

Creating a New Smile using Ceramic Restoration associated with Laser Depigmentation: Clinical Report

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Abstract

The article describes a clinical situation of managing a non harmonious smile caused by old metal ceramic crown on central incisor associated with gingiva hyperpigmentation. It concerns a 23-year-old nonsmoking patient of brown race with a chief complaint of poor aesthetics. He was bothered about the dark-color of upper gum and the discrepancy between the maxillary central incisors. The treatment procedure started by gingival depigmentation using laser diode, followed then by Lithium Disilicate Ceramic crown.

Thanks to a well-planned multi-disciplinary approach, the result was esthetically acceptable and the patient was satisfied.

Key words: smile; central incisor; diode laser; gingival hyperpigmentation; ceramics; CAD

Introduction

Smile esthetics is determined by the color shade, shape, and position of the teeth as well as the gingiva which is considered as the most pigmented tissue in the oral cavity. According to literature, several factors such as thickness of the epithelium, the keratinization quality of the gingiva, the volume of pigments in the tissue can affect gingival color [1]. Creating a new smile in patients with pigmented gingiva is considered as a challenge especially when it is associated with other defects concerning the harmony of teeth caused by old restorations in the aesthetic zone [2].

Gingival depigmentation can be performed by different methods. The selected method depends on the patient's preference as well as the expertise and experience of the clinician. Recent studies demonstrated that the use of diode laser is a safe and effective treatment modality that provides optimal aesthetics with minimal discomfort in patients with gingival hyperpigmentation [7,8].

During the smile, the central incisor should be the most dominant displayed tooth. Starting points for aesthetic management of maxillary central incisor are shape, size, shade, incisal edge position and proportions [a,b]. According to authors, the width/Length ratio is expected to be between 75% and 78% [3-6].

Clinical Discussion

This clinical presentation is dealing with aesthetic rehabilitation of the smile associating laser diode depigmentation of gingiva and all ceramic crown in central incisor. It concerns a 23-year-old nonsmoking patient

of brown race with a chief complaint of poor aesthetics. He was bothered about the dark-color of upper gum and the discrepancy between the maxillary central incisors which was caused by old metal ceramic crown restoring the right one. He was complaining about the form, the shade and the greyish transparency of the crown metal margin through the marginal gingiva. Aesthetic analysis revealed a convex profile with parallel commissural and mid-pupillary lines, squared teeth form, No harmonious smile lines. size discrepancies between central incisors were noticed. Photographs were taken using Canon 700D Camera.

Periodontal probing revealed a thick gingival biotype. bilateral melanin pigmentation was noticed. According to the pigmentation index of Kumar et al. the score was diagnosed as "3" (diffuse brown to black pigmentation, marginal, and attached) [7].

The treatment procedure started by gingival depigmentation, followed then by aesthetic buildup of the core and Lithium Disilicate Ceramic crown.

Firstly, the old crown was removed. a handmade provisional restoration, with precisely fitting and highly polished margins was performed using resin material Texton (SS White, New Jersey, USA). It established correct form and proportions of the central incisor.

Secondly, a semiconductor diode surgical laser unit (Elexxion pico 808 nm diode laser, Elexxion AG, Singen, Germany) was used for depigmentation. it consists on digitally pulsed diode laser with a frequency of 20,000 Hz, a peak power of 5 W, and a pulse width of 26 microseconds.

Finally, the core was built up and the crown on central incisor was performed using Lithium Disilicate Ceramic material IPS e.max CAD (Ivoclar Vivadent, Schaan, Liechtenstein); moderate translucency block was used. It was managed according to aesthetics guidelines and references.

An aesthetic try in of the crown before glazing was necessary. It allows the assessment of the color, the form and proportions. The incisal edge position, the midline, the axial inclination, at this stage, should be checked.

The Rehabilitation of the smile remains a challenge especially when it is associated with gingival problems such as gingival hyperpigmentation.

The morphological features of incisors and facial proportions are closely correlated. According to Williams et al. the shape of central incisor is determined by facial form. This teeth should be restored according to the

concept of dominance. Some studies are speaking about more attractive tapered incisors. [1,13,14]. The incisal edge should be parallel to mid-pupillary line. The Characterization of central incisor surface texture is as important as the shade, the form and dimensions .

Various methods have been used for Gingival depigmentation; they include gingivectomy [8], gingivectomy with free gingival autografting [9], electrosurgery [10], Cryosurgery [11], chemotherapy [12]. But, some of these techniques are prone to complications [13].

Recently lasers have been used to gingival depigmentation [8]. Semiconductor diode, Er: YAG Nd: YAG laser, and CO2 laser are commonly used for de-epithelization. Compared to the erbium laser, melanin shows a strong absorption of the diode wavelengths. According to recent studies [10], it guarantees a shorter treatment procedure with the diode [12]. Figures (1-6)



Figure 1 (a, b) : Initial situation showing unesthetic smile



Figure 2: pigmented gingiva with unesthetic old metal ceramic crown



Figure 3: *Palatal view of anterior region*



Figure 4: *Laser Diode depigmentation*



Figure 5: *Laser depigmentation (after a week)*



Figure 6: Try in of the all-ceramic crown



Figure 7: Final result showing improved smile

Conclusion

The Rehabilitation of the smile remains a challenge for prosthodontists, especially when it is associated with gingival problems such as gingival hyperpigmentation. A diode laser today seems to be an effective and safe technique for melanin depigmentation.

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