

Dentin xenografts to experimental bone defects in rabbit tibia are ankylosed and undergo osseous replacement.

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Abstract

PURPOSE:

After trauma and losses of teeth, bone augmentation with bone grafts or bone replacement material is sometimes required before implant treatment. The ideal bone replacement material has not yet been characterized. Dentin is known to undergo ankylosis and replacement resorption after replantation of teeth. Dentin has also been shown to contain bone morphogenic protein. These properties may possibly be used making dentin an alternative or supplement to bone grafting to defect areas prior to treatment with osseointegrated implants. The aim of this study was to investigate if dentin is ankylosed and replaced by newly formed bone when transplanted to bone defects.

MATERIALS AND METHODS:

Ten New Zealand rabbits were used for the experiment. The rabbits were subjected to surgical exposure and preparation of bone cavities in the tibia bilaterally. Dentin blocks from human premolars extracted for orthodontic reasons were used as grafts. Dentin blocks were inserted in the cavities penetrating into the marrow space in 16 tibias. Four tibias were prepared with the same cavities, but without being subjected to dentin grafting and served as controls. Five rabbits were sacrificed after 3 months and five rabbits after 6 months. Histological processing and evaluation were performed and tissue conditions evaluated. The area of ankylosis was estimated.

RESULTS:

All dentin blocks healed with ankylosis in contact with bone without inflammatory reactions. In the cortical regions of the tibia, fusion of bone with dentin was seen in 86% of the dentin surface after 3 months and 98% after 6 months. On the dentin blocks inserted into the marrow space, bone was formed on the dentin block on average covering 51% of the dentin after 3 months and covering 77% after 6 months. Resorption of the dentin was seen to a larger extent after 6 months with osseous replacement in the resorption cavities.

CONCLUSION:

Dentin xenografts have a potential to be incorporated in bone without inflammation and gradually resorbed and replaced by new bone.

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