

## The right smile in left side: single tooth-implant restoration

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**Abstract:** One of today's reliable treatment option to replace both anterior and posterior missing teeth, is an implant therapy due to its excellent esthetics and function. Replacement of single tooth, multiple missing teeth and complete edentulous cases or abutment of partial or complete dentures can be well achieved by dental implant therapy. The purpose of this case study is to briefly focusing on guidelines of placing a single-tooth dental implant in esthetic area with a high clinical and technical sensitivity for patient who missed his central left incisor and to communicate the outcomes of the case with other dental professionals. One of the important factor to consider for proper case management is the correct surgical placement of a dental implant which is so mandatory to obtain the ideal aesthetic result. The number of dental implants and correct position can be determined through proper treatment planning. Therefore, before surgical placement of a dental implant, adequate hard and soft tissues must be present. The clinician must also consider risks that may occur before, during and post-operatively and finding out the proper management procedures of such complications.

**Key words** - Dental implant, Smile, Single tooth, Implant restoration

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### I. Introduction

Ultimate challenge for many dentists is placing a dental implant in the esthetic zone. Dental implant therapy in esthetic zone has surpassed many of drawbacks of conventional restorative techniques that used anterior natural teeth as abutments. Back for many years professionals aimed at creating an implant-supported restoration that replicated natural teeth [1]. That is why the single-tooth, implant supported restoration in the anterior region remains a challenge to an implant surgeon or other dental specialists. In some circumstances the treatment may be more challenging particularly when the areas present deficiencies in both soft tissue and bone [2]. Therefore, implant therapy in any esthetic zone is a technique sensitive procedure with none or little mistake because any mistake either in implant position or poor handling of soft or hard tissues can have negative effect on treatment outcomes and affecting patient satisfaction [3]. There is an increasing demand by patients for dental

implant placement in the esthetic zone due to many factors, including its outstanding esthetic and functional outcomes ,patient self esteem and psychological factors.

Every one is proud about advancements in the field of dental implant therapy that have lead to predictable survival rates of dental implants [4].As shown by Simeone and others, the current definition of success in addition to long-term predictability, function and integration of the implant primarily focuses on esthetic considerations.

## **II. Case presentation**

### **2.1 Clinical findings**

A 28 year old male patient systemically healthy,presented to the Department of Prosthodontics and implant surgery, Faculty of clinical stomatology, Tongji Hospital of Huazhong University of Science and Technology on 16<sup>th</sup> September, 2010 with chief complaint of loss of upper front tooth due to trauma for 4 years ago. On detailed intra oral examination revealed a missing tooth on #21 regions. (Fig.1-A).General periodontal condition of the patient was healthy and fair despite the patient did not have his professional oral check-up for long time.we found that periodontal pocket depths were less than 3mm in all anterior and posterior teeth ,gingiva phenotype was thick and keratinized.The alveolar ridge in #21 was thin with concavity of buccal bone.

### **2.2 Radiographic investigation**

A preoperative orthopantomogram radiography (OPG) showed both upper jaw and lower jaw, revealed also maxillary sinus,nasal cavity,inferior alveolar canal (IAC) in better contrast and symmetry. In addition there was an excellent periodontal condition of the remaining teeth with adequate bone height and mesiodistal width for the placement of the implant of missing tooth #21.(Fig.1-B)

### **2.3 Treatment options**

Available treatment options including removable partial denture (RPD), fixed partial denture (FPD), resin bonded bridge (RBB) and single tooth implant fixture were all presented and discussed to the patient by focusing on merits and demerits of each.Among these treatment options,our patient agreed upon implant placement in missing area and he signed his consent form before starting the treatment .

### **2.4 Surgical phase**

After proper treatment planning,endo-osseous implant,Ankylos,Dentsply,Germany dental implant system,tapered self threaded measuring  $3.5 \times 11$  mm in dimension was selected. Following an injection of 2% lidocaine with 1: 80,000 anaesthetic agent in the area of the missing central left incisor,a palatally positioned full-thickness incision was made and the flap was raised.Bone width was measured to be 8mm and following the manufacturer's protocol for implant placement, an osteotomy was drilled with the help of the surgical guide template.A parallel sided, threaded, rough surface implant was then placed with 3.5 mm of diameter and 11.0 mm of height and primary stability was achieved at 35N,(Fig.2-A) ,a healing abutment was placed on top of the implant and the flap was closed with the help of silk 3.0 sutures.(Fig.2-B)

Appropriate antibiotic (amoxicillin 500 mg, 3 times daily for 7 days) and analgesic (ibuprofen 800 mg, every 4 to 6 hours as needed) were prescribed and post operative instructions were given. The patient was seen post-surgically after 1 week for suture removal,without any complaint or other signs or symptoms reported. (Fig.3).

