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CLINICAL REPORT

# Retrieval of a fractured implant abutment using a modified cover screw removal instrument: A clinical report

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## ABSTRACT

Implant abutment fractures are an uncommon mechanical complication, and the removal of the abutment fragment and replacement with a new prosthesis is the best solution. However, successful retrieval of the fractured abutment fragment from the implant is challenging, and effective rescue kits are lacking. This clinical report describes the retrieval of a fractured implant abutment in a conical connection implant using a modified manufacturer-specific instrument. (J Prosthet Dent 2025;133:14-17)

Mechanical complications of implant-supported prostheses, including crown fracture, ceramic chipping, implant fracture, and loosening or fracture of the abutment and abutment screws, continue to be reported.[1,2] Abutment screw loosening has been reported to be the most common prosthetic complication and may be responsible for subsequent abutment screw or implant fracture.[3–5] Systematic reviews and clinical studies have determined that the incidence of abutment or screw fracture has been between 0.35% and 0.5%.[4–6] Despite the low incidence, most reported fractured abutments have occurred in internal conical implant-abutment connection prostheses.[7–14] Conical connections were developed to minimize the incidence of prosthetic complications and improve the interface between the soft tissue and the implant-abutment junction.[15,16] However, finite element analysis studies revealed that higher levels of stress concentrated in the conical joint region of the abutment may account for the principal failure mode reported in in vitro studies.[17–20]

In conical connections, the friction between the abutment and implant interface is responsible for effective retention,[21] and the functional load can increase the contact between the conical walls of the abutment and the implant, increasing friction and subsequently making it difficult to remove the abutment from the implant.[22,23] However, although it is possible to retain fractured fragments and restore the implant, successful removal of the fractured part is the optimal outcome.[24,25] Retrieving that fractured fragment wedged in the implant is challenging, particularly with conical connections.[5,26] Zhu et al[13] reported an incidence of abutment fracture of 0.24% (6/2487) for a conical connection implant system. Unfortunately, all fractured abutments could not be retrieved without the help of a specific rescue kit, and 6 implants were removed.

The risk-based decision tree proposed by Mizumoto et al[27] may help clinicians manage fractured abutments and prosthetic screws. Several kits have been marketed by implant manufacturers to facilitate the retrieval of fractured fragments. However, if not used carefully, the manufacturer's rescue kits may damage the internal threads of the implant,[28] and, as most of the kits were designed for specific implant systems, clinically less expensive and more commonly available instruments should be tried initially. This clinical report describes a straightforward but effective method that may help

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clinicians retrieve a fractured implant abutment using a modified manufacturer-specific instrument. In addition, instruments can be modified according to different implant-abutment connections or clinical situations.

## CLINICAL REPORT

A 31-year-old woman presented to the Department of Stomatology, Zhejiang Provincial People's Hospital, with the complaint of a mobile dental implant (Ankylos B11; Dentsply Sirona) in the left mandibular posterior area, which had been inserted 3 years previously. The screw access opening in the crown of the implant-supported prosthesis had been filled with composite resin. Clinical examination showed that the gingiva around the prosthesis was healthy and that there were no signs of peri-implantitis, such as bleeding on probing or implant mobility. The prosthesis was mobile, but an osseointegrated implant and stable marginal bone at the level of the implant shoulder were observed. The intact abutment screw was retrieved, confirming the diagnosis of an implant abutment fracture. The apical portion of the fractured abutment fragment was attached to the internal aspect of the implant. After discussing treatment options, the patient decided not to replace the implant, and after informed consent had been obtained, efforts were made to retrieve the abutment fragment.

