrictor effect, promotes marked gingival retraction and results in minimal soft tissue recession. However, due to the high prevalence of concomitant cardiovascular, endocrine and genitourinary diseases, adrenaline should not be used, as there is a risk of life-threatening emergencies (4, 5, and 7).

Aluminium chloride is used instead of adrenaline as one of the most common astringents, it does not cause systemic side effects, but the haemostatic effect and retraction capacity of aluminium chloride are inferior to adrenaline. It is also worth considering that aluminium chloride can inhibit the reaction of polyester chains, which results in a "blurred" contour of the impression material in contact with aluminium chloride-impregnated thread [8].

Iron sulphate and iron (III) chloride are highly effective haemostatic and binding agents. They can be used to achieve the most rapid and prolonged haemostasis compared to other haemostatic agents. Dental hemostatic preparations based on iron sulphate are available in solutions, e.g. Astringedent (Ultradent), Stasis (GingiPak), Caprofer (Liquor), and gels, e.g. ViscoStat (Ultradent) [8,10]. Aluminium chloride also has a strong haemostatic effect, but does not stain the tissue or dental material in contact with it. It is available in solutions such as Hemodent (Premier Dental Products), Racestypine solution (Septodont), gels such as ViscoStat Clear (Ultradent), Retragel (VladMiVa) and pastes such as Hemostasyl (Pierre Rolland).[7,8,9]

ViscoStat Clear (Ultradent) is used for the aesthetic restoration of frontal teeth. The advantage of this product is that it does not change its clear colour when it reacts with blood as is the case with ferric chloride-based haemostatic agents. This prevents possible staining of the restorations [2].

The use of gels is quite effective and convenient because they do not spread over the gingival surface, fill the gingival sulcus and provide long-lasting hemostasis. The gel can be applied using a disposable syringe with a Dento-Infusor (Ultra dent) applicator tip with a brush on the end. Unimpregnated sutures can be used with gels and other preparations for chemical retraction [1,3].

Combined chemo-mechanical gingival retraction is performed with impregnated retraction sutures and retraction pastes [4].

Retraction floss is an important component of the material support for aesthetic dental restorations with composite materials. [5,7]. The use of knitted yarns (knotted, woven, knitted) is currently considered appropriate. They are characterised by a high absorption capacity. When the loops of knitted thread are inserted into the dental sulcus, they are compressed and a haemostatic solution is released into the tissue. After compaction (packing) in the sulcus has ceased, the thread takes on its original dimensions. [2,9]

Retraction sutures are available in various diameters (thicknesses), but there is no standard numerical or colour coding. The dimensions are indicated by the manufacturer. The most commonly used ones are: "00", "0", "1", "2" (Knittrax, Gingi-Pak, Ultrapak) or "7", "8", "9", "10" (Siltrax and Racord).[2,6]

Gingi Tgas material is also used for combined retraction. During the chemical reaction, the paste increases in volume and there is a mechanical expansion of the gingival sulcus, which is combined with the effect of hemostatic agents. Gingi Tagas initially has a soft and malleable consistency; after reacting with a catalyst and interacting with air oxygen and oral fluid, it takes on a hard, elastic consistency. This method of retraction is considered the gentlest, because the paste does not traumatize the gums as it does with retraction floss. When using retraction paste does not require

local anesthesia and additional equipment. Using Gingi Tras eliminates the risk of gingival recession and bone desorption associated with damage to the epithelial attachment. This method of retraction also reduces the time of the procedure. [2, 4]

The paste is a silicone elastomer that reacts at room temperature; the paste consists of the following components: a poly dimethyl siloxane base and a tin-based catalyst. When the base and the catalyst interact, a hydrogen release reaction takes place. Gas appears inside the silicone matrix, causing the paste to expand by a factor of 4. The consistency remains solid and elastic, which allows for the reproduction of topographic details as an impression material.[2]

Results and discussion

Any known method of retraction is traumatic, which is manifested by a temporary disturbance of microcirculation in the marginal gingiva and increased discharge of periodontal fluid from the sulcus.

After reviewing the articles, we found that the clinical experience with various retraction techniques shows no significant difference in the depth of the gingival sulcus opening for visualisation of the preparation margin and its clear display during impression taking between mechanical, chemical and combined retraction methods.

Gingival retraction with Ultrapak 00 (Ultradent) maximises penetration of the corrective material into the gingival sulcus and increases production of periodontal fluid.

In patients with cardiovascular pathology, the method of gingival retraction must be chosen, giving preference to mechanical retraction, as the epinephrine contained in some pastes and gels can have a detrimental effect on the cardiovascular system.

Conclusion: Thus, in reviewing the retraction methods, we have concluded that no one method can be favoured over another, as each retraction method has its own advantages

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