Case Report

Facial Asymmetry Case with Multiple Missing Teeth Treated by Molar Autotransplantation and Orthognathic Surgery

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Abstract: Autotransplantation is an alternative treatment in cases of missing teeth. Autotransplantation of teeth can lead to significantly shorter treatment time and an improved treatment result in certain cases of tooth loss, wherever a suitable tooth is available and the anatomic circumstances permit it. The presented case report, treated successfully with molar autotransplantation and orthognathic surgery, had a number of missing teeth and facial asymmetry. (*Angle Orthod* 2004;74:137–144.)

Key Words: Autotransplantation; Orthognathic surgery; Missing teeth

INTRODUCTION

The primary objective of comprehensive dental treatment planning is conservation of tooth tissue. The absence of teeth, either congenital or due to caries or trauma, presents a challenge to the concept of conservative tissue treatment. Orthodontic space closure and prosthetic replacement are two possible approaches to solving this problem. Yet another approach is autogenic tooth transplantation.[1]

Autotransplantation of teeth can lead to significantly shorter treatment time and an improved treatment result in certain cases of tooth loss or ectopia, wherever a suitable tooth is available and the anatomic circumstances permit autotransplantation.[2] Autotransplantation followed by orthodontic treatment can also be an alternative to prosthodontic treatment in some cases of tooth loss or aplasia. Any tooth within the patient's dentition might be a candidate for transplantation. Third molars have been most frequently used, for a number of reasons. These teeth, that otherwise are often extracted, have served well as replacements for destroyed first molars.[3–6] After the decisive work of Apfel,[7] who reported transplantations of the third molar buds into extraction sites of the first permanent molars, Nordenram and Bergman,[6] Baum and Hertz,[5] and Slagsvold and Bjercke[8] started premolar transplantations in orthodontic problem cases. Various studies in the literature demonstrate the high success rate of autotransplantations.

The objective of this article is to report a case involving mandibular third molar autotransplantation combined with Le Fort I and sagittal split ramus osteotomies.

CASE REPORT

A 22-year-old woman with conspicuous facial asymmetry visited our clinic (Figure 1a,b). The patient's dental history showed that her 21 was fractured and that she had had endodontic treatment after a trauma she suffered at age 12. She had 18, 28, 15, and 25 congenitally missing and also 26, 32, and 33 had been extracted.

An intraoral orthodontic examination demonstrated that the extraction spaces of 32 and 33 were closed and that the mandibular midline was shifted to the left side. On the other hand, the extraction space of 26 was preserved. She had fillings on 11, 16, 36, 37, 46, and 47. She also had a narrow maxillary arch (Figures 2a through e and 3). Oral hygiene and gingival conditions were poor. The cephalometric analyses showed a dolichofacial pattern. Table 1 shows the cephalometric measurements.

Treatment plan

Treatment was initiated after improving oral hygiene and gingival status with the plan to maintain the space of 26 and to apply orthognathic surgery in order to correct the facial asymmetry.

Treatment was initiated by expansion of the maxillary arch by Quad Helix appliance. After obtaining adequate expansion, maxillary and mandibular teeth were bonded and aligned. When the teeth were in the desired position, the orthognathic surgery was planned. Because the man-

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Accepted: April 2003. Submitted: February 2003.

FIGURE 1. (a) Pretreatment extraoral frontal view. (b) Pretreatment extraoral lateral view.

TABLE 1. Cephalometric Measurements

Convexity (mm)	−4
Lower facial height (°)	58
Facial depth (°)	91
Facial axis (°)	88
Maxillary depth (°)	87
Maxillary height (°)	60
Mandibular plane (°)	31
SNA (°)	80
SNB (°)	83
ANB (°)	−3
Cranial deflection (°)	28
Mandibular arc (°)	28
Lower lip to esthetic plane (mm)	−3
Saddle angle (°)	118
B1 to A-Po plane (mm)	3
B1 inclination to A-Po (°)	20
A1 to FH plane (°)	113
A1 to SN plane (°)	105
A1 to NA plane (°)	25
A1 to NA plane (mm)	7

dibular third molars were in the osteotomy site, it was deemed appropriate to extract them (Figure 4). Consequently, autotransplantation of one of the mandibular third molars to the extraction site of 26 was considered. On the basis of a diagnostic setup, it was decided to transplant 48 in a 90° rotated position. After consultation with the oral surgeon, this alternative to the prosthodontic treatment was proposed to the patient. The potential risks of this treatment as explained to the patient were either inflammatory root resorption of the transplanted tooth, a condition known to be treatable endodontically, or ankylosis of the transplant. The latter complication, although untreatable, is known to constitute a normally functioning, symptom-free tooth for years, thereby postponing the prosthodontic treatment for years.

