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Using apical surgery to prepare apical bone before immediate implant placement and provisionalization in esthetic zone—a case report



KEYWORDS

Immediate implant placement and provisionalization;
Apical surgery;
Single-tooth replacement;
Extraction;
Esthetic outcome

Due to high satisfaction, immediate implantation has been an attractive treatment option for many patients nowadays.¹ Immediate implant placement and provisionalization (IIPP) may contribute to a more promising result.^{2,3} However, the indications for IIPP are quite strict that not all the cases may match.⁴ Primary stability, sufficient bone volume and proper implant position are critical factors to the reliable osseointegration, satisfactory esthetic and functional outcome. In other words, some endodontic failure or vertical root fractured cases that result in significant bone loss may not be appropriate for IIPP. Here, we presented a case performing periapical surgery combined with guided bone regeneration to create a good foundation for IIPP in the esthetic zone.

A 40-year-old male was referred to our department for a surgical consultation on May 15, 2019. The patient was diagnosed with symptomatic periapical periodontitis of the right upper central incisor (tooth 11), and the radiolucent lesion size was about 13 mm × 11 mm × 6 mm. He accepted the endodontic retreatments by specialists since December 4, 2012, but the symptoms and signs were not improved for

seven years (Fig. 1A). Moreover, poor crown structure and many crack lines were also noted under microscopic field. Due to the questionable prognosis of the tooth, single-tooth-replacement therapy was then considered. Although there was no deep probing pocket of tooth 11, this site was still not adequate for IIPP due to the sizeable apical lesion. Advantages and disadvantages of different treatment protocols were also discussed, including: postponed extraction might lead to labial plate dehiscence; conventional implantation could be performed after natural bone healing; labial plate collapse and loss of interdental papilla might encounter; and it might need additional bone grafting procedures. In order not to in a quandary, the patient agreed to regenerate apical bone for IIPP. Enucleation of the cystic-like lesion, apicoectomy of tooth 11 with MTA retrograde filling, and guided bone regeneration with anorganic bovine bone and resorbable membrane were performed on June 11, 2019 (Fig. 1B). After the surgery, we planned to wait 6–8 months for bone healing. During the close follow-up period, the crown cracking was noticed by the patient on November 21, 2019. Therefore, the IIPP surgery was performed on December 16, 2019 (Fig. 1C). Although little labial defect was noticed, sufficient primary stability was achieved because of good apical bone foundation, and IIPP was done successfully. Final prosthesis was delivered on July 23, 2020 (Fig. 1D). After 6-month follow up (post IIPP 1 year), no facial bone resorption and minimal gingival recession were noticed. The follow-up computed tomography showed that the implant was surrounded by grafting bone materials (Fig. 1E). The patient satisfied with treatment experience and esthetic outcome (Fig. 1F).

IIPP has become a trend in implant therapy due to high patient's satisfaction for esthetic. To achieve good implant primary stability, the integrity of apical bone is the first consideration. For stable esthetic outcome, sufficient labial

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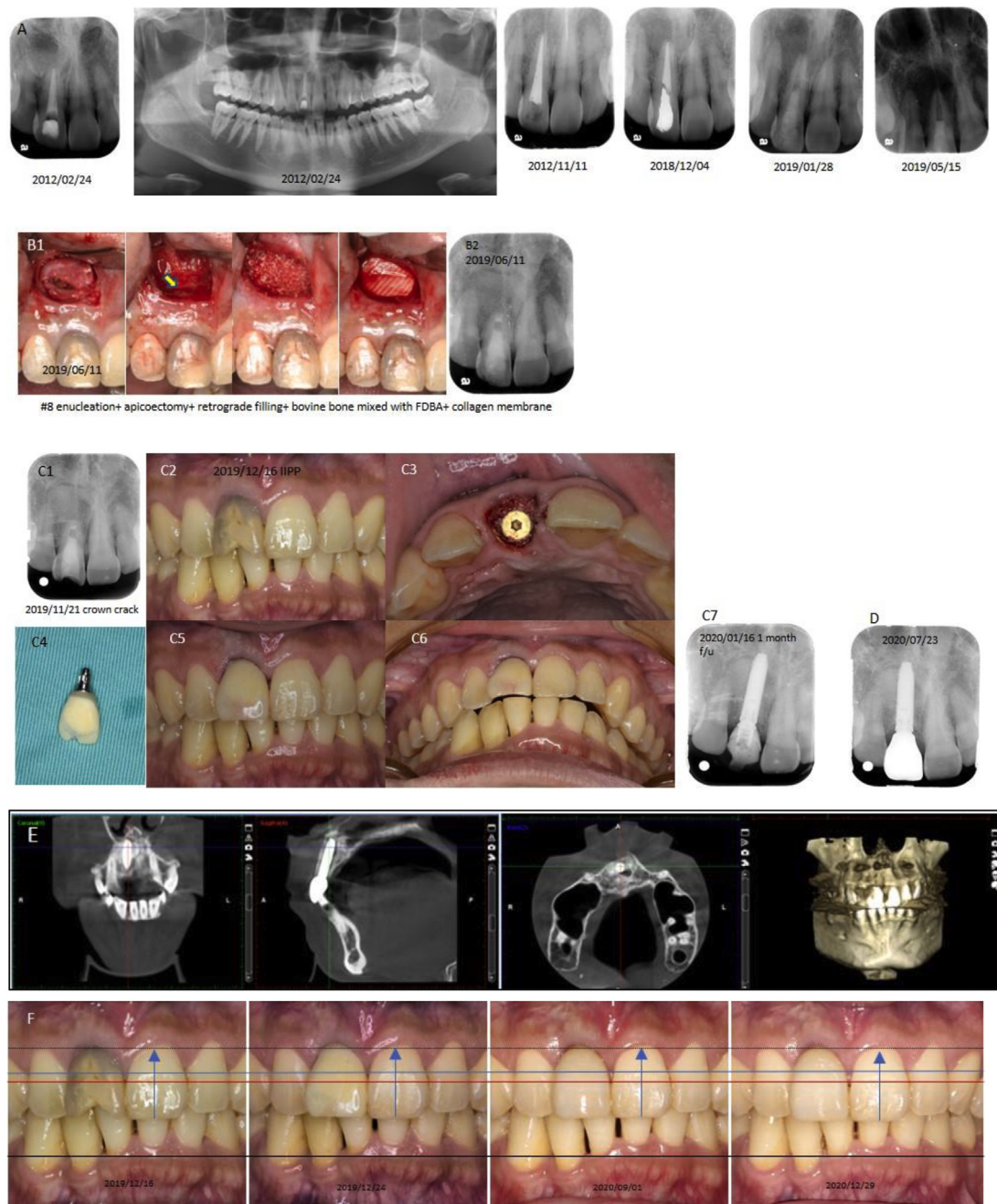