Despite attempts with an explorer, spoon excavator, ultrasonic scaler, and combinations of these, the abutment fragment could not be retrieved. An attempt was made using the manufacturer's self-cutting removal instrument (Ankylos Unscrew Instrument for Cover Screws, Long; Dentsply Sirona), designed to remove the implant cover screws. The instrument was modified to fit the coronal part of the fractured abutment and then connected to a handle (Ankylos Handle for Screwdriver Standard Ø 7 mm; Dentsply Sirona) (Fig. 1). Specifically, the position where the removal instrument could be attached to the abutment was labeled with the rubber ring taken from a K-file (Endodontic file; Dentsply Sirona) (Fig. 1A). Then, a diamond bur (SR-11; Mani) in a high-speed handpiece (T3 Racer Midwest; Dentsply Sirona) was used to cut the top end 2 to 3 mm from the rubber ring (Fig. 1B, C). Subsequently, the modified instrument was inserted into the abutment fragment, followed by counterclockwise rotation until further rotation was arrested (Fig. 2A). Subsequent gentle knocks followed by multidirectional shaking led to the abutment fragment being dislodged and removed. A new healing abutment was placed after saline irrigation (Fig. 2B). A panoramic radiograph had been obtained 3 months after implant placement (Fig. 3A). Two weeks later, an implant-level impression was obtained, and,

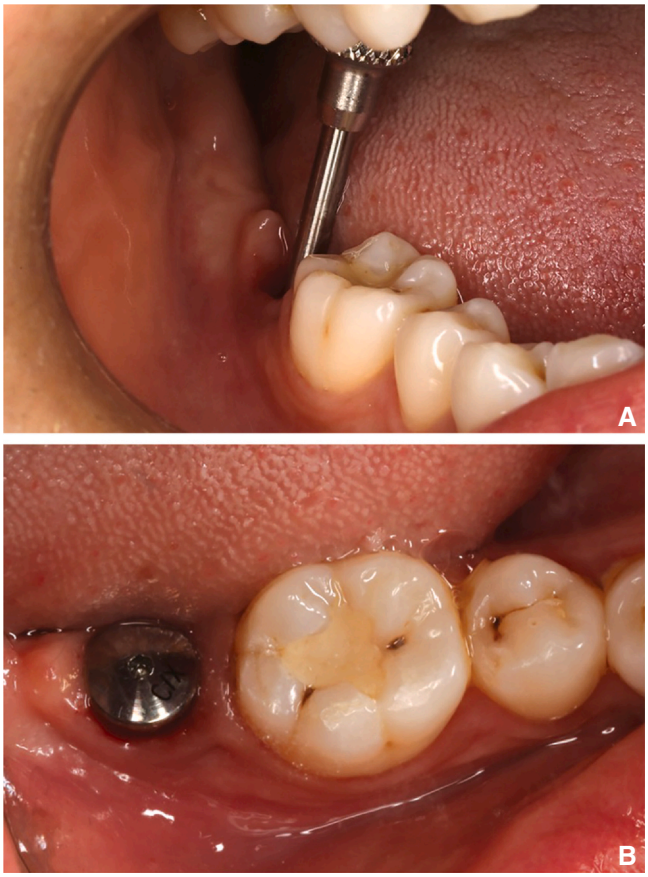


**Figure 2.** A, Modified removal instrument inserted into fractured implant abutment to retrieve abutment fragment. B, Healing abutment placed in position after retrieval of abutment fragment.

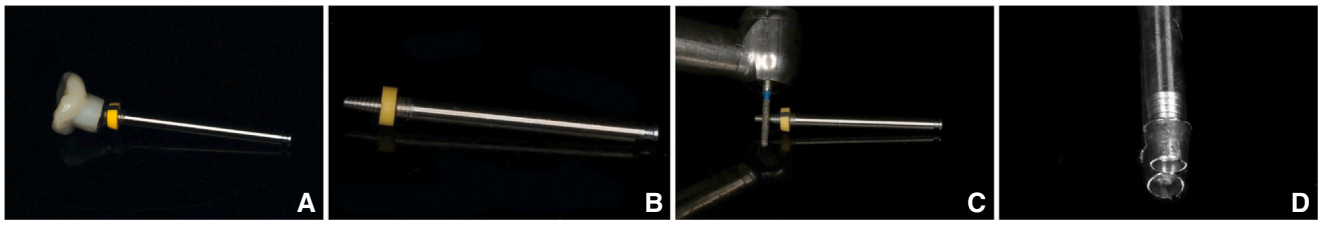


**Figure 1.** Modifying procedure of removal instrument. A, Position where removal instrument can be attached to abutment, labeled with rubber ring taken from K-file. B, Labeled removal instrument. C, Removal instrument modified with high-speed handpiece. D, Abutment fragment retrieved with modified removal instrument.

