

Aesthetic restoration of the smile using combined Periodontal–Prosthetic Treatment Approach: a case report

Estetyczna odbudowa uśmiechu przy zastosowaniu łączonego leczenia periodontologiczno-protetycznego: opis przypadku

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HASŁA INDEKSOWE:

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Summary

The restoration of the smile requires a comprehensive management by a multidisciplinary approach involving different specialties like orthodontics, prosthodontics and periodontics. To achieve an aesthetic outcome and an optimal gingival architecture after a prosthetic treatment, it is crucial to take gingival health into account during treatment planning. It is among the first fundamental aesthetic objectives for any dental treatment. With the advances in materials and concepts in fixed prosthodontics, several types of prosthesis have been proposed for the management of decayed anterior teeth such as zirconia crowns which were considered as a suitable solution, they offer the best outcome in terms of aesthetic result, durability and biocompatibility. The clinical case report showed a patient with Sjögren's syndrome, high caries risk with multiple Miller Class II gingival recessions, consulted to restore her decayed anterior teeth. We indicated a multidisciplinary approach involving periodon-

Streszczenie

Przywrócenie uśmiechu wymaga kompleksowego postępowania w ramach multidyscyplinarnego podejścia obejmującego różne specjalności, takie jak ortodoncja, protetyka i periodontologia. Aby osiągnąć efekt estetyczny i optymalną architekturę dziąseł po leczeniu protetycznym, podczas planowania leczenia konieczne należy wziąć pod uwagę stan dziąseł. Jest to jeden z pierwszych podstawowych celów estetycznych każdego leczenia stomatologicznego.

Wraz z udoskonalaniem materiałów stomatologicznych i nowymi koncepcjami w protetyce odbudów stałych zaproponowano szereg rodzajów protez podczas rehabilitacji zębów dotkniętych próchnicą w odcinku przednim. Należą do nich, między innymi, korony z tlenku cyrkonu uważane za właściwe rozwiązanie gdyż są estetyczne, trwałe i biokompatybilne. Opisany przypadek dotyczy pacjentki z zespołem Sjögrena, wysokim ryzykiem próchnicy i licznymi recesjami dziąsłowymi klasy II wg. Millera, która zgłosiła się w celu odbudowy

tal and prosthetic treatment for anterior teeth to achieve successful aesthetic restoration of the smile.

zębów z próchnicą w odcinku przednim. Proponujemy podejście multidyscyplinarne obejmujące leczenie periodontologiczne i protetyczne zębów przednich dla osiągnięcia estetycznej odbudowy uśmiechu.

Introduction

In modern society, the demand for aesthetic dental treatment is increasing. Various types of dental abnormalities can be observed in the anterior region and can cause genuine aesthetic problems.

Smile restoration requires a multidisciplinary approach involving different specialties like orthodontics, prosthodontics and periodontics.¹

A treatment plan which involves the anterior teeth requires special attention, it entails the use of a diagnostic wax-up/mock-up, as well as the use of a planning technique such as digital smile design (DSD). Hence, it becomes essential to assess all aesthetic aspects and to comprehend the fundamentals of a genuine smile, utilizing this knowledge in oral restoration. The primary objective of aesthetic restoration revolves around achieving a balance among tooth form, colour, and texture in conjunction with the gums and the lips.²

To achieve an aesthetic outcome and an optimal gingival architecture after a prosthetic treatment, it is crucial to take gingival health into account during treatment planning. It is among the first fundamental aesthetic objectives for any dental treatment.^{3,4} It is also important to consider gingival morphology and to optimize gingival contours.⁵

Zirconia crowns have been proposed as a suitable solution for the management of decayed anterior teeth as they offer the best solutions in terms of aesthetic result, durability and biocompatibility.⁶

In this paper, we describe a multidisciplinary approach involving periodontal and prosthetic treatment to achieve successful aesthetic restoration of the smile.

Case presentation

A 54-year-old patient with Sjögren's syndrome was referred to the Military Hospital of Instruction of Tunis-Tunisia to restore her decayed anterior teeth.

Clinical examination revealed poor hygiene and oral symptoms common in patients with Sjögren's syndrome, such as reduced saliva production or xerostomia.

The patient also presented a high caries risk and multiple marginal recessions extending to the mucogingival junction (MGJ), which were classified as Miller Class II recessions. This recession was due to a previous orthodontic treatment that lasted four years. The teeth 22 and 21 had previously been restored using composite resin restorations, but they failed and changed colour (Fig. 1).

Panoramic radiograph showed the presence of endodontic treatment in teeth 21 and 22 (Fig. 2).

After clinical and radiological examinations, the decision to restore the maxillary incisors, canines and premolars with zirconia crowns was taken to improve the smile of the patient.

A pre-prosthetic coronally positioned flaps and tunnelling were indicated for both right and left sides.

The tunnel technique was initiated by subperiosteal dissection using a microsurgical



Fig. 1. Initial situation.



Fig. 2. Initial panoramic radiograph.



Fig. 3. Subperiosteal dissection using a microsurgical periosteal elevator.



Fig. 4. Insertion of the Allograft.



Fig. 5. Allograft and overlying tissue coronally positioned together to the cementoamel junction.



Fig. 6. One week postoperatively with minimal erythema and or oedema.

periosteal elevator. Subsequently, a precise supra-periosteal dissection was carried out using the Allen Arrowhead Knife, culminating with the Modified Orban Knife. Following these steps, the allograft was placed within the tunnel

by means of a W-flap, aligning it coronally with the adjoining tissue up to the cementoamel junction (CEJ). This positioning was then firmly anchored using a continuous 6-0 sling suture (Figs. 3, 4, 5, 6).



