An in vitro and in vivo application of borate bioactive glass and chitosan composite for the delivery of teicoplanin to treat a severe case of methicillin-resistant *Staphylococcus aureus* (MRSA) induced osteomyelitis has been reported. In vitro, the discharge of teicoplanin from the composite pellets into PBS and its antibacterial activity were recorded. The composite implant loaded with 8 wt% teicoplanin exhibited good ability to treat a severe case of osteomyelitis in a rabbit through sustained release of the antibiotic. Furthermore, the composite implant was strong enough to be used as a load bearing implant. The presence of borate and its release from the composite implant did not cause any adverse reaction to the local or systemic tissues. In addition, the composite implant promoted the formation of HA-like material on its surface, thus stimulating the formation of new hard tissue (Zhang et al., 2010). The sustained release of antibiotic, ability to be used as a load bearing implant, and capability to promote formation of new bone are qualities which sum up the potential of the borate glass-chitosan composite as a bone regeneration material.

Treatment of full-thickness skin defects is of high importance these days and therefore has recently become the center of many research investigations. Wound dressing materials are in high demand to stimulate skin reconstruction and treatment of major skin flaws (Boulbitch et al., 2001). A study was recently carried out to compare the efficacy of microfibers of borate bioactive glass and microfibers of Bioglass for dermal reconstruction. The in vitro investigation studied the morphology of the fibers, as well as the resorption of the fibers and their bioactivity, whereas the in vivo full-thickness skin defect model developed for rats and the Microfil technique were used to investigate the reduction in wound size and angiogenic effects of borate glass and Bioglass microfibers. The cytocompatibility of the fibers was studied by recording the response of HUVECs to the microfibers. The thinner borate glass microfibers (1 μm) showed better bioactivity than the Bioglass microfibers. Ions released from the borate glass and Bioglass microfibers did not exhibit any toxicity toward the HUVECs. After the 9 days of in vivo application, the dressing of borate microfibers showed the substantial formation of new blood vessels and quicker reduction in the wound size when compared with the Bioglass microfibers (Zhou et al., 2016).

Images of the unfilled defects (control group) and the defects treated with Bioglass and borate glass microfibers for 0, 3, and 9 days are shown in Fig. 5.6. The images clearly show that the microfibers of borate bioactive glass significantly healed the defects better when compared to the control and the Bioglass. The better skin defect reconstruction of borate bioactive glass was attributed to the presence of boron in the microfibers leading to the enhanced bioactivity and angiogenesis.

Biomaterials are frequently used in clinical application to activate bone repair. A novel borosilicate glass was sintered into highly porous 3D scaffolds. The glass was prepared from a mixture of two melt-derived glasses combined through gel casting and foam replication techniques. The bioactivity of the scaffold was enhanced through nitridation. The highly interconnected