Figure 1 Clinical photographs and radiographs of our case: (A) Periapical and panoramic radiograph series before apical surgery. (B) B1: Clinical photographs of apical surgery. B2: The periapical radiograph immediately after apical surgery showing the retrograde filling and grafting materials. The pathologic features were consistent with long-standing radicular cyst. (C) C1: Periapical radiograph showed tooth 11 crown crack. C2: Clinical photograph before IIPP. Tooth 11 vertical crack revealed clearly. C3: A 4.3 mm × 18 mm NobelParallel™ was placed in the socket of tooth 11 with high insertion torque (>35 Ncm). The labial gap was filled with anorganic bovine bone. C4: Screw retained provisional crown was made with temporary snap abutment. C5: Frontal view when the provisional crown of tooth 11 was installed. C6: Occlusal contact should be avoided. C7: Periapical radiograph one month after IIPP. (D) Periapical radiograph after final prosthesis was delivered. (E) Computed tomographs of tooth 11 apical area. The apex of implant was total embedded inside the grafting materials. This showed that the regenerated bone after apical surgery could support IIPP. (F) Gingiva level comparison. Black dot line and black line show the gingiva level of teeth 21 and 41 as a standard line, respectively. The sizes of tooth 21 (blue arrow line) were all equal. The pre-operation tooth 11 distal papilla level was marked with the blue line, and pre-operation tooth 11 mesial papilla level was marked with the red line. Only minimal gingival recession was noted over the mid-point of facial gingival margin and the mesial papilla during IIPP. Both the mid-point of the facial gingiva margin and the mesial papilla of tooth 11 became more satisfying after the final prosthesis was delivered. This might be due to the favorable morphology of the final prosthesis.

bone is the keystone. From the case demonstrated above, the initial condition may not be suitable for IIPP. Once the apical bone is regenerated, IIPP is not a problem and labial bone can be saved.^{3,5} From our experience, apical bone regeneration treatment can be considered even when a large apical lesion is present. After apical bone regeneration, the socket can become a candidate for IIPP.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. Hu KS, Li H, Tu YK, Lin SJ. Esthetic results of immediate implant placement in extraction sockets with intact versus deficient walls. *J Dent Sci* 2021;16:108–14.
2. Chen CL, Chang CL, Lin SJ. Immediate implant placement and provisionalization with simultaneous guided bone regeneration in the esthetic zone. *J Dent Sci* 2011;6:53–60.
3. Kan JYK, Rungcharassaeng K, Deflorian M, Weinstein T, Wang HL, Testori T. Immediate implant placement and provisionalization of maxillary anterior single implants. *Periodontol 2000* 2018; 1–16. 0.
4. Buser D, Chappuis V, Belser UC, Chen S. Implant placement post extraction in esthetic single tooth sites: when immediate, when early, when late? *Periodontol 2000* 2017;73:84–102.
5. Cho YD, Seol YJ, Lee YM, Heo SJ, Ku Y. Immediate implant placement at a periapical lesion site: a case series. *J Oral Implantol* 2018;4:281–6.

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