Retrieval of Cold Welded Dental Implant Cover Screw using a New Technique

Ravishankar Krishna, Rashmi Kejriwal, J Suma

ABSTRACT

Background: Cold welded cover screw is a rare mechanical complication. There is barely any literature on the etiology and removal techniques for the same. However, it can pose a serious problem and the screw needs to be removed, without damaging the internal threads of the implant, to initiate the prosthetic phase of implant therapy.

Aim: The aim of this paper is to report our experience with the retrieval of cold welded dental implant cover screw.

Case description: The present situation illustrates a new technique to retrieve a cold welded cover screw.

Conclusion: Removing a cold welded cover screw from an implant can be difficult. There is no method of screw removal that can be universally applied. In this particular case, the screw was successfully removed using the prescribed technique. Therefore, this new technique may be used when removing a cold welded coverscrew from the implant.

Clinical significance: This technique is cost-effective, simple, and applicable to all available dental implant systems and can be effectively incorporated into the clinical situations in which the cold welded screws are not retrievable by conventional techniques.

Keywords: Case report, Cover screw, Cold welding, Dental implant, Screw retrieval technique.

INTRODUCTION

Clinicians have for many years attempted to replace missing teeth with dental implants. Scientifically based dental implant therapy, emerged around the 1970s with 10-year clinical results presented by a research group in Sweden directed by Dr Per-Ingvar Branemark.1

Implant therapy is an effective and reliable restorative treatment option.2 The success of dental implants is based primarily on the extent of osseointegration. Implant restorations can fail biologically or mechanically.3,4

Cold welded cover-screw is a rare mechanical complication. There is barely any literature on the etiology and retrieval techniques for the same. However, it can pose a serious problem and the screw needs to be retrieved, without damaging the internal threads of the implant, to initiate the prosthetic phase of implant therapy.

In the previously reported cases, when the retrieved cold welded coverscrews were inspected, dried blood was always present around the threads of the cover screw. Thus, the primary reason for cold welded cover screw is considered to be the blood and bone debris that remain in and around the implant, when the coverscrew is being attached. It is believed that the fibrin in the blood glues the two parts together. Dried blood, bone or any debris can also wedge in the delicate threads and thus affect the seating of the screw. In either of the situations, the cold welded cover screw will create a preload with the top surface of the implant that exceeds the ability to unscrew.4,5

Other situations encountered where cover-screw retrieval is difficult are: Manufacturing error (of either component), bone growing over the edges of the cover screw and wearing out of the threads of the hex-driver (stripped hex).

Various methods have been tried for retrieving the cover-screw from within the implant, by clinicians all around the world. Some of the approaches are:5,6

- To use an ultrasonic tool to vibrate the screw and retrieve in the process.
- To use an extraction forceps, like a lower anterior forceps, with fine beaks, to tease out the cover screw.
- To apply crushed ice over the cover screw, to shrink the screw threads so they let go.
- To reverse torque the coverscrew up to 40 to 50 Ncm and retrieve.
- To use a ratchet with unlimited torque to unscrew the cover screw, if the implant has osseointegrated, the cover screw will unscrew.
• To drill into the screw access on the cover screw until the body of the cover screw disengages, with a high speed handpiece and a #6 round bur. The extension of the cover screw left inside the implant can then be unscrewed with a screwdriver.
• To make a plus shape groove and then make pattern with handle, and get it casted. Then remove with the casted driver (self-made screw-driver)
• To submerge the implant and restore the edentulous space with a conventional fixed partial denture.
• To remove the implant entirely and start all over again.
However, it is essential not only to retrieve the cover screw but also to determine the reason for cold welding and to take precautions, so as to avoid such clinical situations.
Precautions to be taken to avoid cold welding: 4,5
• In the olden days, petroleum jelly was applied over the contacting surfaces.
• Thorough irrigation is recommended to avoid blood contamination/wedging of blood-bone debris between the contacting surfaces.
• Small amount of antibiotic ointment may be applied on the screw threads.
• Straumann recommends application of chlorhexidine gel inside the implant.

CASE DESCRIPTION
A 32-year-old female reported to the department of prosthodontics for second stage surgery with implant placed in the lower right first molar region.