After the treatment alternatives had been explained to the patient, she chose the treatment that included autotransplantation of the mandibular 48, accepting the potential risks. To avoid the occlusal forces, the tooth was placed in a slightly gingival position (Figures 5 through 7). Before orthognathic surgery, 38 was extracted. Le Fort I and sagittal split ramus osteotomies were performed six months after transplantation to correct the facial asymmetry. After the final phase of orthodontic treatment, fixed appliances were removed and Hawley-type retainers were placed (Figures 8 through 10).

Clinical and radiographic follow-up

During the first two weeks after autotransplantation, a soft diet was given, and the patient was instructed to avoid chewing on the left side for approximately one month. No

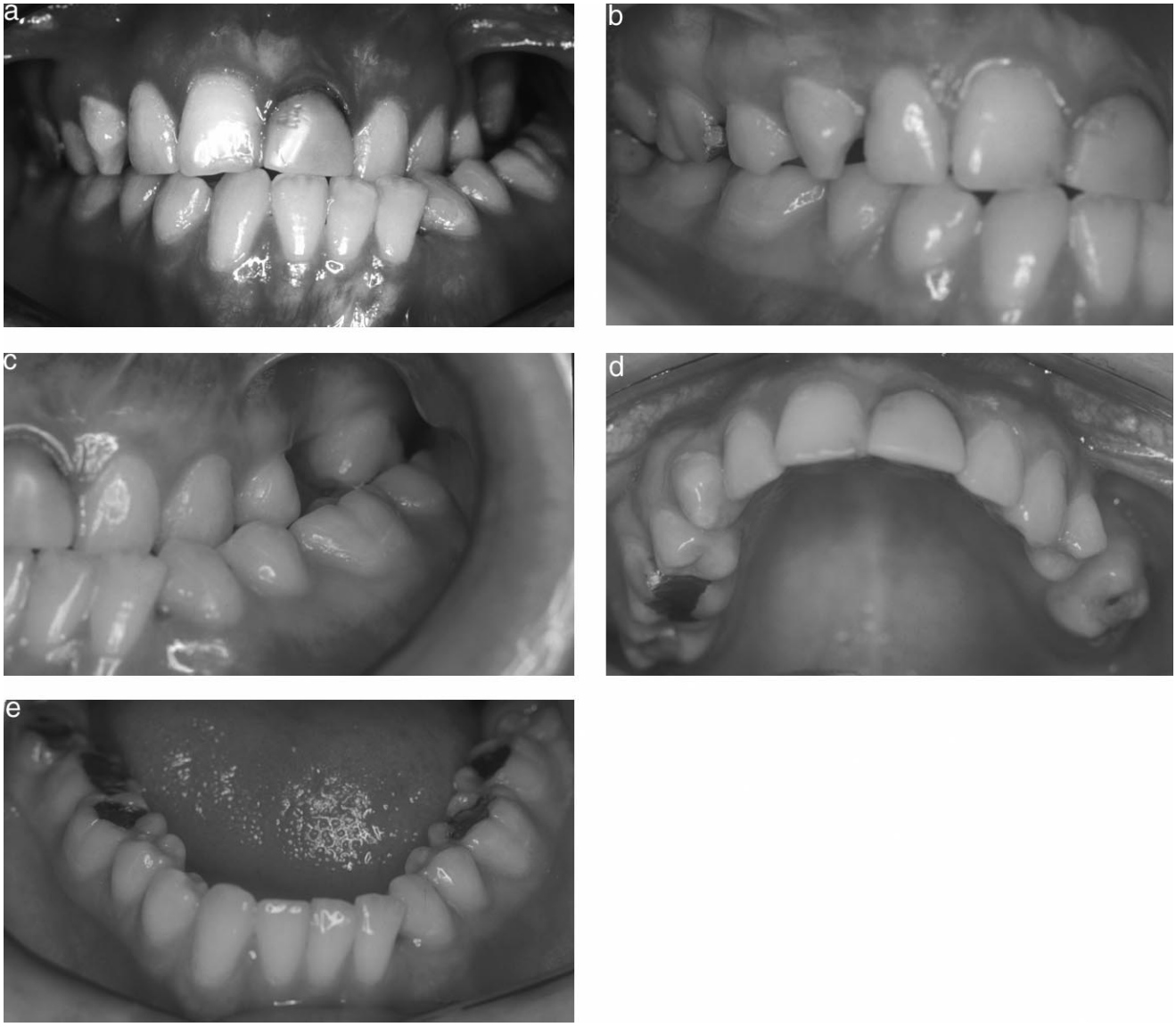

FIGURE 2. (a)–(c) Intraoral view. (d) Maxillary arch. (e) Mandibular arch.

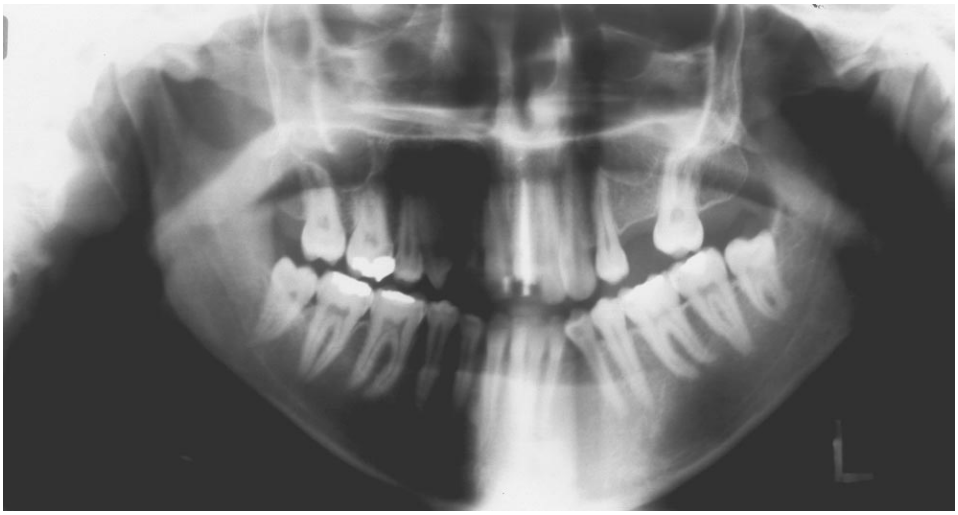

FIGURE 3. Pretreatment panoramic radiograph.

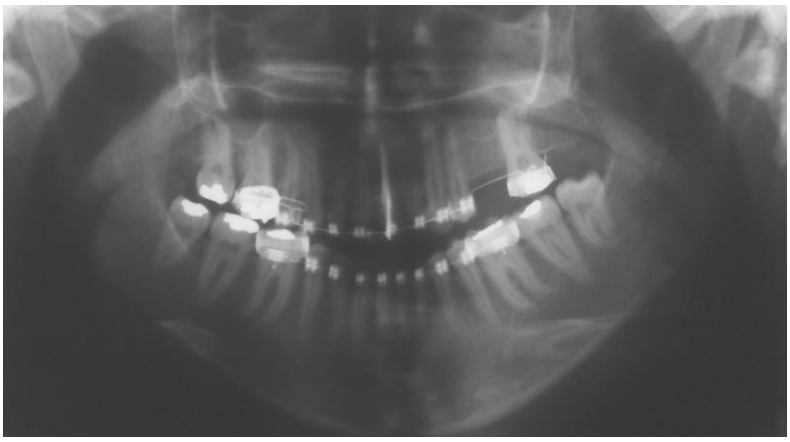

FIGURE 4. Panoramic radiograph before autotransplantation.

