

Improving the Effect of Aesthetic All-Ceramic Restorations with Hyaluronic Acid Fillers: Clinical Cases

Angelina Vlahova^{1*}, Rada Kazakova¹, Christo Kissov¹, Elka Popova² and Georgi Todorov¹

¹Department of Prosthetic Dentistry, Faculty of Dental Medicine, 3 "Chr. Botev" Blvd., 4000, Plovdiv, Bulgaria

²Department of Periodontology and Oral Mucosa Diseases, Faculty of Dental Medicine, 3 "Chr. Botev" Blvd., 4000, Plovdiv, Bulgaria

*Corresponding author: Angelina Vlahova, Department of Prosthetic Dentistry, Faculty of Dental Medicine, 3 "Chr. Botev" Blvd., 4000, Plovdiv, Bulgaria, Tel: +359 888 77 36 70; Fax: +35932632687; E-mail: a_vlahova@yahoo.com

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Abstract

Background: The Aesthetic Prosthodontics is a part of the Aesthetic Medicine. So called "gummy" smile is an excessive display of gum tissue in the upper jaw during smiling and it is a big aesthetic problem for most of the patients.

Purpose: The aim of this study is to illustrate two clinical cases of aesthetic all-ceramic restorations in a combination with hyaluronic acid (HA) filler lip augmentation for reduction of "gummy smile".

Methods: Two clinical cases of young women after aesthetic all-ceramic restorations of the upper frontal teeth in combination with dermal filler injection for lip enhancement were described.

Results: The use of linear threading (retrograde) technique with HA dermal filler for lip contour shaping and for lip volume augmentation was exceptionally beneficial for the improving the effect of the aesthetic restorations. The final results were satisfying for the patients. They received harmonious, attractive appearance and their quality of life was improved.

Conclusions: Use of dermal fillers for facial rejuvenation in particular for lip augmentation can be successfully used for improvement of the effect of aesthetic fixed prosthetic constructions of women with high or medium smile line.

Keywords: Aesthetic all-ceramic restorations; Hyaluronic acid; Lip augmentation

Abbreviations:

HA: Hyaluronic Acid

Introduction

The Aesthetic Dentistry is a part of the Aesthetic Medicine. Usually dental prosthetic constructions are applied when dental tissues are damaged or one and more teeth are missing. Aesthetic prosthodontics performs a slightly different function – it is usually done in the area of the frontal teeth in order to adjust their shape, color, position or to close the gaps between them. Modern dental materials used for aesthetic dental restorations have optical and mechanical characteristics that are very similar to natural teeth. Metal-free ceramics and zirconium oxide restorations look great, because their color can be perfectly adapted to the natural teeth. Also they are durable and wear-resistant. Today, instead of crowns and bridges with a metal substructure, silica, aluminum or zirconium oxides are more preferable.

The "white" aesthetics achieved by all-ceramic prosthetic constructions is inextricably bound up with the "red" aesthetics – the optimal position and condition of the gums. The symmetric smile

that is a combination between proper arranged teeth and a healthy gingiva, cannot be achieved without the frame of the lips. So called "gummy" smile is an excessive display of gum tissue in the upper jaw during smiling and it is a big aesthetic problem for most of the patients. Sometimes the periodontal surgery methods are not enough for correction of such condition. The use of dermal fillers for lip augmentation in these cases can be very helpful [1].

Dermal fillers have become an integral part of any aesthetic physician's intervention. According to Allemann and Baumann [2] the first dermal fillers used in the 1980s were animal-derived collagen fillers (Zyplast®, Zyderm®, Allergan). However, the need of products with longer clinical duration and no requirements for prior skin allergy testing lead to the development of the hyaluronic acid (HA) fillers. Of the two biologic fillers currently used – collagen and HAs – HAs have become the new gold standard, and have almost replaced collagen fillers [3]. This is explained by the advantages of HAs over collagen, such as its longer duration (6–12 months compared with 2–4 months), no request for skin testing, fewer allergic side effects and better pliability. A third group of dermal fillers currently used are synthetic fillers, such as Sculptra® (Dermik Laboratories, Sanofi - Aventis, Bridgewater, NJ), Radiesse® (BioForm Medical, San Mateo, CA), and Artefill® (Artes Medical, Inc., San Diego, CA).

HA, or hyaluronan, by definition, is a glycosaminoglycan which consists of regular repeating non-sulfated disaccharide units of

glucuronic acid and N-acetylglucosamine [4]. HA is a naturally occurring substance, a biopolymer, which exhibits no species and no tissue specificity. HA is an essential component of the extracellular matrix of all animal and human tissues and is an abundant component of this matrix. HA is highly hydrophilic, that is, it attracts water, and this helps it form large concentrations that can occupy a large volume relative to its mass. It has been shown to form gels at even low concentrations. When water is drawn into the HA matrix, it has been shown to create a swelling pressure or turgor that enables the HA complex to withstand compressive forces. Thus it has been found useful as filler in treating some of the signs of aging and for tissue augmentation [5].

The first HA developed as a dermal filler was in 1989 by Balazs [6], who understood the biocompatibility of this class of compounds and lack of immunogenicity. The product was not long lasting, but the revolution had begun [7].

