cross-linked fibrin fibers (Wolberg, 2007). Fibrin is formed by the action of the thrombin on fibrinogen (Jarvis et al., 2003). Platelets and surrounding wound tissue also promote new tissue regeneration by releasing pro-inflammatory cytokines and growth factors.

Inflammation is important to the removal of contaminating microorganisms and their toxins. In the absence of effective decontamination, a wound may pass into a chronic state and fail to heal (Martin, 1997; Koh and DiPietro, 2013). Macrophages participate in the biosynthesis of numerous growth factors, such as TGF-β, TGF-α, basic fibroblast growth factor (bFGF), vascular endothelial growth factor (VEGF), and insulin-like growth factor (IGF)-1, which promote cell proliferation and protein synthesis. These factors also stimulate cellular proliferation, angiogenesis, migration, and activation of fibroblast.

The proliferation starts around the first day after injury and continues for up to 1 month. This stage is characterized by angiogenesis and granulation tissue formation, reepithelialization, and extracellular matrix formation. Fibroblast cells are critical for the production producing the new extracellular matrix (Mickelson et al., 2016; Öztürk and Ermertcan, 2011). Angiogenesis plays a crucial role in normal wound healing and is stimulated by growth factors such as VEGF, bFGF, (TGF)-β, and hypoxia related growth factors such as hypoxia-inducible factor (HIF), resulting in increased vascular permeability, endothelial cell migration, and capillary formation (Singer and Clark, 1999).

Reepithelialization involves proliferation and migration of epidermal keratinocytes from the wound edges, differentiation of epithelial progenitor cells into a stratified epidermis, and the restoration of an intact basement membrane zone that connects the epidermis and the underlying dermis (Li et al., 2007). During the remodeling phase (maturation), the new tissue becomes stronger and more elastic with time. This phase involves the deposition of the matrix and its subsequent changes over time. Collagen fibers remodel by aligning with tension lines of the body and gain strength through cross-linking. The scar eventually becomes lesser, with approximately 80% of the original strength acquired at best (Öztürk and Ermertcan, 2011).

Bioactive glass has been extensively investigated for bone repair. There has been relatively less research on the application of bioactive glass to the repair of soft tissues. Soft tissues such as skin and muscle have bonded to bioactive glass (Hench and Paschall, 1973). Boron-containing bioactive glasses in vivo almost do not exhibit cytotoxicity and inflammation. Bioactive glass accelerates wound healing by adhesion cells and biomolecules on their surface and release of various ions into the wound. Fibrous glass scaffolds have gained increasing attention in wound healing because of their similarity to the structure of fibrin cloth, high porosity, surface area, rapid degradation, and conversion to HAP. The high surface area and porosity as well as special generation of the HAP layer favors adhesion of biomolecules and cells proliferation, migration, and differentiation. The release of trace elements from a bioactive glass, such as boron, silicone, calcium, zinc, magnesium, copper, manganese, and iron, may