MEDWIN PUBLISHERS
Committed to create value for Researchers

Open Access Journal of Dental Sciences
ISSN: 2573-8771

Could the Freshly Extracted Teeth be a New Alternative for Autogenous Bone Grafts in Dento-Alveolar Bone Defects?

Ahmad Al Nashar*

Department of Oral and Maxillofacial Surgery, Al-Andalus University for Medical Sciences, Syrian Arab Republic

***Corresponding author:** Ahmad A, Department of Oral and Maxillofacial Surgery, Al-Andalus University for Medical Sciences, Syrian Arab Republic, E-mail: dr.ahmad.alnashar@hotmail.com

Editorial

Volume 2 Issue 1

Received Date: December 16, 2016

Published Date: January 02, 2017

DOI: 10.23880/oajds-16000119

Editorial

Dento-alveolar bony defects pose a significant problem when dental implants are planned. Dental implant placement in the atrophic alveolar ridge is often limited by the lack of alveolar bone height and width. Reconstructive alternatives for dento-alveolar bone defects are a prerequisite to enhance the success of dental implants functionally and aesthetically. Various graft materials have been developed especially for implant procedures. According to bone-healing mechanisms, they can be categorized into materials that induce osteogenesis, osteoinduction, and osteoconduction. Autogenous grafts which still considered the gold standard are capable of osteogenesis, osteoinduction, and osteoconduction. However, the use of autogenous tissue involves the need of harvesting it from a donor site, with the consequent drawbacks in terms of costs, procedure time, patient discomfort and possible complications. Ideally, the graft material is required to have the ability to facilitate osteogenesis, stability when implanted with the graft, low risk of infection, ready availability, low antigenicity, and a high-level of reliability [1].

It is well known that alveolar bone, as well as dental tissues, including enamel, dentin, cementum, pulp, and periodontal ligament, are derived from the neural crest cells. Recently, studies have been done using fresh tooth in the form of demineralized dentin matrix DDM as a biocompatible autogenous bone graft [2,3]. Previous studies showed that autogenous DDM possessed osteoinductive and osteoconductive properties similar to the one present in bone. These studies proved that BMP2 included in enamel has the capacity for osteoinduction, which is important in bone formation.Enamel has growth factors such as insulin-like growth factor (IGF) II, BMP2, and transforming growth factor (TGF) beta like bone. Cement has TGF-beta, IGFI, and platelet-derived growth factor. Dentin also contains a variety of proteins as those of the bone. All of these growth factors and proteins play an important role in bone formation [4,5]. Kim, et al. [3] developed bone graft materials using human or animal teeth in the form of tooth-ash, which consisted of 55% inorganic and 45% organic substances. Among the inorganic substances, hydroxyapatite (HA) has the characteristics of combining and dissociating calcium and phosphate as those of bone. Organic substances include the bone morphogenetic protein (BMP) as well as type I collagen, which is the same as alveolar bone [6]. From the clinical aspects, tooth derived bone substitutes had achieved positive results. Kim, et al. [7] used demineralized autogenous tooth graft at the time of implant placement simultaneously with guided bone regenerated. Lee, et al. [8] conducted a study to compare the efficiency of autogenous tooth graft and other graft materials used in sinus bone graft surgeries, autogenous tooth graft showed a faster and superior quality bone formation.

Other studies tested the use of autogenous tooth bone graft after extraction for socket preservation and they reported good healing of extraction sockets [9,10]. The extracted teeth were cleaned, crushed, decalcified and disinfected to prepare DDM graft, which is cost and time-

consuming. Additionally, in this technique, the organic components are removed and the inorganic component hydroxyapatite remains as the main component. New trends towards the preparation of bacteria-free tooth-derived graft from freshly extracted teeth without demineralization have been made. In this way, the graft material would be ready to use in a short time. From mentioned above, tooth-derived graft has the potential to be used as a bone graft in spite of the differences in preparation processes. Further studies, including precise preparation methods and the clinical application should be performed to replace autogenous bone and other grafts, which have many limitations.

References

1. Kim SG, Kim WK, Park JC, Kim HJ (2002) A comparative study of osseointegration of Avana implants in a demineralized freeze-dried bone alone or with platelet-rich plasma. J Oral Maxillofac Surg 60(9): 1018-1025.

2. Murata M, Sato D, Hino J, Akazawa T, Tazaki J, et al. (2012) Acid-insoluble human dentin as carrier material for recombinant human BMP-2. J Biomed Mater Res A 100(3): 571-577.

3. Kim YK, Lee J, Um IW, Kim KW, Murata M, et al. (2013) Tooth-derived bone graft material. J Korean Assoc Oral Maxillofac Surg 39(3): 103-111.

4. Ike M, Urist MR (1998) Recycled dentin root matrix for a carrier of recombinant human bone morphogenetic protein. J Oral Implantol 24(3): 124-132.

5. Gao J, Symons AL, Bartold PM (1998) Expression of transforming growth factor-beta 1 (TGF-beta1) in the developing periodontium of rats. J Dent Res 77(9): 1708-1716.

6. Saygin NE, Tokiyasu Y, Giannobile WV, Somerman MJ (2000) Growth factors regulate expression of mineral associated genes incementoblasts. J Periodontol 71(10): 1591-1600.

7. Kim YK, Kim SG, Byeon JH, Lee HJ, Um IU, et al. (2010) Development of a novel bone grafting material using autogenous teeth. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 109(4): 496-503.

8. Lee JY, Kim YK, Su-Gwan K, Lim SC (2011) Histomorphometric study of sinus bone graft using various graft material. J Dental Rehabilitation and Applied Science 27(2): 141-147.

9. Gomes MF, Abreu PP, Morosolli ARC, Araújo MM, Goulart MGV (2006) Densitometric analysis of the autogenous demineralized dentin matrix on the dental socket wound healing process in humans. Braz Oral Res 20(4): 324-330.

10. Kim YK, Yun PY, Um IW, Lee HJ, Yi YJ, et al. (2014) Alveolar ridge preservation of an extraction socket using autogenous tooth bone graft material for implant site development: prospective case series. J Adv Prosthodont 6(6): 521-527.