

# Replacement of Retained Deciduous Tooth by Immediate Implant Placement

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## INTRODUCTION

**R**etained primary teeth in the absence of the permanent successor, when requiring to be extracted or managed as part of a restorative treatment plan, are always a challenge for the clinician. Dental agenesis is a relatively common finding with a prevalence of 5.5% in Europe and 3.9% in North America. The mandibular second incisor is the most common missing tooth, followed by the maxillary lateral incisor and the maxillary second premolar. Females have a prevalence of agenesis 1.37 times higher than males, and all the agenesis grouped per type of tooth are prevalently unilateral except for maxillary lateral incisors.<sup>1</sup>

The etiology of dental agenesis still remains unclear. It has been clarified that genetic factors play a major role, frequently associated with systemically broader genetic syndromes affecting the patient, such as Down syndrome or ectodermal dysplasia. Apart from genetic causes, local factors such as early irradiation of tooth germs, hormonal and metabolic influences, trauma, osteomyelitis, and unintentional removal of tooth bud during primary tooth extraction can cause agenesis. Both genetic and local factors lead to a series of consequences that prevent the formation of the permanent tooth.<sup>2</sup>

No long-term follow-up studies are available showing the survival rate of retained primary teeth in a population from the third age decade onwards. In a follow-up study involving subjects in mixed dentition followed up to their late 20s it was shown that a considerable number of primary molars persisted unaltered up to 15 years after the normal exfoliation time, concluding that the persistence of these elements is an acceptable semipermanent solution for the patient.<sup>3</sup> In a different study with a shorter follow-up period, 41 patients with agenesis of 1 or both second premolars and retained primary molars were followed from the age of 12 to 13 years up to a mean age of 20 years and 6 months, with only 6 molars out of 59 lost during the follow-up period. Despite the fact that most of the teeth had root resorption, infraocclusion or tipping at the first examination, none of these findings increased very much after the age of 20. The authors concluded that if the primary molars remain in the dental arch at 20 years of age they have a favorable long-term prognosis.<sup>4</sup>

So, the question to the clinician remains: What are the

treatment options for primary retained teeth in adults? General guidelines have been proposed defining 4 main options: retain; retain and modify; extraction and space closure; and extraction and prosthetic replacement. Retention can be a fair option when the root and the crown are in good condition and the tooth is functionally and aesthetically acceptable. When infraocclusion has occurred or esthetic improvements are necessary, the primary tooth may still be retained but it will need to be modified either with a direct or indirect restoration. Extraction and space closure is needed in case of crowding to align the arch orthodontically. When the arch is already well-aligned but the primary tooth has a poor prognosis for root resorption, caries, periodontal or periapical disease, inadequate esthetics, then the best option is extraction and prosthetic replacement with conventional bridges or implants.<sup>5</sup>

## DESCRIPTION OF THE CASE

A healthy 50-year-old female Caucasian patient presented with a retained right maxillary primary first molar without a permanent successor (Figures 1 and 2). The tooth was slightly mobile and had a history of recurrent gingival inflammation. The patient did not want to have a fixed bridge. A decision was made to perform a 2-stage implant surgery in the fresh extraction socket associated with guided bone regeneration.

Prior to surgery an impression was taken, the tooth was removed from the cast in order to simulate the appearance after the extraction and an acrylic resin radiologic and surgical guide was built over the cast.

