

Autotransplantation: Practical Uses in Modern Dentistry

KEY POINTS

- I. The movement of a tooth from one position to another within the same person; to replace any missing, damaged, malformed or malpositioned tooth as well as regenerate bone.
- II. Donor Tooth Developmental Stage
 - A. Immature teeth with open apex:
 1. Characteristics:
 - a) Ideal length 2/3-3/4 length (to allow for stability should the root not continue to form)
 2. Success Criteria:
 - a) Erupt into position (if transplanted infraocclusally), but orthodontically can assist to correct location.
 - b) Regenerate Bone
 - c) Continued root formation
 - d) Pulpal obliteration (tooth may be unresponsive to pulp test, does not require endodontic treatment)
 3. Causes for failure:
 - a) Damage to PDL: Ankylosis (may be ok if not resorptive and patient done growing), lack of bone regeneration
 - b) Damage to Hertwigs epithelial root sheath: Incomplete root formation (ok unless too mobile)
 - c) Damage to Pulp: Pulp necrosis needing RCT (ok unless RCT unsuccessful)
 - B. Mature teeth with closed apex:
 1. Special Considerations
 - a) Endodontic treatment required
 - b) Healthy PDL will regenerate bone, but can become ankylosed or have root resorption if PDL damaged.
 - c) Donor tooth risk factors: Prior endo, Prior restorations, Caries, Periodontitis, Multiple/Divergent roots.
 - d) Recipient ridge should not be edentulous for over 2.5 years.
 - e) Can consider orthodontics pre-surgically to widen the PDL for ease of extraction, and stimulate PDL to reduce risk for ankylosis.
- III. Donor Tooth Types:
 - A. Premolars
 1. Donor Advantages: Easy to access surgically, often single rooted
 2. Donor order of preference:
 - a) Md 2nd PM
 - b) Md 1st PM (small lingual cusp best for replacing central incisors)
 - c) Mx 2nd PM
 - d) Mx 1st PM (often bifurcated and large facial root difficult to use for a central incisor)
 3. Recipient Locations:
 - a) Most commonly replace other premolars (especially in congenitally missing premolar situations)
 - b) Can replace central incisors (may rotate the PM 90 degrees to get CEJ width similar to a central for mature transplants with full coverage restoration, not advised for immature transplants requiring minimal preparation)
 - c) Can replace molars (may rotate 90 deg for mature transplants with full coverage restoration)
 - d) Edentulous ridge (may regenerate bone in Cleft Alveolus situations)
 - B. Molars
 1. Donor Disadvantages: Difficult to access surgically, can have complex root formation
 2. Recipient Locations:
 - a) Most commonly other molars
 - b) Can replace incisors if small enough
 - C. Canines/Other
 1. Canines primarily surgically uprighted and less often used to replace other teeth.
 2. Can consider using supernumerary teeth as transplants as well
- IV. Treatment Planning:
 - A. Refer early: Parents may be overwhelmed by the urgency of treatment and may not pursue it.
 - B. Communicate ahead of time: Collaborate with other team members before patient meets next team member.
 - C. Coordinate with the Orthodontist: Choose a tooth on contralateral side or opposing arch, or a tooth orthodontist can work with; May start orthodontic movement of transplant as soon as 4-6 weeks after surgery.
 - D. Coordinate with the Restorative Dentist: Endodontic treatment on mature transplants 2 weeks after transplantation; May choose a tooth rotation that matches the CEJ of contralateral tooth; Don't prepare into dentin on immature teeth which risks causing pulp necrosis and are difficult to treat endodontically because of obliterated pulp.
- V. Summary of Advantages
 - A. Great solution for growing patients
 - B. Reduces need or length of time of implant use in the future
 - C. Maintains excellent bone and soft tissues
 - D. Can assist in regenerating bone in areas very difficult to graft