

## DENTAL TRAUMATOLOGY

Much of what we know regarding the outcome of autotransplanted teeth is derived from our understanding of the care of teeth that are avulsed. Avulsion is the complete loss of a tooth from the mouth. It occurs in 0.5-3% of all dental trauma, is the most serious of the types of dental injuries, and is most common in the 9-12 year old.

Immediate re-implantation is the treatment of choice for permanent teeth which is aimed at reducing damage to the PDL (which in turn relates to the risk of ankylosis) and potentially allowing re-vascularization of the pulp in immature teeth.

Before re-implantation, the tooth and socket should both be gently but thoroughly rinsed with saline. Root surface treatment with a topical antibiotic (1mg minocycline or doxycycline / 20mL saline soak for 5 minutes) appears experimentally to improve the chance of re-vascularization in immature teeth. Root canal treatment is only performed on these immature teeth if infection develops and/or the pulp space does not re-vascularize on its own.

For teeth with a closed apex, root canal treatment should be initiated in 7-10 days post re-implantation. Calcium hydroxide should be used for one month, then root canal filling can be performed.

A flexible splint should be applied for the first two weeks (rigid splints can promote ankylosis), and an antibiotic administered. Cleaning the area by the patient should be performed with chlorhexidine or a soft toothbrush for the first week. The patient should consume a soft diet for the first two weeks and resume normal function thereafter.

Despite our best efforts, the long term expectation is that in up to 70% of cases, root resorption will occur.

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## WHAT IS AUTOTRANSPLANTATION?

Tooth autotransplantation is the surgical extraction of a tooth from one location in the alveolus, and implantation at a different position in the ridge. A variation of this is called transalveolar transplantation where a tooth that is severely malpositioned in the correct tooth area is surgically uprighted into a more ideal orientation.

Tooth autotransplantation in humans was first reported in the literature by Bjercke and Slagsvold in 1959, and can be used to replace any missing, malpositioned, or damaged tooth.

The donor tooth root should be incompletely formed such that it is 2/3 to 3/4 in length of development (which corresponds to a chronological age of 9-12 years).

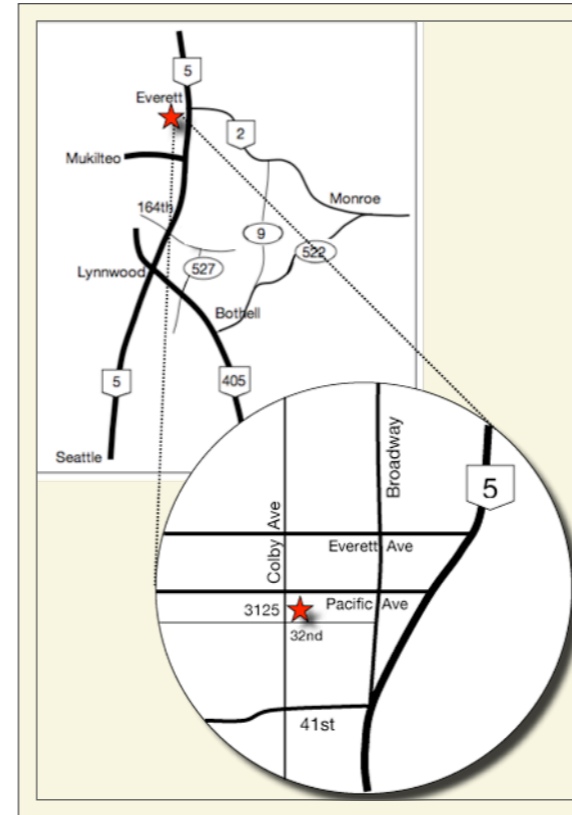
Because the donor tooth is extracted, there is risk of damage to the PDL or pulp space, which can lead to incomplete root formation or malformation, obliteration of pulp space, root resorption, or pulp necrosis. If replacement root resorption occurs as a result of damage to the PDL, then ankylosis (fusion of the root to the bone) will occur and the tooth will eventually be lost. If inflammatory root resorption caused by pulpal injury and necrosis occurs, then root canal therapy is necessary to arrest resorption and maintain the tooth for as long as possible.