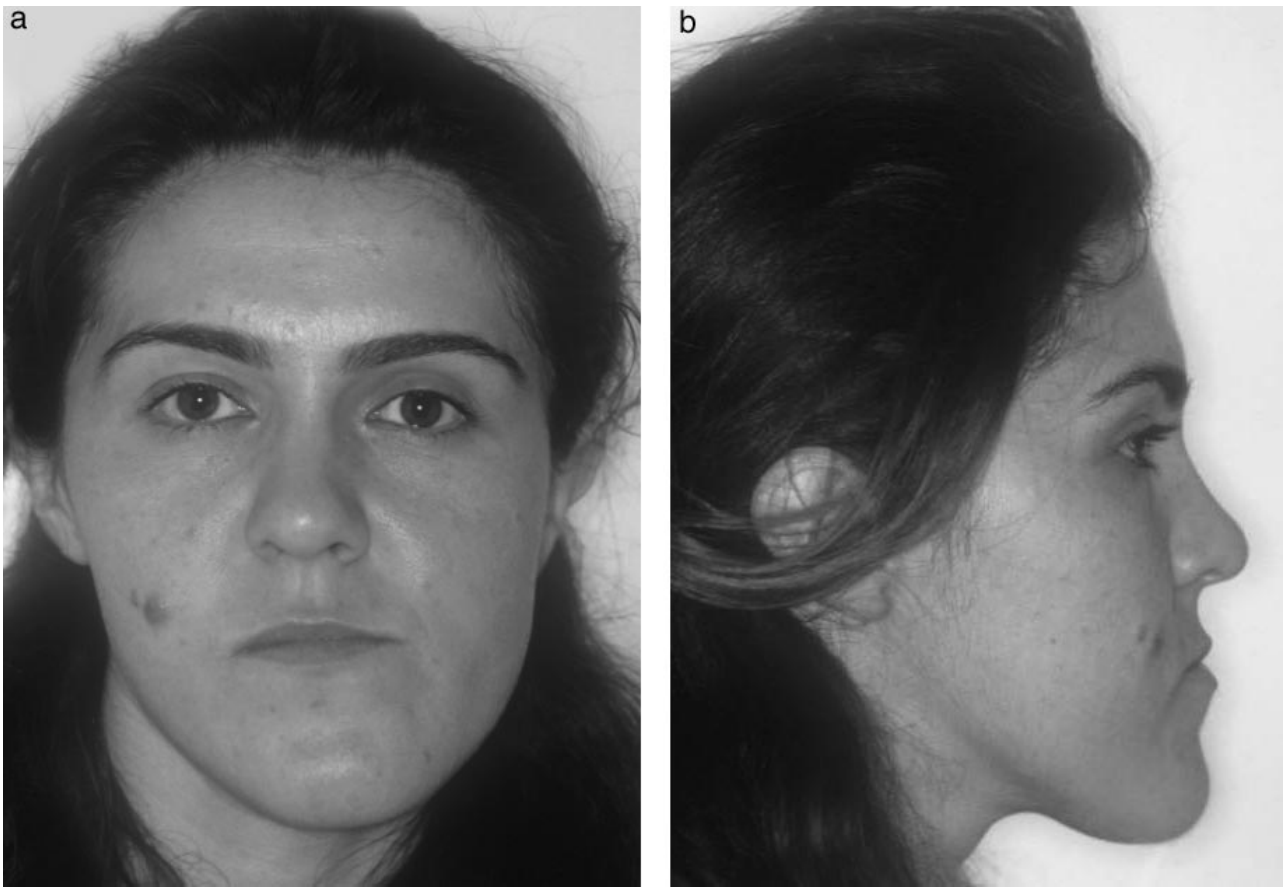

FIGURE 5. (a) Extraoral frontal view before orthognathic surgery. (b) Extraoral lateral view before orthognathic surgery.

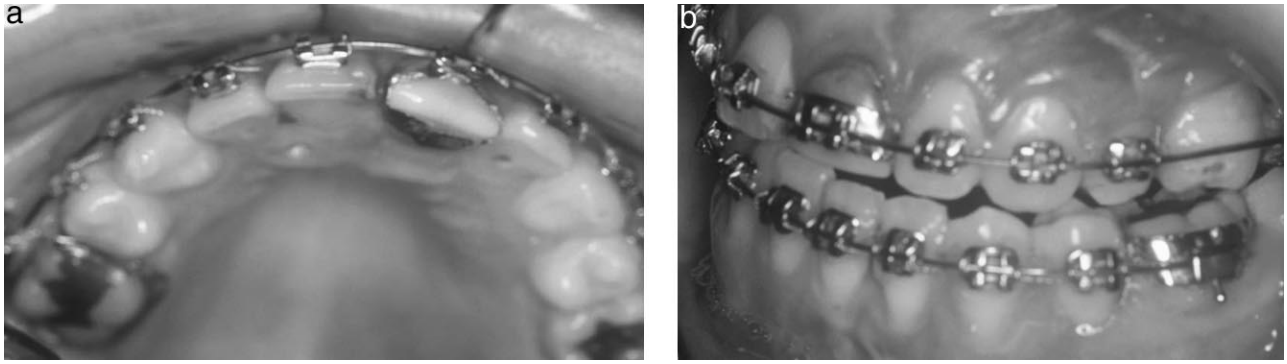

FIGURE 6. (a) and (b) After autotransplantation.

