

# Masterclass in Clinical Practice

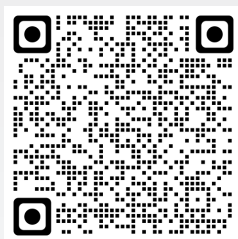
## Implant Dentistry

with

Prof Andre W van Zyl<sup>1</sup>



## Removing a fractured implant screw



### References

1. Walmsley AD. Ultrasonics in Dentistry. *Physics Procedia*. 2015;63:201-7.
2. Tesmer M, Wallet S, Koutouzis T, Lundgren T. Bacterial colonization of the dental implant fixture-abutment interface: an in vitro study. *J Periodontol*. 2009;80(12):1991-7.

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I am often sent patients with the request to remove fractured screws within implants. As implants age and metal fatigue sets in, this will become a routine procedure that many clinicians will be faced with. If the screw is not removed successfully, or if the screw thread within the implant is damaged in an effort to remove it, it may lead to the loss of the implant. This has massive cost implications for the patient and may involve many procedures if the implant is to be removed and replaced with a new one. It is therefore an extremely important procedure, yet a very simple one in most cases. There are some important do's and don'ts in this procedure.

**1st Tip:** Never use a drill at any time in the process of trying to remove the broken off screw. This will most definitely damage the screw threads within the implant, rendering the implant useless. To tap new thread inside an implant is in my humble opinion not a viable option for most.

**2nd Tip:** Once the screw head fractures off, the screw is no longer under tension, and should be loose within the implant. This implies that it should be very easy to turn the screw out, provided a method can be found to turn the screw anti-clockwise. No force is therefore necessary, rather a light touch used correctly.

### Clinical procedure:

In my experience the ultrasonic scaler works best for removing broken off screws. Almost all practices will have an ultrasonic scaler, so it should be possible for most clinicians to use this technique.

In order to use the ultrasonic to remove a broken off screw, one has to understand the action of the scaler tip. Regardless of the type of scaler, it has been found that most use the same action of a longitudinal elliptical nature.<sup>1</sup> This forward and backward movement if used correctly will spin the screw anti-clockwise and so remove the screw. One has to be patient and not touch any exposed threads inside the implant as this will damage the threads and prevent placement of a new abutment/screw.

The idea is to touch the tip gently on the screw and to induce a rotational force on the screw by moving the tip as shown in Figure 1.

It follows that this rotational force can be inward or outward, depending on how and where the tip touches the screw shaft. By touching it gently to the screw, and playing with the tip in an anti-clockwise motion, the screw will at some stage tend to rotate outward. Figure 1 shows the correct application of the tip as indicated by the arrow.

This may cause a sudden movement, expelling the screw fragment completely, or it may move it slightly (see Figures 2a and b), enabling the clinician to use a tweezer or instrument like a probe to further rotate it outwards. After each application one should carefully inspect the screw for movement, as it may just as quickly turn clockwise again.

**3rd Tip:** To prevent the screw from being aspirated, precautions should be taken to catch the screw in a gauze placed posterior around implant to protect throat area or alternatively using high volume suction to catch it as it comes out.

The smallest diameter scaling tip should be used (Figure 3) so as to engage the screw only, without damaging the threads adjacent. A larger diameter tip may damage the implant. The tip shown is a

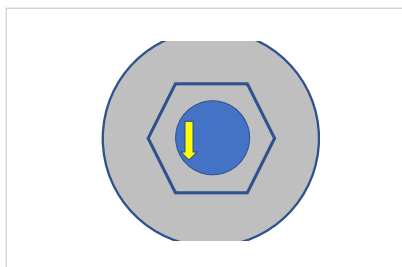


Figure 1: Diagrammatic illustration of correct application of scaling tip on screw (shown as blue circle) in an external hex implant

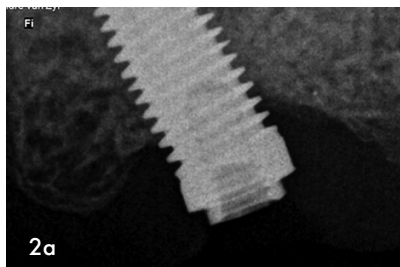


Figure 2a: Radiograph showing broken off screw deep in implant

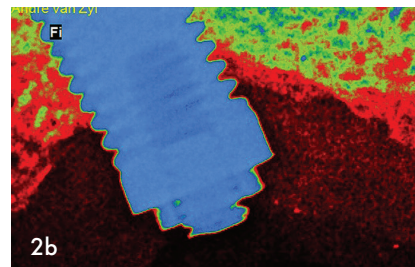


Figure 2b: Radiograph showing screw just emerging above implant after applying a light ultrasonic force as described

