OSTEOGENICS
CLINICAL EDUCATION

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Minimally Invasive Socket Reconstruction Using A High-Density Titanium-Reinforced PTFE Membrane

Fig 1

Fig 2

Fig 3

Fig 4

Fig 5

Fig 6

Fig 7

Fig 8

A flapless and minimally invasive approach to socket reconstruction, facilitated by the unique characteristics of titanium-reinforced dense PTFE membrane is illustrated in this case. The patient, a 50 year-old female, presented with a severe buccal wall defect secondary to a vertical root fracture (Fig 1). A chronic fistula was present, but was not actively draining at the time of surgery. The tooth was removed using an intrasulcular incision without reflecting the interdental papillae (Fig 2).

Upon curettage and exploration of the socket, the entire buccal wall was found to be missing. Granulation tissue, which was adherent to the facial flap, was removed with sharp dissection (Fig 3) and the socket was irrigated with sterile saline. Next, a subperiosteal pocket was developed on the facial and palatal aspect of the socket, extending 3 mm beyond the defect margins (Fig 4).

A combination of mineralized and demineralized allograft bone was mixed with approximately 25 mg of clindamycin and placed into the socket (Fig 5). A titanium-reinforced high-density PTFE membrane (Cytoplast® Ti-250 Anterior Narrow) was shaped to completely cover the facial defect and to cover the coronal aspect of the socket, overlapping the defect margins by 3 mm. The membrane was introduced into the facial pocket first (Fig 6) then under the palatal flap (Fig 7) and finally tucked under the interdental papillae, taking care to keep the margins of the membrane at least 1 mm from the roots of the adjacent teeth.The single titanium strut facilitates precise placement and stabilization of the device. Adaptation of the flap to the membrane surface was achieved with a single 3-0 PTFE suture (Cytoplast® PTFE Suture; CS0518) (Fig 8). Note that primary closure was not attempted in an effort to preserve the soft tissue architecture of the site.

Fig 9

Fig 10

Fig 11a

Fig 11b

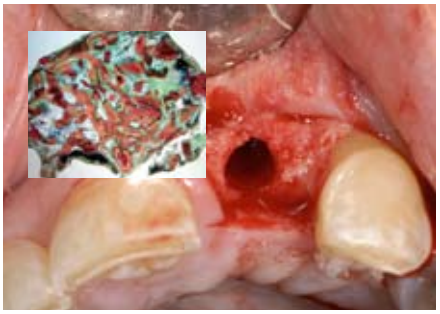

Fig 12

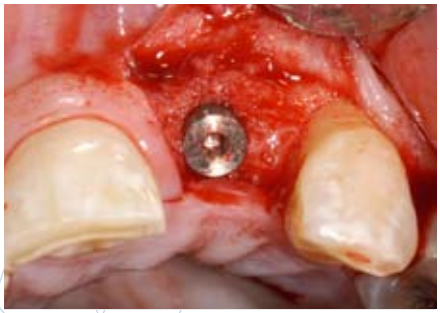

Fig 13

Fig 14

Fig 15

After 3 weeks of healing, the soft tissue around the exposed membrane exhibited no inflammation (Fig 9). After four weeks of healing, the membrane was removed non-surgically by simply removing it through the socket opening. At 6 months of healing, there was adequate ridge width for placement of a dental implant as well as maintenance of the soft tissue architecture (Figs 10 and 11a & b).

A biopsy taken at the time of implant placement revealed the presence of 80% vital bone (Fig12). (Histology by Michael Rohrer, DDS, MS.) Complete regeneration of the socket and facial bone contour was evident at the time of implant placement, six months following the grafting procedure (Fig 13).

The implant was exposed at 4 months and restored with a zirconium abutment and all-ceramic restoration (Fig 14). The post-treatment radiograph demonstrates total regeneration of the socket defect and maintenance of the interproximal height of bone (Fig 15).

Summary

There are several advantages of a titanium-reinforced dense PTFE membrane. In defects where an entire wall is missing, there is a tendency for loss of volume as the underlying graft material undergoes consolidation and replacement by vital bone. The addition of the titanium strut provides support to the overlying soft tissue preventing its collapse into the defect, resulting in increased bone volume. Additionally, in a minimally invasive technique such as the one illustrated, the presence of the strut allows the surgeon to precisely position the membrane under flaps with minimal dissection and flap reflection.

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