Incorrect management of a broken abutment screw

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Abstract

Objective: The aim of the present article is to present the incorrect management of a fractured abutment screw by a classic surtex post. Methods: Implant abutment screw fracture is an uncommon though challenging complication. A fractured abutment screw should be removed without damaging the threads of the screw channel to reuse the prosthesis. Results: To retrieve the fractured part without severing the threads, various procedures have been proposed, such as to try to unscrew the fractured part using a strong, straight and pointed probe, or to prepare a small dent into the center of the fractured part using a small round diamond burr in a counter clockwise motion. Various screw removal kits have been introduced to this aim, but with inconsistent results. Conclusion: The use of classic surtex posts is not recommended.

Keywords: Abutment, Classic surtex post, Dental implant, Fracture, Implant abutment screw fracture

DOI: 10.15562/jdmfs.v8i2.1558

Introduction

Abutment screw fracture is an uncommon though challenging complication. A fractured abutment screw should be removed without damaging the threads of the screw channel to reuse the prosthesis.1-6

To retrieve the fractured part without severing the threads, various procedures have been proposed, such as to try to unscrew the fractured part using a strong, straight and pointed probe, or to prepare a small dent into the center of the fractured part using a small round diamond burr to unscrew the fractured part by the application of a slightly bigger cylindrical diamond burr or a fissure burr in a counterclockwise motion. Various screw removal kits have been introduced to this aim, but with inconsistent results.1-5

When a physician does not manage to remove the fractured screw in either way, he/she often chooses to either replace the implant, which can be an expensive option, or abandon the implant and cover it with soft tissue, which may lead to compromised function, phonetics, or esthetics.2-3

Instead, saving the implant would greatly benefit patients. To this aim, the conversion of the screw chamber into a dowel space for a dowel-core and crown restoration has been proposed, thanks to the aid of laser-welded titanium for example.1-4

Instead, other techniques do not seem to have been commonly accepted. The aim of the present article is to present the incorrect management of a fractured abutment screw by a classic surtex post.

Case Report

A 65-year-old woman presented to the Outpatient Clinic complaining of an unstable maxillary fixed complete implant retained prosthesis figure 1.

Clinical examination showed the presence of a classic surtex post functioning as abutment of the implant in correspondence of the right upper premolar region figure 2.

A Cone Beam CT scan confirmed the presence of periimplantitis in correspondence of the right upper premolar implant, that had been perforated by a classic surtex post figure 3.

It was decided, together with the patient, to remove the perforated dental implant under local anesthesia figure 4. The following treatment foresaw bone regeneration and placement of a new dental implant.

Discussion

Implants with a butt-joint and external hex connection to the abutment are especially prone to screw loosening when compared with internal-taper/cone joints with an anti-rotation feature. In the first, all forces, with the exception of compressive force, are concentrated on the abutment screw. The second has the advantage of both friction and form lock, with off-axis loading mostly resisted by the taper interface.1-7

Failures of implant-supported restorations can be divided into 2 groups: those relating to the implant components, and those relating to
to the prosthesis. Technical problems related to implant components include abutment screw fractures. This complication has been increasingly reported. The primary cause for screw fracture is undetected screw loosening, which can be due to bruxism, an unfavorable superstructure, overloading, or malfunction. The number, position, dimension, and design of implants, and the design of the prosthesis, have to be carefully planned keeping in mind that, to withstand high bending stress, implants should be as long and as wide as possible, used in adequate numbers, and have a position which possibly allows axial loading. Implant components are known to fracture more frequently in the posterior region and in partially dentate patients compared to completely edentulous patients.

Inadequate tightening, adverse occlusal forces, fatigue character and yielding strength of the screw material are considered to be the main cause of screw loosening or fracture. Furthermore, the surface of a new metal screw has microscopic surface imperfections in the form of high spots, grooves, and irregularities, such that when initial torque is applied only the high spots in the system will be in contact: flattening and wear of these high spots is described as screw settling, and will result in the loss of some of the initial preload. Moreover, during occlusal function, the vibration and damping effect at the screw joint can result in a loss of screw preload and hence loosening.

Screw fracture and screw loosening are closely associated, so that it has been hypothesized that screw loosening is the first stage of screw fracture. When a screw loosens, surface damage occurs at high stress locations, particularly the screw head and the first thread. Therefore, it has been suggested that loose abutment screws should always be replaced as a loose screw could have a fatigue history predisposing it to fracture.

When facing a fractured screw and replacing it with a new one without any damage to the internal threads of the implant is the recommended solution. In some situations, the fractured screw cannot be removed. When all the screw retrieval techniques fail, various options can be considered, such as the fabrication of custom laser-welded attachments, then cemented into the implants with autopolymerizing resin cement.

Conclusion

When a fractured abutment screw is encountered, after attempts to retrieve the fractured part without severing the threads, main options remain to either replace the implant or to fabricate specific attachment. The use of classic

Figure 1. Intraoral image. Unstable maxillary fixed complete implant retained prosthesis.

Figure 2. A.B. Intraoral frontal, A. and palatal, B. views showing the presence of a classic surtex post functioning as abutment of the implant in correspondence of the right upper premolar region implant.

Figure 3. Cone Beam CT scan confirming the presence of periimplantitis in correspondence of the right upper premolar implant, that had been perforated by a classic surtex post.


Table 1. A,B. Removed perforated dental implant.

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