

Implant Platform Deformation as a Complication of Guided Implant Surgery

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INTRODUCTION

Guided implant surgeries aim to ensure the desired prosthetic outcome and satisfy the patient and dentist's expectations. Static surgical guides are fabricated to increase the accuracy of implant placement while reducing surgical trauma and intraoperative time. The guides are designed with a base (in contact with the supporting structures), guiding cylinders, and other support extensions, which require sufficient operational space.

Such guided surgeries possess additional potential for complications because guided surgeries require additional steps such as prosthetic diagnosis, treatment planning, designing and fabricating the surgical guide, and the actual usage of the guide during surgery. In addition, each step provides opportunities for human and random errors. *This case report aims to present and discuss a highly unusual complication that occurred during implant surgery using a guided surgical approach: A deformation of the internal implant connection.*

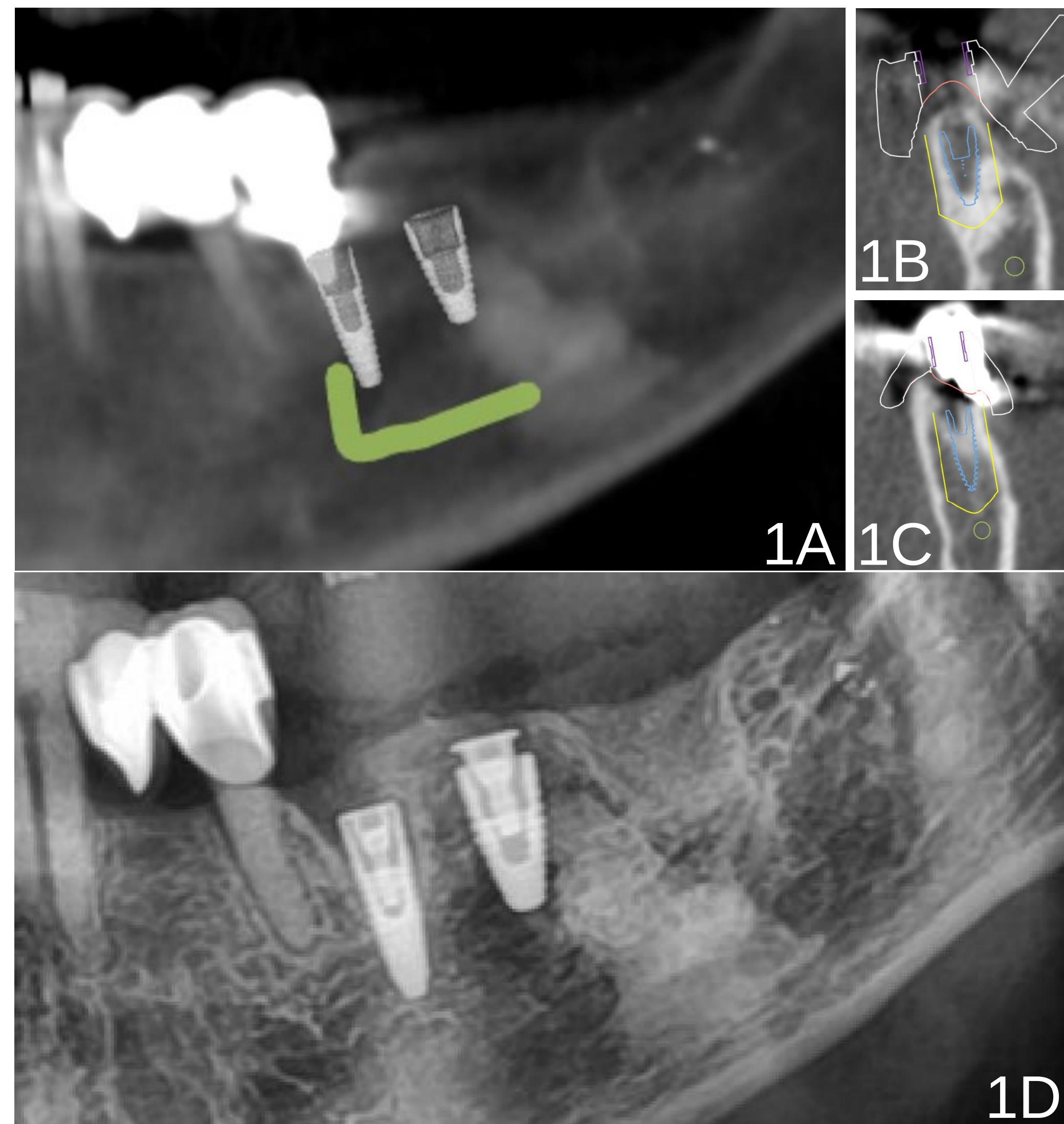


Fig. 1A/B/C: Digital planning of implant placement. Panoramic view, #19i, and 20i respectively; Fig. 1D: Immediate postoperative radiograph. The implants were placed at the desired positions and path. However, the cover screw of implant #19 is not fully seated.