Fig. 7. Three weeks after gingival surgery.



Fig. 8. Teeth preparation.



Fig. 9. Indirect fiber post and core.



Fig. 10. Final result.

After three weeks, the patient returned, and gingiva healed with a harmonious gingival line (Fig. 7).

The teeth were prepared following the recommendations for all-ceramic restorations, including a circumferential chamfer of 1 mm and an axial reduction of 1.5 mm with a ten-degree taper. Additionally, an occlusal reduction of 2 mm was achieved using rotary diamond cutters.

The labial side of the restorations had margins placed 0.5 mm subgingivally for aesthetic reasons, while on the lingual side the margins were placed supragingivally. Additionally, all sharp edges were rounded (Fig. 8).

A coronoradicular reconstruction of the incisor 22 was performed using an indirect fiber post and core (Fig. 9).

Definitive impressions were made with additional polyvinyl siloxane (Aquasil, Dentsply, Germany). The final restorations



Fig. 11. Final smile.

were fabricated using CAD/CAM technique and were checked intraorally. Then the crowns were cemented with resin-modified glass ionomer cement (BioCem; NuSmile, Ltd, Houston, TX, USA) following the manufacturer's instructions. Excess cement was removed. The final restoration is shown in figures 10 and 11 (Figs. 10, 11).

Discussion

Sjögren's syndrome is an autoimmune rheumatic disease. It is characterized by lymphocytic infiltrate exocrine glands like the salivary glands, leading to dysfunction and giving rise to dry mouth,⁷ which is responsible for the occurrence of multiple caries in this case.

Several treatment modalities have been suggested for the management of carious lesions in the anterior dentition. Composite can be used to restore decayed teeth with either direct or indirect technique.⁸

The presence of multiple discoloured resin composite restorations in anterior teeth may affect the aesthetic appearance, as this material is susceptible to discoloration and wear over time. Consequently, the utilization of ceramic materials is essential to uphold a durable glossy appearance.⁹

This concern is particularly relevant in instances of labial restorations, where a noticeable contrast in colour may arise between the natural tooth surface and the restoration itself.

The improvement of smile is an integral part of dentistry, involving careful examination of all elements of the oral sphere. The crafting of an attractive smile requires a detailed preoperative aesthetic analysis of lips, gingival tissues, and teeth.¹⁰

Such an ideal smile depends on the symmetry and balance between all of these elements. Numerous aesthetic "check-lists" have been used to provide objective assessment tools and to measure the integration of such restorations with the surrounding soft tissue.^{11,12}

Recession defects may be present with the loss of papillae and lead to the creation of "black triangle syndrome" which may require periodontal surgery to improve aesthetics, reduce plaque retention and decrease dentinal sensitivity.¹³

Several classifications have been used to

describe gingival recession. Currently, the most widely used is that of Miller. This classification system is based on the amount of soft tissue loss along the vertical axis relative to the MGJ and the extent of interproximal periodontal tissue loss. It divides defects into four categories. In Miller Class I, there is gingival recession that stops above the MGJ, whereas in Class II, the exposed root defect reaches the MGJ. Class I and II defects retain the interproximal attachment and bone, with mild/moderate loss in Class III and severe loss in Class IV, extending beyond the midfacial recession.¹⁴

Recently, the tunnel technique has become increasingly popular among clinicians due to its promising clinical outcomes and aesthetic benefits in treating gingival recession defects. The systematic review of *Tavelli L et al.* showed that this technique demonstrated its effectiveness in treating both localized and multiple gingival recession defects.¹⁵

One significant component of gingival architecture is the gingival line, which is the line joining the tangents of the gingival zeniths of the central incisor and canine. The gingival zenith is defined as the most apical point of free gingival margin. The level of the incisor gingival zenith should be appropriately established.^{10,16}

According to *Pawar B et al.*, the gingival zenith of the canine should be between the anterior third and the distal third, the lateral incisor in the middle and the central incisor should be at the distal third. The location of the gingival zenith can be a guide to create the suitable axial inclination of the tooth by modifying the line angle position of the long axis of the tooth.¹⁶

Along with these parameters related to gingival aesthetics, other dental parameters may serve as aesthetic guidelines and can allow us to achieve a more predictable result.

The aesthetics of anterior restorations can be improved by adopting geometric proportions

between teeth on either side of the midline and by the selection of correct tooth size.^{17,18}

Various clinical methods were used to evaluate the tooth-to-tooth proportion proposed during prosthetic design. These methods included the photogrammetric method, the static method and the digital smile method.¹⁸

The most widely known was the “golden proportion” defined by Dr Levin in 1978.¹⁹ It allowed determining the mesiodistal widths of the central and lateral incisors and the mesial half of the canine. Thus, it gave a ratio of 1 to the lateral incisor, consequently the central incisor will have a 1.616 ratio and the mesial part of the canine will have a 0.618 ratio.

Nonetheless, the research conducted by *Sandeep N et al.*²⁰ concludes that aesthetics in dentistry cannot be justified mathematically. It emphasizes that people should not be subjected to a uniform standard, as aesthetic preferences differ significantly among individuals. Therefore, it is crucial to consider the dento-facial specificities of each individual, as well as the diverse inherent proportions of natural teeth when undertaking the restoration of maxillary anterior teeth. Moreover, perceptions of beauty and individual cultural characteristics should be considered.

Conclusion

The restoration of smile is an integral part of dentistry, involving several specialties. The crafting of an attractive smile requires a detailed preoperative aesthetic analysis of soft tissues, to achieve a perfect harmony between teeth and gingiva, which is the first fundamental aesthetic objective for any dental treatment.

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