Case Report
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Recovery of Fractured Abutment Screw from Implant Body: A Case Report

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ABSTRACT

Dental implants have become widely recognised, accepted, and effective treatment options for missing teeth. Although the overall success rate of osseointegrated dental implants is very high, various complications may arise during and after treatment. Aesthetic, phonetic, functional, biological, and mechanical are major categories of complications. This case report highlights the retrieval of a fractured abutment screw from the implant body of a 33-year-old male patient. The screw was fractured during prosthesis delivery. A screw retrieval kit was used for recovery followed by placement of a new abutment with a screw and cementation of the final prosthesis.

Keywords: Dental implant; fractured abutment screw; screw retrieval kit.

INTRODUCTION

Implant therapy is very effective and reliable method for treating complete or partial edentulism. Achieving long-term success and minimising complications in dental implantation is critical. Various complications comprising surgical, biological, mechanical, aesthetic, and phonetics may be encountered. Retention issues, crown fractures, screw fractures and loosening, and framework fractures are examples of mechanical complications. A five-year study found that 3.9% of abutment screws fractured and 6.7% of screws got loosened.[1] Depending on the location of fractured abutment screw various armamentariums like explorer, probe, ultrasonic scaler, forceps, haemostat, low-speed handpiece and screw retrieval kit can be used for its retrieval.[2]

CASE REPORT

A 33-year-old male patient with no relevant medical history reported to the Department of Periodontology and Oral Implantology, College of Dental Surgery, B.P. Koirala Institute of Health Sciences, Dharan, Sunsari, Nepal, with a complaint of missing tooth in the lower left back region of the jaw for five and a half months. After four months of healing, second-stage implant surgery was performed. On the day of the prosthesis delivery during the tightening of the abutment screw it got fractured and remained within the implant body. Due to some technical error in the first prosthesis, it was a repeat prosthesis on the same final abutment. The abutment screw got fractured after adjustment of the prosthesis during tightening with finger pressure before using the torque wrench. The patient was informed about the fracture and the retrieval of retained screw fragment was planned with verbal consent from the patient followed by replacement with a new abutment and abutment screw. Further radiographic assessment confirmed the presence of the fractured abutment screw threaded into the implant with no indication of any damage to the implant body (Figure 1).

To retrieve the broken fragment, after confirming the site of the fractured screw, the implant body was meticulously cleaned using an air/water spray from the three-way syringe and dried with air. Initially, an explorer or probe was used in a counterclockwise direction to loosen the fragment but it failed. Secondly, we tried with a piezo ultrasonic scaler tip, but that manoeuver also failed. Since the fractured screw was deep and unable to remove via all the mentioned measures, a screw retrieval kit of i-Fix® was used. It contained a drill guide, screw removal drill, screw removal tap, and screw removal bar (Figure 2).

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Figure 1: Radiograph showing fracture part of abutment screw within the implant body.

Figure 2: Screw retrieval armamentarium of the kit.

At first, a drill guide was inserted into the implant platform. A contra angle handpiece and a screw removal drill at 1,000-1,250 rpm in a push motion/ action was used with abundant irrigation to create a hole of 1-2 mm depth into the fragmented screw head. After that, the metal shavings were vacuumed out and the area was irrigated. The tap drill was used to remove the fractured screw from the screw chamber at a speed of 70–80 rpm in counterclockwise motion.[3] Finally, the fractured screw was retrieved (Figures 3, 4).

A radiograph was taken after retrieval of the broken piece (Figure 5). After that, a new abutment and screw was tested for implant fit. The passive fit of the abutment confirmed the preservation of implant's internal structure. The new abutment was secured to the implant body with a screw, the previous prosthesis was cemented, and a radiograph was taken (Figures 6, 7).

Figure 3: Retrieved abutment screw.

Figure 4: Fractured part with its upper part.

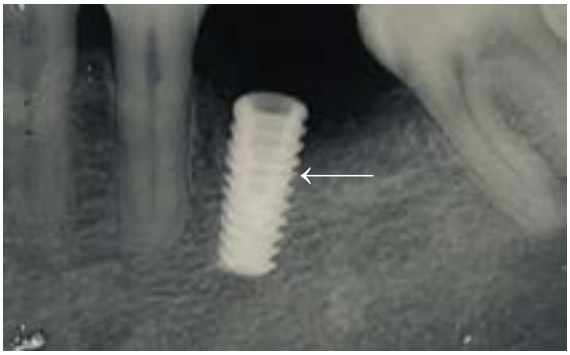

Figure 5: Radiograph after retrieval.

Figure 6: Checking for the fit of new abutment.

Figure 7: Radiograph after prosthesis placement.

Figure 8: Clinical view after placement.

DISCUSSION

Abutment screw fracture in implant-supported restoration is challenging. For the implant to operate effectively, the fractured abutment screw must be removed without endangering the implant body's internal threads. Such fracture may occur due to unobserved screw loosening, overloading, metal fatigue, bruxism, unfavourable design and shape of superstructure, malocclusion and repeated loosening and retightening of screw.[4] Although, the above are the common causes of abutment screw fracture however in this case, surprisingly it fractured on finger pressure which is a novel occurrence. Manufacturers do not specify a torque requirement for healing abutments, impression posts, or cover screws, but final abutments must typically be torqued down to a depth of 20 to 32 Ncm. According to Kanawati et al. in their study, 50 subjects had an average maximum torque ability of 24 Ncm (male dentists: 28 Ncm; students: 22 Ncm; male students: 24 Ncm; female students: 19 Ncm). Maximum torque values for all participants ranged from 11 Ncm to 38 Ncm.[5] Above study verified the study of Goheen et al.[6] and Hill et al.[7] that a wide range of torque force can be delivered with hand screwdrivers. The same final abutment with a screw was sent to a dental prosthetic laboratory for the second time to fabricate a new crown. There might have been repeated tightening and loosening of the screw which could have caused permanent deformation and lead to screw fracture. According to Kim et al., as the number of tightening and loosening of the abutment screw was increased, the wear or distortion with deformation was more severely progressed.[8]

Therefore, precise observation and checking for every component of the implant is of utmost importance to minimise such complication. It is important to pay attention to the occlusal scheme, proper torque tightening, and regular monitoring. Moreover, we can send an extra abutment screw to the dental laboratory other than the final abutment screw.

SUMMARY

In this clinical report, a patient's fractured abutment screw was successfully retrieved using the tool designed by the implant manufacturer. Complications may arise in any implant system. Along with adequate knowledge and operative skills, easy availability of all the armamentarium required from implant placement to complication management also plays a crucial in the successful management of any complications.

Conflict of interest: None.

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