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## Case Report

# Surgical Management of Multiple Dental Anomalies in an Adolescent: A Case Report

Michaela DeSeta<sup>1\*</sup>, Nabina Bhujel<sup>2</sup> and Jerry Kwok<sup>3</sup>

<sup>1</sup>Specialty Dentist in Paediatric Dentistry, Paediatric Dentistry Department, Guy's and St Thomas' NHS Foundation Trust, St Thomas' Hospital, London, UK

<sup>2</sup>Consultant in Paediatric Dentistry, Paediatric Dentistry Department, Guy's and St Thomas' NHS Foundation Trust, St Thomas' Hospital, London, UK

<sup>3</sup>Oral Surgery Consultant, Oral Surgery Department, Floor 23, Guy's and St Thomas' NHS Foundation Trust, Guy's Hospital, London, UK

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### ABSTRACT

**Introduction:** Unerupted or impacted teeth are commonly seen in young adolescents, whilst transposition of teeth is fairly uncommon. Paediatric patients presenting with an impacted or missing permanent tooth can complicate what may otherwise be a straightforward transition to the permanent dentition. In patients with multiple impacted teeth or transposition of teeth, the complexity of the case is increased further.

**Case Report:** We present a case of impaction and transposition in an adolescent, managed by surgical technique only, using autotransplantation and corticotomy. This technique permitted rapid positional changes of the teeth to give an immediate aesthetic and functional improvement, with less reliance on long-term patient compliance. **Conclusion:** This report discusses the complexity of different treatment options that could have been undertaken. A multidisciplinary approach gave more treatment options to the patient, and total surgical management had many clinical advantages, along with a huge reduction in overall treatment time.

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## 1. Clinical Relevance

### 1.1. Scientific Rationale

Children presenting with impacted or ectopic teeth are often managed through a combination of surgery and orthodontics. More complex cases, such as multiple impactions or transpositions, can involve many management options with prolonged treatment times.

### 1.2. Principal Findings

In more complex cases, a surgical only approach despite being more invasive, can offer many clinical advantages as well as hugely reducing the treatment time. Autotransplantation is a well documented, successful technique which permits rapid movement of the teeth.

### 1.3. Practical Implications

This report shows how autotransplantation and corticotomy can be valuable tools in cases of complex dental anomalies in an adolescent.

## 2. Introduction

Unerupted or impacted teeth are commonly seen in young adolescents, and usually present in the mixed-dentition [1]. They can manifest with delayed eruption and retained deciduous teeth, and are often noted when the contralateral tooth has erupted more than 6 months earlier [1]. Transposition of teeth is fairly uncommon, at around 0.33% prevalence, and it is more commonly seen in the maxilla [2]. Paediatric patients presenting with an impacted or missing permanent tooth can complicate what may otherwise be a straightforward transition to the permanent dentition [3]. In patients with multiple impacted teeth or transposition of teeth, the complexity of the case is increased further [3]. We present a case of impaction and transposition dealt with purely through surgical management, following a multidisciplinary team discussion with the paediatric, orthodontic and surgical teams.

The most commonly impacted teeth are third molars, followed by maxillary canines and maxillary central incisors [1]. Unerupted or missing anterior teeth can affect both the occlusion, and the dental and facial aesthetics, which in turn can affect confidence and self-esteem [4]. The causes for tooth displacement are often multifactorial, linked to

\*Correspondence to: Michaela DeSeta, Paediatric Dentistry Department, Guy's and St Thomas' NHS Foundation Trust, St Thomas' Hospital, London, UK

inadequate space, obstruction or previous dental trauma [1]. Failure of eruption of maxillary incisors may be seen alongside other dental anomalies including supernumeraries, ectopic teeth, and enamel hypoplasia [5].

Management of ectopic teeth usually requires a combination of orthodontics along with surgical assistance, by exposure and bonding of the impacted teeth, or autotransplantation. The general principles are to ensure adequate space in the arch along with removal of any obstructions [1]. Autotransplantation involves surgical transfer of the impacted teeth into surgically prepared sockets within the same patient [6, 7]. It is a well-documented way of managing ectopic teeth when surgical exposure and orthodontic realignment has failed, or is problematic, due to unfavourable impaction position [8]. Success rates vary between 79% and 92%, [9, 10], with the main risks being ankylosis, root resorption, loss of vitality, and the consequential need for root canal treatment [11]. Another surgical technique used to aid orthodontic alignment, especially in severe malocclusion, is corticotomy. The technique involves removal of cortical bone whilst keeping the marrow bone, to maintain blood circulation and continuity of bone tissues, and reduce the risk of necrosis whilst facilitating tooth movement [12].

### 3. Case Report

We present a case of an adolescent who presented with multiple dental anomalies, and was managed by surgical technique only, using autotransplantation and corticotomy. The patient was 13 years of age, fit and well, and was referred regarding his retained primary teeth. Referral to secondary care was extremely delayed in this case, which affected both the patient's confidence and self-esteem, as well as the treatment options available and the treatment outcomes. Clinical exam revealed a retained URA and URC, and unerupted UR1 and UR3, seen in (Figure 1). The rest of the dentition was well aligned with a Class I molar relationship, fair oral hygiene and no sign of caries. No reason could be found for the unerupted UR1, with no memorable history of trauma. Radiographic exam with dental panoramic tomography (DPT) seen in (Figure 2), revealed the UR1 and UR3 to be impacted, and the UR1 was transposed with the UR2. Further investigation with cone beam computer tomography (CBCT) showed the position of the UR1 root was horizontal with no dilacerations.