Survival rates are reported even up to 100% for autotransplantation of pre-molars at 1 year, and with 90% survival at up to 41 years by patients originally treated by Drs. Slagsvold and Bjercke.

This issue of **ProbeTips** will illustrate four more common situations shared by other clinicians, where autotransplantation can be utilized. I've had the fortune to attend a course in London in September, and hope to provide this service as the opportunity arises.

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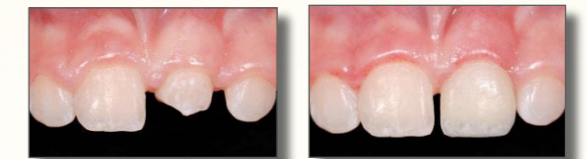
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# PROBE TIPS

A QUARTERLY PERIODONTAL  
NEWSLETTER

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## Autotransplantation of Developing Teeth



Images from article:  
AJODO 2012 Janakievski, J \*\*

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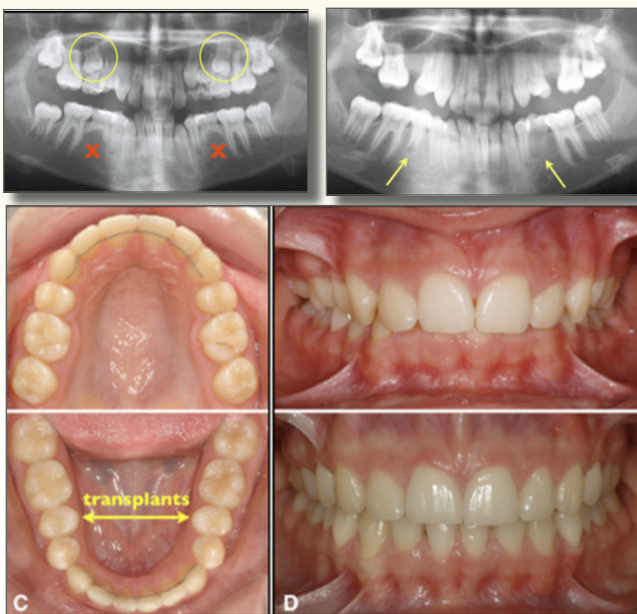
# Autotransplantation of Developing Teeth

## CASE 1: PREMOLAR TO PREMOLAR

IDEAL AGE: 10 YRS

Premolars are considered the easiest teeth to transplant. This is because of an easier surgical procedure with regard to access, and a root shape that is easier to fit into ridge osteotomies because they are generally single rooted. Ideally, the donor tooth should be removed from the non-affected quadrant or arch.

The case below demonstrates a situation where maxillary premolars which were an orthodontic excess were transplanted to the mandible where they were congenitally missing. The transplants prevent the use of fixed partial dentures or dental implants in the mandible in the future. No pathology was noted at the 5 year recall other than shorter root apices and pulpal obliteration.



Images from article:  
AJODO 2013, Plakwicz, P \*\*

## CASE 2: PREMOLAR TO CENTRAL

IDEAL AGE: 10 YRS

For a situation where a maxillary central incisor has been lost, or will need to be extracted (e.g. geminated central incisor), a premolar can be used to replace the missing tooth. The best premolars to use would be mandibular premolars because they are generally single rooted and have a small lingual cusp which would not interfere with occlusion. Maxillary 1st premolars are generally not used because of the prominent buccal root.

Once placed in the ridge and after 3 months to 1 year of healing, the orthodontist can position the premolar such that the CEJ is level with the adjacent central incisor, and in order to allow uneven space mesio-distally (1/3 mesially and 2/3 distally). Then the tooth can be more easily restored to match the natural central (see front page).



