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Forced Eruption for Implant Site Development Utilizing a CAD/CAM Provisional FPD

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Introduction

Bone and soft tissue defects can jeopardize the aesthetic and functional outcomes of implant therapy. Orthodontic extrusion has been described as a predictable, nonsurgical strategy for vertical hard and soft tissue augmentation in case reports, commonly through the use of unaesthetic orthodontic brackets on multiple adjacent teeth. This case report describes a technique using an aesthetic, short-span fixed provisional as an anchor for the forced eruption of an anterior tooth in preparation for the future implant placement.

Case Description

Patient presentation: a 52-year-old female presented with #7 and #8 ceramo-metal restorations with recurrent caries. #7 also had interproximal vertical bony defects and buccal gingival recession. Both #7 and #8 had non-surgical root canal therapy in the past.

Treatment plan: After caries control, #7 was determined non-restorable. #7 single implant and #8 new ceramo-metal restoration were planned for treatment.

Provisional design for #7 forced eruption: Before extraction, #7 was decoronated and orthodontic extrusion was planned to be performed through a short-span, milled PMMA provisional. Intraoral scans were obtained and the provisional was digitally designed and milled.



Fig. 1: Facial view of #7 and #8

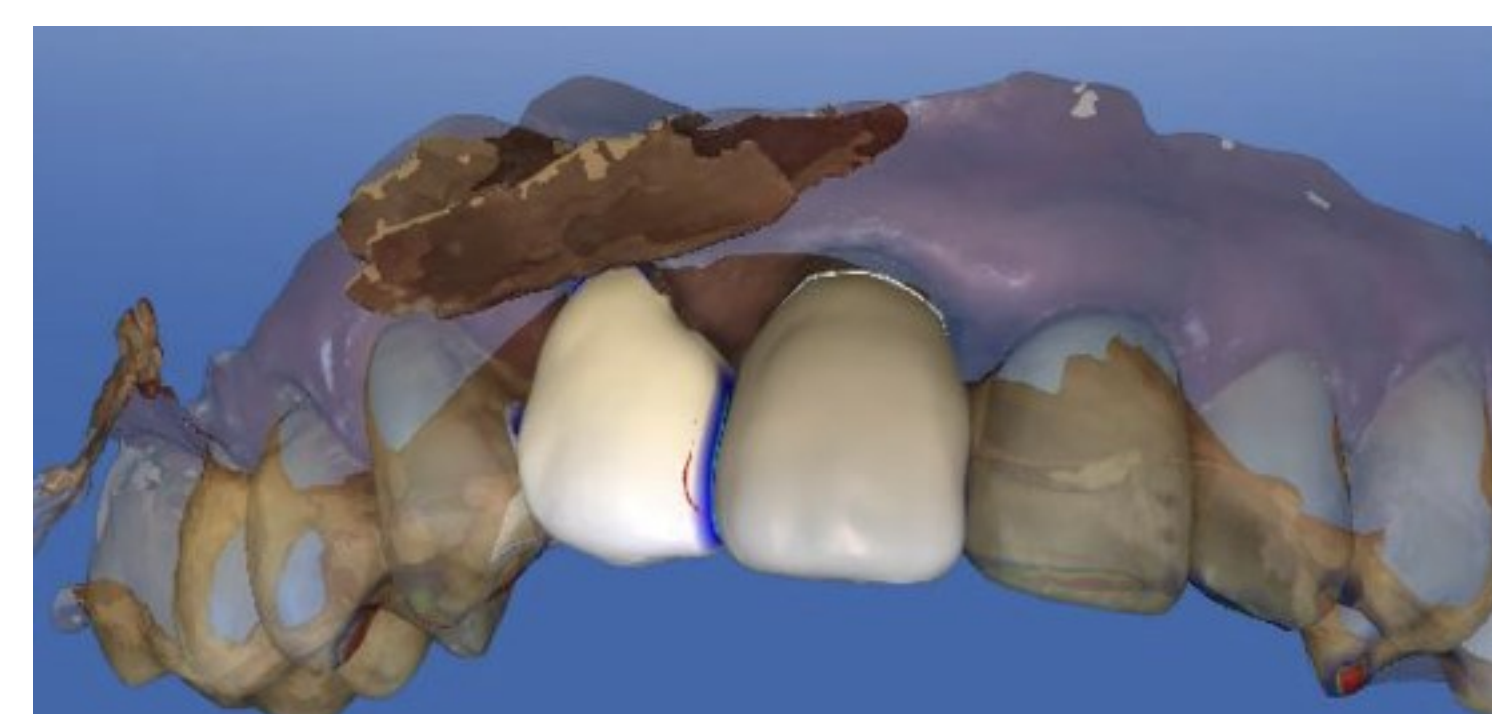


Fig. 2: Facial (left) and palatal (right) views of the provisional design in CEREC software. Intraoral scans were obtained with Omnicam. A provisional that includes splinted #7 and #8 full-coverage crowns with #6 palatal wing was designed; A Telio CAD block was used to mill the provisional.

