Wound Healing Effect of Silk Fibroin/Alginate-blended sponge

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The natural materials such as silk fibroin and alginate have been proved to be invaluable materials in the field of biomedical engineering.This study was designed to compare the wound healing effect of silk fibroin (SF), alginate (AA) and fibroin/alginate-blend sponge (SF/AA) with clinically used Nu GauzeTM (CONT) in a rat full thickness wound model. Two full thickness wounds on the back of rat were covered with either of SF, AA, or SF/AA sponges.On the postoperative days of 3, 7, 10 and 14, the residual wound area was calculated using image analysis software.At the same time, skin wound tissues were biopsiedto measure the area of regenerated epithelium and collagen deposition as well as the number of proliferating cell nuclear antigen (PCNA)-immunoreactive cells. Half healing time (HT50) of SF/AA group was dramatically reduced as compared with those of SF and AA as well as CONT treatment.Furthermore, SF/AA treatment significant increased the size of re-epithelialization and collagen deposition, and the number of PCNA positive cells. These results suggest that the wound healing effect of SF/AA-blend sponge might be mediated by the increase of re-epithelialization, collagen deposition and cell proliferation.Based on these findings, SF/AA-blend sponge may be a promising treatment for full thickness wound of skin.