

Smile Correction of A Patient with Missing Central Incisor: Case Report

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Abstract: A smile is a gateway to success. Early extraction of a permanent tooth at the aesthetic zone is a common problem. This resulted in teeth asymmetry and drifting of adjacent teeth. The following case presentation illustrates a successful aesthetic and functional correction of an uneven distributed spaces for a young male patient with a CAD/CAM all ceramic system in combination with porcelain veneers. This resulted in symmetrical appearance and natural smile at the aesthetic zone of the maxillary anterior teeth. The cemented prostheses had mimicked optical characteristics of natural teeth, such as fluorescence, opalescence, and translucence, which is extremely relevant when it comes to restorations in anterior teeth.

Keywords: aesthetic, gender, all ceramic, maxilla, extracted tooth

I. Introduction

Agensis or early extraction of permanent teeth is a common problem facing a dentist during daily practice. Recent studies have shown that the incidence of anodontia is increasing (1). When one tooth is missing in the aesthetic zone, parents, dentists, and orthodontists are tasked to make the right decisions at an early stage. This early decision will determine the dental health and physical appearance of the patient for a whole lifetime (1,2). The smile is a gateway to success. The magic of an improved smile can instill confidence in a patient to a degree unimaginable. Since smile is a complex phenomenon which involves colors, illusions, proportions, etc. to achieve the desired result one has to encompass all the principles of esthetics (2).

During the comprehensive diagnosis and treatment plans for aesthetic, an interdisciplinary treatment planning; dental technician, dentist, periodontics, orthodontists and selecting the most conservative treatment to achieve functional and aesthetic goals (1). Early missing anterior tooth at incisor region create an esthetic problem with specific orthodontic and prosthetic considerations. Selecting the appropriate treatment option depends on many factors, such as the malocclusion, the anterior relationship, specific space requirements, bone volume, root proximity, an adjacent teeth conditions, and esthetic prediction mainly when the canine involved in the plan (3).

The following case presentation illustrates a successful aesthetic and functional correction of an excited uneven distributed spaces for a young male patient with a CAD/CAM all ceramic based system in combination with porcelain veneers for symmetrical appearance and natural smile at the aesthetic zone of maxillary arch

II. Case report

A 22-year-old male patient attended to the dental clinics. The patient requested to correct his smile and replace a long-standing extracted maxillary tooth. The patient was unhappy with his asymmetrical anterior frontal maxillary teeth. Furthermore, he complained of a bad odor discharge came from his tooth. He also asked for more natural attractive and expressed interest in improving his facial appearance by symmetry of his anterior maxillary frontal teeth. Intraoral examinations showed exposed and spacing of anterior maxillary teeth due to extracted of tooth #21 since 8 years (Figure 1). The endodontic examination showed necrotic teeth # 12, 11, 22 in addition to that open pulp chamber of tooth # 11. Moderate gingivitis in the interproximal and embrasure areas at the free gingiva of all dentition. No pain in the temporomandibular joint was detected. Class 1 molar relationship and canine guidance occlusion were observed. About 1-2 mm of anterior overbite. Panoramic examination showed periapical radiolucency of tooth # 11 and un-continuous lamina dura around the teeth # 12, 11, 22 (Figure 2).

After examination of the patient and data collecting, the steps of the treatment plan sequences were discussed with the patient, his agreement was taken. At this visit, scaling and polishing of all teeth were done. The treatment was begun with root canal treatments of teeth # 12, 11, 22 (Figure 3). Then the replacement of the

extracted teeth was done with composite to check the appearance and the approval of the patient for the new shape of his teeth (Figure 4). The patient was unhappy with the new appearance. Then maxillary and mandibular impression with alginate dust-free impression materials were taken. Then the impressions were poured and the new diagnostic design was prepared from the master cast with the help of the dental technician, by CAD/ CAM machine. This design was planned with the involvement of teeth # 13, and 23 to get asymmetry of the anterior maxillary teeth. This new design was shown to the patient and approval of the patient was gained (Figure 5).

The preparation of the all abutment teeth to receive all ceramic restoration were done under local anesthesia. A separated all ceramic crowns on the right side and a 3 unit bridge on the left side were designed. The double retraction cords were applied around the abutments and the light body were applied around the prepared teeth with intraoral tip after removal of the retraction cord. The maxillary impression was taken with addition Silicon (Virtual Ivoclar Vivadent, Lichtenstein) using one step technique (Figure 6). The provisional crowns and bridge were constructed (Success SD, Promedica Neumunster, Germany) and cemented with temporary cementation (Temp-BondNT, Italy).