Forced Eruption – Technique & Results

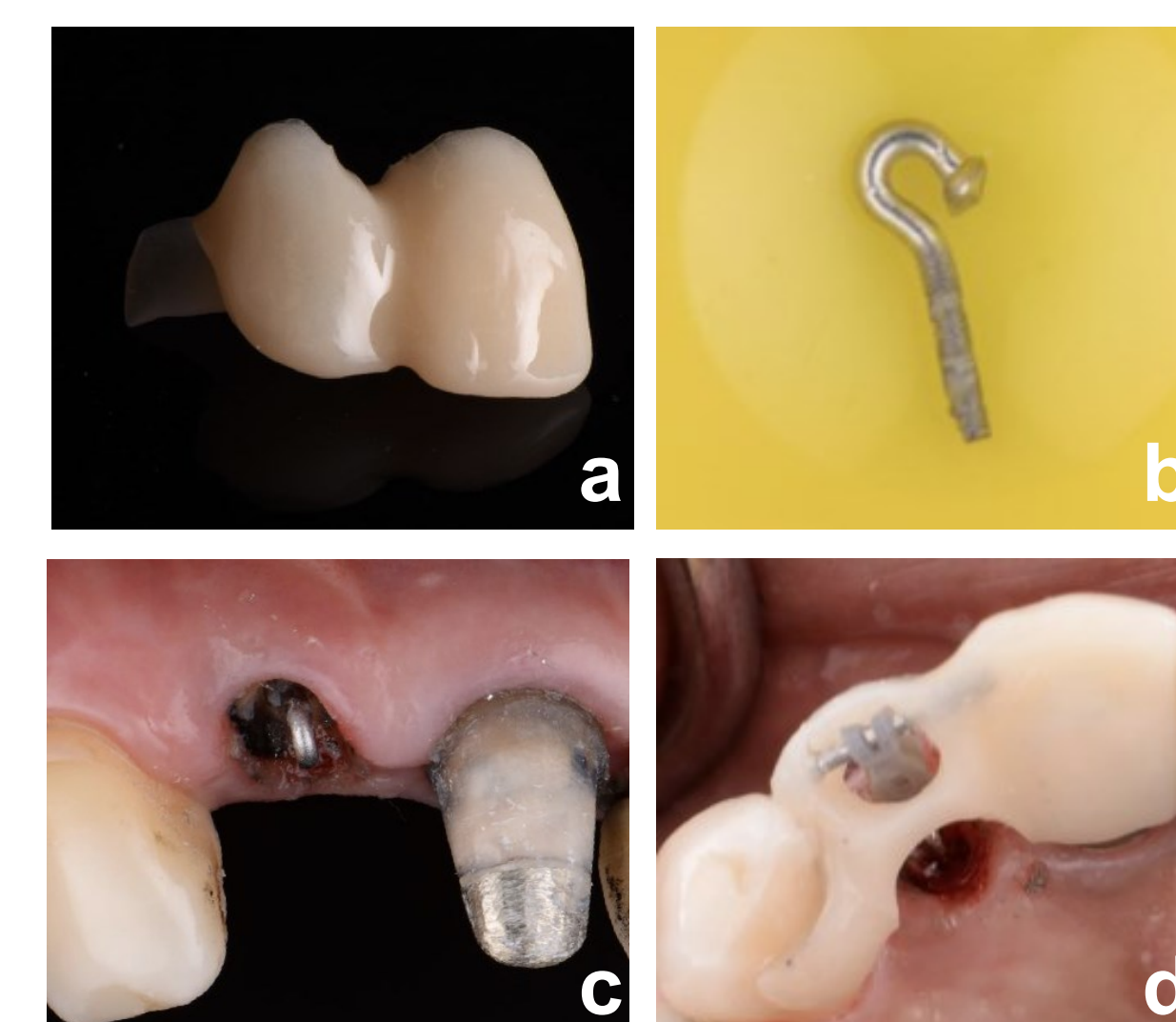


Fig. 3: Provisional setup for forced eruption of #7. a: milled FPD with #6 palatal wing; b: hook adapted from a ball-clasp wire, roughened and sandblasted to increase retention; c: decoronated #7 with hook cemented in place; d: a power chain anchored around a metal post embedded in #7 provisional shell. Duralon carboxylate luting cement (on #8) and RelyX Unicem resin cement (on #6 palatal wing) were used for cementation.



Fig. 4: Provisional modification during forced eruption. a: provisional set-up at time of cementation (week 0); b: at 1-week follow-up, interference was observed between extruded #7 and #7 provisional shell; b': #7 provisional shell was modified to relieve interference to allow further extrusion of #7.

