

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 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.

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.

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 autotransplantation cases, the literature* indicates that risk of root resorption is lowered to 20% or less, with successful transplants documented up to 41 years and counting. This rivals titanium implant outcomes, and surpasses ankylosed implants 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 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.

Transplantation of teeth between humans has been known about as early as 1050 when slaves were forced to donate their teeth to Pharaohs. Teeth were mature and transplantation would fail due to lack of endodontic treatment. They could also transmit disease from one person to another.

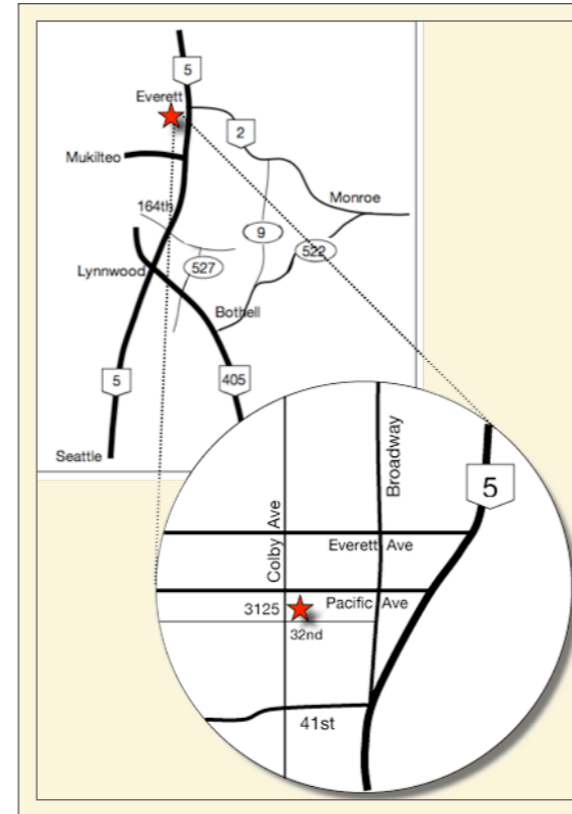
Modern tooth autotransplantation in humans has been reported in the literature as early as 1956 by Joseph Tam at the University of Minnesota, but was full developed and perfected in Norway by Bjercke and Slagsvold starting in 1959. These transplants involved immature teeth, but it is possible also to use mature teeth provided root canal therapy is provided in a timely manner.

Tooth autotransplantation is a fascinating treatment option for a specific class of patients, but one that can offer solutions 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 the uses of autotransplantation beyond those outlined in prior newsletters, as well as update you on a few of my own cases.

Pamela A Nicoara DDS MSD PLLC

PERIODONTOLOGY IMPLANTOLOGY ORAL MEDICINE



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

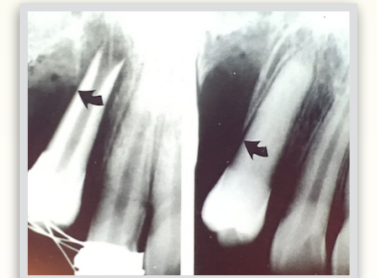
www.NICOARaperio.com
doctor@NICOARaperio.com

PROBE TIPS

A QUARTERLY PERIODONTAL
NEWSLETTER

BY PAMELA NICOARA DDS MSD

Autotransplantation Update



Taken from Dr. Jens O Andreasen

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Autotransplantation of Teeth

CASE 1: CANINE UPRIGHTING

Surgically uprighting a tooth is useful when orthodontic treatment would not be possible or would be too complicated or time consuming. My first transplant was a canine uprighting, and I'm pleased to report a healthy 3 year follow up. In this case, because the canine was mature with a closed apex, endodontic treatment with Dr. Tiina Oviir was necessary on tooth #22. Tooth #27 was exposed and a chain placed for traditional orthodontic uprighting with Dr. Terry Sullivan. Despite a complete lack of facial bone at the time of transplant, the 1 yr CBCT shows facial bone to 3mm apical to the CEJ.