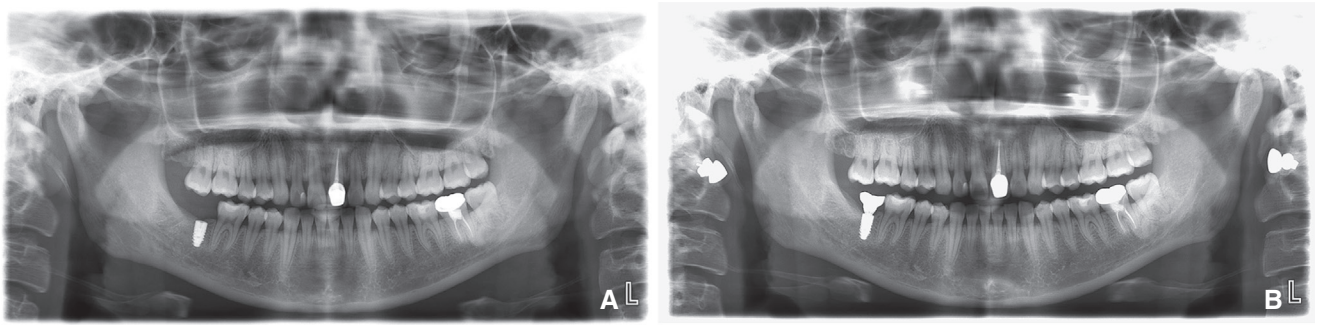


**Figure 3.** Panoramic radiographs. A, Three months after implant placement. B, At 3-month follow-up visit.

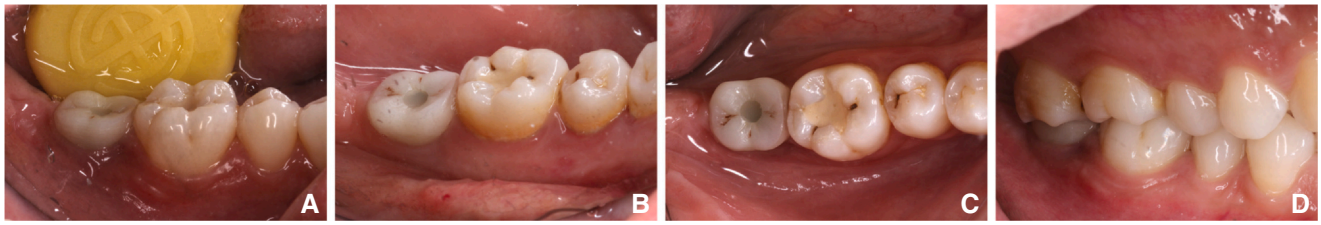


**Figure 4.** Clinical photographs of definitive prosthesis made at 7-month follow-up. A, Buccal view. B, Lingual view. C, Occlusal view. D, View in occlusion.

finally, the healing abutment was replaced with a new prosthesis.

A radiograph made at the 3-month follow-up visit indicated that the marginal bone around the implant was stable (Fig. 3B). At the 7-month follow-up visit, no radiographs were made because of pregnancy, but the prosthesis was stable (Fig. 4).

## DISCUSSION

This clinical report described a cost-effective, straightforward, time-efficient, and nonsurgical solution to the retrieval of fractured abutment fragments. With this method, clinicians can avoid surgical intervention and limit the risk of damage to the internal thread of the implant. The commercially available prosthetic instrument for the removal of cover screws can be easily obtained from the manufacturer. Furthermore, instruments can be modified according to different implant-abutment connections or clinical scenarios, and clinicians can use this method to retrieve fractured abutments in different implant systems. Limitations included the fact that this method may not be suitable for patients with limited mouth opening or severe periodontitis, especially those with extruded adjacent teeth, which may hinder the insertion of the instrument into the fractured abutment.

## SUMMARY

This clinical report presents a patient for whom a fractured abutment was successfully retrieved using the manufacturer's specific instrument. The important advantages of this technique are the easy availability of the instrument and the elimination of drilling for fragment removal.

## PATIENT CONSENT

Informed consent was obtained from involved participant.

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**CRediT authorship contribution statement**

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