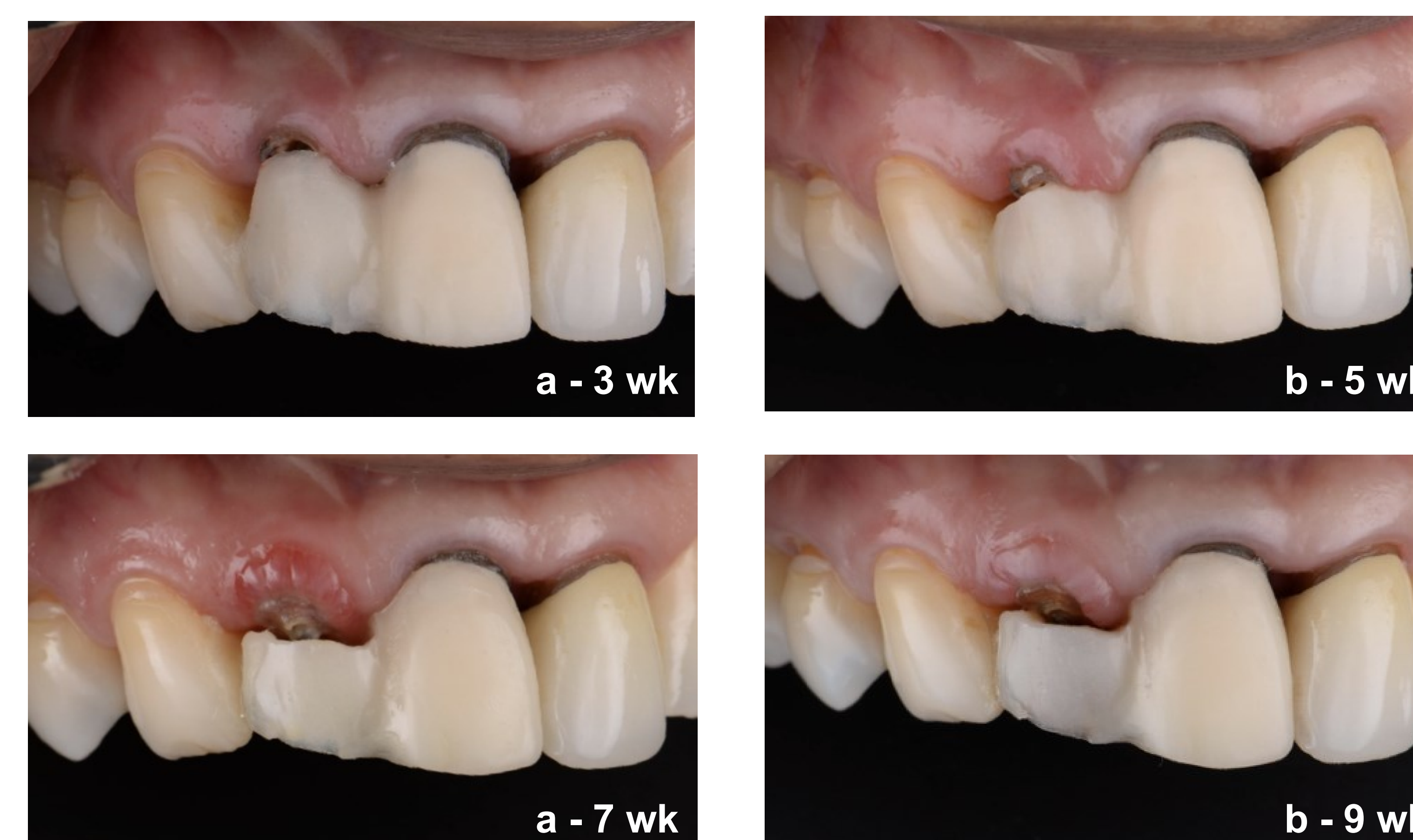


Fig. 5: Forced eruption of #7 over 9 weeks. Coronal movement of gingival margin was observed clinically. #7 provisional shell was cut back bi-weekly to relieve interference with #7 root tip. The power chain was changed bi-weekly and shortened as necessary to recreate tension. At completion of forced eruption (week 9), a new identical provisional was placed for stabilization of #7 (a minimum of 9 weeks) before the surgical phase of implant therapy.