### **2.5 Exposure of dental implants and attachment of abutment**

12 weeks after implant placement,the healing abutment was removed and an impression coping placed, followed by a Poly Vinyl Siloxane (Aquasil, Dentsply/Caulk, Milford, DE) open-tray impression to capture the position of the implant.The impression coping was removed and the healing abutment was replaced by another one of 1.5 mm of diameter and 3.0 mm of height,small amount of bio-oss was used to fill resorptive defect at the crest of alveolar bone.(Fig.4).shade was also recorded. The case was then sent to the laboratory for temporary crown fabrication.The patient was now seen after eight weeks of healing before prosthetic phase(Fig.5)

A radiography was taken before the seating of the abutment (Fig.6). The abutment was then torqued to 25N with the help of a torque wrench.(Fig.7)

### **2.6 Restorative phase**

The aim of this phase is to construct the crown after appropriate healing period of the dental implant site (osseointegration) .The temporary crown was then placed, the proximal contacts and occlusion also verified. For

maximum intercuspation,there was light contact with no contact in protrusive and lateral excursions.The temporary crown was then cemented with the help of noneugenol based temporary cement(Fig.8).Excess cement was removed and the occlusion was verified again. After 16 weeks of healing since implant placement, the temporary crown was removed and the gingival was observed for healing, it exhibited an adequate amount of interdental papilla and the buccal contours were observed to be similar to the adjacent tooth. Final restoration was delivered at 20 weeks after implant placement. The abutment was cleaned with copious amounts of water and the final crown was then tried in.(Fig.9-A).The proximal contacts and occlusion was checked again . The crown was then cemented using a resin modified glass ionomer cement (Fig.9-B).The patient was very happy with the final esthetic and functional outcome(Fig.10-A) as well lip profile with smile view (Fig.10-B).Oral hygiene instructions were given to the patient and recall after 3 months for regular check up.

### **III. Discussion**

There is a big challenge of placing dental implant in esthetic zone especially in anterior maxilla region due to bone resorption seen in this area,however there are some options to overcome this challenge,among these options we have onlay bone graft and distraction osteogenesis that are autogenous sources.The difference between these two techniques is that onlay bone graft ,the bone is taken either intra-orally (Ramus or chin sites) or extraorally,from iliac or calvaria.One of the demerits of extra-oral bone graft is that there is requirement for general anesthesia with increased morbidity.while distraction osteogenesis helps to transfer an amount of existing bone to a more coronal position after surgical osteotomy and fixing screws are used to stabilize the graft.After performing alveolar bone osteotomy, a device called distractor is placed in recipient site which remains fully vascularized via its periosteum and last few months prior to implant placement [12]. As shown in previous study,there are similar success rates and survival rates of implants placed in horizontally or vertically resorbed edentulous ridges reconstructed with block bone grafts and implants placed in native bone,in distracted sites or with guided bone regeneration(GBR).However there is increase of surgical problems and morbidity from vertical augmentation [13]. Contrary to the latest systematic review and meta-analysis study aimed to assess the efficacy of alveolar vertical distraction osteogenesis and autogenous bone grafting in terms of bone gain, bone resorption, and implant survival and success rates,in addition to investigate the relationship between bone gain and resorption after alveolar vertical distraction osteogenesis,the study found that there is significant difference between alveolar distraction osteogenesis and onlay bone grafting in terms of bone gain and bone resorption [14].

In order to provide successful and aesthetic dental implant treatment, certain clinical parameters must be met.This is particularly true in the anterior maxilla,where the teeth and their supporting structures are readily visible. Successful implant treatment to replace missing teeth in the anterior maxilla requires comprehensive preoperative planning and a specific surgical plan, and ultimately prostheses that are fabricated in consideration of function and soft tissue support [3].Technical expertise is also essential and treatment planning must consider the final prosthetic result, so that implant surgery can be tailored to fulfill the preplanned objectives. Unless the position of the final prosthesis is visualized prior to surgery, the placement of the dental implants may not allow the desired end result to be achieved [15]. Alternative treatment options to our case included a removable partial denture(RPD), fixed partial dentures (FPD) and resin bonded bridges,also known as Maryland bridges.

