



Case Report

A novel technique to retrieve a cold welded gingival former- A Technical note

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ABSTRACT

Cold welding is one of the mechanical complications of dental implants. This case report describes how a cold welded gingival former was successfully retrieved without damaging the threads using combination of ultrasonic scaler, surgical screw driver and a gingival retraction cord. This is a simple, cost-effective technique that can be adopted in all dental implant systems.

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1. Introduction

Dental implants have procured acceptance for placement of missing teeth. This advancement depends on the capability of the implant material to integrate with the surrounding tissue.¹ However, complications associated with dental implants are not uncommon. According to a retrospective study by Adler L et al.², 376 patients (1095 implants) were investigated and prevalence of biological and technical complications at patient level were noted to be 52% and 32% respectively. According to Jung et al.³ the leading biological complications is the peri-implant mucosal lesions while the most prevalent mechanical complications are abutment or occlusal screw loosening, fracture of the implant body or prosthetic components, degradation of the luting cement and fracture of the veneering. Aravind P et al.,⁴ reported retrieval of cold welded gingival former using extraction forceps which is a rare mechanical complication.

Therefore, in this case we attempt to explain the technique to retrieve cold welded gingival former which is a rare mechanical complication as well as emphasize reasons for its occurrence.

2. Case Report

A 35-year-old male in good general health reported to the Department of Oral Implantology with missing tooth number 46. Standard-sized diameter root form implant (5×12mm, Superline Dentium Co., Seoul, Korea) was used towards replacement. Implant was installed in relation to 46 with a final torque of 35 N/cm.² Good primary stability was achieved with ISQ value of 76. Routine clinical and radiographic evaluation after 3 months revealed complete osseointegration with fixture. Thus, the second stage was initiated. During this procedure the implant was exposed and gingival former was placed in order to seal from oral environment and to aid in tissue healing. After a period of one month patient reported for final impression. We experienced difficulty in retrieval of the gingival former. The

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gingival former was cold welded to implant. Thus, various methods like the use of ratchet and extraction forceps with fine beaks were tried to retrieve the gingival former from the implant fixture without damaging the threads. These methods were of no avail. Finally ultrasonic scaler was applied and was moved in anti-clockwise direction. This created vibrations at the screw joint as well as widened the space between gingival former and soft tissues. Thereafter, gingival retraction cord was used to retract marginal soft tissue so as to provide clear working view as well as to prevent damage to tissues and implant surfaces. Then a slot was prepared on the gingival former with a tapered fissured diamond bur after which a surgical screw driver was engaged into the slot created. Care was taken not exceeding a depth of 1mm on the surface. This was then advanced in anti-clockwise direction. Cold welded gingival former was successfully removed from the implant without impairing the threads which forms the novelty of this technique. The site was curetted to remove the soft tissue tags and thorough betadine irrigation was performed. The healing abutment was placed and its fit was confirmed clinically as well as radiographically. (Figures 1, 2, 3, 4 and 5).



Fig. 1: Three months after implant placement in relation to 46

3. Discussion

Cold welding is an unusual mechanical complication which can be encountered following second stage implant surgery. Norton MR et al.⁵ defined as an increase in loosening torque with respect to tightening torque and result in a lack of retrievability which is inherent in the three-component system of the hex design. Krishna R et al.⁶ reported that cold welding occurs as the result of bone debris and dried blood remaining on the surfaces of implant components. The blood fibrin serves as a glue. It can also occur due to some manufacturing defect in the components or if gingival former has been over torqued during placement. The implant used in the study had an internal hex connection. Therefore, it distributes intraoral forces deeper within implant body and bone. Tightening of the gingival former generates tension in the screw which is referred to as preload.⁷



Fig. 2: Second stage in relation to 46



Fig. 3: Retrieval of gingival former

Preload leads to over clamping force between gingival former and implant. This clamping force causes elastic recovery and pulls both the surfaces towards each other thus creating long term screw fixation. The advised torque for a preload should be 75% of the value to reach permanent deformation.⁷ Hence applying an adequate preload helps in maintaining lower micromotion of implant-abutment screw interface. In addition, it minimizes frequency of screw loosening, locking of implant-abutment connection and improves fatigue.⁸



Fig. 4: Armamentarium for retrieval of gingival former



Fig. 5: Site after retrieval



Fig. 6: Crown cementation with 46

The case as explained above shows retrieval of gingival former using ultrasonic scaler and slot creation on the surface along with use of gingival retraction cord. The ultrasonic scaler created vibrations at the screw joint, thus generating shear force that would activate loosening of the joint. The slot created on the screw head resulted mechanical interlocking of the elevator and screw head. This created a lever arm around the central axis.

This incidence of cold welding of the gingival former can be prevented by taking certain precautions such as application of petroleum jelly or antibiotic ointment on contacting surfaces, thorough irrigation to avoid blood contamination and bone debris wedged between threads and application of chlorhexidine gel inside implant.^{6–10}

4. Conclusion

The incidence of cold welding can be experienced in dental practice with any implant systems. Although there is no universally accepted solution for its retrieval, adequate precautions can be adopted to avoid this situation. The technique of retrieval of the gingival former as mentioned above is simple, cost effective and can be adopted in all dental implant systems.

5. Source of Funding

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6. Conflict of Interest

None.

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