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內文：

Abstract:

1. Evaluate the outcome of autotransplantation or replantation of cryopreserved teeth clinically and radiographically
2. The limited indications of this procedure represent a major disadvantage—both a healthy donor tooth and a healthy recipient site must be available simultaneously
- 3..We have been conducting laboratory and clinical investigations on the cryopreservation of donor teeth to expand the indications for tooth autotransplantation

Materials and methods

a. Patients

1. Seven patients (three men and four women) in whom cryopreserved teeth with complete root formation were autotransplanted
2. The age of patients at the time of tooth cryopreservation ranged from 16 to 44 years with a mean age 30.67 years

b. Cryopreservation

1. Donor teeth were carefully extracted, and the condition of the periodontal ligament was recorded after removal.
2. Donor teeth were immersed in autogenous plasma containing 5% dimethylsulfoxide (DMSO) and 6% hydroxyethyl starch (HES) in cryotubes for 5–10 min at 4°C.
3. The cryotubes were slowly frozen at a rate of -1°C/min from room temperature to the freezing point(-7°C), followed by limited super cooling (-40°C) for 5 min to eliminate latent heat in a programmed freezer
4. The cryotubes were then cooled at a rate of -0.5°C /min to -80°C and transferred to a freezer maintained at -152°C

c. Transplantation procedures

1. Mucoperiosteal flaps at the recipient site were made after local anesthesia
2. The recipient socket was prepared with a bone trephine bar and surgical round bar before thawing the cryopreserved donor tooth
3. The donor tooth in the cryotube was thawed in a warm water bath at 37°C, and the tooth was rinsed with physiological saline
4. All transplanted teeth were stabilized with orthodontic wire and resin or silk sutures. The sutures were removed after 7 days, and the wire splint was removed 3 weeks postoperatively

d. Endodontic treatment

1. Debridement of the root canal system
2. Interim root canal filling with calcium hydroxide(3 weeks after the operation)
3. Replacement of the calcium hydroxide filling with thermoplasticized gutta-percha

- (2-week to 3-month intervals)
- e. Postoperative examination and evaluation of prognosis
1. The patients were evaluated by clinical and radiographic examination after 1, 2, and 3 weeks and at 2,3, and 4 to 5, 6, 9, and 12 months
 2. All cryopreserved transplants were evaluated clinically and radiographically
 3. The cases were classified into two groups
 - (1) good cases:
Exhibited periodontal regeneration clinically and radiographically
 - (2) bad cases:
presented abnormal findings (i.e., failure of initial healing, root resorption, periodontal inflammation, and delay in bone regeneration)
 3. Root resorption:
 - (1) inflammatory resorption→Periradicular radiolucency
 - (2) replacement resorption→ Lack of clinical mobility, high percussion sound, and radiographic confirmation of the disappearance of the periodontal space

Results

Case	Age (years)	Sex	Donor teeth	Duration of cryopreservation (months)	Recipient sites	Postoperative course	Observation period (months)
1	24	M	44	24	47	Good	88
2	16	M	33	8	33	Good	13
3	44	F	48	4	47	Good	13
4	21	F	38	5	37	Replacement root resorption	25
5	44	M	18	5	17	Replacement root resorption	12
6	35	F	34	36	11	Replacement root resorption	45
7	35	F	44	36	12	Replacement root resorption	45

1. The mean duration of cryopreservation was 13.7 months, ranging from 4 to 36 months
2. All cryopreserved third molars were transplanted to the position of second or first molar, while 3 first premolars were transplanted to the position of incisor or second molar
3. A cryopreserved canine removed during fracture of the mandible was transplanted to the same position after healing of the jaw fracture

Discussion

1. The indication of tooth transplantation can be expanded by cryopreservation of donor teeth, which allows storage of donor teeth for extended periods of time
2. Teeth extracted for orthodontic reasons or impacted third molars are excellent candidates for cryopreservation and future transplantation

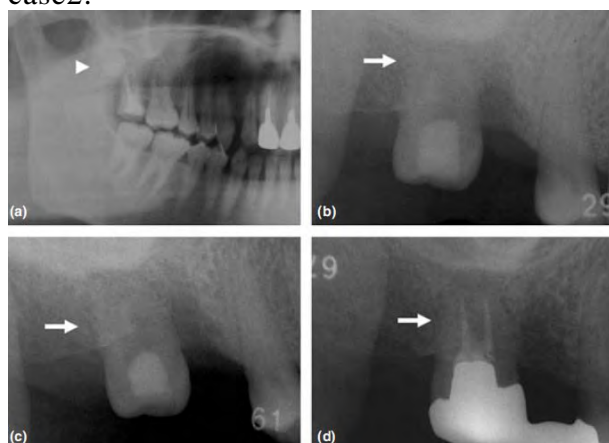
Case1:



a 24-year-old man whose lower right first premolar was extracted for orthodontic treatment, cryopreserved for 24 months, and then autotransplanted to the position of the lower right second molar, which was congenitally missing .Periapical radiographs taken at: (a) 3 weeks; (b) 6 months; (c) 16 months; (d) 24 months after autotransplantation. The continuous periodontal space and lamina dura can be observed at 16

months. No root resorption was observed up to 24 months

case2:



Replacement root resorption seen after cryopreserved tooth autotransplantation: a 44-year-old man whose upper right first and second molars were removed due to tooth fracture. At the same time, the third molar (arrowhead) was removed, cryopreserved for 5 months, and then transplanted to the position of the lost upper right second molar. (a) Preoperative panoramic radiograph (arrowhead; donor tooth). Periapical radiographs taken at: (b) 3 weeks; (c) 2 months; (d) 12 months after autotransplantation. The continuous periodontal space and lamina dura were not observed up to 12 months

3. Replacement root resorption occur after transplantation when
 - (1) Lack of cementum or loss of precementum and cementoblasts resulting from root surface injury
 - (2) Drying of the root surface
4. Ice injury is the most serious problem that tissue faced during cryopreservation; slow and controlled-rate freezing can reduces the ice injury
5. The delay in periodontal regeneration may be influenced by the procedure of cryopreservation and thawing including the equilibration of cryoprotectants as well as the storage duration
6. Further experimental studies exploring the procedures for cryopreservation and thawing to promote periodontal regeneration and the limitations of long-term storage are required
7. Further studies are needed to promote the regeneration of the periodontium after cryopreserved tooth autotransplantation.

題號	.
1	以下列何種方式來保護已脫落的牙齒，將其送至醫院或診所再植入後，將會有比較好的結果？ (A) 用乾燥的手巾 (B) 置入寶特瓶中 (C) 置入口中 (D) 用乾淨的手握住
答案(C)	出處：Contemporary Oral and Maxillofacial Surgery P.483
題號	題目
2	有關牙體再植術何者正確？ (A) 牙根尖已成熟的牙齒完成再植術後應在兩周後開始進行根管治療 (B) 開放性根尖孔的牙齒應在術後兩周之內進行根管治療 (C) 牙根尖已成熟的牙齒,可在手術時順便完成根管治療 (D) 開放性根尖孔的牙齒大都沒有機會可以產生血管再形成

答案(A)	出處：當代口腔顎面外科學 p.654
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