

A New Restorative Technique for the Perishing Implant Due to Abutment Screw Fracture

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INTRODUCTION

Dental implantology has revolutionized the treatment for edentulous and partially edentulous patients. With proper treatment planning, appropriate placement, adequate prosthetic design, and proper maintenance, implants can achieve a success rate of 97% to 99%.¹ However, despite high survival rates, biological and technical failures or complications may occur.² Technical problems can be divided into 2 groups: those related to the implant components, and those related to the prosthesis. Technical problems related to implant components include abutment screw loosening and fractures, and both have high incidence rates.³ Once an abutment screw fracture has occurred, the fractured screw segment inside the implant has to be removed. However, during this procedure, damage to the internal threads of the implant may happen. As a result, the implant may remain osseointegrated but will lose its ability to retain the prosthesis. To overcome this problem, a technique to remove the fractured screw and restore the tooth without sacrificing the implant is suggested. This article presents a technique of converting the screw chamber into post space and replacing the prosthetic component over this custom-made post and core system.

PROCEDURE

1) Remove the fractured end of the abutment screw (Figure 1) using rotary carbide and diamond

instruments with a high-speed handpiece. Start the preparation by using a round carbide bur or end cutting diamond point under copious irrigation. Remove the fractured screw completely by using straight carbide bur and give one orientation or antirotational groove against the wall.

- 2) Eliminate the internal threads of the implant screw hole using a straight diamond rotary cutting instrument with the high-speed handpiece under saline irrigation. Now the smooth screw chamber space is ready for the custom-made post (Figure 2).
- 3) Fabricate the custom-made post either by direct technique (fabricated directly in the mouth on the prepared tooth) or by indirect technique (by making a wax or resin pattern on a cast of the prepared tooth).
- 4) After the completion of the core pattern, cast it in gold or nickel–chrome alloy.
- 5) Cement the post and core on the implant with the help of the orientation groove and take the impression of the implant along with the cemented post and core (Figure 3).
- 6) Fabricate the definitive crown over this die. Cement the postcore crown with the recommended cement (Figure 4).

A significant reason for screw fracture is screw loosening, and undetected micromovements of the abutment under functional loading, which may occur as a result of bruxism, an unfavorable superstructure, overloading, or malfunction.⁴ Several methods of addressing a fractured abutment screw have been described. Two common approaches for removing a fractured or damaged abutment screw are: (1) the use of a self-made screwdriver or (2) the use of a service set available for the specific implant system (ITI Dental Implant System, Institut Straumann AG, Waldenburg, Swit-

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FIGURES 1–4. **FIGURE 1.** Fractured screw in implant with external hex design. **FIGURE 2.** Post space with smooth walls. **FIGURE 3.** Cemented post and core. **FIGURE 4.** Crown placed over the core cemented on implant.

zerland, Nobel Biocare USA, Yorba Linda, Calif).⁵ However, there is always the possibility of damage to the threads with the use of these techniques. Though the manufacturer purports that the new abutment will fit after tapping the threads, the new abutment may be slightly rotated and may not fit.⁶ However, the method is complex and difficult for routine application because the procedure can be time-consuming and involves the risk of damaging the threads inside the implant.

CONCLUSION

Prevention is better than a cure, and the correct measures should be taken to ensure that screw loosening and fracture does not happen. However, when these problems occur, the first approach should be a conservative retrieval of the fractured

screw without damaging the threads. If conservative retrieval fails, then the technique explained in this article should be employed without sacrificing the osseointegrated implant. Even the proposed technique has a few disadvantages such as weakening of the implant body and excessive heat production during cutting of the fractured screw. Further long-term clinical trials are required to confirm its success in the long run.

REFERENCES

1. Ekelund JA, Lindquist LW, Carlsson GE, Jemt T. Implant treatment in the edentulous mandible: a prospective study on Branemark system implants over more than 20 years. *Int J Prosthodont.* 2003;16:602–608.
2. Jung RE, Pjetursson BE, Glauser R, Zembic A, Zwahlen M, Lang NP. A systematic review of the 5-year survival and

complication rates of implant-supported single crowns. *Clin Oral Implants Res.* 2008;19:119–130.

3. Eckert SE, Meraw SJ, Cal E, Ow RK. Analysis of incidence and associated factors with fractured implants: a retrospective study. *Int J Oral Maxillofac Implants.* 2000;15:662–667.

4. Bakaeen LG, Winkler S, Neff PA. The effect of implant diameter, restoration design, and occlusal table variations on screw

loosening of posterior single-tooth implant restorations. *J Oral Implantol.* 2001;27:63–72.

5. Williamson RT, Robinson FG. Retrieval technique for fractured implant screws. *J Prosthet Dent.* 2001;86:549–550.

6. Luterbacher S, Fourmouis I, Lang NP, Bragger U. Fractured prosthetic abutments in osseointegrated implants: a technical complication to cope with. *Clin Oral Implants Res.* 2000;11:163–170.