THE SINGLE-TOOTH IMPLANT TREATMENT FOR MAXILLARY CENTRAL INCISORS LOSS AFTER TRAUMA: CASE REPORTS

ABSTRACT

Loss of a single tooth may cause functional and esthetic deficits. There are two treatment options that exist for replacing missing incisors. They include a tooth-supported restoration, or a single-tooth implant. Dental implants are a good treatment option for replacing missing teeth in adolescents, provided that the subject’s dental and skeletal development is complete. In some patients the space across the alveolar crest is too narrow to permit the surgeon to place the implant. Occasionally the root apices of the adjacent central, lateral incisors and canines are in close proximity. In other cases the ridge thickness could be inadequate and require augmentation. When the orthodontist opens the space, the individual aspects of treatment are aimed at optimizing dentofacial esthetics and at improving masticatory function and hygiene potential of prosthetic restoration. In the present study the treatment of the patients with missing upper central incisors was presented according to the esthetic requirements with dental implants.

Key words: Single-Tooth Implant, Trauma.

INTRODUCTION

There are many patients who present with missing teeth. In the anterior region, teeth loss is most commonly a result of a traumatic injury or it is a congenital anomaly. Single missing posterior teeth are usually caused by advanced caries or a failed endodontic procedure and occasionally by a congenital defect. There are several options available for the replacement of a single missing tooth.1-6

A removable partial denture is one option for the replacement of a single missing tooth. However, most patients are not
satisfied with this alternative due to the bulk of metal and acrylic and the unsightly clasps necessary to stabilize the prosthesis. The provisional restoration for a single-tooth implant is often a removable prosthesis. However, the acrylic restorations lack stability and retention. While some may feel that a resin-bonded prosthesis (Maryland bridge) is a viable option, clinical experience has shown that these resin bonded pontics do not have a good long term track record if the teeth are not prepared aggressively enough for mechanical retention.

Today, the two most common treatment options for single tooth replacement are the fixed partial denture (three unit bridge) and the single tooth implant. Dental implants are a good treatment option for replacing the missing teeth in adolescents, provided that the subject’s dental and skeletal development is complete.

Anterior maxillary single tooth replacement; effect of implant design, diameter, and surface characteristics; soft tissue stability/contours around anterior implant restorations; ceramic abutments; influence of surgical techniques; and finally, evaluation of patient satisfaction. Angled abutments are often used to restore dental implants placed in the anterior maxilla due to esthetic or spatial needs.

The purpose of this study was to provide a report of experience and results with implant systems used for single tooth treatment in two patients.

**CASE REPORTS**

*Clinical case no 1*

First case; 18-year-old woman with missing maxillary left central incisor loss after trauma (cycle accident) came to the dental office (Figures 1, 2).

During the examination, her medical and dental history were reviewed, peri-apical and panoramic radiographs were taken and impressions of her teeth and gums were created so that the study casts were made. Diagnostic wax-up of missing tooth and treatment plans were made. The stent was prepared for surgery. The manufacturer’s recommended formal surgical procedure was followed. A 3.7x11mm Swissplus implant (Zimmer Dental Inc, Carlsbad CA, USA) was placed on the right side for her.

Cover screw was fastened. During healing, the patient was wearing Roach bridge which has relief under the bridge on the implant. After four months, abutment analog was attached to the implant (Figure 3), and was screwed onto the implant and tightened, using special equipment so that it won’t come loose. The impression was made and the abutment was placed on the cast (Figure 4). The ceramic core was made (Figure 5), the maxillary right central incisor
was prepared (Figure 6). The final restoration was made of all-porcelain crown (In-ceram alumina). The crown was cemented (Figure 7). The maintenance procedure was explained to the patient, which included brushing and flossing daily as the natural teeth and the supporting tissues nearby, where the implant was made, had to be kept in good health.

She was to visit her dentist every three months for checkups at first; eventually she was told to have checkups every six months. Intraoral radiographs were taken directly after the implant placement, at 6 and 12 months. The restorations were followed-up for four years.

Clinical case no 2

The second case involves an 18-year-old male with missing maxillary right central incisor loss after trauma (cycle accident) (Figures 8, 9). He has an unremarkable medical history. Clinical examination revealed nonesthetic appearance on the left central incisor.

Periapical and panoramic radiographs were taken, impressions and gums were created, and the casts were made. Diagnostic wax-up of missing tooth was made. Various options were discussed with the patient and the decision made was to replace the missing tooth with dental
implant and restore the other central incisor with all ceramic restoration. The stent was prepared for surgery. The manufacturer’s recommended formal surgical procedure was followed.