Removable partial dentures while an option can contribute to the loss of alveolar bone on both abutment and non-abutment teeth. Along with that the dissatisfaction rate of removable partial dentures is relatively high,ranging from 9-26% [16].On the other hand the use of fixed partial dentures would have required the unnecessary destruction of adjacent teeth to prepare them as abutments and loss of vital tooth structure. Another option would be a resin bonded bridge, which would reduce the amount of adjacent tooth destruction but with a high incidence of pontic failure and debonding [17].We felt the implant treatment plan would have been the best option,however proper prosthetic concepts must also be followed to maximize aesthetics and function and the clinician must consider the time needed for implant integration and soft-tissue healing, creation of emergence profiles, occlusal forces in relationship to progressive loading, and occlusal forces on the final restoration [18].

### **IV. Conclusion**

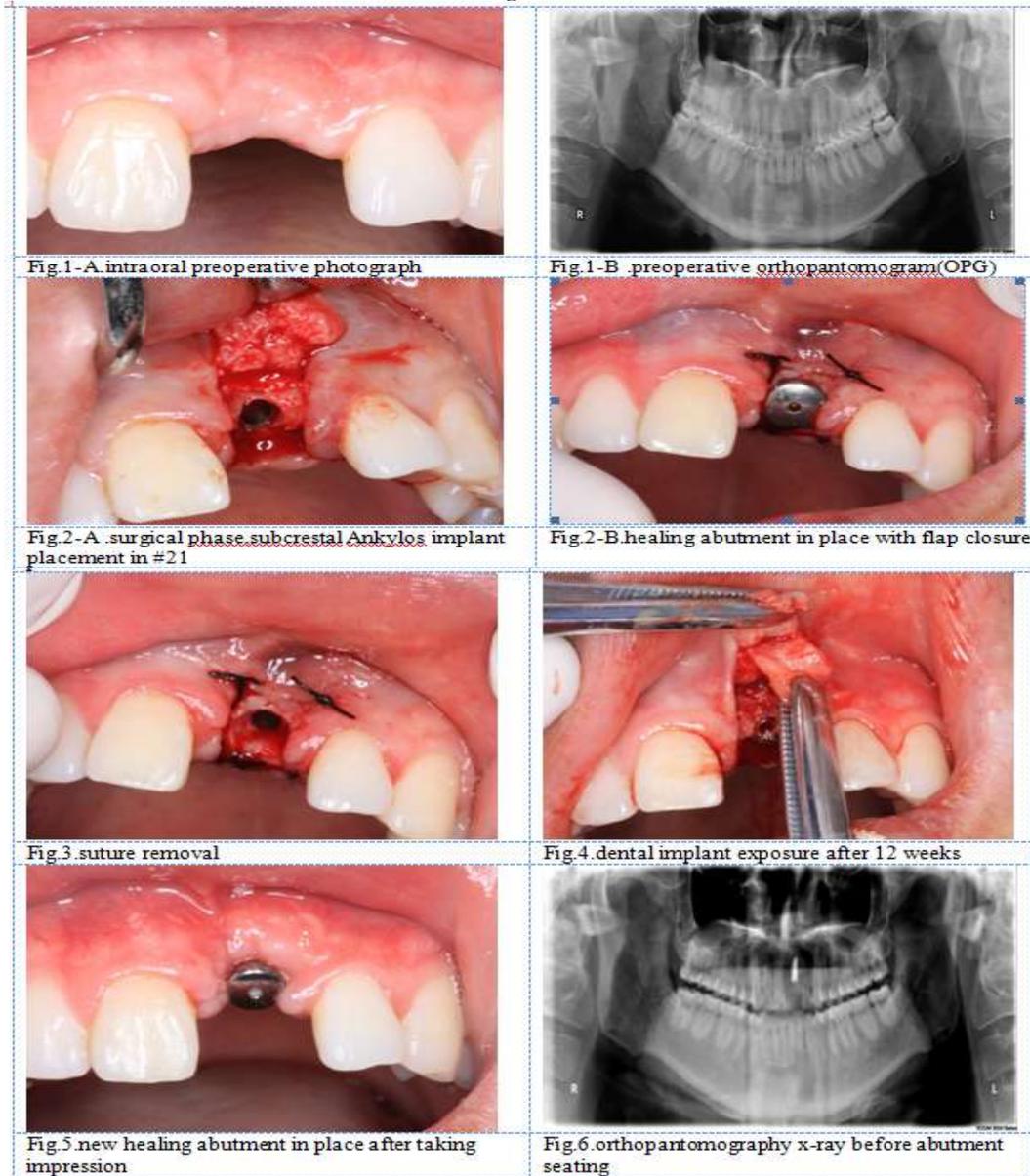
Placing dental implant in the maxillary anterior region requires precise planning, surgery and prosthetic treatment. This case report has illustrated the steps needed to create ideal aesthetics in the maxillary anterior region and also tips to achieve a good esthetic result when replacing a missing tooth situated in esthetic zone by dental implant,a thorough preoperative diagnosis,comprehensive treatment planning combined with excellent operator's clinical skills is mandatory .Comprehensive treatment planning allows the implant surgeon, working with the restorative dentist to select location, angulations, and spacing of dental implants to achieve ideal aesthetics. The prosthetic restoration of a dental implant must be also ideal in order to achieve the desired