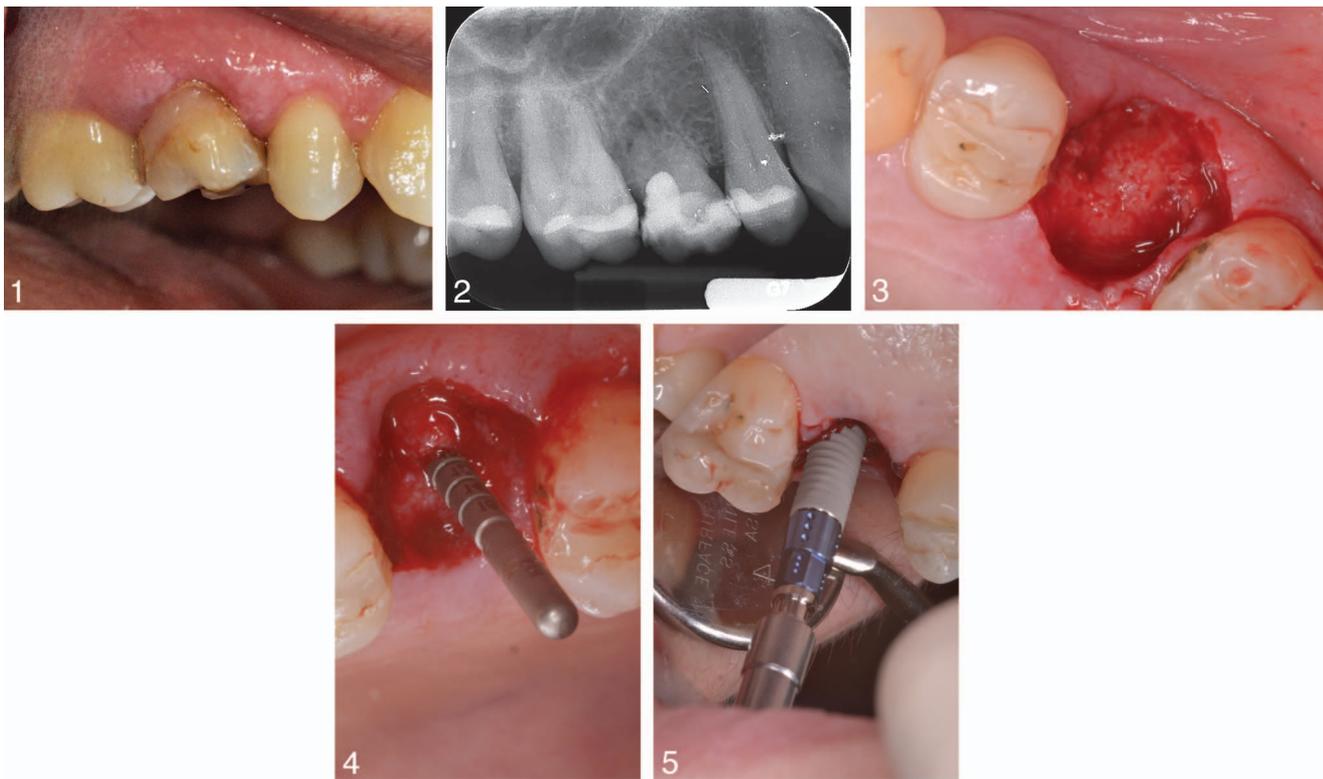
A gentle extraction of the retained primary tooth was performed (Figure 3), the implant site was prepared and a bone level 4.1 × 12 mm regular CrossFit implant (SLA BL, Straumann, Basel, Switzerland) was placed in the socket according to the manufacturer's instructions (Figures 4 through 6). The remaining space of the extraction socket was filled with calcium sulfate hemihydrate (Dentogen, Orthogen, Springfield, NJ; Figure 7) and a 15 × 20 mm resorbable collagen membrane (conFORM, ACE Surgical Supply Co Inc, Brockton, Mass) was trimmed and adapted underneath the gingival margin covering the grafted socket in a flapless approach. A suture (3-0 Cytoplast) engaging the 4 corners of the socket was applied (Figure 8). The suture was removed after 2 weeks. Systemic antibiotics, amoxicillin 875 mg twice per day for a total of 10 days starting from the day before the surgery, was prescribed. Local application of chlorhexidine gluconate 0.12% twice per day was recommended. The suture removal was done 14 days

