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Immediate Loading of Single-Tooth Implant Restoration in Congenitally Missing Maxillary Lateral Incisors: A Thorough Clinical Guide Case Report

Manal R Alammari[1*], Khalid Alhindi[2]
[1]Associate Professor and consultant in Prosthodontics Department of Oral and Maxillofacial Prosthodontics, King Abdulaziz University Dental Hospital, Jeddah, Kingdom of Saudi Arabia
[2]Najran University, Department of Prosthodontics, Saudi Arabia

Case Report

***Corresponding author**
Manal R Alammari

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Abstract: This case report describes a A23-year-old female patient with a congenitally missing maxillary lateral incisor whose missing lateral incisor tooth was rehabilitated using a dental implant which was restored with cemented e-max crown over gold abutment. As the patient is a young female and the implant was in the aesthetic area, placing immediate provisional restoration was the chosen method of restoration. The case reported presented illustrates a therapeutic strategy consisting of implant placement and immediate provisionalization. The treatment sequences were followed as recommended in the dental protocol. First, A maxillary surgical stent was prepared for the correct implant position, a submerged maxillary anterior single-tooth implant placed according to a standard protocol 3.5mmx10mmTC Prima Implant in the area of tooth 12. The implant's shoulder was placed 2 mm apical to the cemento-enamel junction of the adjacent teeth. Thereafter immediate temporization was done in two stages. First stage immediately after the implant placement then 3 months after. Lastly, a consistent and suitable follow-up program was applied. Conclusion: When sensibly selected and accomplished, our case report outcome indicates that this technique may provide promising immediate results relative to the aesthetic, maintenance and stability of the peri-implanted tissues as well as patients' satisfaction, expectation and functionality.

Keywords: Congenitally missing, Dental implants, Emergence profile, Implant temporization, lateral Incisor, Maxillary.

INTRODUCTION

In the practice of dentistry, One of the common dental irregularities encounter is hypodontia. By definition, *hypodontia* refers to a situation in which a person is missing one to six teeth. The occurrence of hypodontia, ranges from 1.6% to 36.5%, depending on the population considered (1). The long-term management of hypodontia in the esthetic area is challenging.

Treatment of tooth loss or agenesia in the anterior maxilla with single-tooth implant supported crowns is well-documented [2-4]. The concept was developed because of previous research on implants in edentulous and partially edentulous patients [5, 6].

In order to reach an ideal esthetic and functional consequence, it is often essential to launch a harmonized, interdisciplinary tactic involving an orthodontist, oral surgeon or periodontist, a restorative dentist and a prosthodontist. Careful diagnosis and communication among team participants is necessary to frame a treatment plan that satisfies the patient's wishes and expectations. Some of the many aspects that the team must consider in their treatment planning include the patient's age, facial type and profile, occlusal scheme, spacing, tooth anatomy and condition (shape, color, and size), alveolar bone quality and quantity, gingival display, and biotype [7-10]. In the end, the ideal treatment plan should be predictable, stable, least-invasive and pleasing especially in young females.

CASE REPORT

A 23-year-old female patient with a congenitally missing maxillary lateral incisors referred to the Department of Proshodontics, King Abdulaziz University Dental Hospital in September 2017. Her medical and dental history was evaluated. Dental history revealed that she had received orthodontic treatment for obtaining proper space for prosthetic restoration of her missing right lateral incisor after extraction wisdom teeth 18, 48 in 2015. She was wearing a retainer. Periapical and panoramic radiographs and preliminary impression and photos Figure 1were taken for diagnostic evaluation. A decision was made for dental implant treatment.

