

tissue engineering, as discussed in the following sections on blood vessel, bone, and muscle regeneration.

10.8.2 Wound/Injury Dressings

Usually, injury dressings (e.g., gauze) keep the injury dry by facilitating the fading of injury exudates and at the same time protecting the entry of pathogen into the injury; they act mostly as a barrier. Curing chronic and acute wound is an urgent need in a lot of facets of drugs, and alginate-based wound dressings put forward numerous beneficial features [102]. Current dressings (e.g., dressings by alginate) give wet injury surroundings and allow injury healing [103]. Alginate dressings are usually formed by ionic cross-linking of calcium ions with an alginate aqueous solution to make a gel, and then processing them to make freeze-dried spongy sheets (i.e., foam) and stringy nonwoven dressings. Alginate dressings soak up the injury fluid with the dry form to re-gel and to maintain a moist physiological microsurrounding and reduce microbial infection at the injured area; the gel afterward can provide water to a dry injury. These roles can also endorse granulated tissue development, fast epithelialization, and curing. A variety of alginate dressings like Sorbsan (UDL Laboratories), AlgiSite (Smith & Nephew), Algicell (Derma Sciences), Comfeel Plus (Coloplast), Tegagen (3M Healthcare), and Kaltostat (ConvaTec) are commercially offered. A diversity of extra functions of bioactive alginate-based wound dressings have also been studied to date. The constant discharge of a controller of human keratinocyte production, cyclic adenosine monophosphate dibutyryl, partly oxidized gels of alginate that triggers injury healing and leads to the end of re-epithelialization of injury in 10 days in a rat model [104]. Alginate gels secreting stromal factor-1 (cell-derived) were also helpful in triggering injury end rates and minimizing scar development in pigs by severe surgical injury [105]. Alginate dressings integrated with silver-improved antibacterial properties and enhanced the binding efficiency for proinflammatory cytokines (e.g., IL-8), matrix metalloproteases-2 (MMP-2), and elastase. The adding up of silver into dressings of alginate also improved the antioxidant ability [106]. The adding up of zinc ions into alginate fibers has also been anticipated for injury dressings because zinc ions might produce immunomodulatory and antibacterial effects, in addition to improved keratinocyte passage and improved stages of endogenous growth factors [107]. The mixture of chitosan, alginate, and fucoidan gels has been found to give wet healing surroundings in rats, with no difficulty of application and elimination [108].