

Effects of Collagen Wound Dressing on Wound Healing in Rat Skin Wound

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ABSTRACT

Background: Collagen is a key component of a healing wound. Previously, collagens were thought to function only as a structural support; however, it is now evident that collagen and collagen-derived fragments control many cellular functions, including cell shape and differentiation, migration and synthesis of a number of proteins. Research has shown that some collagen-based dressings its ability to promote fibroblast migration and proliferation in vitro and to accelerate wound repair in the diabetic mouse.

Collagen is a vital structure in wound healing and is essential when cross-linked for wound tensile strength. The role of collagen involves stimulating fibroblast activity and improving the healing process. The most important functions of fibroblasts are synthesis and deposition of the extracellular matrix components. Fibrous connective tissue elements include collagen, elastin, and reticulin, while the nonfibrous portion includes basic substances that are primarily water, salts, and glycosaminoglycans. Collagenase and other proteolytic enzymes are produced during the inflammatory phase and throughout the proliferative phase as fibroplasia regulators. The goals of this phase of healing involve filling in the wound defect with new tissue and restoring skin integrity.

Objective : To verify the role of collagen wound dressing on fibroblast cell count and collagen density in rat skin wound.

Method: 30 male Rat of Wistar, 3-4 months old, weight 200-300gr will be used. 2 incisional wounds, sized 1cm at the back-torso will be made by surgical blade no.15 on each rat, with total 60 wounds. Every rat will be treated with collagen wound dressing at left sided wound and at the right sided is cared by salin soaked gauzed than closed by transparent dressing. In this design will be sacrificed each 10 rats, at day 3rd, 14th and 21st. All Wounds then will be excised and analized with Hemato-Eosin stained to count the macrophage per centimeter square. The amount of fibroblast and density of collagen per centimeter square on collagen wound dressing and transparent dressing than be compared statistically.

Results : Collagen density in treatment group is thicker than control group in 3rd days. But in 14th days, collagen density between treatment and control group is not significant. In 21st days, collagen density in treatment group is thicker than control group. Fibroblast amount in treatment group is fewer in 3rd days, but increasingly high until 14th days than control group. Then fibroblast amount decrease in 21st days either in treatment group and control group.

Conclusion : Collagen wound dressing application improves wound healing rate by increasing collagen synthesis and stimulate fibroblast production.

Keywords: Wound healing, Collagen wound dressing, fibroblast, collagen, transparent dressing.