FIGURE 7. Panoramic radiograph after autotransplantation.

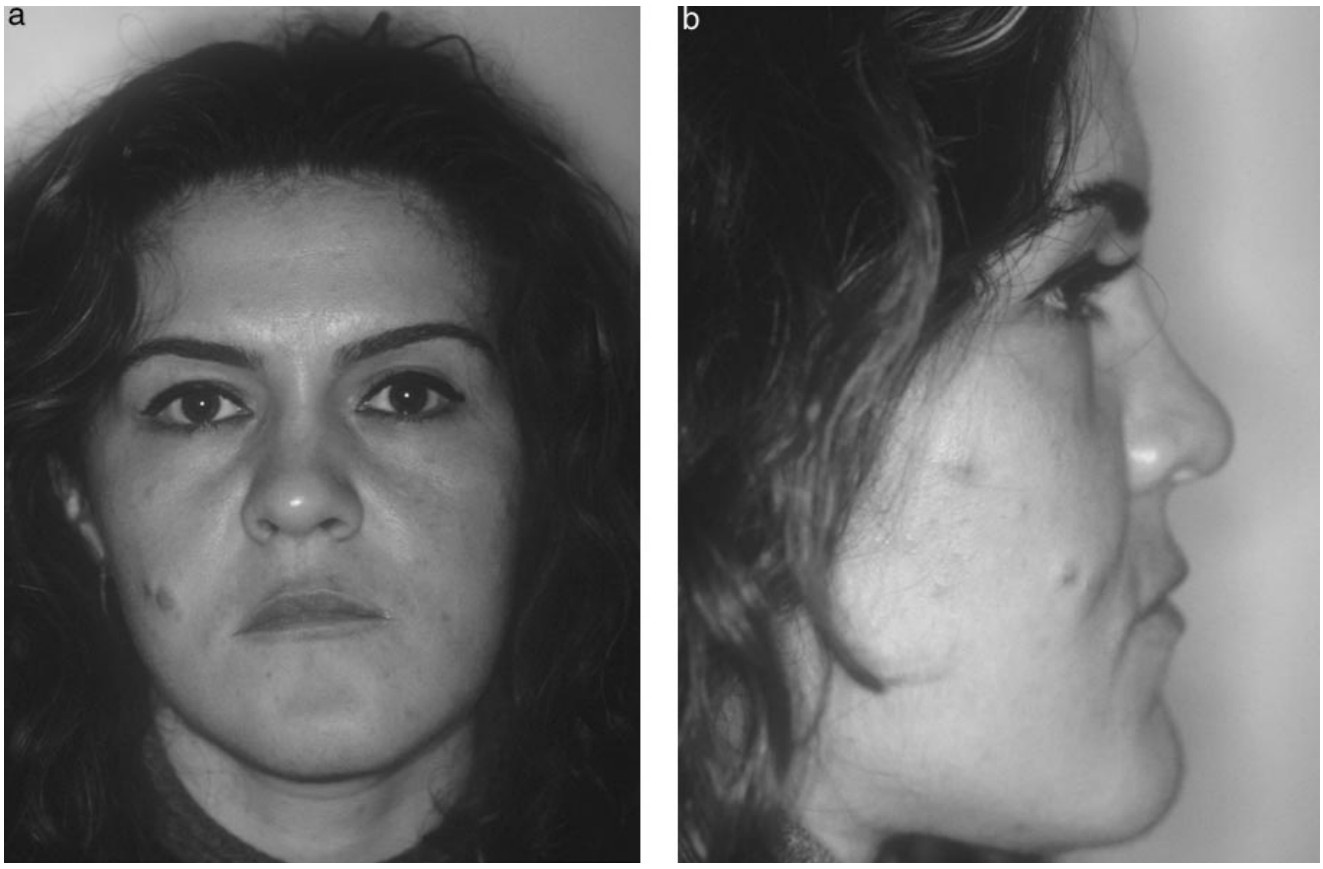

FIGURE 8. (a) Frontal extraoral view at the end of treatment. (b) Lateral extraoral view at the end of treatment.

