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**Bone Regeneration in femur defects
in rabbits treated with an e-PTFE
and a VBR titanium membrane**

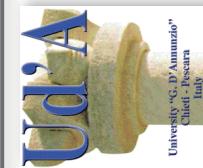
Authors

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01 Poster Bone Regeneration VBR



Bone regeneration in femur defects in rabbits treated with an e-PTFE and a VBR titanium membrane

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ABSTRACT

The aim of this work was an histological study of the bone healing of femoral defects in rabbits treated with an e-PTFE titanium reinforced membrane (W.L. Gore & Associates, Flagstaff, AZ, USA) and a new titanium membrane (VBR - Valve Bone Regeneration, Oralplant, Cordenons, Italy). Twelve New Zealand rabbits, weighing about 2.5 Kg were used in this study. One defect (6 mm x 6 mm) was created in each femur. Twelve defects were covered with e-PTFE membranes (control defects) and the other 12 defects were covered with the titanium membrane (test defects). The rabbits were killed after 8 weeks, with an intravenous injection of Tanax, and the block sections, containing the bone defects, were retrieved. A total of 24 defects were retrieved and the specimens were processed to obtain thin ground sections. All the defects of both groups were completely filled by mature, lamellar bone. Newly formed bone was in close, direct contact with both membranes and no gaps were present. Both membranes adhered closely to the bone defects. The e-PTFE membrane appeared to be compressed, in a few areas, by the overlying soft tissues. No multinucleated giant cells were present. No differences were found in the quantity of the bone regeneration using these two types of membranes, and both membranes have shown a high degree of biocompatibility, and did not induce any untoward effects.

INTRODUCTION

The need to insert dental implants with a guided prosthetic axis in patients with atrophy of the jawbones, has determined the use of numerous techniques of guided bone regeneration. The guided bone regeneration is based on the use of a membrane that, acting as a mechanical semi-waterproof barrier, excludes the connective and epithelial cells from the surgical repair site and, at the same time, favours the osteopromoting cells invasion.

The fundamental conditions to obtain the bone regeneration are:

- **highest contact surface between the surrounding bone and the blood clot**
- **highest blood clot stability (space making effect)**
- **minimal damage to the overlying soft tissues.**

In bone defects with low space making capability (open defects) the membrane, as well as creating a protective and semi-waterproof compartment for the blood clot keeps the space (space making effect) favoring the bone regeneration.

A total of 24 defects were processed to obtain thin ground sections. All the defects of both groups were completely filled by mature, lamellar bone. Newly formed bone was in close, direct contact with both membranes and no gaps were present. Both membranes adhered closely to the bone defects. The e-PTFE membrane appeared to be compressed, in a few areas, by the overlying soft tissues. No multinucleated giant cells were present. No differences were found in the quantity of the bone regeneration using these two types of membranes, and both membranes have shown a high degree of biocompatibility, and did not induce any untoward effects.

AIM

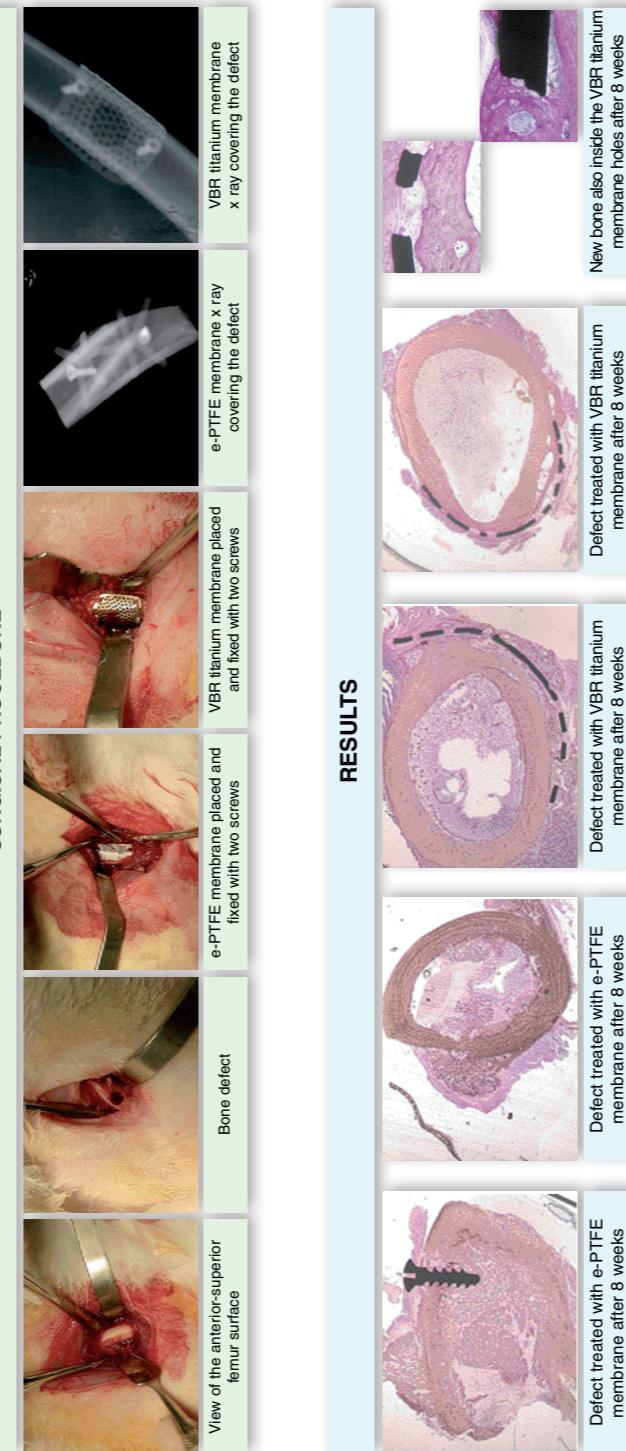
The aim of this work was: 1) an histological study of the bone healing of femoral defects in rabbits treated with an e-PTFE reinforced titanium membrane (W.L. Gore & Associates, Flagstaff, AZ, USA) and a new VBR titanium membrane (Valve Regeneration, Oralplant, Cordenons, Italy); 2) an evaluation of the space making capability of both membranes.