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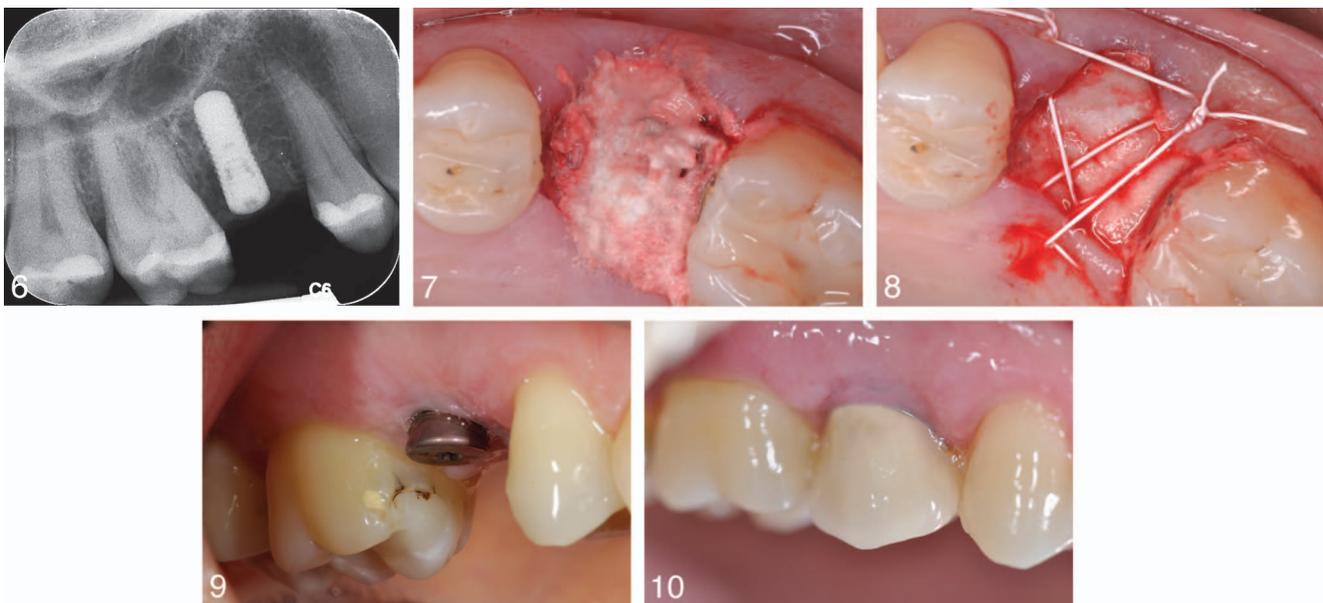
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**FIGURES 1–5.** **FIGURE 1.** Preoperative appearance of the retained primary molar. **FIGURE 2.** Preoperative periapical X ray of the retained primary molar. **FIGURE 3.** Occlusal view of the extraction socket. **FIGURE 4.** Direction pin in place during the implant site preparation. **FIGURE 5.** Implant insertion after completion of site preparation.



**FIGURES 6–10.** **FIGURE 6.** Periapical X ray after implant placement. **FIGURE 7.** Extraction socket grafted with calcium sulfate hemihydrate. **FIGURE 8.** Occlusal view of the surgical site after placement of a resorbable collagen membrane and suturing. **FIGURE 9.** Lateral view after second stage surgery and placement of the healing abutment. **FIGURE 10.** Lateral view of the final restoration 18 months after surgery.

following surgery, when the socket was closed approximately 90%.

The healing was uneventful, second stage surgery was performed 4 months after implant placement (Figure 9), and the implant was restored in the pre-doc clinic of the SUNY at Buffalo School of Dental Medicine, Buffalo New York (Figure 10).

The case has been monitored for 18 months, with no adverse events and with high patient satisfaction.

