

# Human demineralized dentin barrier membrane in socket preservation

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Demineralized dentin matrix (DDM) is well known osteoinductive bone substitutes, mostly consisting of type I collagen, widely used in implant dentistry. The authors were fabricated the demineralized dentin barrier (DDB) from the block type of autogenous DDM for overcome mechanical instability of collagen membrane, and reported firstly introduces a successful outcome in guided bone regeneration and dental implantation with the DDB as novel human-derived collagen membrane.

### **Technical Report & Case Presentation**

#### **#1. Preparation of DDB**



The extracted tooth was fabricated for the block type DDM, through demineralization, defatting, dehydration, and freeze-drying (European Patent No. 2462899). The DDM was sliced, in the occlusal–apical direction, into the a 300 to 800 µm thickness membrane as DDB.

Demineralized dentin barrier (DDB). Scanning electronic microscopy of DDB surface with exposed dentinal tubules

## **#2. Surgical procedure (application of DDB)**



Dental implants (diameter 3.8 mm, length 13 mm, Dio, Busan, Korea) were placed. DDM was applied for guided bone regeneration on left mandibular premolar. And then, the DDB covered up the graft. Because the authors confirmed stability of DDB with autogenous blood, no additional fixing method was applied.

The surgical site was re-opened for prosthetic procedure. The DDB was transformed into a homogeneous hard tissues surrounding implant.

## **#3. Radiological outcome**

The prosthetic loading was performed at 17 weeks after implantation. At 4 years 8 months after prosthetic loading, the buccal defect, which was filled with DDM coverin DDB, and crestal bone height were well maintained with sound cortico-cancellous bone on CBCT.



At immediately after implant placement with guided bone regeneration using DDB, there was a radiolucent defect that were filled with DDM and covered with DDB. At 4 years 8 months, the cortical bone around implant neck was fully repaired by well developed cortico-cancellous bone

#### **Discussion & Conclusion**

DDB was a collagen-based osteoinductive barrier fabricated from block-type human dentin, well known to have mechanical stability. Although primary closure was achieve in this case, DDB might have protected the grafted bone substitutes inside the DDB from infection like other collagen membranes. Further, DDB could be expected that the bone formation of the grafted bone can be achieved as fast as the function of the periosteum due to the rapid remodeling capacity of DDM with endogenous BMP from dentin. Although DDM has 3-6 µm micropores of enlarged dentinal tubule, 100-200 µm of additional macropores were created for promoting osteogenecity in the manufacturing process before fabrication of DDB. Further research should be needed to determine whether this additional macroporous necessary for DDB as a collagen membrane. In conclusion, a successful GBR could be achieve by covering DDB, which was fabricated from DDM, an osteoinductive bone substitutes. Therefore, DDB could be considered as a functional collagen membrane for implant dentistry