

The two-phase transplantation concept for rehabilitation of jaw growth after traumatic tooth loss in childhood and adolescence

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Introduction:

The clinical management of traumatic tooth loss in infant and adolescent denture poses a particular challenge for the surgical treatment due to the resulting local bone and soft tissue deficit. The "two-phase transplantation concept" (TPTX) has been developed to account for adequate recovery of aesthetics and function by reliably maintaining the growth of the youthful jaw up to early adulthood.

Material and Method:

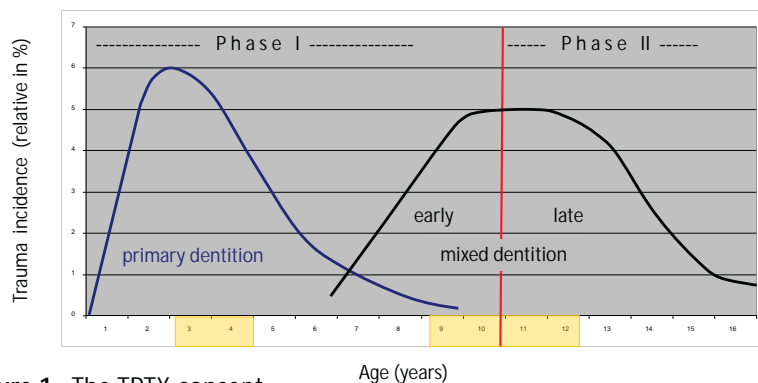


Figure 1. The TPTX-concept.

In the primary and early mixed dentitions (age 4 to 10) the not yet exfoliated primary canines are used as tooth substitutes for the upper lost permanent incisor (phase I). Exfoliation of the transplanted primary canines occurs either spontaneously or due to the growth of the adjacent erupting teeth. In phase II (> 10 years of age), premolar transplantation can be applied for long-term rehabilitation of the adolescent jaw.

Results:

Autogenous transplantation (auto-TX) of primary canines reliably stimulates the growth of local bone in the anterior upper jaw¹ (Fig. 2).

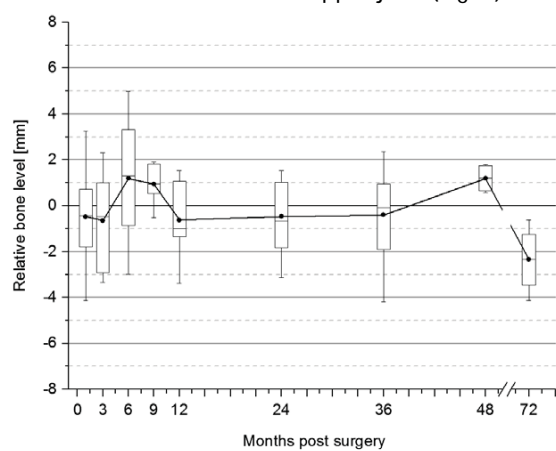


Figure 2. Bone level around transplants compared to adjacent teeth.

The horizontal course of line indicates the adequate co-development of bone around the transplants. Mean 5-year survival rate for primary canines auto-TX assessed by Kaplan-Meier estimator was 87% (n=14)¹. The transplants' whereabouts are given in figure 3.

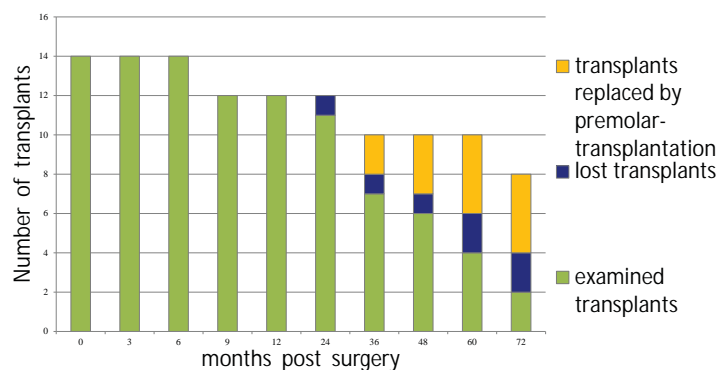


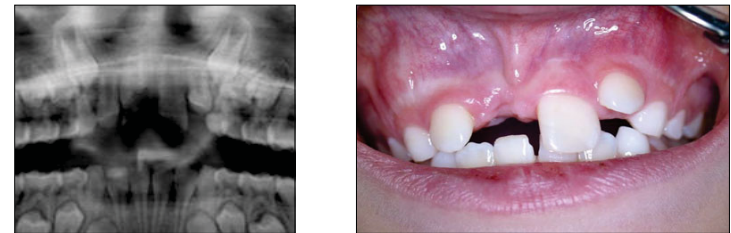
Figure 3. Transplants' whereabouts.