The aim of this study is to illustrate two clinical cases of aesthetic prosthetic constructions in a combination with HA filler lip augmentation for reduction of “gummy smile”.

Materials and Methods

The first clinical case is of a young lady, 27-years old, who went through aesthetic reconstruction of the first and second upper right incisors (11 and 12) with all-ceramic crowns made of e.max Press, Ivoclar Vivadent (Figure 1). As a result of previous endodontic treatment of the two teeth their roots were dark colored and showed through the thin attached gingiva during a wide smile, because the patient was with high smile line (Figure 2). This fact decreased the aesthetic effect of the restorations. We made lip augmentation with HA dermal filler Hyaluronica 2°, Vital Esthetique, France to correct that (Figure 3). We used Linear Threading (retrograde) technique for lip contour shaping and for lip volume [8]. The final result was satisfying for the patient because the “gummy” smile was gone (Figure 4).

The second clinical case is of a 32-years old lady after aesthetic reconstruction of the upper frontal teeth with all-ceramic constructions, made of Hera Ceram Press (HeraeusKulzer) (Figure 5). The patient central incisors were restored with two crowns, the left canine was transformed into a lateral incisor by means of laminate veneer and the left first premolar was turned into a canine by a crown, because she had no natural left lateral incisor (Figure 6). This clinical case was similar to the previous one because the central incisors of the patient were devitalized and their colored roots could be seen through the thin attached gingiva in spite of previously made periodontal surgery for crown lengthening. The patient wanted to eliminate the “gummy smile” during a wide smile (Figure 7) so we also made her lip augmentation using the retrograde injection technique [8] with a HA dermal filler Hyaluronica 2°, Vital Esthetique, France. She was pleased with the final result (Figure 8).



Figure 1: All-ceramic crowns (e.max Press, Ivoclar Vivadent)



Figure 2: Dark colored roots showed through the thin attached gingiva.



Figure 3: Lip augmentation with a HA dermal filler Hyaluronica 2°, Vital Esthetique, France.



Figure 4: The high smile line was gone.



Figure 5: All-ceramic constructions (Hera Ceram Press, HeraeusKulzer).



Figure 6: Fixed all-ceramic restorations.



Figure 7: High smile line during a wide smile.



Figure 8: Final result after the lip augmentation.

Results and Discussion

“Gummy smile” is associated with an over exposure of the gingival margin during smile. The upper lip elevates too far above the upper teeth causing excessive gingival display. The cause of this is either a hyperactive muscle around the mouth which then elevates the upper

lip or a thin upper lip. The physician should discuss the relative merits of fillers and other competing or complementary treatments (for example, botulinum toxin type A [BOTOX®] and surgery), duration of effect, and benefits and risks of each option [9].

In the first case one of the treatment methods is with expertly positioned injections using Botulinum Toxin Type A such as Botox. The results from this treatment usually last approximately three months. If the gummy smile is due to a thin upper lip, then the lip can be enhanced by using a hyaluronic acid (HA) dermal filler such as Hyaluronica 2°, Juvederm Ultra, etc. This treatment can be performed under a dental anesthesia to make the procedure pain free. Results usually last approximately six months.

The simplest way to classify the smile line—using the relationship between the maxillary incisors and the upper lip—is through height (low, medium, and high). The ideal for the height of the smile line is to be classified using as a reference the relationship between the lower edge of the upper lip and the gingival edge of the maxillary central incisor. However, a 2 mm limit should be established above and below the gingival edge, thus instituting the three classes of smile height: high, medium, and low. As such, a positive aspect is that, with a 4 mm difference, the differentiation of high and low smiles—the smile types that lead patients to seek treatment—is clinically facilitated. Moreover, a numeric differentiation is created among the heights, making it easier to measure their classification [10].

Linear threading [11] is a technique in which the needle is inserted into the skin and the filler is deposited in a linear fashion along the track as the needle is slowly withdrawn. Because this creates essentially a tunnel of filler, this is also commonly referred to as the tunneling technique. Injection for lip augmentation is typically done with a linear threading (for lip contour and volume) or a serial puncture technique (for volume), proceeding from medial to lateral. Along the red lip, the targeted level for filler placement is within the submucosa just above the orbicularis oris muscle. In many cases, a layered distribution helps to provide fuller, more uniform enhancement. Also light massage is recommended after injection for that reason.

The use of linear threading (retrograde) technique with HA dermal filler (in this clinical cases Hyaluronica 2°, Vital Esthetique, France) for lip contour shaping and for lip volume augmentation was exceptionally beneficial to the improvement of the effect of the aesthetic all-ceramic restorations. We chose Hyaluronica 2 instead of Hyaluronica 1 HA filler because of its high viscosity and slower resorption, facts that make it an optimum decision for lip contouring and enlargement. The final results were satisfying for the patients. They received harmonious, attractive appearance and their quality of life was improved.

Conclusions

Use of dermal fillers for facial rejuvenation has become popular because these treatments provide desirable aesthetic outcomes such as a harmonious, attractive appearance without invasive surgical procedures. When they are performed by a skilled physician and with the use of the appropriate filler for the specific application, soft tissue augmentation provide predictable and consistent results. These procedures can be successfully used for improving the effect of aesthetic fixed prosthetic constructions of women with high or medium smile line.

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