

CONTROLLED DENTAL TRAUMA

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 *avulsed* 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. In these cases, root canal treatment should be initiated 7-10 days post re-implantation. Despite our best efforts, the long term expectation in *traumatic* avulsion cases is that in up to 70% of cases, root resorption will occur.

However, in *controlled* surgical auto-transplantation cases, the literature indicates that risk of root resorption is lowered to 1% or less at 10 years in adolescent patients with immature roots**, with successful transplants documented up to 41 years* and counting. Success rates of 41 years when treating an adolescent in particular is outstanding, and outlives most restorative crown and bridge options even in adults! Transplants surpass ankylosed titanium implant outcomes in the following key ways:

Transplants can do what titanium cannot:

1. Create alveolar bone.
2. Maintain a natural papilla.
3. Erupt and move with facial growth (even as an adult).

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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 in the same individual. A variation involves a tooth that is severely malpositioned in the correct tooth area that is surgically uprighted into a more ideal orientation.

Transplantation of teeth between humans has been known as early as 1050AD when slaves were forced to donate their teeth to Pharaohs. Teeth were endodontically mature and transplantation failed due to lack of endodontic treatment. Diseases were also transmitted.

Modern tooth autotransplantation in humans has been reported in the literature as early as 1956. These transplants involved endodontically immature teeth, **the ideal transplant being a tooth that has 3/4 of the root formed and a simpler root morphology.** It is possible also to use mature teeth provided root canal therapy is provided in a timely manner. Orthodontic treatment planning and sequencing is also key.

As a restorative dentist, identifying young patients with traumatic or congenitally missing teeth, and having an orthodontist evaluate the potential for tooth transplantation can offer a solution that no other treatment modality can rival in terms of tissue regeneration for esthetic and hygienic outcomes in the shortest treatment time possible.

This issue of **ProbeTips** will review some of my newest cases and follow up on existing cases beyond those outlined in prior newsletters.

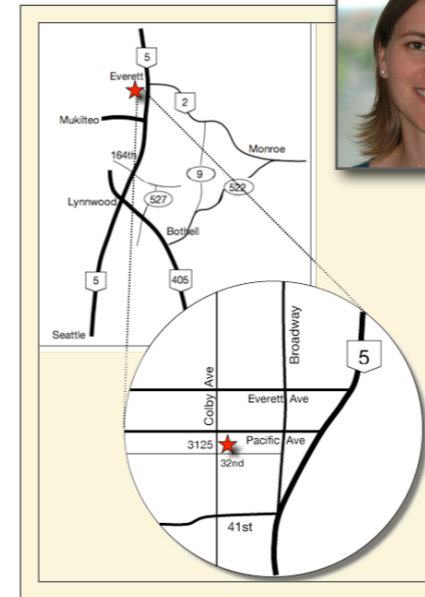
Follow the links below for further information!
https://nicoaraperio.com/Referring%20Doctors_files/ToothTransplantation.pps
https://nicoaraperio.com/Referring%20Doctors_files/TransplantationOverview.pdf

Pamela A Nicoara DDS MSD PLLC

PERIODONTOLOGY IMPLANTOLOGY ORAL MEDICINE

Pamela Nicoara is a Board Certified Periodontist practicing in Everett since 2007. She is a UW Perio graduate, and a transplant from Dallas, Texas.

She is driven to achieve esthetic and predictable outcomes, particularly for anterior implant cases, and is always looking to improve processes and results. You can email her directly below with questions, comments, or suggestions for future newsletters.



3125 Colby Avenue, Suite H
Everett WA 98201
T: 425-374-5380 F: 425-374-5382

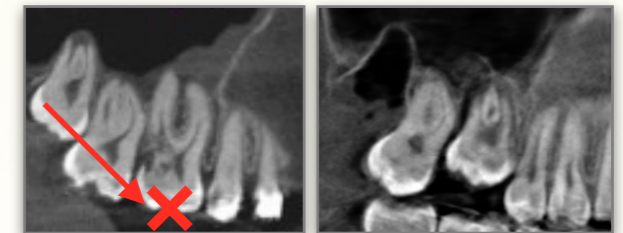
www.NICOARaperio.com
doctor@NICOARaperio.com

PROBE TIPS

A QUARTERLY PERIODONTAL NEWSLETTER

BY PAMELA NICOARA DDS MSD

Autotransplantation Update 2024



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Autotransplantation of Teeth



CASE 1: SURGICAL UPRIGHTING

Premolars are considered the easiest teeth to transplant because of a typically easier surgical procedure with regard to access, and a generally single root shape that is easier to fit into ridge osteotomies. The location of this tooth lingually, and severe root curvature of this premolar was not ideal, but I was still able to remove and replace it in a more ideal orientation in the same tooth space without damage. Because it was a mature tooth with a fully formed apex, root canal therapy was necessary.