**FIGURE 1:** Patient at initial presentation.



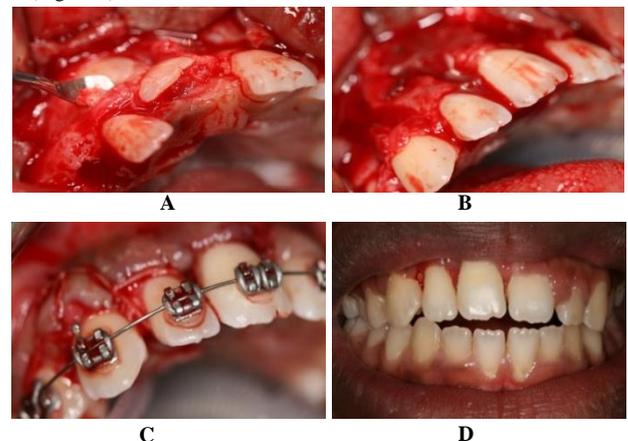
**FIGURE 2:** DPT of patient at initial presentation.

Following a multidisciplinary team discussion of the possible treatment options (Table 1), the patient and parent chose option 5, which was carried out under general anaesthetic by the oral surgery team. The patient understood that long term monitoring with sensibility testing and radiographs would be required following the surgical procedure, due to the risks associated with the autotransplantation and corticotomy procedures.

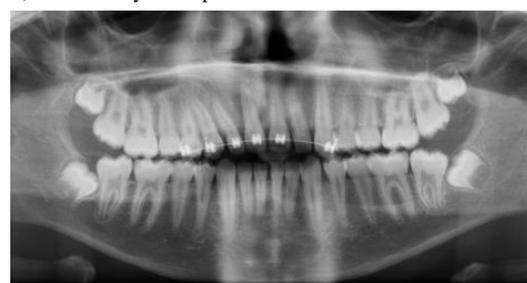
**TABLE 1:** Options for treatment.

1. No treatment- accept appearance (not an accepted option).
2. Extraction URA URC, expose and bond UR1 UR3, orthodontics to distalise UR2 and align UR1 UR3- accept transposition and camouflage UR2 UR3 as appropriate.
3. Extract URA URC, expose and bond UR1 UR3, realign UR3 into position over UR2 root, align UR1- accept risk of root resorption UR2.
4. Extract URA URC, autotransplantation of UR3 and UR1 into correct position, repositioning of UR2 with corticotomy to allow space for UR3- accept risks associated with autotransplantation.

Stages from the surgical procedure can be seen in (Figure 3A-3C). Post-surgical management included a 10 day course of antibiotics, analgesia, Corsodyl® mouthwash, and a 3 week post-surgical review. After a further 3 weeks, the orthodontic brackets and wire were removed (Figure 3D). Prior to the splint removal, a new radiograph was taken and is seen in (Figure 4).



**FIGURE 3:** Stages from the clinical procedure and following splint removal. **A)** Exposure of impacted teeth and position. **B)** Repositioned UR123 with corticotomy UR2. **C)** Fixation of the teeth in new position. **D)** Immediately after splint removal.



**FIGURE 4:** DPT taken 3 weeks following the surgical treatment.

#### 4. Discussion

This case shows the complexity of different treatment options that could have been undertaken, with the main complicating factor in this case being the transposition of UR2 UR3. Some options involved prolonged orthodontic treatment, with surgical assistance in exposure of the impacted teeth. Attempting to correct the transposition of the UR3 using orthodontic forces could also have caused significant root resorption of the UR2, and would have required careful radiographic monitoring. The option of surgical management alone was efficient and less prolonged in achieving a good aesthetic result. Autotransplantation with corticotomy permitted rapid positional changes of the teeth, to give an immediate aesthetic and functional improvement, with less reliance on long-term patient compliance.

By keeping the natural teeth versus any kind of prosthetic replacement, there was potential for induction of further alveolar bone growth and maintenance of a normal periodontal ligament to support proprioceptive function, along with maintenance of the interdental papillae, giving a more optimal aesthetic result [8]. Furthermore, as autotransplanted teeth have the potential to erupt alongside neighbouring teeth during continued facial growth of the patient, this is also a good option in younger patients who are still growing [13]. Autotransplantation has been a useful technique that has been performed with good outcomes [13]. In their retrospective study, Abela *et al.* reported that apical pathology was seen in 16% of autotransplanted teeth post-operatively with the majority of cases being evident in the first 3 years [13]. The majority of cases (70%) of external resorption were also seen within the first 3 years [13]. Other studies have concluded that fully developed teeth require root canal treatment following autotransplantation, due to the high possibility of pulpal necrosis [8].

Murtadha *et al.* looked at this retrospectively, and found that even in cases of teeth with complete root formation, there is potential for revascularisation [14]. They proposed that in mature teeth, close monitoring for radiographic signs of pulpal necrosis, internal resorption or external resorption is feasible prior to commencing any root canal treatment [14]. Due to the age of our patient at the time of treatment, it is possible that root canal treatment, particularly for the UR1, will be required in the next few years. This was discussed in detail with the patient prior to any treatment being done.

#### 5. Conclusion

This report highlights that surgical management in a paediatric case with multiple dental anomalies, can produce a good aesthetic outcome and improve a young patient's confidence and self-esteem. Auto transplantation was a valuable tool in the management of this case, and although it is more invasive than other treatment modalities, it has many clinical advantages and gave a vast reduction in overall treatment time. Although the patient was originally referred to the paediatric dental department, this report highlights that a multidisciplinary approach in complex paediatric cases, gives more treatment options to the patient. Total surgical management carried out by the oral surgery team was quick and efficient, and relied on the expertise of the clinical surgical team.

#### Conflicts of Interest

None.

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There was no funding involved in this project, but the authors carried out the management of the patient as part of their employment within Guy's and St Thomas' NHS Foundation Trust.

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