Figure 9. Before implant treatment

When the surgical flap was removed for him, we saw the large fossa (bone deformity); because of this, the implant was carefully placed without perforation. The patient received surgical augmentation, which was unsuccessful, prior to registering to us. 3.3x12mm ITI implant (Institut Straumann AG, Basel, Switzerland) was placed on the right side for him. Cover screw was fastened (Figure 10). During healing, the patient was wearing Roach bridge. After four months, the abutment was attached to the implant (Figures 11, 12), and was screwed onto the implant and tightened with the aid of a torque driver. The solid abutment was placed for him, then the impression was made. The ceramic core was made (Figure 13), the maxillary left central incisor was prepared (Figure 11). The restorations were made of Inceram alumina. Interproximal contacts and occlusion were adjusted on crowns. The ceramic crowns were cemented with an adhesive cement (Figure 14).

Figure 10. Fastened cover screw

Figure 11. Impression cap and prepared maxillary left incisor

The maintenance procedure was explained to the patient, which included brushing and flossing daily. Natural teeth and supporting tissues nearby, where the implant was had to be in good health. Regular controls were performed at monthly intervals for three months and then once every six month. The restorations have been followed-up for two years.

Figure 12. Placed the implant

DISCUSSION

The use of dental implants in the esthetic zone is well-documented in the literature, and numerous controlled clinical trials show that the respective overall implant survival and success rates are similar to those reported for other segments of the jaws.

A recently published prospective, five-year multi-center study on osseointegrated implants for single tooth
replacement, showed 96.6% success rate in the maxilla and 100% success rate in the mandible.\textsuperscript{11}

Although there are many articles in the prosthodontic literature to support the use of a 3-unit fixed partial denture, it appears that single tooth implant replacement may be a more viable option for patients today. Some of the advantages include improved esthetics, improved hygiene accessibility, osseous preservation, and reduced future maintenance all at a comparable cost.

![Figure 13. Core in mouth and prepared maxillary left central incisor](image1)

![Figure 14. Final restoration and gingivally-placed pink ceramic](image2)

The esthetic advantage of a single tooth implant versus a 3-unit bridge is the most apparent one. A pontic for a 3-unit bridge simply sits on top of the soft tissue, whereas a single tooth implant restoration emerges from the soft tissue.\textsuperscript{12,13} When replacing a single missing tooth where diastemas are present, it is difficult, if not impossible, to create an ideal tooth replacement using a fixed partial denture. With a single tooth implant it is easy to achieve an acceptable esthetic result.\textsuperscript{12,13}

Hygiene accessibility becomes a major issue when comparing these two replacement options. When a single tooth dental implant restoration is fabricated, the patient can easily floss in the conventional fashion as with a natural tooth. Whereas with a 3-unit fixed partial denture, the patient will need to use either a proxybrush, floss threaders, or superfloss to gain access beneath the solder joint area for proper oral hygiene.\textsuperscript{12,13}

When a natural tooth is extracted and not replaced with an implant, it is common to see an osseous defect occur. This osseous defect is often a result of the collapse of the buccal plate due to tooth loss and its functional stimulus. If an osseointegrated implant can be placed on the day of tooth extraction, the osseous contour can be maintained to provide a more esthetic appearance. If the implant is placed at a later date, it may be necessary to augment the osseous defect, using bone regenerative procedures either prior to, during, or after the surgical placement of the dental implant.\textsuperscript{12,13} When we saw the defect in the young man, the surgical technique wasn’t used. The all-ceramic crown had pink area such as gum (Figure 14).

While to some, placement of a dental implant may be considered an aggressive approach, in reality, it is a most conservative approach from a biological standpoint. Placing a dental implant in bone provides a functional stimulus to help preserve the remaining bone and prevent resorption while preserving the enamel and dentin of the adjacent teeth.\textsuperscript{12-15}

Angled abutments are often used to restore dental implants placed in the anterior maxilla due to esthetic or spatial needs.\textsuperscript{8} In this case, the angled abutment was used. Esthetic requirements were fulfilled. Forces applied off-axis may be expected to overload the bone surrounding single-tooth implants, as shown by means of finite element (FE) analysis. But also many authors concluded that angled abutments may be considered a suitable restorative option when implants are not placed in ideal axial positions.\textsuperscript{8}

CONCLUSION

In this study, special attention is drawn on the factors affecting anterior implant success, such as maintenance or reestablishment of harmoniously scalloped soft-tissue lines and natural contours.
The single implant has many biological advantages over traditional prosthodontic methods, including preservation of the natural dentition and supporting periodontum. Additional benefits include improved esthetics, improved hygiene accessibility, and fewer long term costs. This procedure has provided that the subject’s dental and skeletal development is complete in adolescents; also all-ceramic restorations are successful in achieving good esthetic.

REFERENCES