Pre-Operative



Post-Operative

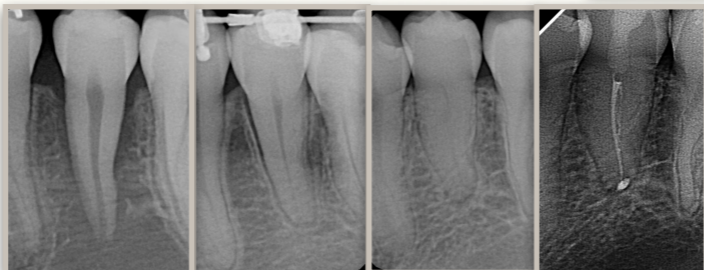
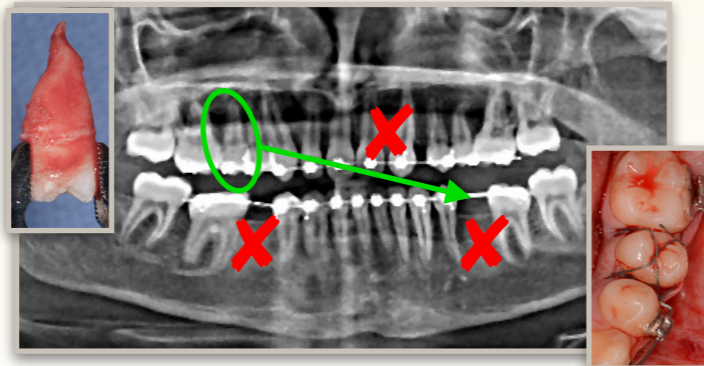


Post-Endodontic Care

CASE 2: PREMOLAR TO PREMOLAR

The case below was treated 4 years ago involving multiple missing teeth (#1, 10, 16, 20, 29 and 32). I was asked to move the maxillary premolar to the mandible to create the most symmetrical number of teeth per quadrant. Orthodontically closing spaces and substituting teeth minimizes the number of future implants to #29 only, so the implant is in a less esthetically demanding mandibular position. A shortened root apex and reduced canal space at 1 year is normal.

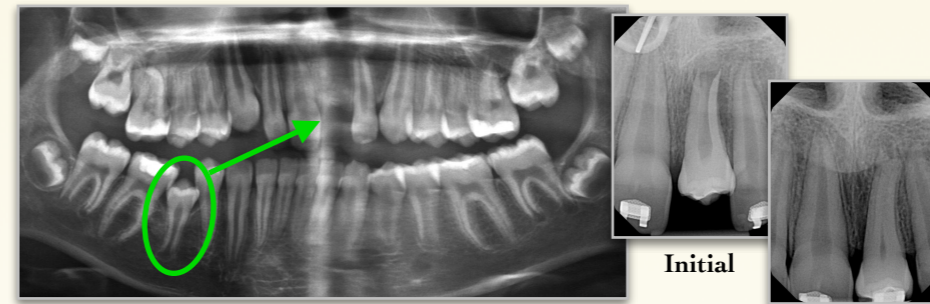
Recently, the patient noted pain to hot and cold. Root canal therapy was needed 4 years after transplantation. The long term expectation is excellent: it is not ankylosed and will be a long term solution postponing titanium implant replacement for as long as possible. Transplanting at an earlier root development stage lessens the risk for necrosis.



—Surgery— | —1 year— | ——— 4 years ———

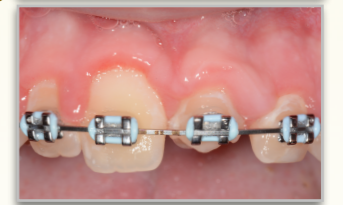
CASE 3: PREMOLAR TO CENTRAL

Tooth #9 was lost due to trauma in this 11 year old girl. Tooth #29 was blocked out by the adjacent teeth. The orthodontist did not need tooth #29 to maintain arch length, and I was asked to use it when at the ideal root stage to replace #9 to avoid an implant for as long as possible. Note the severe ridge resorption prior to surgery. The healthy PDL on the tooth regenerates the missing bone without any grafting, and the result at one year is natural papilla and gingival contours with a single surgical appointment in my office as opposed to multiple surgeries to achieve a potentially similar result with a titanium dental implant, which would have to wait until dentofacial maturity in 6 years. In the meantime, the space for #29 is closed.



Initial

1 year Recall



1 year Recall

At 1 year of healing, it is time to fabricate a facial restoration on the premolar to mimic a central. This will allow bracket placement in a correct position to move the CEJ of the premolar in line with the CEJ of the adjacent central #8. Some images below of a different case highlight fabrication of the restoration which leaves the palatal cusps of the premolar undisturbed and is minimally prepared facially. Any restorative work breaching the dentin will require endodontic treatment and may lead to failure of the transplant. Because the tooth had an open apex, root canal therapy was not required.

Different case highlighting the restoration. Veneer performed by Dr. Kyle Schmidt



REFERENCES

***Dental Traumatology*. Barendregt et al. 2023.

Dental Traumatology Andersson et al. 2012

AJODO. Janakievski, J. 2012

**AJODO*. Czochrowska et al. 2002. (Outcomes)

Complete references available on request, and more about autotransplantation at www.nicoaraperio.com.