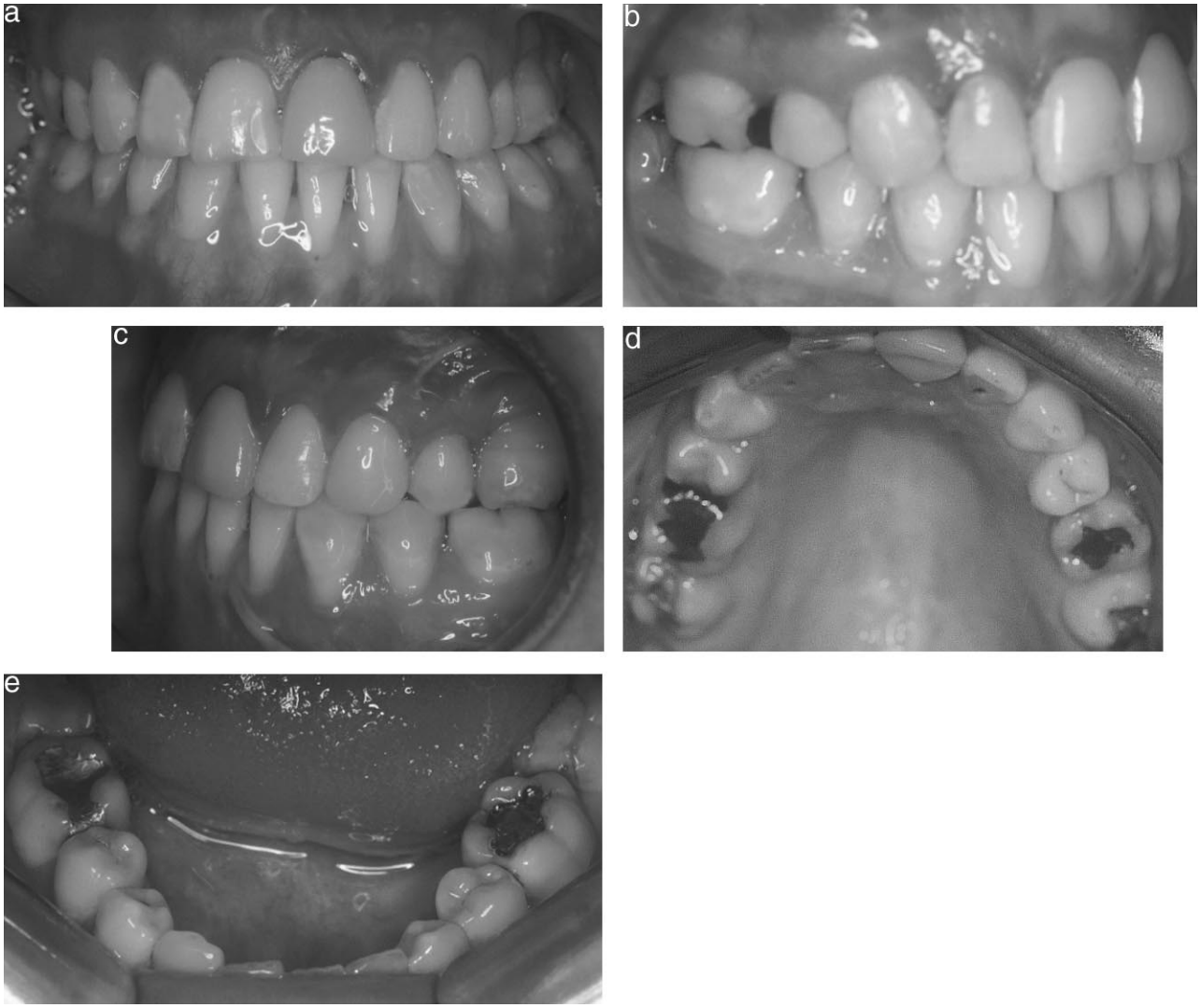

FIGURE 9. (a)–(e) Intraoral views at the end of treatment.

FIGURE 10. Panoramic radiograph at the end of treatment.