Initial

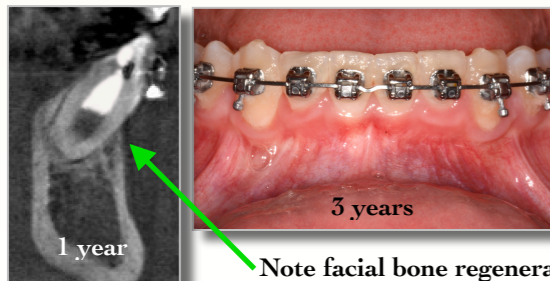
Primary canines removed, #22 uprighted, #27 chained



2 weeks

3 months

RCT required on mature tooth



1 year

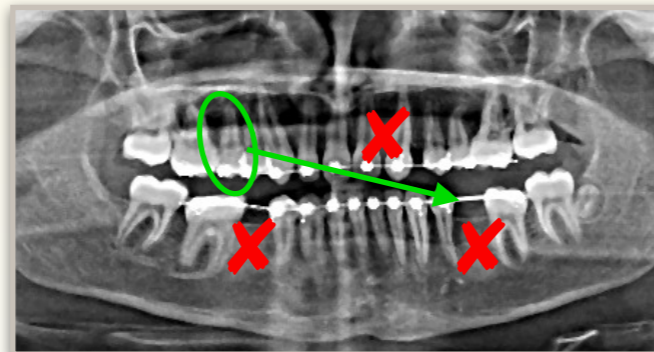
3 years

Note facial bone regeneration

CASE 2: PREMOLAR TO PREMOLAR

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

The case below involves multiple missing teeth (#1, 10, 16, 20, 29 and 32). A maxillary premolar is moved to the mandible in order to create the most symmetrical number of teeth per quadrant. Orthodontically closing spaces where possible and substituting teeth will minimize the number of future implants to site #29 only, keeping the implant in less esthetically demanding mandibular position. A shortened root apex at 1 year is normal.



----- Day of Surgery ----- | -- 1 year -- |

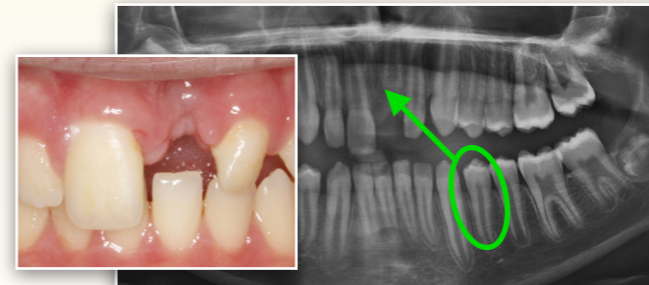
Surgeon: Dr. Pamela Nicoara
Orthodontist: Dr. Terry Sullivan

CASE 3: PREMOLAR TO CENTRAL

Mandibular first premolars are ideal replacements for central incisors because they have a small lingual cusp which would not interfere with occlusion, and are generally single rooted.

Once placed in the ridge and after 6 weeks or more of healing, the orthodontist can position the premolar so that the CEJ is level with the adjacent central incisor, and close the space where the donor tooth was taken.

Note the severe ridge resorption prior to surgery, requiring the significant apical position of the transplant. Despite this, the result is ideal papilla and gingival contours with a single surgical appointment. A titanium implant would require multiple surgeries to achieve a potentially similar result, which would have to wait until dentofacial maturity in this 13 year old.

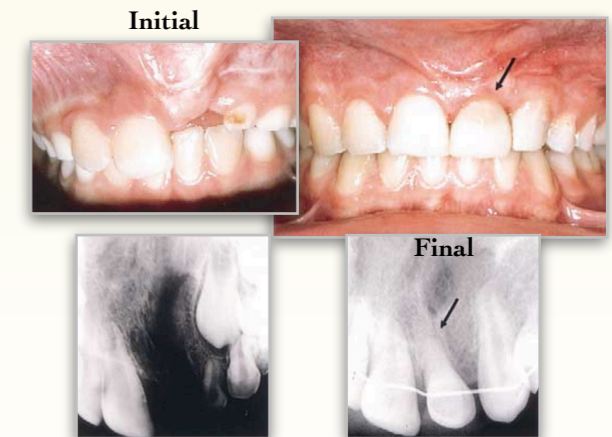


Surgeon: Dr. Jim Janakievski
Orthodontist: Dr. Michael George
Prosthodontist: Dr. Kyle Schmidt

CASE 4: CLEFT LIP

Cleft lip and palate patients have significant defects to overcome. Most repair surgeries are inadequate for creating a foundation for dental implants. Auto-transplantation offers an option, similar to our last case, to minimize surgical procedures and maximize tissue outcomes even in developing patients so that the time required for temporization is also lessened.

The case below from Dr. Bjorn Albus demonstrates placement of a mandibular premolar in the area of missing teeth #9 and 10. Tooth #11 is mesialized to substitute for #10, and the premolar is restored to look like a central. No other option allows for such ideal outcomes with such a minimal number of procedures.



Initial

Final

REFERENCES

- *AJODO. Czochrowska et al. 2002. (Outcomes)
- AJODO. Czochrowska et al. 2002. (Clefts)
- Dental Traumatology Andersson et al. 2012.
- AJODO. Janakievski, J. 2012
- *Complete references available on request.*