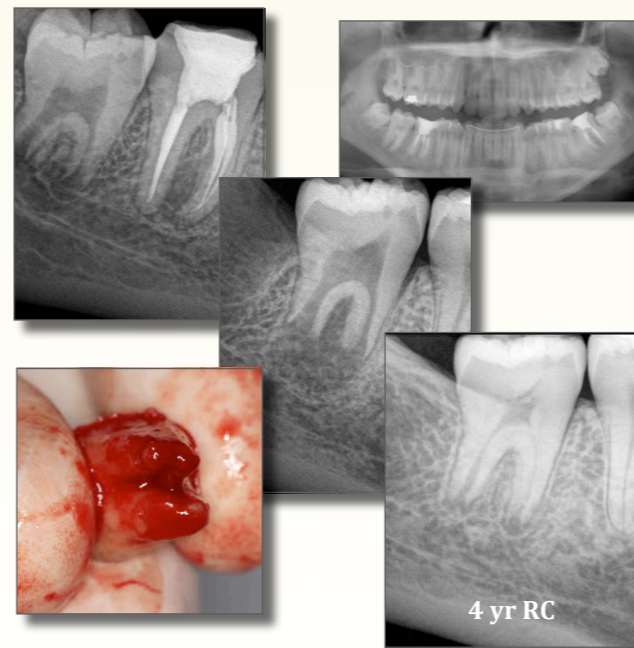
Images from article:  
PCSO Bulletin 2010 Janakievski, J \*\*

## CASE 3: MOLAR TO MOLAR

IDEAL AGE: 16 YRS

Developing molars can be placed into the space of missing or damaged 1st or 2nd molars. If it is a small enough 3rd molar, it can be used to replace a premolar or even a lateral incisor! Maxillary 3rd molars are easier to remove than mandibular 3rds, and are approached from the buccal. Because mandibular molars are more difficult to remove, the risk for damage and subsequent ankylosis or pulp necrosis is greater.

For the case below, tooth #31 had a strip perforation after endodontic treatment and was not restorable. It was extracted and tooth #32 was moved into its position. The tooth is vital and in good condition at 4 years despite slightly shortened root apices.

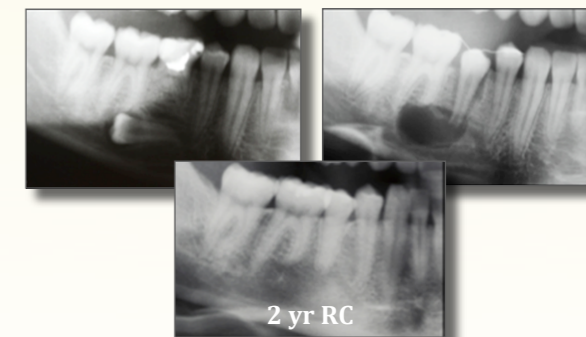


Unpublished images courtesy Dr. Keith  
Kanter, Endodontist, Orlando FL

## CASE 4: TRANSALVEOLAR

IDEAL AGE: 10 YRS

Surgically uprighting a tooth in the alveolus can be utilized in situations where orthodontic treatment would be not be possible or would be too complicated. In these situations, the recipient site is oversized because the donor tooth needs adequate bone removal to allow extraction of the tooth without damaging it. This often requires more stabilization than other types of transplantation, with non-rigid fixation up to 4 weeks. In addition, because of its malposition, the tooth is often malformed because of proximity to other structures which limit its normal development. CBCT is an excellent tool to visualize dilacerated roots which may be severe enough to prevent use of the tooth as a transplant.



Images from article:  
AJODO 2013, Plakwicz, P \*\*

## REFERENCES

- PCSO Bulletin. Janakievski, J. 2010.
- Dental Traumatology Andersson et al. 2012.
- AJODO. Janakievski, J. 2012
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\*Complete references available on request.\*

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