

Dentistry Clinical

Implant screw fracture: a case report

Christopher Lambert-Rose tackles abutment screw loosening, a recognised complication of implant placement

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Introduction

Implant restorations can fail biologically or mechanically. Mechanical failures include crown fractures, framework fractures, retention problems, screw loosening and screw fracture. A recent study has shown that, over a five-year period, the incidence of abutment screw fracture is 3.9% and abutment screw loosening is 6.7%¹.

The causes of loosening and fracture are tightening to the incorrect torque, excessive occlusal loads and structural inadequacy of the screw material. Screw fracture will occur more readily with a loose screw as it will be more prone to excessive sideways loads.

The crown-implant connection can be either an internal taper-cone joint with anti-rotation feature or butt joint and external hex. In both designs, the implant-abutment joint is reliant on a clamping effect (called the preload) caused by tightening the abutment screw to the manufacturers recommended torque.

With internal hex designs, there is additionally form-lock and friction which helps resist sideways forces. In the external hex all the forces, except compressive force, is concentrated through the abutment screw. This makes this type of connector more prone to screw loosening and fracture².

Case Report

A 64-year-old man self-referred regarding a crown fracture on his implant at site 21. Two days previously, the patient had bitten into some hard food and the crown separated from the implant. The Osteo TI implant had been placed about five years previously, together with an implant at site 22. About 12 months ago, the crown at 21 had become loose, but ill health and mobility problems had prevented the patient from seeking treatment. Examination revealed an implant at 21 with the abutment screw retained within and below the head of the implant. The other half of the screw was in the crown (see Figure 1 below).



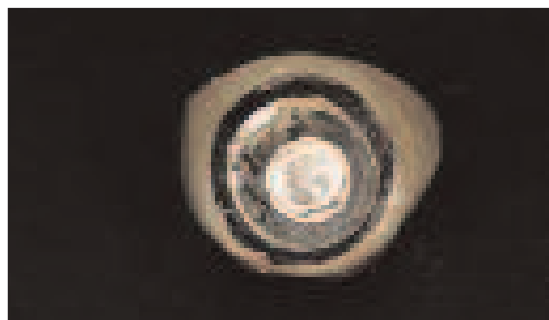
An implant-retained crown was also present at 22. The gingival adaptation around the implants was poor and the heads of the implants were exposed, but this did not concern the patient due to his low lip line.

A peri-apical radiograph showed the fractured portion of screw some way within the implant (see Figure 2 above). The implant face was sealed with a soft temporary dressing and impressions were taken for an immediate P/-, as the patient was attending a wedding three days later.

Appointments were made to fit the denture and to attempt to remove the screw. The patient was counselled that it may not be possible to remove the screw, or that the internal thread may be damaged or become damaged as a result of screw removal.

The temporary coverage was removed and the screw visualised under magnification (2.5x). A fine ultrasonic endodontic tip (see Figure 3 below) was placed on the screw and vibrated at low setting. This caused the screw to move and indicated it was loose. It was not possible at this stage to get the screw to move constantly in an anti-clockwise direction. A very small goose neck bur (see Figure 3 below) was placed on the screw face and rotated at medium speed in an anti-clockwise direction.

This created a small depression in the fractured screw and moved the screw very slightly out of the



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implant. A larger gooseneck bur was then used very carefully, taking care to avoid damaging the internal thread. The depression helped it positioned centrally on the screw. Friction, from the anti-clockwise rotating bur, moved the screw anti-clockwise and out of the implant.



Patience is required at this point, as the screw moved very slowly at first and it took some 15-20 minutes of alternately using gooseneck bur and endodontic scaler tip to eventually remove it from the implant (see Figure 4 left).

Once the screw was



Figure 5: The new crown was retained using a transverse screw

removed, a fixture head impression was taken and sent off to the laboratory for a new crown. The new crown was retained using a transverse screw to allow ease of removal should the abutment screw become loose again (see Figure 5 above).

The patient was counselled on the need for urgent treatment if a similar event occurred again.

Discussion

Where the abutment screw has become loose, then retrieving the situation depends on whether the crown is screw-retained or cement-retained. If the crown is screw-retained, obtaining access to the loose abutment screw is a relatively simple procedure. The crown can easily be removed to obtain access to the abutment screw.

For cement-retained crowns, the process is potentially more complex. If the crown is cemented with temporary cement, then it can usually be removed with some judicious force using a straight excavator, dedicated crown remover or extraction forceps and gauze. If this cannot be done, then the only alternative is to cut the crown off from the abutment – an expensive option for the patient, or the dentist if the crown is still under warranty.

Where screw fracture has occurred leaving the screw in-situ, patience and a careful approach is necessary to avoid damaging the internal thread of the implant. Damaging the internal implant thread could render the implant unable to be restored. If there is any uncertainty, then the patient should be referred to a local implant specialist who may be better equipped to deal with the problem.

At the Dental Implant Clinic, we provide mainly screw-retained crowns. They allow easy servicing and maintenance, if the patient has chipped the porcelain on the crown or where the abutment screw has loosened.

Depending on tooth orientation and adjacent structures, the screw position can be vertical or transverse. Screw-retained crowns can be used with porcelain-fused-to-metal crowns or zirconia all-ceramic crowns.

Prevention is better than cure and the correct steps should be taken to ensure that the chances of loosening. Treatment planning and correct occlusal adjustment should ensure that the implant crown is not overloaded by occlusal forces. Tightening the abutment screw to the correct torque will minimise the incidence of screw loosening.

Summary

Abutment screw loosening is a recognised complication of implant placement. Adequate treatment planning, good occlusal adjustment and tightening to the correct torque will minimise the incidence of abutment screw loosening and fracture. Referral to a local implant specialist should be considered if appropriate.

References

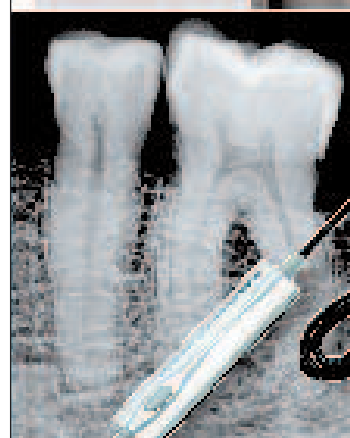
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