#### DISCUSSION AND CONCLUSIONS

A patient with a retained maxillary primary molar with poor prognosis was treated with extraction and immediate implant placement. A decision was made to perform a 2-stage implant surgery in the fresh extraction socket associated with guided bone regeneration. Though the original Branemark protocol<sup>6</sup> suggested a healing period following tooth extraction before implant placement, later in the 1990s the possibility of positioning implants in fresh extraction sockets had been explored as shown in an early case series. A report on 31 patients receiving 32 implants placed immediately after extractions showed only 1 implant failure after 4 to 6 months and a mean of 1.5 mm bone loss 16 months after occlusal loading.<sup>7</sup> More recently, immediate insertion of implants into extraction sockets, has become a routinely performed protocol supported by literature and confirmed in a recent consensus conference<sup>9</sup> that, within the other statements and recommendations, affirm that "survival rates are similar for immediate-early and late placed implants" and that a gap between the implant and the socket wall does not affect the outcome of immediate implant placement because "three-wall defects (critical jumping distance<sup>8</sup> 1.5 mm) have a high potential for spontaneous healing for both early (10 days) and late (3 months) placed implants."<sup>9</sup>

In the case hereby reported, the gap between the implant and the extraction socket, although limited in depth, was grafted according to the socket preservation protocol adopted in the Implant Center of the SUNY at Buffalo School of Dental Medicine that involves the use of a bone filler material, in this case only calcium sulfate due to the moderate width of the socket, but generally a mix of this latter with a cortico-cancellous allograft, a collagen membrane to cover the graft placed at the alveolar crest level retained under the gingival

margin without pouch or flap elevation, stabilized and secured using a reverse cross-mattress resorbable suture.<sup>10</sup> Avoiding flap elevation prevents mucogingival changes and minimizes the trauma to the alveolar bone caused by the detachment of the periosteum with its blood supply that elicits a bone remodeling activity that mediates resorption of the bone surface layer in the exposed area.<sup>11-13</sup>

Extraction and immediate implant placement with guided bone regeneration can be a suitable and recommendable treatment option in cases of retained primary teeth with unfavorable prognosis.

#### REFERENCES

1. Polder BJ, Van't Hof MA, Frans PGM, Van der Linden FPGM, Kuijpers-Jagtman AM. A meta-analysis of the prevalence of dental agenesis of permanent teeth. *Community Dent Oral Epidemiol.* 2004;32:217-226.
2. Nunn JH, Carter NE, Gillgrass TJ, et al. The interdisciplinary management of hypodontia: background and role of paediatric dentistry. *Br Dent J.* 2003;194:245-251.
3. Ith-Hansen K, Kjær I. Persistence of deciduous molars in subjects with a genesis of the second premolars. *Eur J Orthodont.* 2000;22:239-243.
4. Bjerklin K, Bennett J. The long-term survival of lower second primary molars in subjects with agenesis of the premolars. *Eur J Orthodont.* 2000;22:245-255.
5. Robinson S, Chan FWY. New teeth from old: treatment options for retained primary teeth. *Br Dent J.* 2009;207:315-320.
6. Adell R, Lekholm U, Rokler B, Brånemark P-I. A 15-year study of osseointegrated implants in the treatment of the edentulous jaw. *Int J Oral Surg.* 1981;10:387-416.
7. Pecora G, Andreana S, Covani U, De Leonardis D, Schifferle RE. New directions in surgical endodontics: immediate implantation into an extraction socket. *J Endod.* 1996;22:135-139.
8. Botticelli D, Berglundh T, Buser D, Lindhe J. The jumping distance revisited. *Clin Oral Impl Res.* 2003;14:35-42.
9. Gotfredsen K, Carlsson GE, Jokstad A, et al. Implants and/or teeth: consensus statements and recommendations. *J Oral Rehabil.* 2008;35:2-8.
10. Kutkut A, Andreana S, Monaco E. Esthetic consideration for alveolar socket preservation prior to implant placement: description of a technique and 80-case series report. *Gen Dent.* 2012;60:e398-e403.
11. Tavtigian R. The height of the facial radicular alveolar crest following apically positioned flap operations. *J Periodontol.* 1970;41:412-418.
12. Wood DL, Hoag PM, Donnenfeld OW, Rosenfeld LD. Alveolar crest reduction following full and partial thickness flaps. *J Periodontol.* 1972;43:141-144.
13. Sunitha RV, Ramakrishnan T, Kumar S, Emmadi P. Soft tissue preservation and crestal bone loss around single-tooth implants. *J Oral Implantol.* 2008;34:223-229.