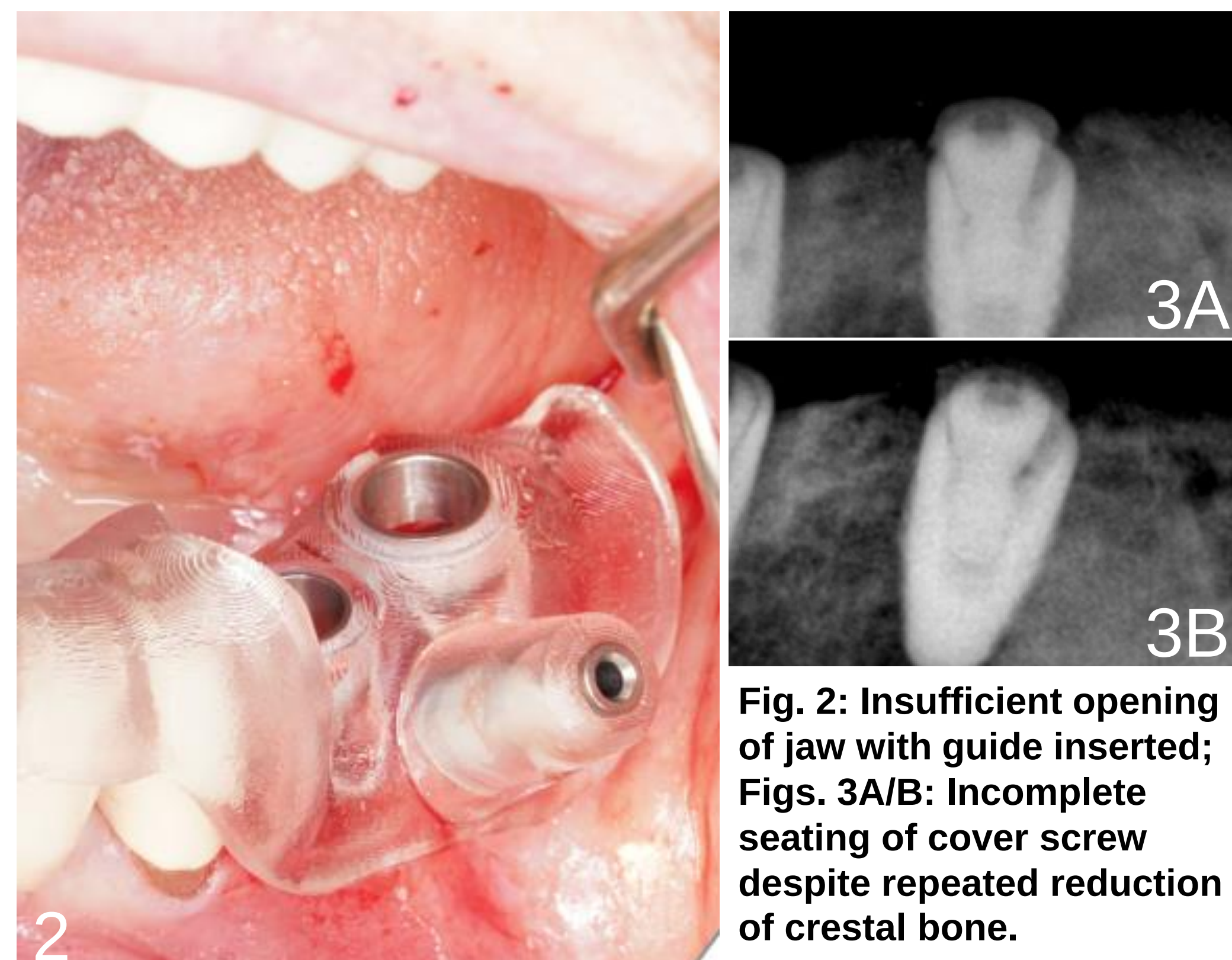


Fig. 2: Insufficient opening of jaw with guide inserted; Figs. 3A/B: Incomplete seating of cover screw despite repeated reduction of crestal bone.

CASE REPORT

A 70-year-old female patient was undergoing implant therapy on sites #19 and #20. The tooth #19 was previously missing, and #20, hopeless, was extracted and immediately replaced with an implant. The surgery was performed under sedation, utilizing a digitally fabricated guide (Fig. 1). Throughout the procedure difficulties arose because the sedated patient could not open her mouth as wide as needed to accommodate the extended length of the guided drill. The two implants (4.3x8 mm and 3.5x10mm) were placed subcrestally with acceptable implant stability. Patient had difficulties in opening her mouth sufficiently, providing difficulties in removing the implant mount and the guide (Fig. 2). The cover screws were placed, and a postoperative control radiograph was taken.