The survival rate of premolar auto-TX is reported in the literature to be over 90% after 33 years² which is supported by our own data (mean 3-year survival rate: 100%, n=24). Patient satisfaction, assessed by a questionnaire, resulted in excellent school grades for both primary canine (1.5) and premolar autotransplantation (1.7), respectively³.

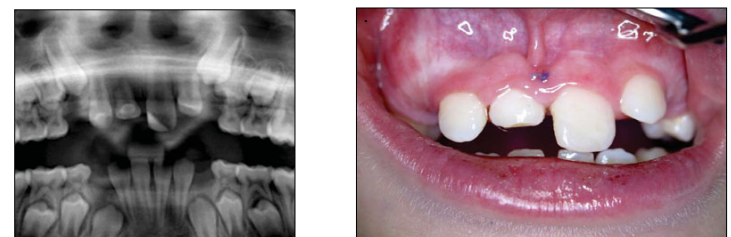
References:

1. Tschammler C, Angermair J, Heiligensetzer M, Linsenmann R, Huth KC, Nolte D. Primary canine auto-transplantation: a new surgical technique. Oral Surg Oral Med Oral Pathol Oral Radiol (2014, in press).
2. Andreasen JO, Paulsen HU, Yu Z, Ahlquist R, Bayer T, Schwartz O. A long-term study of 370 autotransplanted premolars. Parts I-IV. Eur J Orthod 1990;12:3-50.
3. Nolte D, Tschammler C, Henzler M, Angermair J. Two-phase transplantation concept (TPTX) - A biological approach for rapid rehabilitation of young children after dental trauma. J Oral Maxillofac Surg (2014, submitted).

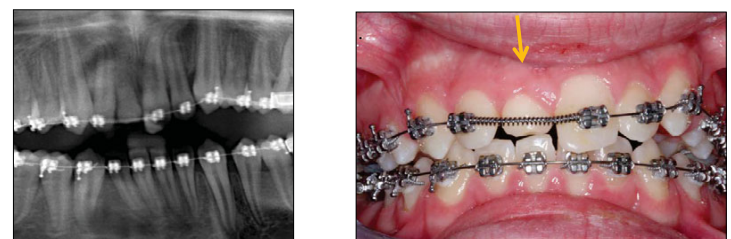
Phase I (early mixed dentition)



A. Post-traumatic situation with avulsed tooth 11



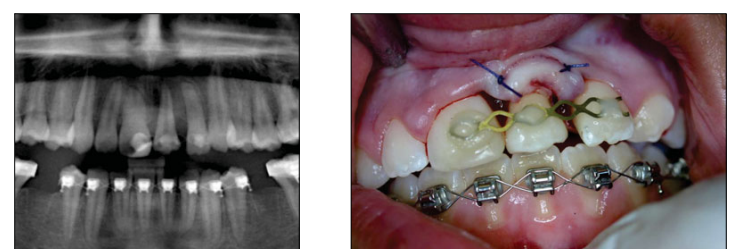
B. Post-OP situation after auto-TX 63 -> 11



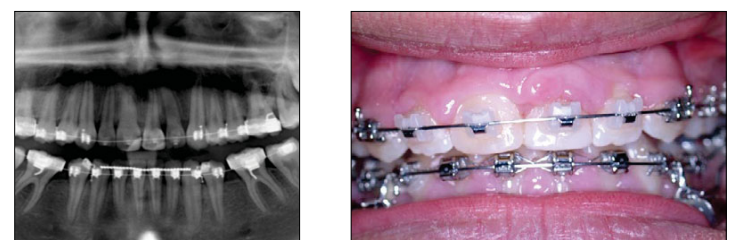
C. Situation 4 1/2 years after auto-TX 63 -> 11

Figure 4. Clinical case of primary canine auto-TX in a 9-year-old boy after avulsion of tooth 11. Note the overshooting soft tissue growth (C., →) compared to adjacent tooth 21.

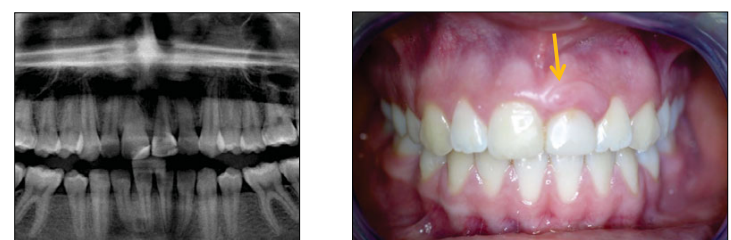
Phase II (late mixed dentition)



A. Post-OP situation after auto-TX 35 -> 021



B. Clinical findings 2 1/2 years after auto-TX 35 -> 021



C. Clinical findings 4 1/2 years after auto-TX 35 -> 021

Figure 5. Clinical case of premolar auto-TX in a 12-year-old girl after avulsion of 21. Note the excellent formation of bone and soft tissue around the transplant which is still visible 4 1/2 years later (C., →).