Abstract: This case report describes the use of autotransplantation as part of an orthodontic treatment plan where there was early loss of an upper molar tooth secondary to irreversible pulpitis. An impacted lower third molar, which had symptoms of pericoronitis, was transplanted into the upper left second molar socket. Fixed orthodontic treatment, to correct the patient’s initial complaint of crowding, was completed in 22 months. The transplanted tooth remained vital and functional throughout.

Clinical Relevance: The enforced loss of large molar teeth can provide the orthodontist with problems of excess space in patients with minimal crowding. In these situations, the autotransplantation of symptomatic, impacted third molars may be indicated.

Autotransplantation can be defined as the transplantation of embedded, impacted or erupted teeth from one site to another in the same individual into extraction sites or surgically prepared sockets.¹ The technique has been advocated in situations where the patient would require a fixed prosthesis, or where osseointegrated implants are contraindicated in a growing patient owing to the risk of infra-occlusion or expense. It has been reported that the average lifespan of a conventional bridge in general dental practice was 6.2 years, indicating many replacements over the lifespan of a young patient.²

The first case reports occurred in the 1950s, describing the autotransplantation of immature third molars to replace carious first molars.³,⁴ Since then, an increasing number of teeth, especially premolars and canines, have been successfully transplanted.

The effects of orthodontic tooth movement on transplanted teeth have been investigated⁵ and it has been shown that there is a slightly increased risk of inflammatory root resorption. It was thought advisable that only light orthodontic forces should be applied initially and no sooner than three months post surgery.⁶ The literature also advises that teeth with mature apices at the time of transplantation should undergo endodontic treatment with calcium hydroxide 4 weeks post surgery.⁷

Success rates of 95% at five years have been reported for premolar teeth with immature apices, and 98% survival rate for mature premolar teeth that underwent endodontic therapy four weeks post transplantation.⁸

Complications encountered following transplantation include:
- loss of pulpal vitality;
- poor periodontal healing;
- root resorption; and
- ankylosis.

CASE REPORT
A fit and healthy, 25-year-old female was referred to the Orthodontic Department at Chesterfield Royal Hospital by her general dental practitioner. She complained of crowding around her upper incisor teeth. Clinical examination revealed a Class III incisor relationship on a mild Class III skeletal base with reduced FMPA and competent lips (Fig. 1a–h). Intra-orally, the oral hygiene was fair. The teeth present were 7| – 2| and 7| – 7|; 8|8 were unerupted and mesially impacted and the patient was missing 8|8. Unfortunately, 7| and 7| had large carious cavities and were diagnosed as having a poor long-term prognosis (Figure 2). The patient also reported previous symptoms of pericoronitis associated with 8|.
There was mild crowding in both arches (3 mm) with $21|1$ in crossbite. The incisor relationship was Class III, overjet was -2 mm in intercuspal position and the overbite was reduced. The buccal segment relationship was Class I on the right and 3 mm Class III on the left. There was no discernible mandibular displacement on closure.

The treatment plan was as follows:

- Extract $|7, |7$.
- Autotransplantation $8$ into $|7$ socket.
- Allow eruption of $8$.
- Upper and lower pre-adjusted edgewise appliances.
- Retention.

This plan would provide an occlusal contact for $8$ when it erupts, preventing future overeruption.

Because of the need to operate bilaterally, and taking into consideration the patient’s nervous disposition, the extractions and autotransplantations were carried out under general anaesthetic. Using a minimally traumatic technique, every effort was made to minimize any instrumentation of the root of the tooth to be transplanted. The transplanted tooth was gently placed in the socket vacated by the carious upper left second molar and was held in place by a vacuumed-formed splint, cemented with zinc oxide eugenol for 7 days. Periodontal and radiographic examination revealed satisfactory healing with no evidence of pathology (Figure 3a–c).
Three months post-transplantation, fixed appliance therapy was commenced. Upper first permanent molars were banded and upper and lower bonds were placed on the remaining teeth. Using a simple sequence of 016 NiTi, 18/25 NiTi and 19/25 steel alignment of the teeth rapidly occurred (Figure 4). Treatment took 22 months to complete with both the third molars remaining asymptomatic throughout. Endodontic treatment for the transplanted tooth was discussed with the patient, who decided she would prefer to wait to see if symptoms arose before embarking upon this difficult and time-consuming procedure.

A full periodontal examination and pulp testing with ethyl chloride at the end of fixed appliance treatment revealed the tooth to be healthy and completely functional 28 months post-transplantation. The patient was delighted with the dental and facial result achieved (Figure 5a–h), particularly after her general dental practitioner provided aesthetic work with composite restorations.

**CONCLUSION**

In cases where molars have a poor long-term prognosis and third molars are present, autotransplantation should be considered as a possible treatment option. With good communication and co-operation between the orthodontist, the maxillofacial surgeon and the general dental practitioner, excellent aesthetic results may be obtained in difficult cases.

**REFERENCES**


**Figure 4.** Near end of treatment OPT.

**Figure 5.** (a–h) Post-treatment views. (a) Extra-oral full face view. (b) Extra-oral three-quarter view. (c) Extra-oral profile view. (d) Intra-oral right buccal view. (e) Intra-oral anterior view. (f) Intra-oral left buccal view. (g) Upper occlusal view. (h) Lower occlusal view.