MATERIAL AND METHODS

Twelve New Zealand rabbits, weighing about 2,5 Kg, were used.

- One defect (6mm x 6mm) was created in each femur.
- Twelve defects were covered with e-PTFE membranes (control defects).
- Twelve defects were covered with VBR titanium membranes (test defects).
- The rabbits were killed after 8 weeks and the block sections, containing the bone defects, were retrieved.
- A total of 24 defects were retrieved and the specimens were processed to obtain thin ground sections.

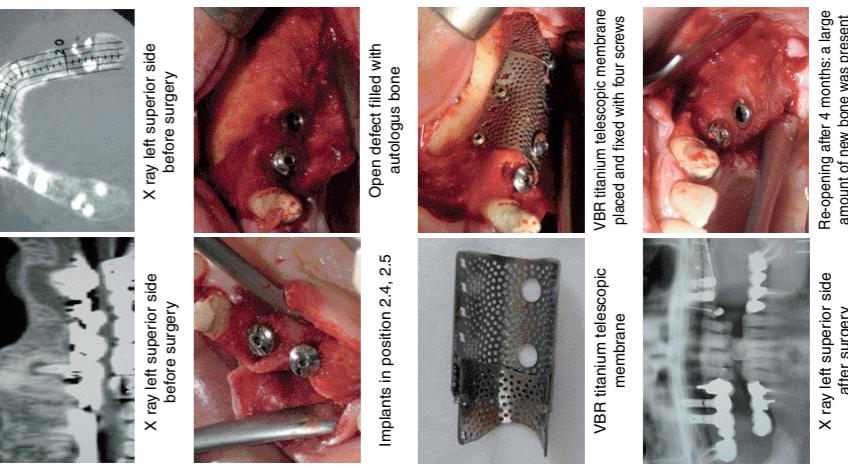
SURGICAL PROCEDURE



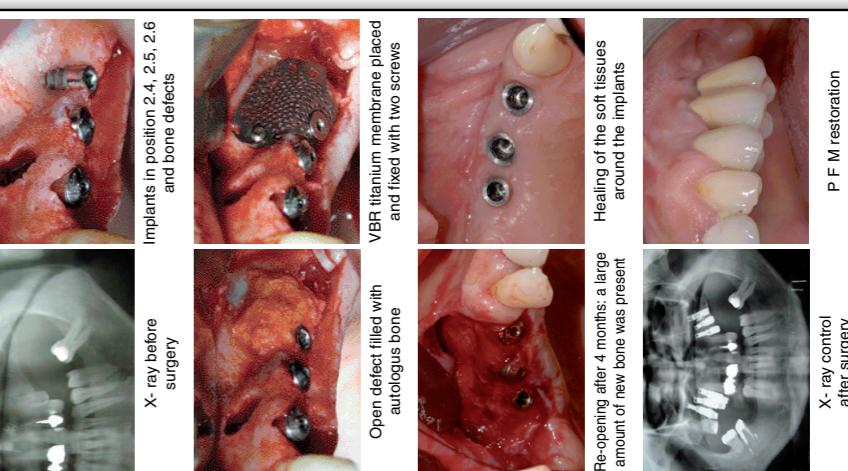
RESULTS



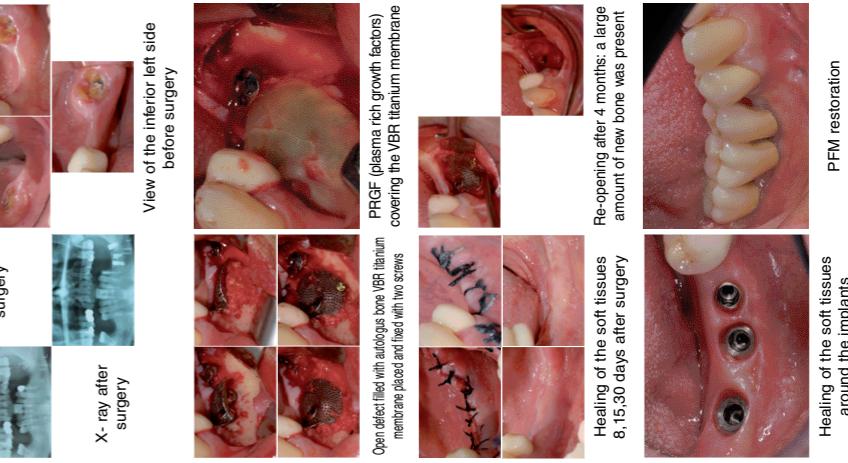
CLINICAL CASE 1



CLINICAL CASE 2



CLINICAL CASE 3



CONCLUSIONS

- All the defects of both groups were completely filled by mature, lamellar bone.
- No inflammatory cells infiltrate was present. No multi-nucleated giant cells were present.
- Newly formed bone was in close, direct contact with both membranes and no gaps were present. Both membranes adhered closely to the bone defects.
- The e-PTFE membrane appeared to be compressed, in a few areas, by the overlying soft tissues.
- The VBR membrane did not appear compressed in any areas.
- No differences were found in the quantity of the bone regeneration using these two types of membranes and both membranes have shown a high degree of biocompatibility, and did not induce any untoward effects.