Retrieval technique for fractured implant screws

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Fractured screws generally are challenging to remove. The technique described in this article involves the use of inexpensive instruments commonly found in dental offices. The force required to remove the broken screw is minimal provided that the screw threads have not been damaged previously. A high degree of manual dexterity is required, however, to prevent damage to the implant itself; thus, this may not be the procedure of choice for inexperienced practitioners.
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In implant prosthodontics, abutment screws and prosthetic retaining screws both have the potential for fracture.[1,2] When a patient presents with a loose abutment or crown, it is tempting to simply tighten the loose screw and dismiss the patient. However, screw loosening and retightening may lead to subsequent fracture of abutment screws or prosthetic retaining screws.[3]

Fractured screws generally are challenging to remove. If an abutment screw fractures above the head of the implant, hemostats may be used to grasp the broken screw and remove it successfully. If the screw fracture occurs below the head of the implant or is stuck, other methods are required. Some manufactures (Nobel Biocare USA, Inc, Yorba Linda, Calif.; Implant Innovations, Inc, Palm Beach Gardens, Fla.) have systems available to facilitate the removal of broken screws from dental implants. The objective of these systems is to drill a hole into the center of the broken screw and drive into the hole a removal wedge that engages the broken screw when reverse torque is applied with the removal instrument. If no thread damage has occurred and the screw has not "bottomed out" or torqued into a seating stop, then the force necessary to back out the screw is minimal.

If these systems are not available, one method for broken screw retrieval involves the following procedure. After the prosthesis or abutment is removed, the screw hole is vigorously flushed with an air/water spray from a 3-way syringe. An air stream is applied to dry the screw hole, and a drop of mineral oil (carried on the tip of an explorer) is introduced into the screw hole. A sharp ¼-round bur in a high-speed handpiece is activated and lightly touched to the exposed side of the fractured screw. The objective is to have the spinning bur blades contact the metal surface of the screw so that the screw will spin out of the screw hole. When repeated several times, the screw can be backed out and retrieved easily with forceps. When this technique fails to "unscrew" the fractured screw, a slot can be created in the fractured screw with use of the technique described in this article.

TECHNIQUE

1. Select a new ¼-round bur, and place it into a high-speed handpiece.
2. With the handpiece in the "off" position, place the bur into the thread space, and feel the top of the screw.
3. Center the bur on the screw by moving the bur in a buccolingual direction and then in a mesiodistal direction to get the proper orientation.
4. Activate the rheostat of the handpiece, and place a small dimple into the center of the screw.
5. With a mouth mirror and proper lighting, visually verify that the dimple is located on the center of the screw.
6. Again with the handpiece turned off, place the bur into the dimple. Practice moving the bur from the dimple toward the buccal wall without contacting the threads. Then place a groove from the dimple to the buccal surface of the screw.
7. Visually verify that the groove has been properly placed.
8. Repeat step 6 for the lingual groove.
9. Practice moving the bur along the groove buccolingually and then proceed to deepen the groove. The groove should be deep enough to have definite mesial and distal walls.
10. Select a new #1 round bur (Fig. 1). Sharpen the cutting end of the bur with a heatless stone, and finish with green and white stones to produce a straight screwdriver end (Fig. 2).
11. With use of a manual handpiece (a latch-type contra-angle with a handle that can be rotated to drive the bur), place the sharpened bur into the thread hole.
12. With one hand, hold the bur and contra-angle handpiece in place while rotating the handle clockwise and counterclockwise to engage the groove on the head of the fractured screw.
13. Once the bur has engaged the groove, loosen

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Fig. 1. Development of slotted screwdriver. Hold new #1 round carbide bur firmly with hemostats. With use of heatless stone, sharpen cutting end of bur. Flatten tip and refine with green and white stones.

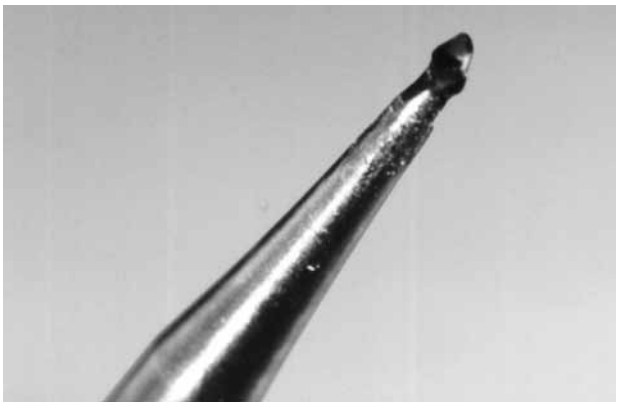

Fig. 2. Number 1 round bur modified for use as screwdriver.

Fig. 3. Retrieved fractured implant screw with groove.

the screw and back out the fractured portion (Fig. 3). Provided that the threads have not been previously damaged, only a small amount of force will be required to successfully retrieve the fractured screw.

DISCUSSION

Prevention of fractured screws is the best treatment. Fractured screws may be prevented by (1) confirming adequate fit of the prosthesis, (2) avoiding occlusal overload of the prosthesis, (3) having an adequate number of implants to bear the occlusal load, (4) avoiding excessive angulation of implants to occlusal load, (5) applying recommended screw tightening torque with a torque wrench, (6) using the correct fixation screw, (7) replacing loose screws instead of retightening them, (8) reinforcing periodic maintenance, and (9) scheduling an immediate dental visit if the patient detects looseness of the prosthesis.[4,5]

The technique described in this article involves the use of inexpensive instruments commonly found in dental offices. The force required to remove the broken screw is minimal provided that the screw threads have not been damaged previously. However, a high degree of manual dexterity is required to prevent damage to the implant itself; thus, this may not be the procedure of choice for inexperienced practitioners. Some clinicians may choose to use one of the manufacturer's screw retrieval systems that utilizes a drill guide to orient the drill along the long axis of the implant.

SUMMARY

This article presented a technique for removing fractured retaining screws associated with abutments and prostheses in implant dentistry. Under optimal conditions, little force is required to remove broken screws with the use of common, inexpensive dental instrumentation.

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