Autotransplantation of a premolar for incisor replacement and orthodontic traction of a supernumerary premolar - A case report

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Background

Autotransplantation is a technique that can provide for definitive tooth replacement for children and teenagers in the anterior area[1]. Multidisciplinary and multispecialty collaboration appears to contribute to successful outcomes through shared expertise[2]. This case report describes the autotransplantation of a premolar to replace a lost upper left central permanent incisor following a traumatic injury. It also shows how 3D planning and 3D printing can aid in surgical planning and receiver site preparation to avoid iatrogenic damage.

Case presentation

A male teenager presented to the clinic with a missing upper left central permanent incisor which was lost following a traumatic injury. Incidentally, the patient also had a supernumerary impacted premolar above the second upper left premolar. The patient was thus identified as a potential candidate for autotransplantation.

Initially, the supernumerary premolar was the tooth considered for transplantation. The patient was placed on a recall schedule to wait for the premolar to develop a longer root. As its root development was very slow and due to ease of access, it was decided to transplant the second permanent premolar. This tooth was easier to recover without damage to the PDL.

Despite being vital, it received a pre-extraction root canal therapy with an endodontist since its apex was closed. The tooth underwent orthodontic activation forces for 6 weeks and was then extracted and reimplanted to replace the lost incisor. The selected tooth had two roots which was not ideal for transplantation but the surgery was aided by digital planning using a CBCT which was used to simulate the surgical phase. A 3D printed replica of the tooth to be transplanted was created in order to perform a trial surgery.
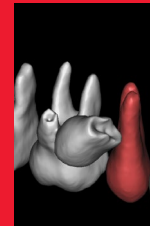
After the surgical site was prepared, the transplant was harvested and stabilized with sutures. Postoperative evaluation and radiographic assessment demonstrated successful healing of the transplanted tooth.

Preoperative panoramic radiograph

Preoperative CBCT of the second premolar

Preoperative RCT on the second premolar

Maxillary resin model with Cr-Co replica

Post-transplant PA

Composite buildup

Postoperative panoramic radiograph

Discussion

The case presented was successful but longer follow-up is required to determine if it was a complete success. It appears that orthodontic treatment does make the surgical intervention and extraction easier. Autotransplantation of teeth is often perceived as unreliable but this perception is probably derived from failures related to reimplanted teeth following trauma. Surgical technique and surgeon experience seems to play a significant role. Datasets show that patient age also has an impact on success[3].

Conclusion

Autogenous tooth transplantation (ATT) of premolars allows for predictable replacement of traumatized incisors in children and teenagers. Pediatric dentists are uniquely positioned to incorporate autotransplantation of teeth in their practices. With digital 3D planning, the planning and surgical phases are now easier to execute by pediatric dentists.

References

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