The implant was placed 5 months prior to her visit. Implant dimensions were 4 × 13 mm (CMI IS-II fixture). Radiographic examination (intraoral periapical radiograph (IOPAR), revealed complete osseointegration of the fixture. Therefore, second stage surgery was initiated.

A mid-crestal, plus shaped incision was given on the soft tissue over the implant. The soft tissue was gently teased to uncover the platform of the implant. The hex driver was then engaged into the cover screw of the implant and unscrewing of coverscrew was attempted. Since it did not loosen, a manual ratchet was used to retrieve the cover screw by applying reverse torque, of greater than 35 Ncm. However, the reverse torque applied also did not loosen the cover screw.

Hence, the soft tissue incision was extended mesio-distally and flap was raised, to rule out any bone growth over the edges of the cover screw (which may not have been detected in the IOPAR). Upon reflection, it was observed that the edges of the cover screw were distinct and there was no evidence of bone growth over the edges.

The friction slot of the cover screw became worn out, because of repeated trials to remove the cover screw. This made it difficult to engage the hex driver to the cover screw.

The unyielding cover screw was probably because of cold-welding between the cover screw and the implant head. Cold welded components are very difficult to separate. It is extremely challenging to retrieve the cover screw without damaging the internal threads of the implant.

The option of drilling into the screw access on the cover screw until the body of the cover screw disengages, with a high speed handpiece and a #6 round bur was considered. However, due to the risk of damaging the internal threads of the implant in the process, drilling completely through the body of the cover screw was aborted.

Extensions were cut using high speed hand piece and tapered fissure carbide bur, from the center of the cover screw to both ends, making a groove for a screw driver, without cutting into the threads of the implant. A screw driver-tool was selected from the multiple array of screw-driver attachments (Fig. 1). These tools have different head sizes. Several of them were tried until one of them engaged the slot created on the cover screw (Fig. 2). The screw driver tool was turned anticlockwise with the aid of artery forceps. Firm apical pressure was applied followed by anticlockwise movement, until the cover screw was retrieved (Fig. 3).

The implant threads were thus preserved. They were intact and untouched. The fit of the abutment was verified—both clinically and radiographically (Fig. 4). Healing abutment was placed after thorough betadine irrigation and the site was sutured.
DISCUSSION

The present situation illustrates one of the rare mechanical complications encountered during the second stage of implant surgery. The reason for the cold welding was assumed to be the wedging of the dried blood between the screw and the implant components. Other possible reasons could be a defect in the screw itself, that the screw may have been over torqued on insertion or that the screw may not have been fully seated when the torque was applied to the screw, which resulted in wedging.

Several techniques of retrieval of cold welded cover screw have been tried by clinicians, such as reverse torquing or drilling through the center of the cover screw. However, different techniques may be used in conjunction, to successfully retrieve the cover screw.

In the described clinical situation, the cold welded cover screw could not be retrieved by reverse torquing or drilling through the screw. So, a notch was created over the screw head between the center of the screw and its periphery for the mechanical interlocking of the screw driver-tool and screw head (Fig. 5). This was done to create a lever arm around the central axis.

This technique is cost-effective, simple, and applicable to all available dental implant systems and can be effectively incorporated into the clinical situations in which the cold welded screws are not retrievable by conventional techniques. Further studies are required to assess the benefits of this technique over conventional methods of screw retrieval.

CONCLUSION

Cold welding of the cover screw is a rare complication of implant placement. Adequate treatment planning, knowledge of various retrieval schemes, tightening to the correct torque, and taking adequate precautionary measures before tightening the cover screw in place will minimize the incidence of a cold welded cover screw.
Retrieval of a cold welded cover screw from an implant can be difficult. There is no one method of screw retrieval that can be universally applied. In this particular case, the screw was successfully retrieved using the prescribed technique. Therefore, this new technique may be used when removing a cold welded cover screw from the implant.

CLINICAL SIGNIFICANCE

This technique is cost-effective, simple, and applicable to all available dental implant systems and can be effectively incorporated into the clinical situations in which the cold welded screws are not retrievable by conventional techniques.

REFERENCES

6. Removing a cover screw on nobel biocare replace select implant any ideas. Available from: www.osseonews.com