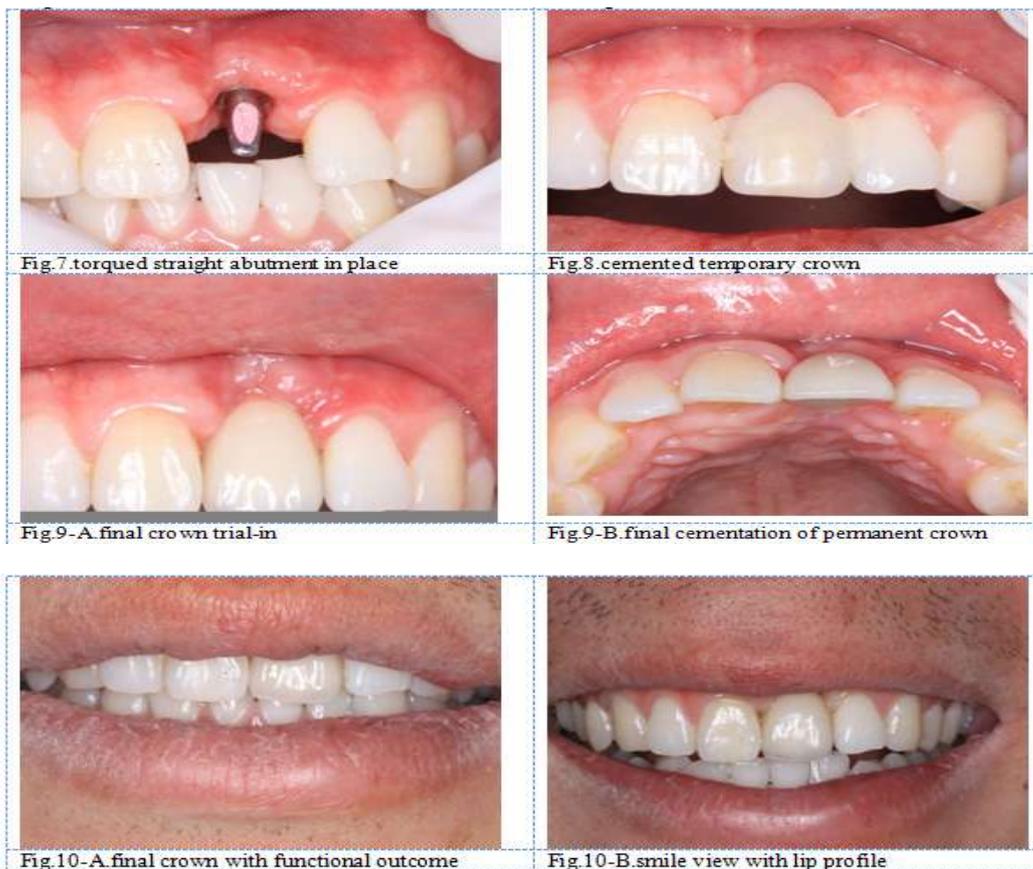
aesthetic result. This case report also reminds clinicians the importance of a comprehensive and interdisciplinary approach to treatment planning, surgery, and restoration of dental implants in the maxillary anterior region of the mouth as well to lessen the possibility of increased post-operative and post-prosthetic risks by following standard protocols . “Restoring is more important than losing,perfect smile enhances quality of our life ” .

**Competing interests:** None.

**Patient consent:** obtained.

**Figures**





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