The postoperative control radiograph presented insufficient fit of the cover screw in implant #19i (Figs. 1D, 3A/B). Because the source of this complication was deemed to be interference from the bone, the peri-implant crestal bone was reduced with special attention using hand and rotary instruments. Despite repeated attempts and eventual complete removal of surrounding crestal bone, radiographs consistently demonstrated the same complication. The problem persisted when using a different cover screw.

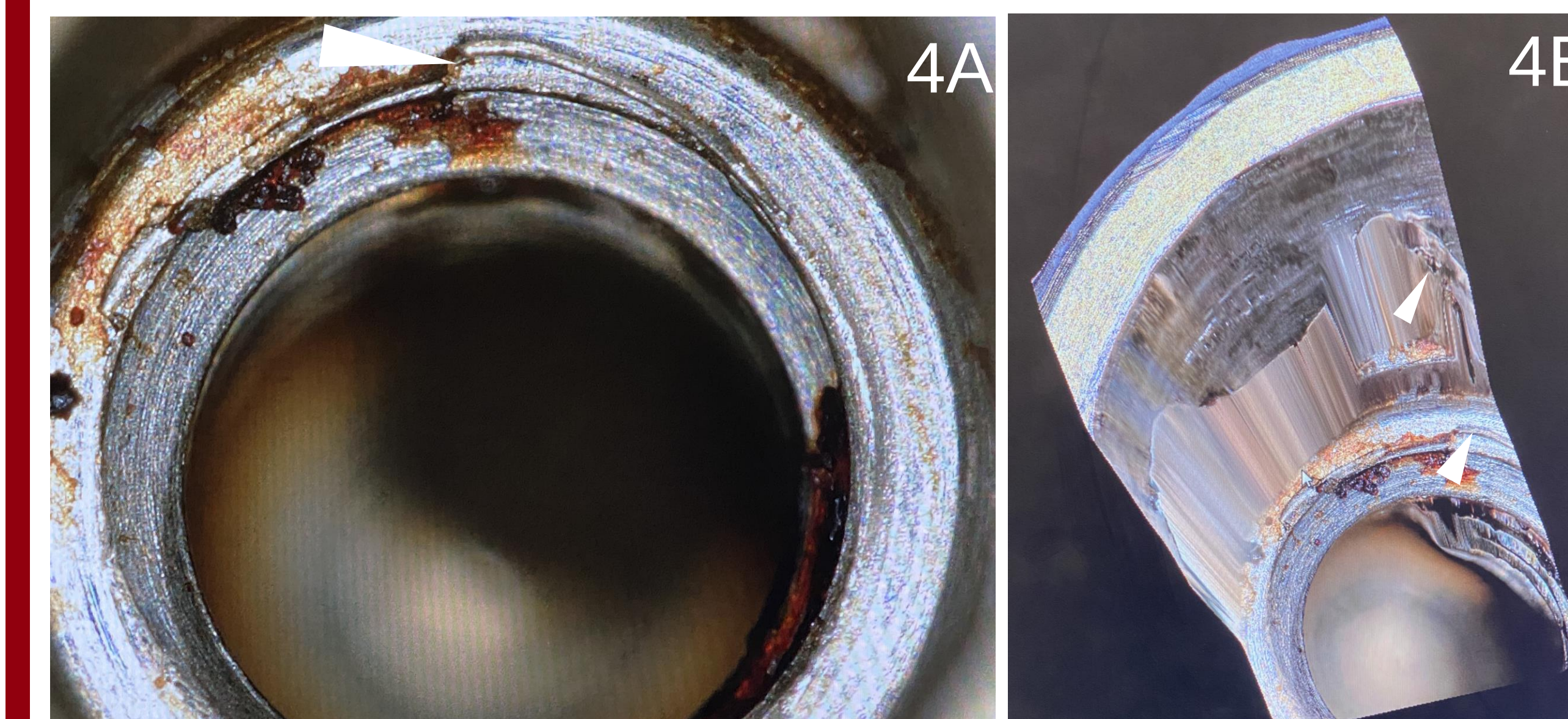
A thorough clinical examination of the implant revealed damage of the internal connection. The implant was retrieved, and a new implant was placed. The retrieved implant was examined under laser confocal microscope which verified a significant platform deformation (Fig. 4).

RESULTS and DISCUSSION

Examination under laser confocal microscope demonstrated deformation of the implant platform. Such damage to the connection seems to have occurred during the forceful removal of the mount from the guide. The implant mount was made of surgical grade CP Cold-worked titanium which is much stronger than grade IV titanium used for the implant fixture.

CONCLUSION

While digitally guided implant surgeries are increasing in popularity as reliable techniques, further research is needed to control potential risks for patients with specific limitations.



Figs. 4A/B: Deformations of implant internal connection elucidated under laser confocal microscopy (arrows).