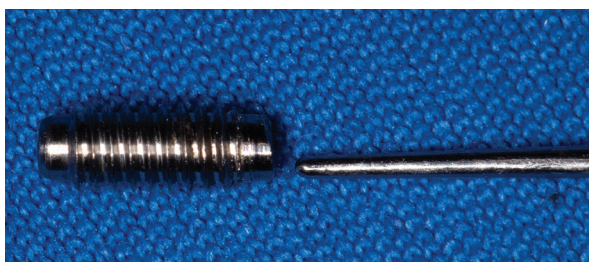


Figure 3: Small diameter scaling tip shown against a broken off standard size implant abutment screw.

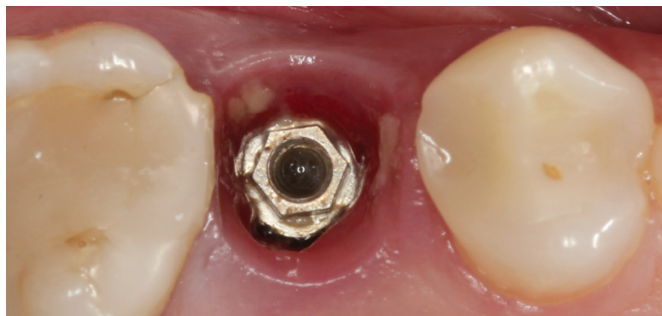


Figure 4: External hex implant showing clear visual access to screw hole



Figure 5: View of a cone-in-cone connection obscuring the implant platform and showing cone only

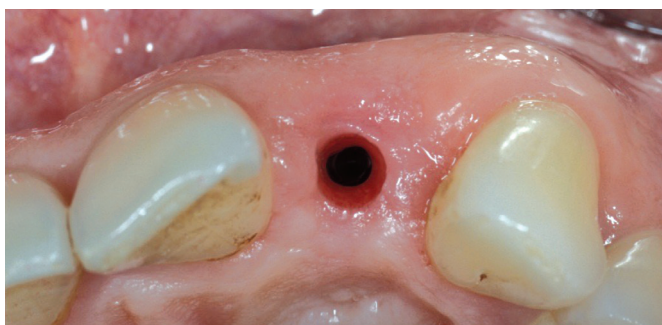


Figure 6: Figure 6: Narrow diameter abutment and a cone in cone abutment connection with almost no visual or physical access to screw hole (Image courtesy Prof. Paul Weigl, Frankfurt)

NSK® P-20S. If a rotation is sensed but the screw does not turn enough, the tip may be used in a complete rotational manner to help turn the screw out. Keep the tip in light contact with the screw while guiding the tip in anticlockwise circle movements.

Over the past 12 years many implant designers have changed to a cone-in cone implant abutment connection. Should a screw fracture in such implant designs, the challenge is to remove the screw without touching the cone inside the implant as the cone is important in providing a bacterial seal. Scratching the cone with the ultrasonic scaler may cause loss of the bacterial seal leading to bacterial accumulation within the implant.<sup>2</sup>

When examining a butt-joint external hex implant, the screw hole is visible and soft tissue will not obscure the implant platform (Figure 4). However, when a cone-in cone connection is examined, the implant cone is visible, but the implant platform is obscured by soft tissue and bone (Figure 5). This makes it very difficult to view the screw and

to engage the screw without damaging the cone interface. The smaller the cone angle (Also called the Morse taper), the more difficult the access will be. In addition, if a narrow diameter abutment was used, it may be impossible to see and access the broken off screw (Figure 6) and it may need a surgical exposure to obtain access to the implant platform and screw.

## Conclusion

Removing a broken off screw can be a rewarding experience for clinician and patient if it is successful, but can be a practice breaker if it becomes a drawn out procedure ending in the loss of the implant. It is well worth it to book these procedures as the last of the day, so as to have enough time and not rush it. Have a healing abutment or abutment on hand to place once the screw is removed to maintain the gingival opening.

The procedure is shown in the video clip.  
Click on the QR code to view