

Evaluation of the Efficacy of Microporous Versus Macroporous PTFE Membranes for Guided Bone Regeneration (GSR) in An Elderly Experimental Model

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The clinical effectiveness of expanded polytetrafluoroethylene (e-PTFE) membranes for guided bone regeneration (GBR) has been reported in several occasions in the literature. However, one major drawback of this material is the need of a second surgical operation for removal of the membrane. Therefore, other modified forms of barrier membranes have been sought to obviate the necessity for retrieval surgery. In addition, most studies involving GBR in animal models utilize young animals or animals of unspecified age, but in some clinical situations GBR may be indicated in elderly jaw bones. The objective of this investigation is to evaluate the effectiveness of a newly introduced non-resorbable, high-density PTFE membrane (TefGen-FD) which does not require a second stage surgery for its removal, for enhancement of bone growth in elderly rabbit's calvaria, and to compare the findings with those obtained using the commonly used expanded PTFE membrane (Core-Tex).

Elderly rabbits over 30 months old served as the experimental animals in this study. Two non self-healing full-thickness defects were created in each rabbit; calvarium. One of the two defects was fully covered with macroporous e-PTFE membrane (Core-Tex). The other defect was covered with microporous PTFE membrane (TefGen-FD). Specimens were obtained at 4, 8 and 16 weeks and examined by light microscopy. Clinically, the microporous membrane was much easier to detach from the underlying bone as compared to the macroporous membrane which showed strict adherence to the underlying bone surface upon removal.

Microscopically, a relatively greater speed and quantity of bone regeneration was observed in the defective cavities covered with the macroporous membrane than those covered with the microporous one.

It appears that the use of macroporous expanded PTFE membrane for GBR in elderly bone is more effective than the microporous PTFE membrane. These findings have relevance for the clinical situation of using GBR in conjunction with implant placement and ridge augmentation procedures in the atrophic elderly jaws.