

Predictable guided bone regeneration



Markus B. Hürzeler, DMD, PhD

Clinical Associate Professor
University of Freiburg
Freiburg, Germany
Private Practice
Munich, Germany

A lot can be done to make guided bone regeneration more predictable. For one thing, getting blood vessels into the regenerated area is extremely important. For instance, augmentations done with block bone grafts are very difficult for blood vessels to grow into. It is easier biologically to use granules, into which the blood vessels can grow, and if granules contain interconnecting pores, that is even better. A pore diameter of about 200 microns appears to be optimal for fostering vascularization and the in-growth of osteoblasts.

The second most important fact from a biological standpoint is graft stability. If the augmentation materials are mobile during the maturation process, mineralization cannot occur.

A related question is whether implants can be placed simultaneously with the augmentation procedure. This depends on the defect size. It is always a question of whether the implant can be primarily stabilized in the defect. If not, implant placement must be delayed for four or five months. But otherwise, I prefer to offer simultaneous treatment because it is better for the patient to only have to undergo a single surgical procedure.

In my practice, our team has also looked for approaches that minimize the risk of membrane exposure. We have encountered fewer complications by using a combination of two different membranes: one on the exterior that integrates well with the tissue, so that the flap can easily attach to it; and a second membrane with a longer barrier function internal to the membrane described above.

Flap management is also very important. It starts as soon as a full-thickness flap is opened. Cutting into the soft tissue always produces bleeding. If this is done immediately before closing, the result will be more swelling later on. So the first step is to manage the soft tissue immediately after elevation: achieve mobility in the flap to cover the augmented area later. It is also important to use microsurgical instruments and appropriate suture material. Using very small suture material tells the surgeon if the flap design is correct. With 7-0 sutures, if the suture pulls the flap too much, it will tear. If that happens, flap management was inadequate.

Hopefully in the future, a manufacturer will introduce a membrane that combines the two functions that are needed: tissue integration on the outside and extended barrier function underneath. It would be better not to have to use two separate membranes in one surgical procedure. Beyond that, I also expect to see further advances in grafting material. These could include the incorporation of proteins on the surface of the graft material to enhance the osteoconduction, as well as increased osteoinductive capacities. This will help make the final results of guided bone regeneration better and more predictable.