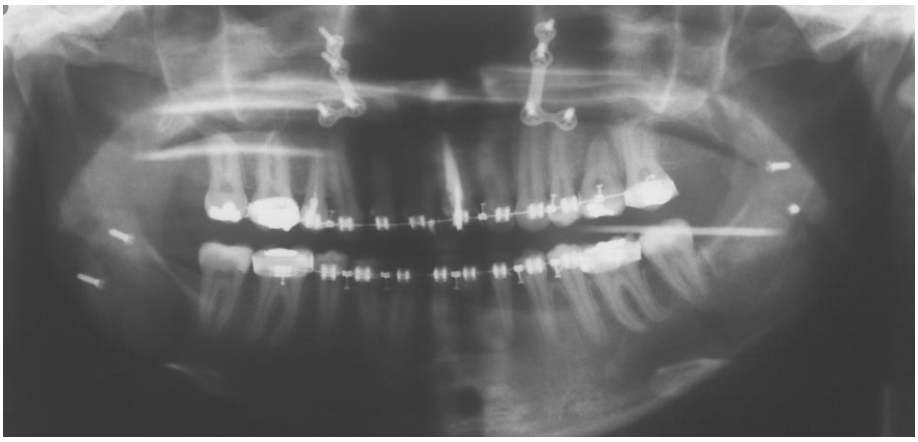

FIGURE 11. Panoramic radiograph, 10 months after autotransplantation.

FIGURE 12. Panoramic radiograph, 22 months after autotransplantation.

signs of tenderness or pain during mastication were recorded at any time. Postoperatively, no tenderness to percussion or ankylosis-like percussion sounds was found, and no signs of gingival inflammation were noted in the follow-up period. At the time of removal of the fixed appliance, the transplanted tooth was firm with normal mobility. After 22 months, clinical examination of the transplant showed a normal percussion response, which demonstrated unaltered normal mobility. The gingiva showed no signs of inflammation.

The radiographic follow-up revealed normal bone healing around the transplanted tooth with regeneration of normally appearing periodontal space 10 months after transplantation (Figure 11). At the follow-up 22 months after autotransplantation, no signs of inflammatory or replacement root resorption were found, and the marginal bone support appeared similar to the neighboring teeth (Figure 12).

DISCUSSION

Autotransplantation in certain cases of tooth loss or aplasia can be an alternative to prosthodontic treatment. The trauma of reimplantation can elicit adverse periodontal reactions and significant pulp damage, which can be healed by various pulpal dental processes. Breivik[9] reported that odontoblasts can perfectly survive the reimplantation procedure, reparative dentin being already noticeable after two weeks in the apical third of the tooth. A wide open root apex seems to create favorable conditions for the healing processes: the pulp of immature teeth recovers vitality, but revascularization rarely takes place if root formation is completed, as confirmed by Kristerson[10] and Andreasen et al.[3] Andreasen et al[11] also reported in a later study that the incidence of pulp necrosis and root resorption was greater in mature premolar transplants because of their closed apices.

Agnew and Fong[12] have documented a reestablishment of blood supply within a closed apex. Northway and Konigsberg[1,13] have reported that complete rigidity during the initial healing may increase the chances of ankylosis or an otherwise nonphysiologic union, so they believed that sufficient fixation can be provided with adequate depth of preparation at the recipient site, sutures, and proper diet management. In some situations, there may be resorption

of the alveolar ridge at the recipient site with insufficient buccopalatal width to accommodate the transplant. In such cases, specialized investigative techniques may have to be carried out to ascertain the amount of bone present buccopalatally. Alveolar bone grafting of the recipient site may be required before transplantation.[14]

Two factors known to have tremendous effect on the quality of the transplantation are preserving the periodontal membrane and minimizing the time the tooth is out of the mouth during transplantation.[15–18] Great care must be taken to avoid touching the periodontal ligament and to include Hertwig's epithelial root sheath. This procedure should not be performed in areas of localized infection; moreover, studies indicate that antibiotic therapy after transplantation is beneficial.[14,19]

Various long-term studies were conducted to evaluate the success rates of autotransplantation. Andreasen et al[11] reported survival rates of more than 90% in a comprehensive study, but only a few of their transplants had an observation period of more than 10 years. Schwartz et al[20] presented a mean observation time of 10 years with a range of one to 25 years for transplanted teeth. Czochrowska et al[21] reported a high success and survival rate in a study of 33 transplanted premolars with a mean follow-up period of 26 years.

CONCLUSIONS

In this article, we have presented the case of a patient treated successfully by orthognathic surgery and autotransplantation. Autogenic tooth transplantation is a treatment modality that should be considered. In properly selected cases, the need for prostheses can be eliminated and maximal conservation of tooth tissue is acheived.

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