TOOTH TRANSFORMER

PROTEINE DEL DENTE IN COMUNE CON L'OSSO	
Osteopontin **OPN**	Deputata al mantenimento della omeostasi delle ossa. Si lega all'idrossiapatite e fornisce la struttura di base (matrice) per l'osso.
Bone sialoprotein **BSP**	Stimola l'angiogenesi. La quantità di BSP nell'osso e nella dentina è uguale.
Osteocalcin	Stimola l'attività endocrina ed è indicatore dell'attività ossea.
Dentin sialopretein **DSP**	Stimola l'angiogenesi. La quantità di DSP nell'osso e nella dentina è uguale.
Dentin matrix protein-1 **DMP-1**	Stimola la formazione del tessuto mineralizzato.
Type 1 collagen	È fondamentale per la rigenerazione ossea. Collega le parti minerali e funge da matrice organica dell'osso.
Cbfa1 **RUNx2**	È essenziale per la differenziazione degli osteoblasti e per la morfogenesi scheletrica.
Insulin-like growth factor IGF-II e IGF-I	Fattori di crescita che stimolano la sintesi della matrice ossea inducendo un aumento della proliferazione cellulare della linea osteogenitrice.
Bone morphogenetic protein **BMP-2**	È una proteina morfogenetica dell'osso che induce la formazione di osso e di cartilagine.
Transforming growth factor **TGF-b** 19	Fattore di crescita che favorisce la formazione ossea aumentando il numero delle cellule staminali.

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A New Method for Alveolar Bone Repair Using Extracted Teeth for the Graft Material

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Background: In the clinical field of jawbone formation, the use of autogenous bone as the graft material is the gold standard. However, there are some problems with this technique, such as risk of infection on the donor side, the limited amount of available bone mass, and marked resorption of the grafted bone. We investigated the potential for using teeth as a bone graft material for jawbone formation because the dental pulp contains stem cells, including undifferentiated neural crest–derived cells.

Methods: Alveolar bone defects were created in Wistar rats, and the defects were filled with either tooth or iliac bone graft material, or left as controls. The potential for using teeth as a bone graft material for jawbone formation was measured using real-time polymerase chain reaction, microcomputed tomography, and histologic analysis.

Results: Polymerase chain reaction revealed that the expressions of P75, P0, nestin, and musashi-1 were significantly higher in teeth than in mandibular bone and iliac bone grafts. Hematoxylin and eosin staining and microcomputed tomography showed that at 8 weeks, tooth graft material produced a similar amount of new bone compared to iliac bone graft material. Osteopontin was expressed in both the tooth and iliac bone graft material at 6 and 8 weeks after surgery. Dentin sialoprotein was expressed in the tooth graft material in the new bone at 6 weeks only.

Conclusion: These results indicate that teeth may be an alternative material to autogenous bone for treating alveolar bone defects by grafting. *J Periodontol 2010;81:1264-1272.*

KEY WORDS

Bone regeneration; bone substitute; grafts, bone; neural crest; tooth.

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In the field of clinical dental bone formation, various bone graft materials are used. These include allografts (e.g., demineralized freeze-dried bone allografts and freeze-dried bone allografts); xenografts, (e.g., bovine bone and coral); and alloplasts, (e.g., ceramics for biologic use, β-tricalcium phosphate [β-TCP] and hydroxyapatite). Three properties are required for an ideal bone graft material: 1) osteoconduction, which provides scaffolds for bone regeneration;[1] 2) osteoinduction, which promotes the recruitment of bone-forming cells, such as undifferentiated cells and preosteoblasts, and formation of bone from these cells;[1,2] and 3) osteoproliferation, the induction of cells contained in the graft material to promote bone regeneration.[3] Allografts lack osteoproliferation, and xenografts and alloplasts only show osteoconduction. Because only autogenous bone exhibits all three properties, autogenous bone grafting is currently considered the best method.[4] The iliac bone is a frequently used autogenous bone and it is grafted into alveolar bone defects in most cases of cleft palate.[5] However, there are problems with autogenous bone grafting, such as risk of infection at the donor side, limited amount of available bone mass, and marked resorption of the grafted bone.[6,7]

Developmentally, most bones of the trunk and extremities, including the iliac bone, are formed by endochondral

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