Fig-1: Clinical situation before implant placement

Surgical preparation

A maxillary surgical stent was prepared for the correct implant position. At the first stage of surgery, labial alveolar bone depression in the area of tooth 12 was found. Then formal surgical procedure recommended by the manufacturer of the dental implant system (Prima Implant System) (1.6mm, 11.5mm). followed by the use of first and second spreader to expand the area. Last drill was used (3.5mmx 11.5mm). Therefore, a submerged maxillary anterior single-tooth implants placed according to a standard protocol 3.5mmx10mmTC Prima Implant in the area of 12. The implant's shoulder was placed 2 mm apical to the cemento-enamel junction of the adjacent teeth. Figure-2 Thereafter immediate temporization was done as shown in Figure-3.

Fig-2: Preparation of the implant

Prosthetic Restoration

As the patient is a young female and the implant was in the aesthetic area, placing immediate provisional restoration was the chosen method of restoration. In this case, it has been done twice to satisfy the patient's necessities and to deliver the best prosthodontic treatment. Soft tissue was managed by the modifications of provisional crown during follow-up visits. Then soft tissue impression was made to pick up the emergence profile Figure 4. Dental implant as restored with cemented e-max crown over gold abutment. Any premature contact during lateral and protrusive movement were evaded. After surgical intervention, the prefabricated temporary crown with acrylic resin was trimmed, polished, and screwed immediately after implant placement) Figure-3.

Next, in office bleaching was done by using opalescence tooth whitening system (ultradent, USA) to get the proper shade. Then, after three months; the initial temporary crown removed, custom impression post prepared. Implant analogue inserted in putty silicon material and temporary crown is screwed to the analogue. Impression of the soft tissue profile was done by 3-lihgt body PVS material then the impression post was screwed to the implant analogue and GC resin (GC amrica INC, Japan) applied around as shown in Figure-4.

Fig-3: (a) Temporary crown construction (b) removing the temporary crown for finishing and polishing. (c) Temporary crown after finishing (d) screwed provisional implant crown and the flap was precisely repositioned and sutured free of tension with bite guard immediately after implant insertion (e) one month follow up (f) 3 months follow up

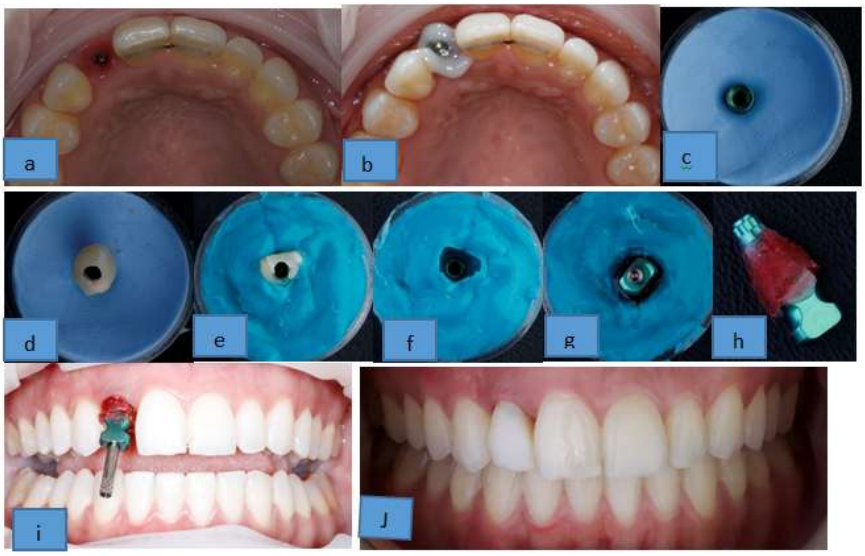

Fig-4: (a) healed peri-implant soft tissue after removing the temporary crown (b) placement of healing abutment with resin material immediately after removing the temporary crown for preservation of soft tissue profile while preparing of custom impression post. (c) implant analogue inserted in putty silicon material (d) temporary crown is screwed to implant analogue (e) light body PVS material was applied to the temporary crown to get the impression of soft tissue emergence profile. (f) the replica of soft tissue profile (g) the impression post was screwed to the implant analogue and GC resin applied around. (h) custom made impression post. (i) custom made impression post was screwed to the implant. (j) The patient with the final temporary crown after bleaching

Then the final impression was poured using type IV die stone (GC fujirock EP, JAPAN) and the UCLA gold abutment was fabricated. As the patient has thin gingival biotype and to mask the color of abutment as will as to move the finish line more incisaly to control the excess cement the emax (IPS e.max® Ivoclar Vivadent, Liechtenstein) coping with the medium opacity ingots (MO) ingot was chosen then covered with emax veneer using MT ingot with layered porcelain.