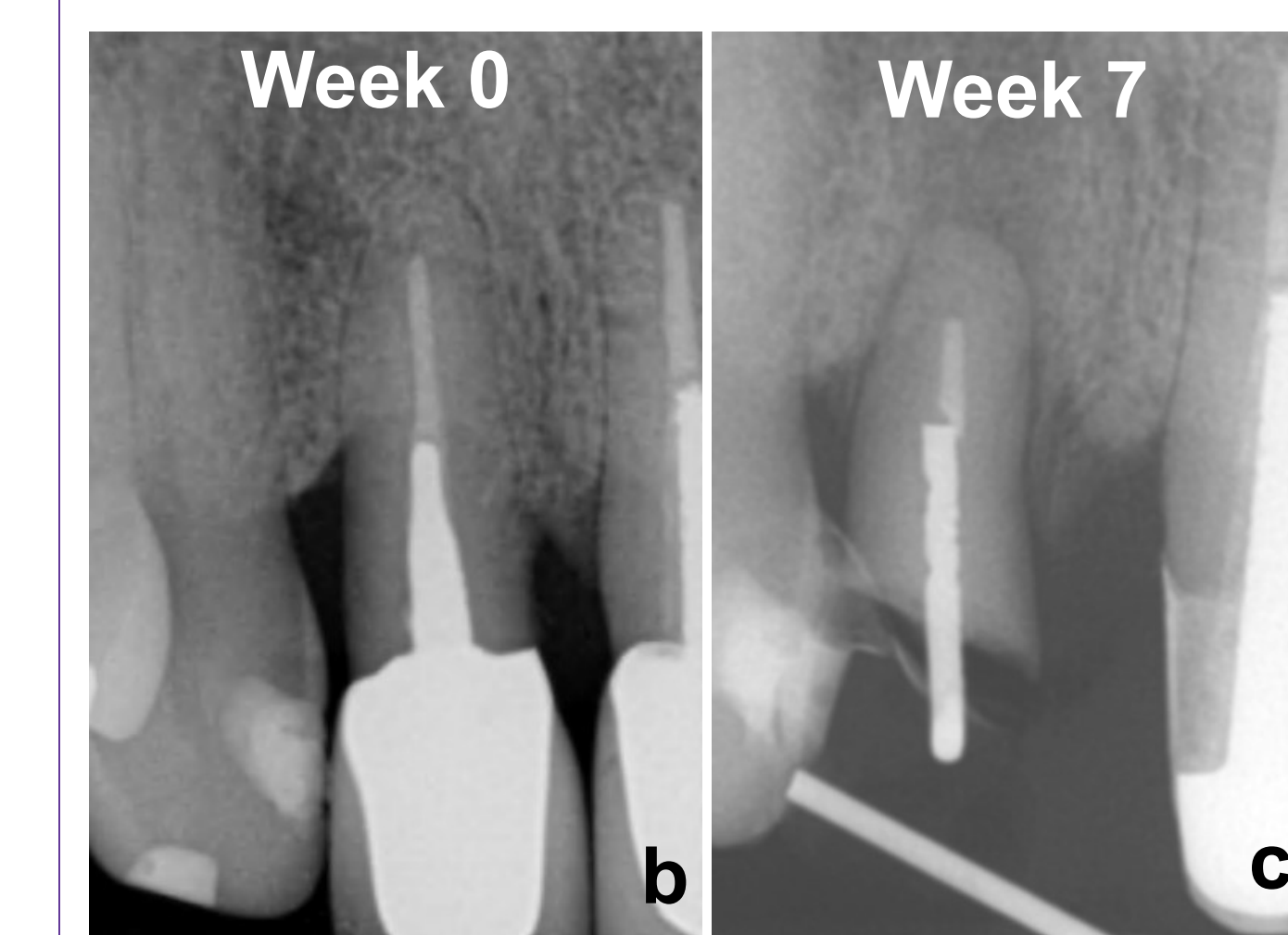


Fig. 6: Pre-op and post-op comparisons of #7 bone and soft tissue level after forced eruption. a: Superimposition of #7 gingival margin before and after forced eruption shows gain of soft tissue coronally as outlined in white. b, c: #7 periapical radiographs at week 0 and week 7, respectively. Premature bone formation was observed interproximally at week 7 of forced eruption.

Conclusions

Orthodontic extrusion may serve as a predictable, efficient, non-surgical alternative to vertical bone and soft tissue augmentation in developing future implant sites in the aesthetic zone. The use of a short-span fixed provisional appears to be an effective and esthetic technique for the forced eruption of a single anterior tooth.

References

1. Abdulaziz A, Wael A. Orthodontic extrusion for pre-implant site enhancement: Principles and clinical guidelines. *J of Prosth Research* 2016; 60:145-55.
2. Fakhry A. Enhancing restorative, periodontal, and esthetic outcomes through orthodontic extrusion. *Eur J Esthet Dent* 2007;2:312-20.
3. Mantzikos T, Shamus I. Forced eruption and implant site development: an osteophysiologic response. *Am J Orthod Dentofac Orthop* 1999;115:583-91.
4. Salama H, Salama M. The role of orthodontic extrusive remodeling in the enhancement of soft and hard tissue profiles prior to implant placement: a systematic approach to the management of extraction site defects. *Int J Periodontics Restorative Dent* 1993;13(4):312-33.