The pouring of a maxillary final impression was done with CAD/CAM special stone (BEGO/Germany). The die preparation, ditching and finish line exposure were done, then those dies were mounted on laser scanner (Cynoprod Canada Inc. Listings, Montreal, Canada) for scanning and capturing the preparation (Figure 7). The scanner is connected to the computer screen by the software program 1.3 EVLOTION (Cynoprod Canada Inc. Listings, Montreal, Canada) for milling the zirconia core. The cores build-up were done with Vita In-Ceram YZ Disc (VitaZahnfabric/Germany). Try-in for the milled crowns and bridge were done in the patient's mouth (Figure 8). Then, shade guide selection using the shade guide VITA System 3D-Master (Vita Easyshade (R) Compact, Vita, Germany) was done; the selected shade was (2m2-3D master). The porcelain build-up was done with porcelain VITA VM(R)9 (VitaZahnfabric/Germany). The final shape of the porcelain bridge was the same as in the diagnostic design.

At the final appointment, porcelain try-in of the prostheses was done in the patient mouth, interocclusal adjustment, canine guidance, as well as protrusive and lateral movements were checked before glazing. Pre-apical and panoramic x-rays were taken (Figure 9). Cementation of the glazed all ceramic bridge was done with resin cement (Relaxy XTM, UnicemAppliCap Resin Cement, 3M ESPE, Germany). Post-operative intra oral views were taken at rest, smile and lateral views were taken (Figure 10). All the steps of constructions, fabrications, and cementation of the all ceramic bridge were following the manufacturer instructions. The case was followed-up for maintenance.

III. Discussion

Hypodontia is defined as the developmental absence of one or more teeth which can affect both the primary and permanent dentition. During the diagnosis procedure, several other dental and oral symptoms can be observed. However esthetic and psychological problems require special attention for these patients, considering that they are often associated with low self-esteem and problems with social acceptance. The optimal therapy should include an interdisciplinary team approach (4). There are several treatment options for this anomaly: orthodontic space closure or orthodontic space opening followed by tooth supported restoration, including all the anterior from canine to canine (2).

The advent of new restorative materials and new technologies in oral rehabilitation during the past 30 years improved the restorative dentistry field. There are a variety of approaches to treat the different cases of shape, position, alignment, symmetry, proportion, surface texture and color of anterior teeth in our daily practices (5-6).

With the new technological advances in dental materials, it is now possible to reproduce the lost tooth as well as individual characteristics almost indiscernibly. The current all ceramic systems offer different shades (color name), Chroma (color intensity) and value (degree of brightness), allowing mimicked optical characteristics of natural teeth, such as fluorescence, opalescence and translucence, which is extremely relevant when it comes to restorations in anterior teeth (7-9) .

Generally, the restoring of the anterior segment with restorations is considered to be difficult and more challenging in hypodontia patient. Careful planning of the management of maxillary space for missing teeth in younger individuals is crucially important (10).

In this case, the patient presented with concerns about appearance after extraction of the central incisor. This case was esthetically challenging with a high smile line and maxillary anterior segment spacing. The patient was treated with composite crowns replacing missing maxillary central incisors (make -up), but he wants more symmetrical teeth. The involvements of a bilateral canine were discussed with the patient and showed him the diagnostic shape from CAD/CAM machine (figure, 5). The patient totally agreed with this type of treatment (10).

The demand for the dentist to achieve excellence in aesthetics and function has driven modern advances in materials and restoration fabrication. However, patient requests for more aesthetic and biologically

'safe' materials that have led to an increased demand for metal-free restorations. So the clinical significant from this case were time-saving for the patient, minimizing the cost, obtained a creative smile which gives some confidence for the patient., facial symmetry in the aesthetic zone in maxillary teeth was obvious.

IV. Conclusion

Working for a patient with missing an anterior maxillary permanent tooth, facing so many difficulties and sometimes marked with compromise. Achieving a satisfactory result for both functionally and aesthetically is possible only through the close cooperation of specialists from various fields of dentistry and meticulous planning from the commencement of treatment to a final aesthetic stage. This case shows an excellent symmetrical and aesthetic treatment outcome using E max prostheses crowns and bridge replacing an extracted maxillary central incisors since long time ago.

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Figure 1; Pre-operative extra oral frontal view ,Figure 2; Pre-operative panoramic x-rays



Figure 3; During root canal treatment of teeth, Figure 4; After RCT and composite make-up of teeth



Figure 5; Views of diagnostic design by CAD/CAM machine, Figure 6; Different steps during final impression



Figure 7; The master cast with detached abutments, **Figure 8;** Intra-oral core try-in of crowns and bridge



Figure 9: Post-operative pre-apical and panoramic views, **Figure 10:**Post-operative cemented crowns &bridge