After checking the prosthesis (fitting, shape, and shade) the abetment was cemented extra orally using unicem resin cement then screwed to the implant then the veneer was cemented to the coping using LC resin cement.

Fig-5: a) final impression using light and heavy body PVS impression materia. B) master cast with soft tissue profile replica c) gold custom abutment. D) Emax coping e) Emax veneer. f) post-operative photo g) Smile h) post-operative x-ray

DISCUSSION

One of the toughest areas for implant reform has been the anterior maxilla, or what is known as the "esthetic zone". Improved expertise involving the surface of the implant body, abutment connection and prosthetic reconstruction of implants provided positive Osseo integration with high possibility of fully representing the esthetics and function of natural [11]. Studies recommended that placement of the implants should be done after finishing the orthodontic handling and finish the retention period to achieve soft and hard tissue balance [12].

Our group settles with the fundamental principle to develop treatment procedures that are both conservative and practical while maintaining excellent esthetics and ethics.

The rising agreement among prosthodontists and surgeons is that a successful implant requires not only osseointegration, but likewise attention of the gingival esthetics and the esthetics of the final restoration [13-16]. One of the chief tasks facing implant specialists currently is steadfastly and esthetically replacing a maxillary anterior tooth [17, 18].

Nowadays, the single-tooth implant has turn out to be the most common treatment substitute for the replacement of missing teeth [19-24]. Many studies have revealed the positive osseointegration and long-term function of restorations supported by single-tooth implants [25, 26]. Adding to the high triumph rates, the

key advantage of this type of restoration is that it leaves the next teeth untouched.

To house a standard dental implant in the maxillary lateral incisor area, there should be a minimum of 10 mm of inciso-gingival bone and a minimum of 6.0 mm of facial-palatal bone. Adequate space for the implant is also required between the adjacent roots. One to two mm of space is required between the implant and the adjacent roots [27].

Today, the use of implants with a narrow diameter has been shown to have a positive effect on the amount of bone remodeling typically noted with standard implants [28, 29].

To enhance esthetic treatment results, the use of provisional restoration with adequate emergence profiles is suggested to guide and shape the peri-implant tissue and to prevent failure before definitive restoration [30]. Immediate provisionalisation has been described as relavant to the stability of the periimplant tissues and the aesthetic outcomes [31].

Restoration of Dental implants can be with cemented or screw-retained restorations. Due to the angulation and the location of the screw if it is used would be in the facial, cement retained had to be selected. For this reason, crowns were luted with adhesive resin cement which was carefully evaluated and any remnants removed.

CONCLUSION

There are quite a lot of restorative choices for the replacement of congenitally missing lateral incisors, including resin-bonded bridge, cantilevered bridge, and conventional full-coverage bridge. These options have great success if used in the accurate situation with accurate technique. However, recently, the most common treatment alternative is the single-tooth implant. The main advantage of this type of restoration is conservation of the adjacent tooth structure.

Therefore, it is imperative to manage these patients with an interdisciplinary diagnostic and treatment perspective. In conclusion, orthodontic space opening, implant palcement, immediate temporisation, managing soft tissue and bleaching can provide a successful and satisfactory aesthetic and functional outcomes in congenitally missing anterior maxillary teeth.

Contribution

Dr. Alammari, Concepts, literature search, manuscript preparation, manuscript editing, and manuscript review.
Dr. Alhindi, Clinical work, laboratory work, photographs, manuscript review.

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