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3 Techniques to Remove Broken Abutment Screws

By Doug Benting (/spear-review/author/doug-benting/) on November 30, 2016 | (/bookmarks/bookmark/38993)

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A typical fracture of an abutment screw is of the head, away from the shank or body.

Certainly, removal of the remaining fragment is critical to future use of the implant (https://www.speareducation.com/spear-review/category/implants) fixture. When evaluating implant-supported fixed-bridge restorations over a five-year period, Kreissl, et al., found the incidence of abutment screw fracture to be 3.9 percent with screw loosening reported at 6.7 percent.[1] The significance of a fixed-bridge or perhaps even a fixed-hybrid or fixed-detachable restoration is that a loose abutment screw at only one abutment can exist for an extended period of time before it is clinically detectable.

The primary reason for screw fractures

So what is the most common reason for screw fractures? The answer is undetected screw loosening.

Causes of screw loosening with today's dental implant connections include:

- Contact between the abutment and adjacent alveolar bone when a pre-determined force is applied with a torque wrench
- The torque wrench may be inaccurate, resulting in torque values under or perhaps over the recommended values
- Not having a torque wrench available when tightening the abutment screw
- A substructure connecting two or more implants lacking what would be considered a “passive fit”

The assumption is that it is more common to see an abutment screw fracture and likely easier to remove the remaining fragment with an externally hexed platform design. Many of the internal connections have much more surface area available for intimate contact where the abutment may have fractured within the implant fixture itself. Dr. John Carson written a great article on how to retrieve a broken implant abutment (https://www.speareducation.com/spear-review/2013/04/how-to-retrieve-a-broken-implant-abutment) in this case.

Three techniques to remove a fractured abutment screw

The techniques are listed in order, from conservative to aggressive. Think about the techniques in that they depend on how deep within the dental implant fixture the fractured end or rema

abutment screw is located.

1. **Scaler (Montana Jack):** The sharp and pointed end is used to tease the remnant of the abutment screw in a counter-clockwise direction. A scaler is a great way to start the process, and many times it

is all that is needed. Because of the way an abutment screw typically fractures, it is possible that the remaining portion may be jammed by a metal shard or an uneven edge stuck between the threads of the implant fixture. An ultrasonic scaler can then be used to vibrate the remaining piece of the abutment screw. One technique discussed in the literature includes working with a handpiece to add a couple of indents with a round bur to create a visible reference point as well as an "edge" to grab with the scaler.

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2. **A small round bur and handpiece:** Dr. Gordon J. Christensen states that a ½ round bur in a handpiece rotating clockwise (looking down the shank of the bur to the terminal working end of the round bur) could contact the outer edge of the remaining abutment screw to create the counter-clockwise rotation to loosen the remaining fragment.[2] A secondary alternative is to create a horizontal slot in the shank of what remains of the abutment screw to work with a small straight blade driver to remove the fragment. Working with a handpiece in a small area comes with a level of risk – for example, possibly damaging the internal features of the dental implant fixture.
3. **Reverse-tapping rotary instruments:** For use with a handpiece and sold as a kit, this instrument provides another method to mechanically remove the fractured abutment screw. Certainly, the individual kits vary in the method of retrieving the fractured remnant of the abutment screw and vary in the protection of the dental implant connection for the abutment – whether internal (conical, hexed or hybrid design) or external (typically a hexagon). One innovative technique reported by Yoon, et al., describes the modification of the internal aspect of an impression abutment for use as a method to center the reverse-tapping bur over the center of the shank of the abutment screw while acting to protect the internal retentive and anti-rotational features of the dental implant fixture.[3]

A few final considerations

Identify the type of dental implant (http://www.whatimplantisthat.com/) in order to help define the anticipated success. In a study by Kim, et al., short abutment screws provide adequate resistance to occlusal forces as long as three and a half threads are engaged to the internal threads of the dental implant fixture.[4] Check out the different thread designs in Figure 1.

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When an abutment screw fractures after what is likely a period of deformation (screw loosening proceeds screw fracture), it could be easier to remove a fragment with fewer threads. The other nuance that could create a challenge relates to the design of the threads of the abutment screw. One example includes the Ankylos implant system with a laser-welded interface where the threads are added to the shank of the abutment screw after it is inserted into the abutment. It is a special kind of challenge to remove the threads that have fractured away from the abutment screw.

Take a look at the condition of the alveolar bone immediately surrounding the dental implant as well as the condition of the adjacent teeth or adjacent dental implants. Think about the design features of the abutment screw and the condition of the dental implant to help determine how much time you are willing to spend at removing the abutment screw fragment.

(Click this link for more dentistry articles by Dr. Douglas Benting (https://www.speareducation.com/spear-review/author/doug-benting/)*.)*

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References

1. Kreissl ME, Gerds T, Muche R, Heydecke G, Strub JR. Technical complications of implant-supported fixed partial dentures in partially edentulous cases after an average observation period of 5 years. Clinical Oral Implants Research. 2007;18:720–726.

2. Christensen GJ. Clinical tip: How to easily remove broken abutment screws in dental implants. Dentistry IQ, Guide for Preferred Clients Jul./Aug. 2010, Vol. 15 Issue 4.
3. Yoon JH, Lee H, Kim MY. Safe removal of a broken abutment screw with customized drill guide and rotary instrument: A clinical report. Journal of Prosthodontics. 2016; 25(2):170-173;
4. Yeo IS (http://www.ncbi.nlm.nih.gov/pubmed/?term=Yeo%20IS%5BAuthor%5D&cauthor=true&cauthor_uid=24451854), Lee JH (http://www.ncbi.nlm.nih.gov/pubmed/?term=Lee%20JH%5BAuthor%5D&cauthor=true&cauthor_uid=24451854), Kang TJ (http://www.ncbi.nlm.nih.gov/pubmed/?term=Kang%20TJ%5BAuthor%5D&cauthor=true&cauthor_uid=24451854), Kim SK (http://www.ncbi.nlm.nih.gov/pubmed/?term=Kim%20SK%5BAuthor%5D&cauthor=true&cauthor_uid=24451854), Heo SJ (http://www.ncbi.nlm.nih.gov/pubmed/?term=Heo%20SJ%5BAuthor%5D&cauthor=true&cauthor_uid=24451854), Koak JY (http://www.ncbi.nlm.nih.gov/pubmed/?term=Koak%20JY%5BAuthor%5D&cauthor=true&cauthor_uid=24451854), Park JM (http://www.ncbi.nlm.nih.gov/pubmed/?term=Park%20JM%5BAuthor%5D&cauthor=true&cauthor_uid=24451854), Lee SY (http://www.ncbi.nlm.nih.gov/pubmed/?term=Lee%20SY%5BAuthor%5D&cauthor=true&cauthor_uid=24451854). The effect of abutment screw length on screw loosening in dental implants with external abutment connections after thermocycling. International Journal of Oral Maxillofacial Implants. 2014;29(1):59-62.

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